Anticipating Instability

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Dedicate to Arlene Bueno de Mesquita and Susan Yun for their love and support

Preface

Anticipating Instability aspires to explain the very many destabilizing political events in history that did not happen. Although relatively few pay attention to what did not occur, the evidence shows that the fear of these non-events does more to redefine how people are governed than does the actual realization of coups and revolutions. In unraveling the 'dogs that didn't bark,' the theory we present compels us to analyze how, when, and why leaders who believe their hold on power is at risk focus their political survival efforts on making adjustments to their policy choices or on shifting their government's accountability. These changes are the essential factors behind whether a society becomes freer and more transparent or becomes more oppressive and corrupt. Since major changes in policy precipitate major changes in government institutions, the events that did not happen, as we demonstrate, provide an essential way to explain why governments sometimes become more democratic and other times choose to become more autocratic.

To understand the logic and the consequences of anticipated threats to political stability, including especially those that were never realized, we propose an expanded selectorate theory. It identifies the conditions under which the changes leaders make are expected to lean toward government that is better for the masses, better for an elite inner circle, or better for the national leadership. The expanded theory identifies what we believe is a surprisingly wide array of insights into how governments work, including explaining many government actions that are sometimes construed by others as irrational, inexplicable, or as evidence of leadership psychosis. The theory, for instance, exposes the conditions under which suppression through the use of such tactics as torture and extra-legal killing is an endogenous, often effective, carefully calculated strategic choice. It demonstrates that suppression is designed to salvage incumbency in more autocratic polities when the government's leadership believes it is under threat even when no overt threat is visible (thereby making the horrendous government actions seem to outside observers to be irrational and

psychotic). Yet, the theory also demonstrates why such tactics as torture and extra-legal killing are much less frequently adopted in democratic societies; that is, those polities we refer to as governed by a leadership that is beholden to a large coalition of essential supporters. Indeed, the theory explains much of the variation across governments and time in the use of torture and extra-legal killing using data that cover the years from 1960 to the present and it does so without assessing the psychological condition of any country's leadership. Likewise, it explains much of the variation in government corruption, in the provision or withholding of freedoms, and in the provision of 'public goods' such as government policies that improve life for broad swaths of society. It explains the conditions under which a leader benefits from sustaining or imposing a poverty trap on her population and the conditions under which economic success is a boon for the leader's prospects of remaining in power. The extended and expanded selectorate theory shows why coups and mass uprisings almost never occur in countries with highly autocratic or highly democratic governments but are more frequent risks in intermediate sized coalition regimes. It identifies circumstances that make societies essentially immune from successful government deposition through coups d'état or revolution and, of course, the circumstances that do not assure such immunity.

The theory behind the investigation of suppression, policy change, and institution change starts from a simple premise. Such destabilizing events as coups d'état and revolutions are anomalies. By this we mean that if these sorts of disruptions have systematic causes that make them predictable then incumbents can and do predict them. If incumbents anticipate events that, if successful, will inflict terrible consequences on them, then regardless of whether their expectations are correct or incorrect, they implement counter-measures designed to offset the feared, anticipated threat. Thus, the belief that a threat is on the horizon is sufficient to prompt important political change that may look to an outsider as if it had no predicate. That means that to anticipate change one must first work out what signals leaders look for that alert them to nascent threats and then one must explore what the optimal responses are by leaders, inner-circle elites, and ordinary members of the mass of society to the fear of dangers that have not yet been realized.

As the evidence shows, the counter-measures that leaders undertake succeed frequently in preventing overt efforts to topple the government either by crushing the perceived threat or by buying-off its would-be perpetrators. The content of buy-offs depends on the source of the most credible threat and the credibility of nascent threats depends on the signals, such as those we identify, that help leaders to work out what they need to do if they

are to survive. They might, for instance, reward would-be revolutionaries with expanded freedoms and effective public policies or they might reward cronies in the incumbent's inner circle with increased opportunities to enrich themselves through corruption and rent-seeking. Conversely, if the perceived threat is crushed then we can anticipate that would-be revolutionaries succumb to increased dictatorship and suppression while those thought to be coup plotters find themselves purged from their proximity to power, losing their privileges and maybe even their lives.

None of these outcomes are particularly surprising to see when an uprising or coup has been attempted and failed but here the focus is primarily on beliefs about the threats of coups and revolutions when neither form of instability occurs. We devise theoretically grounded, readily estimated means to detect when leaders are expected to believe that they are at risk even in the absence of any actions against their government and, conversely, when they are expected to believe that their hold on power is secure. We then take the variables and hypotheses derived from the theory to the data to discover how well the expanded selectorate theory does at explaining changes in governance even when the status quo has not faced any overt challenge.

The expanded selectorate theory gives us reason to be hopeful that the political world is less complex and unpredictable than is often believed. While politics may be complex and noisy, the theory presented here offers a logically straightforward explanation of a wide array of political phenomena based on key interactions among subsets of just five main variables: (1) the size of a government's winning coalition; (2) the size of its real selectorate; (3) the length of time its incumbent has been in office; (4) the cost of producing public goods; and (5) the prospects that its incumbent will die soon from old age or severe illness. These variables collectively generate theoretically-derived, dynamic expectations of just how many and what mix of benefits is required to sustain the loyalty of the incumbent's inner circle and at least the passivity of the rest of society. If fewer than the expected amount of public goods, freedoms, or corruption opportunities are provided, then threats to the regime's stability should be anticipated. If more than the expected amount of freedom is granted, especially in smaller coalition settings, then stability is at risk. If more than the expected quantity of private goods (corruption opportunities) are provided and the over-provision is not declining over time, then instability in the form of coups and purges is likely to be in the offing. Each of these contentions is formally derived within the coalition loyalty game or the institution change global game we introduce and each is tested (and supported) empirically.

Formal modeling is used to demonstrate that the few key variables imply dozens of hypotheses, some found in other theories and many that we believe are unique to selectorate theory. Whether a hypothesis is unique or is a component of some other theory, all of the hypotheses follow directly from and are integral to the extended selectorate logic. These hypotheses relate to detailed expectations about policy change, institution change, leadership survival or deposition, reasons for democratization and reasons for autocratization, variation in economic performance, modernization, poverty traps, and more. Empirical tests show that a wide body of data across nearly every country in the world demonstrates strong consistency with even some of the most subtle and nuanced predictions. Illustrative case studies further contribute to the verisimilitude of the hypotheses and their implications for predicting political change – or stasis – even when no overt challenges to a government's survival are observed.

Building on the original statement of selectorate theory that was developed in collaboration with our colleagues, James D. Morrow and Randolph M. Siverson, starting in the early 1990s, the new, expanded version set out here introduces several modifications that facilitate the identification of new general factors behind variations in governance. The theory, for instance, exposes a detailed view of how varying longevity in office alters policy choices. We refer to this phenomenon as a leadership life-cycle. The theory reveals that more experienced rulers are expected to produce fewer public goods, fewer overall benefits for the members of their winning coalition, and a higher proportion of private goods in the coalition's mix of benefits than is true for a leader who is newer in office. Despite the reduced benefits that experienced leader provide, they are less likely to be threatened by ouster through such irregular means as coups d'état or mass uprisings.

The life-cycle effects provide an explanation for why journalists so frequently and mistakenly indicate that new leaders in autocracies are likely to be reformers, much as was said, for instance, of Syria's Bashar al Assad, Myanmar's Aung San Suu Kyi, or Rwanda's Paul Kagame when each first rose to power. The life-cycle also establishes why a change to a new leader tends to yield an increase in economic growth and why that improved growth rate is not sustained as the new incumbent becomes more experienced. Yet, as the theory also elucidates, the higher growth rate is renewed when an experienced ruler is believed to be nearing death whether due to extreme old age or to a chronic illness but it is not renewed if the incumbent suddenly nears death due to an acute illness. The apparent random chance of having a chronic illness rather than an acute illness is seen to materially alter growth rates according to the extended selectorate logic and according to the data.

Anticipating Instability also exploits the interaction between the size of a government's winning coalition and the price it pays for public goods (or, approximately, its level of human capital or labor productivity) to identify why some democratic states are more vulnerable to bouts of instability than others. As well, the interaction of coalition size and the cost of public goods uncovers why it is in the interest of many non-democratic rulers to entrench their society in a poverty trap and when, instead, the solution to perceived political danger is to democratize the government, making the leadership accountable to more of its subjects. The expanded selectorate theory and improved measurement procedures combine to offer a more general account of political change and leadership replacement or survival. The coalition loyalty game offers the potential for reliable, real-time, ex ante predictions (or prescriptions) for policy changes while the institution change global game offers similar insights into modifications in government institutions in any setting. All of the empirical results translate theoretical insights into anticipatory, early-warning indicators.

Despite the breadth of coverage that the extended selectorate theory provides, it remains true that much still remains to be explored. We believe that is especially the case when one moves from thinking of coalition members as individuals, each with her or his own interests, to a world in which winning coalitions are made up of blocs or groups whose members have highly correlated interests and coordinated actions (Smith and Bueno de Mesquita, 2019). In such a world, it is necessary to move beyond a theory about public goods, private goods, and freedoms to a theory that also includes club goods; that is, benefits to groups within the winning coalition. Likewise, we believe that the explanatory power would be improved by working out the complex theoretical interactions between selectorate logic and insights from psychology and sociology. Although important beginnings have been made in some of these directions, we believe these additional questions are currently too big, analytically challenging, and demanding for us to feel comfortable that their nuanced implications are ready to be uncovered and solved. Perhaps we, or others, will solve those puzzles in future work. For now we must content ourselves with the progress made to date and hope that our readers have as much enjoyment from reading *Anticipating Instability* as we did writing it.

Acknowledgements

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Contents

1 Preempting Trouble **1**

1.1 The Danger of Not Paying Attention 2
1.2 Who Wants What? 4
1.3 The Problem 8
1.4 Sources of Instability 10
1.5 Modes of Analysis 14
1.6 Assessing Events: The Choice of Corrective Steps 18
1.7 Early Warning Signs 21
1.8 The Book's Structure 25

2 Selectorate Theory I **27**

2.1 Selectorate Fundamentals 29
2.1.1 Real versus Nominal Selectorates 31
2.1.2 Affinity Among Coalition Members 34
2.1.3 What Leaders Do 38
2.1.4 The Incumbency Constraint 44
2.2 Induced Preferences over Institutions 48
2.2.1 Varying the Size of W and S Under Rawls's Veil of Ignorance 53
2.3 New Insights within the Basic Selectorate Theory 55
2.3.1 The Price of Public Goods and Modernization Theory 56
2.4 Summation 63

3 Selectorate Theory II **65**

3.1 Coalition Loyalty and the Political Life-cycle 66
3.1.1 Affinity Learning and Coalition Retention 69

3.1.2 Cost of rebellion and performance shocks . . . 72
3.1.3 Comments on Model Setup . . . 75
3.1.4 Analysis . . . 76
3.2 Adding Dynamics to the Coalition Loyalty Game . . . 82
3.2.1 Looking Ahead: Calculating Net Present Values . . . 83
3.2.2 The Political Life-Cycle: Coalition Dynamics in Action . . . 85
3.3 Who Wins or Loses Politically from Productivity? . . . 87
3.3.1 No Threat of Revolution . . . 87
3.3.2 A Credible Revolutionary Threat . . . 93
3.3.3 Remediation of revolutionary threats . . . 97
3.4 Leader and Coalition-Led Changes to Institutions . . . 98
3.4.1 Institution Change Game . . . 99
3.4.2 Analysis of the Global Game . . . 101
3.4.3 Key Features of Payoffs with a Credible Coup Threat . . . 104
3.4.4 Policy and Likelihood of Institution Change . . . 107
3.4.5 Coalition Loyalty and the Likelihood of Successful Institution Change 111
3.4.6 Coalition Retention During Institution Transitions . . . 113
3.4.7 Coup d'état via Three Mechanisms . . . 119
3.5 Summation . . . 121

4 Estimating Key Quantities 123
4.1 Summary of Hypotheses . . . 123
4.2 Perspective on the Tests . . . 126
4.3 Coalition and Selectorate Size . . . 127
4.3.1 Measuring Coalition Size . . . 128
4.3.2 How Coalition Size Has Evolved Over Time . . . 131
4.3.3 Measuring Selectorate Size . . . 135
4.3.4 How Selectorate Size has Evolved Over Time . . . 136
4.4 Measuring Productivity . . . 136
4.5 Measuring Public and Private Goods . . . 138
4.5.1 Why Not Other Measures? . . . 141
4.6 The Leader's Characteristics . . . 143
4.7 Data on the Occurrence of Political Events . . . 144
4.7.1 Mass-based political events . . . 145

4.7.2 Elite-based political events . . . 145
4.7.3 Leader-based political events . . . 146
4.8 Economic, Demographic, and Other Data . . . 148
4.9 Model Specification and Robustness . . . 148
4.10 Estimating Coalition Welfare: The Swoosh Curve . . . 149

5 Anticipating Threats and Risks 157
5.1 The First Business of Leaders: Everyday Survival . . . 158
5.2 Coalition Size, Productivity and Risks to Leaders . . . 162
5.3 Life-cycle Effects . . . 166
5.3.1 Beware of New Rulers Bearing Reforms . . . 167
5.3.2 Coalition Turnover and Leader Longevity in Office . . . 169
5.3.3 Life-Cycle Effects on the Risk of Coups and Revolutions . . . 172
5.4 Health Shocks . . . 173
5.5 Estimating Deviations from the Swoosh Curve . . . 177
5.5.1 The Risks of Ill-Health: The Fall of the Shah . . . 178
5.6 Deviations from Expected Policy Provisions and Threats . . . 181
5.6.1 How Policy Deviations Influence Instability . . . 184
5.7 A Tale of Three Coups . . . 189
5.7.1 Pre-empting Revolution: The Burma Coup of 1988 . . . 190
5.7.2 Coups Due to Underpayment: Portugal, 1974 . . . 192
5.7.3 The Over-Provision of Private Goods: Turkey's Coup in 2016 . . . 195
5.8 Summary . . . 198

6 Responding to Threats 201
6.1 Suppression: A Tool for Small Coalition Rulers . . . 203
6.1.1 Testing How Suppression is Used . . . 205
6.1.2 Torture in a Large (USA) and a Small Coalition (USSR) Polity . . . 209
6.2 Purges: Suppressing Threats Within the Coalition . . . 213
6.3 Change Policy to Overcome Threats . . . 216
6.3.1 Testing Policy Adjustments . . . 217
6.3.2 Change Leaders, Change Policy . . . 219
6.4 Changing Institutions . . . 223
6.4.1 Determinants of Changes to Institutions . . . 223

6.4.2 Direction of Change in Institutions . . . 232
6.5 Two Cases of Dogs That Didn't Bark . . . 242
6.5.1 Pakistan . . . 243
6.5.2 The Republic of Korea's Transition to Democracy . . . 246
6.6 Summary: Change and Survival . . . 250

7 Survival **253**
7.1 Survival and Counterfactual Challenges . . . 254
7.2 Observed Patterns of Leader Survival . . . 257
7.3 Framing the Analysis: Hazard Rates and Censoring . . . 260
7.3.1 Competing Risks . . . 261
7.3.2 Hazard Analysis: Weibull . . . 261
7.4 Decomposed Risks: A Starting Place . . . 262
7.5 Baseline Hazard Models . . . 266
7.6 Hazards: Risks and Responses to Them . . . 269
7.7 Changing Policy Provisions and Survival Prospects . . . 272
7.8 Survival by Democratizing or Autocratizing . . . 277
7.9 Summation . . . 282

8 Practical Applications **285**
8.1 Some Key Findings . . . 286
8.2 Swoosh Curve Deviations and Global Prediction . . . 288
8.2.1 How Much Does *Anticipation* Influence Survival? . . . 289
8.2.2 Does Anticipation Influence Institution Change? . . . 291
8.3 Beliefs, Actions and Political Fates in Sierra Leone . . . 296
8.3.1 What President Siaka Stevens Might Have Expected and Done . . . 299
8.3.2 President Momoh Fears Revolution but is Deposed in a Coup . . . 300
8.3.3 Beyond Momoh: A Path to Partial Democracy . . . 303
8.4 The End of the Cold War . . . 305
8.4.1 The Polish Case . . . 305
8.4.2 The Soviet Case . . . 307
8.5 The Arab Spring . . . 310
8.5.1 Estimating Heightened Deposition Risk . . . 312
8.5.2 Adjustment Errors And Political Survival: The Arab Spring . . . 314

8.6 Lessons from Theory, Evidence, and Applications 316

A2 Basic Selectorate Model with Extensions **319**
A2.1 Alternative deposition rule 319
A2.2 Heterogeneous Leaders and the Incumbency Constraint 321

A3 Dynamic Selectorate Approach **325**
A3.1 Optimal policy choice for leaders in each period. 325
A3.2 Analysis of Net Present Value Given a Revolutionary Threat 330
A3.2.1 Analysis of the Institution Change Global Game 333

A5 Conditions for Instability **335**
A5.1 Policy Provision 335
A5.1.1 Predicting Instability 340
A5.1.2 Instability 340
A5.1.3 Impact of Policy Provisions Relative to Expectations 340

A6 Leader Response to Threats **349**
A6.1 Suppression and Additional Payment to the Winning Coalition 349
A6.2 Policy Change in Response to Threats 351
A6.3 Difference-in-Difference Approach 353
A6.3.1 Institution Change 354
A6.4 Democratization or Autocratization: The Direction of Institution Change . 361
A6.4.1 Heteroskedastic Analyses 369

A7 Survival Analyses **373**

List of Tables

3.1 Payoffs in the Coalition Loyalty Game 74
3.2 Abbreviated Payoffs in the Global Game 103
3.3 Leader and Coup Plotter's Payoff from the Institution Change Game 109

4.1 Summary Statistics for Core Variables (1960-2023) 148
4.2 Provision of Coalition Welfare 153

5.1 Provision of Public Goods, Private Goods, Assembly and Coalition Welfare 159
5.2 Provision of Public Goods, Private Goods, Assembly and Coalition Welfare 160
5.3 Coalition Size, Productivity and the Occurrence of Instability (Revolution or Coup) or Leader Change by Irregular Means in Year t or t+1 166
5.4 The Impact of Leader Tenure on Turnover of Cabinet Members 170
5.5 Replacement of Military Personal in Authoritarian Regimes 171
5.6 Health and the Occurrence of Revolutions, Coups, Instability (revolution or coup), Leader Change and Leader Change by Irregular Means in year t or t+1 175
5.7 Policy Provision on the Occurrence of Revolutions, Coups and Irregular Leader Change (Logit) 183

6.1 Institutions, Revolutionary Threats and Suppression via Political Killings and Torture (OLS with nation and year fixed effects) 207
6.2 Institutions, Policy Provisions and Suppression via Political Killings and Torture (OLS with nation and year fixed effects) 208
6.3 Institutions, Regime Risks, and Cabinet Turnover (Model 2 excludes observations with leader change) 215

6.4 Change in Policy as a Reponse to Revolution and Coup Threats: Δ Private=Private$_{t+2}$ - Private$_{t-1}$ . . . 218
6.5 Change in Growth Rate and Policy Provision When Leader Change Occurs: $\Delta y = y_{t+1} - y_{t-1}$ . . . 220
6.6 The Cause of Leader Death and Changes in Economic Growth and Coalition Welfare . . . 222
6.7 Political Threats and Institutional Change . . . 225
6.8 Policy Provisions and Institutional Change . . . 226
6.9 How Under, Over or Expected Provisions of Policy Affect the Likelihood Change in Winning Coalition Size . . . 228
6.10 Ability to Predict When Winning Coalition Size Changes: Based on Model 1 of Table 6.8 . . . 231
6.11 Ability to Predict When Real Selectorate Size Changes: Based on Model 3 of Table 6.8 . . . 231
6.12 Political Threats, Policy Provision and the Direction of Institutional Change between years t-1 and t+2 ($\Delta W = W_{t+2} - W_{t-1}$) (Model 2 restricts sample to observations in which there is some change in W and Model 3 examines a sample where W is predicted to change) . . . 233
6.13 Predicted versus Actual Change in Winning Coalition Size (based on 100 simulations using Model 3 of Table 6.12) . . . 238
6.14 Predicted versus Actual Change in Winning Coalition Size With Leader Turnover in Year t or t+1 (based on 100 simulations using Model 3 of Table 6.12) . . . 238
6.15 Predicted versus Actual Change in Winning Coalition Size Absent Leader Change in Year t or t+1 . . . 239

7.1 Survival Times of Leaders by Winning Coalition Size . . . 263
7.2 Baseline Determinants of Regular and Irregular Removal (Weibull Model) . 267
7.3 The Impact of Instability Risks and Occurrence of Revolutions and Coups on Leader Deposition (Weibull Model) . . . 270
7.4 Change and Levels of Policy Provision and Leader Deposition (Weibull Model) . . . 274
7.5 Change in Winning Coalition Size and Leader Deposition (Weibull Model,) 278

8.1 Leader Deposition Given Anticipation and Occurrence of Instability 290
8.2 Institutional Change Drive by the Occurrence and Threast of Coup and Revolutions ($\Delta W = W_{t+2} - W_{t-1}$) 293
8.3 Appropriate or Incorrect Adjustments to W and Leadership Change 313
8.4 Appropriate or Incorrect Adjustments to W and Iregular Leadership Change 314
8.5 Middle East, 2010: Leader Change and Appropriate or Incorrect Institution Change 315

A5.1 Provision of Public Goods, Private Goods, Assembly and Coalition Welfare 336
A5.2 Provision of Public Goods, Private Goods, Assembly and Coalition Welfare (Regression with country and year fixed effects) 337
A5.3 Heteroskedasticity in Policy Provision 339
A5.4 Coalition Size, Productivity and the Occurrence of a Revolution or Coup in Year t or t+1 340
A5.5 How Under, Over or Expected Provisions of Policy Affect the Occurrence of Revolutions, Coups, and Leader Change by Irregular Means in Year t or t+1 341
A5.6 How Under, Over or Expected Provisions of Policy in Year t-1 Affect the Occurrence of Revolutions, Coups, and Leader Change by Irregular Means in Year t or t+1 341
A5.7 Policy Provision on the Occurrence of Revolutions, Coups and Irregular Leader Change (OLS with country and year fixed effects) 343
A5.8 Policy Provision on the Occurrence of Revolutions, Coups and Irregular Leader Change (Logit with country fixed effects and a cubic time trend) . 344
A5.9 Policy Provision on the Occurrence of Revolutions, Coups and Irregular Leader Change (Logit and OLS with year and country fixed effects) 345

A6.1 Change in Private Goods (Δ Private=Private$_{t+2}$ -Private$_{t-1}$) and Changes in the Level of Torture (Δ Torture=Torture$_{t+2}$ -Torture$_{t-1}$) (OLS with nation and year fixed effects: Model 4 excludes observations with leader change in year t or t+1.) 350
A6.2 Change in Policy as a Response to Revolution and Coup Threats: Δ Private=Private$_{t+1}$ - Private$_{t-1}$ 352
A6.3 Change in Growth Rate and Policy Provision When Leader Change Occurs: $\Delta y = y_{t+1} - y_{t-1}$ 353

A6.4 Change in Growth Rate and Policy Provision When Leader Change Occurs: $\Delta y = y_{t+2} - y_{t-2}$ 354
A6.5 How Under, Over or Expected Provisions of Policy in Year t-1 Affect the Likelihood Change in Winning Coalition Size 355
A6.6 Political Threats and Institutional Change 356
A6.7 Political Threats and Institutional Change 357
A6.8 Ability to Predict When Winning Coalition Size Changes: Based on Model 1 of Table A6.6 358
A6.9 Ability to Predict When Winning Coalition Size Changes: Based on Model 3 of Table A6.7 358
A6.10 Political Threats and Institutional Change: Models 1 and 2 exclude observations with leader change in year t or t+1; models 3 and 4 exclude observations with irregular leader change in year t or t+1 359
A6.11 Deviations in Coalition Welfare Provisions and Change in Winning Coalition 363
A6.12 Political Threats, Policy Provision and the Direction of Institutional Change between t and t+3 ($\Delta W = W_{t+3} - W_t$): Model 2 restricts sample to observations in which there is some change in W) 364
A6.13 Political Threats, Policy Provision and the Direction of Institutional Change between t-1 and t+2 ($\Delta W = W_{t+2} - W_{t-1}$): Model 2 restricts sample to observations in which $\Delta W > 0.05$. Model 3 includes only observations w=estimated to have a 50% chance of $\Delta W > 0.05$. 365
A6.14 Heteroskedastic Regression of Impact of Institutions and Regime Risks on Cabinet Turnover (Excludes observations with leader change) 370
A6.15 Heteroskedastic Regression Analysis of Changes in Winning Coalition Size, $\Delta W = W_{t+2} - W_{t-1}$ (Models 1 and 4 include all possible observation, model 2 and 5 include only observation in which coalition size changes and models 3 and 6 include observations in which institutional change is predicted) . . 372

A7.1 Definitions of Different Forms of Deposition 373
A7.2 Baseline Determinants of Regular and Irregular Removal (Weibull Model) . 374
A7.3 The Impact of Instability Risks and Occurrence of Revolutions and Coups on Leader Deposition (Weibull Model) 375
A7.4 Change and Levels of Policy Provision and Leader Deposition (Weibull Model) 376

A7.5 Change in Winning Coalition Size and Leader Deposition (Weibull Model,) 377
A7.6 Impact of Private Goods Provisions and Changes in Private Provisions on the Relative Risk of Regular and Irregular Deposition 378

List of Figures

1.1 Leadership Change and the Frequency of Coups and Revolutions. 12
1.2 Institution Change: Democratization and Autocratization 13

2.1 Policy Provisions and Winning Coalition Size 43
2.2 Winning Coalition Size and Equilibrium Rewards for Coalition Members: Swoosh Curve 51
2.3 Winning Coalition Size and Equilibrium Rewards for Coalition Members . 58
2.4 The Difficulty in Shrinking Coalition Size in a High Productivity Country . 61
2.5 The Resilience of Mature Democracies: better to be a loser in a large W system than an insider under less accountable institutions 62

3.1 Coalition Loyalty Stage Game 67
3.2 Learning Affinities, Reshuffling and Retention of Coalition Members 72
3.3 Political Life-Cycle: Leader Spending and Survival Probability 86
3.4 Political Life-Cycle: Immediate Rewards and NPV of Coalition Membership 87
3.5 Political Life-Cycle: Leader's Welfare 88
3.6 Political Life-Cycle: Survival Probability 91
3.7 Political Life-Cycle: Expenditure 91
3.8 Political Life-Cycle: NPV of Coalition Membership 92
3.9 Political Life-Cycle: NPV of Selectorate Membership 92
3.10 Political Life-Cycle: Considering a Lottery on Revolution 93
3.11 Selecting the Global Game 108
3.12 Pre-Transition Leader Tenure and the Probabilities that Incumbent and Coup Plotter retain Extant Coalition Members During a Coalition Contraction 115
3.13 Leader Experience and Likelihood of Institution Change 118

4.1 Sample of Country Coalition Sizes, 1960-2023 132
4.2 Distribution of Winning Coalition Size, W 133
4.3 How the Distribution of the Winning Coalition has Changed Over Time . . 134
4.4 How the Distribution of the Real Selectorate Size has Changed Over Time 136
4.5 The Distribution of Productivity for Different Coalition Sizes 138
4.6 The Welfare of the Winning Coalition and Coalition Size: Swoosh Curve . 151
4.7 Deviations From Anticipated Coalition Welfare 156

5.1 Coalition Size, Coalition Welfare, and Safe Havens 163
5.2 Coalition Size, Productivity and the Risks of Revolution and Coup 165
5.3 Instability, Winning Coalition Size, and Leader Experience 173
5.4 Instability and Leader Turnover When Leaders are Chronically Ill and Close to Death 176
5.5 The Distribution of Differences between Policy Provisions and Anticipated Policy Provisions 179
5.6 Changes in the Shah's Policy Provisions: Signalling Illness 180
5.7 Policy Provisions and the Likelihood of Revolution (based on model 1 logit analysis in Table 5.7) 185
5.8 Policy Provisions and the Likelihood of Coup (based on model 2 logit analyses in Table 5.7) 187
5.9 Policy Provisions and the Likelihood of Irregular Leader Removal 189
5.10 1988 Coup Against Ne Win in Burma (later Myanmar) 191
5.11 Policy Provisions and Coups in Portugal 194
5.12 Winning Coalition Size in Portugal, 1968-76 195
5.13 Was There a Reason to Fear Purges Under Turkey's Pent Erdogan? 196
5.14 Attempted Coup Against Turkey's President Erdoğan in 2016: Risks and the Over-Provision of Private Goods 197

6.1 Policy Provisions and the Likelihood of Any Change in Coalition Size: $|\Delta W| = |W_{t+2} - W_{t-1}| > .01$ 230
6.2 Change in Coalition Size and the Under, Over or Expected Provision of Private Goods 234
6.3 Change in Coalition Size and the Under, Over or Expected Provision of Public Goods and Assembly 235

6.4 Repeated Simulation of Predicted Change in Coalition Size: $\Delta W = W_{t+2} - W_{t-1}$ (Observations selected into the sample based on the predictions of Model 1 of Table 6.8 and the directional predictions use the specification in Model 3 of Table 6.12) 236
6.5 Repeated Simulation of Predicted Change in Real Selectorate Size: $\Delta S = S_{t+2} - S_{t-1}$ (Observations selected into the sample based on the predictions of Model 3 of Table 6.8 and the directional predictions use the specification in Model 3 of Table 6.12) 237
6.6 Magnitude of Change in Coalition Size With and Without Leader Change 241
6.7 Magnitude of Change in Real Selectorate Size With and Without Leader Change 242
6.8 Pakistan 1972-82: Winning Coalition Size and Policy Residuals 244
6.9 Pakistan 1972-82: Winning Coalition Size and Turnover of Cabinet Members 245
6.10 Pakistan 1972-82: Risks of Revolution and Coup 246
6.11 The Evolution of Winning Coalition Size in South Korea 247
6.12 South Korea 1979-89: Winning Coalition Size and Policy Residuals 249

7.1 Reasons Leaders Lose Office, By Coalition Size 259
7.2 Kaplan-Meier Survival Analysis by Coalition Size 264
7.3 Political Life-Cycle: Leader Tenure, Coalition Welfare and Leader Deposition 265
7.4 Chronic Illness, Coalition Size, and Deposition 266
7.5 Level and Change in Private Goods Provisions (relative to expectations) and Relative Rates of Regular and Irregular Deposition 275
7.6 Change in Coalition Size, Risks of Revolution and Coup and Relative Deposition Rates 280

8.1 Sierra Leone's Risks of Revolution and Coup d'État by Year 298
8.2 Sierra Leone's Coalition Size and Coalition Benefits During Siaka Stevens's Presidency 301
8.3 Sierra Leone's Coalition Size and Policies, 1985 to 2022 304
8.4 Risks in Poland and the USSR/Russia: The End of the Cold War 306
8.5 Purges and Replacements in the Soviet Union's Leadership 308
8.6 Russia/USSR Policy Provisions Relative to Expectations 310

A2.1 Incumbent's Welfare (retained resources) as a Function of the Oversizing of the Coalition, w 321
A2.2 Spending and Competence: proportion of available resources that a leader must spend to survive given their ability to generate cheap public goods and institutional setting. 322

A5.1 Policy Volatility and Coalition Size 338
A5.2 Policy Provisions and the Likelihood of Revolution (based on Model 1 fixed effects regression analyses in Table A5.7) 342
A5.3 Policy Provisions and the Likelihood of Coup (based on Model 2 fixed effects regression analyses in Table A5.7) 346
A5.4 Policy Provisions and the Likelihood of Irregular Leader Removal (based on Model 3 fixed effects regression analyses in Table A5.7) 347

A6.1 Policy Provisions and the Likelihood of Change in Coalition Size: $|\Delta W| = |W_{t+2} - W_{t-1}| > .05$ (logit) 358
A6.2 Policy Provisions and the Likelihood of Change in Coalition Size: $|\Delta W| = |W_{t+2} - W_{t-1}| > .01$. Based on Sample that Excludes Observation with Leader Change in Year t or t+1 (logit) 360
A6.3 Policy Provisions and the Likelihood of Change in Coalition Size: $|\Delta W| = |W_{t+2} - W_{t-1}| > .01$ Based on Sample that Excludes Observation with Irregular Leader Change in Year t or t+1 (logit) 361
A6.4 Change in Coalition Size and the Under, Over or Expected Provision of Private Goods (Only observations in which the leader survives in years t and $t + 1$.) 362
A6.5 Change in Coalition Size and the Under, Over or Expected Provision of Public Goods and Assembly (Only observations in which the leader survives in years t and $t + 1$.) 362
A6.6 Actual and Predicted Changes in Coalition Size: $\Delta W = W_{t+2} - W_t$. Predictions based in Model 1, 2, and 3 in Table 6.12. 366
A6.7 Actual and Predicted Changes in Coalition Size: $\Delta W = W_{t+3} - W_t$ 367
A6.8 Actual and Predicted Changes in Coalition Size (for relatively large changes in W, $|W_{t+2} - W_{t-1}| > 0.05$) 368

Chapter 1

Preempting Trouble

It must be asked of any government: 'Whose interests does it serve?' The correct answer is not likely to be 'just about everyone's since the interests of leaders, their supporters, and their subjects are almost never the same. Leaders would love a world in which there are no demands on them or on the resources they control but, of course, they never live in such a world. Instead, they operate in a world in which they must correctly anticipate what will keep their inner circle happy and what will keep the mass of people at least passive, if not content. If they fail to do so, then they fall from power. The rest of this book is about addressing theoretically, and testing empirically, what keeps the inner circle happy, what keeps the masses at least passive, and what must be done when the people or the incumbent's cronies are no longer *expected* to be either passive or happy. The broad claims made in this chapter set the stage for our investigation of anticipated political instability, realized instability, and change. Logical proof of the claims we will make depends on a revised, expanded selectorate theory that is formally presented in Chapters 2 and 3. The rest of the book tests the new, stability-related claims we derive.

In devising an expanded selectorate theory, we build upon important, fundamental earlier research into how governments work. In the selectorate perspective leaders struggle between providing benefits for a ruling elite without whom they cannot survive in power (Bachrach and Baratz, 1962; Mills, 1956; Mosca, 1939; Organski, 1965) and the broad interests of the masses who might rise up in revolt against the government's failure to satisfy their expectations (Moore, 1993; Riker, 1987). In the view we develop, leaders pursue their own interests; elites pursue their own interests; and the members of the broader society each pursue their own interests; each to the best of their constrained ability.

The selectorate approach develops an important departure from earlier research about governance. The logic behind the theory shows how a leader's interests and actions are constrained by the size of the elite group (the incumbent's winning coalition) on whom every ruler depends to remain in power. The welfare of the masses as well is seen to be tied to the size of that coalition. If that elite group is small, then few benefits flow to the masses while many flow to the incumbent and the elite. If the inner circle gets to be sufficiently large, then fewer benefits flow to the ruler while more benefits are enjoyed by the elites and by the masses. Herein lies a fundamental source of tension isolated and identified by selectorate logic. That logic makes clear when political incentives lead to policy choices that are best for the leader; best for the leader's coalition of essential backers; best for many members of the broader society; or are Pareto improving, making no one worse off and at least someone better off. As the theory uncovers, Pareto improving policies certainly exist under identifiable, pro-democratization circumstances, but they arise infrequently and almost always are the consequence of a perceived threat to a leader's political survival rather than to the realization of an actual challenge to their continuation in power.

1.1 The Danger of Not Paying Attention

Any ruler who chooses to ignore the interests of her key supporters can expect to fall from power. No one has absolute power; no one rules alone; no one governs without rivals waiting in the wings, ready to seize the moment if the incumbent stumbles. Popularity with the mass population may be another matter. Ignoring the people's wants may entail little risk unless they are capable of organizing, coordinating, and engaging in a mass movement with a credible prospect of toppling the regime. Under those circumstances, ignoring the masses has the same consequence as ignoring the needs of core backers: removal from office.

The fact is that once a leader is deposed, it is exceedingly hard to return to power. This is the reality that every powerful person, no matter how august, must confront and contain. Italo Calvino's fictional account expresses the reality of this concern:

> [T]he throne, once you have been crowned, is where you had best remain seated, without moving, day and night. All your previous life has been only a waiting to become king; now you are king; you have only to reign. And what is reigning if not this long wait? Waiting for the moment when you will be deposed, when you will have to take leave of the throne, the scepter, the crown, and your

head."(Calvino, 1993, p. 36)

The risk of falling from power is the gravest concern of every leader. Hence, every government head must be wary of unresolved threats to their leadership that might arise or that actually arise from within the masses or among their cronies. A failure either to satisfy or to crush demands to modify how the government conducts its business means that the pressure cooker of governance is likely to explode. In the wake of any such explosion, governments may well find themselves with new leaders, new policies, and, perhaps, with modified institutions.

Explosions against the government in the form of mass uprisings, revolutions, civil wars, or coups d'état certainly shake the foundations of governance. But those foundations may be undermined even in the absence of any observable, disruptive, destabilizing event. Indeed, we will demonstrate that the stability of government is more readily, more frequently, and more predictably undermined by, as Thucydides observed, "the expectation of evil intended" (Thucydides, 1959, 3:12) rather than by any visible challenge. Leaders who *anticipate* that their world may become explosive act to the best of their ability to reduce the pressure by neutralizing or accommodating the demands behind expected threats before any disruption to their hold on power actually happens. Leaders nip any "evil intended" in the bud whenever they can. That is why this is a study primarily about anticipated threats and the counter-maneuvers that leaders adopt to thwart such threats rather than a study focused on the causes or consequences of actual coups d'état or mass uprisings. Coups and mass uprisings that overturn an existing government are quite infrequent events but plots or fear of plots to overturn the government, as we demonstrate, are relatively more common and are accompanied by more consequential effects on governance than are actual efforts to overthrow a regime.

Often observers look at sudden reversals in government policy and pronounce them to be unpredictable, chaotic, maladaptive, and even as irrational swings (Jones, Epp and Baumgartner, 2019). How else might we explain, for instance, Deng Xiaoping's 1977 rise to a leadership position in China to promote the very economic policies that earlier had led to his being exiled? How else might we account for Aung San Suu Kyi's emergence from house arrest to become Myanmar's democratically-elected leader only to reverse directions and move the country back toward authoritarianism? And much earlier, what explains Roman Emperor Galerius's sudden shift in 311 from being a staunch advocate of extreme persecution of Christians (he favored burning them alive) to his issuance of his

Proclamation of Tolerance (MacMullen and Lane, 1992, p.219)?

These, and so many other examples of seemingly random policy changes or institutional swings, focus our attention on the causes of shifts in policy and institutions. Such dramatic shifts are sometimes explained by appeals to the personal histories of leaders and their rivals (Horowitz, Stam and Ellis, 2015); to the impact of social movements (Tilly and Wood, 2015); to national or ethnic culture (Calhoun, 1997); to historical animosities (Goertz and Diehl, 1993); to class consciousness (Lukács, 1972); and so forth. Each of these surely plays a part. Yet, they are not features of the selectorate theory and, as the evidence will show, the expanded version of that theory explains a great deal of variation in the elements of governance of most concern here; that is, changes in suppression, policy allocations, and changes in core governmental institutions.

One of our central concerns is to investigate how rulers anticipate potential challenges to their hold on power before those challenges turn into reality. Then we want to understand what incumbents do to satisfy or thwart real or imagined threats to their political survival. By identifying the 'expectation of evil intended' and its resolution we will see that a great deal of change and seeming instability is entirely purposeful and instrumental and is not idiosyncratic, chaotic, maladaptive, irrational, or unpredictable. Instead, it will be evident that instability in the form of changed institutions or policies follows in the wake of efforts to respond to perceived threats even when no discernible, threatening action has actually been observed. Leader change, sometimes accompanied by altered policies and institutions, is the dire consequence that follows in the wake of failure to thwart such threats.

1.2 Who Wants What?

What do a leader's rivals and partners want? There are, of course, infinitely many answers to this question. We boil the list of wants down to its essentials. 'The people' always hope for good health, prosperity, and the freedom to pursue a better future for themselves and their children. Their leaders are never opposed in principle to providing policies that confer such benefits on their subjects but, as every ruler knows, providing a good life for the masses comes at a high price. Because resources are always limited, any help given to the ordinary person often means spending resources that key backers expect to be used to benefit them. Without their expected rewards, the loyalty of essential supporters – the winning coalition –rapidly diminishes or disappears and with it the leader's prospects of remaining in power. The means to reconcile the leadership's desires with the demands of

their key supporters while also keeping the people happy often exists only on a knife's edge, teetering and sometimes toppling over with the slightest shift in the wind.

History teaches us that democracy is the best form of government for fulfilling the people's desires. Their wishes are fulfilled whenever the incumbent's support coalition is so large that its interests mainly overlap with the desires of the bulk of the people. In support of the claim on behalf of democracy, it is notable that people living under such governments – to be defined more precisely in the next chapter – generally are more prosperous, healthier, better educated, and have more life's opportunities than people in monarchies, autocracies, military juntas, or other forms of government. This is not a coincidence. The people's wants are more fully satisfied when the government is structured to ensure that its leaders are accountable to a great many people. We will see in Chapter 2 that this follows logically from the theory we propose. That is to say, we do not *assume* that democracy is preferable for the masses. Rather, we demonstrate that this is so from both a positivist, selectorate theory perspective and from a Rawlsian, normative theory perspective. Despite democracy's appeal to the people, it has inherent limitations that make it a poor form of government for those in leadership positions.

From an incumbent's perspective, democracy is a miserable form of government. Leaders in democracies do not last long and, in fact, often face term limits that assure their loss of power even if they are popular and successful (Cain and Levin, 1999; Posner and Young, 2018). Government heads survive longest when they run a regime in which they depend on hardly anyone to stay in office and they do worst when they are accountable to a great many people. The people do best, at least with respect to a broad array of quality of life indicators including, for instance, income, longevity, education, and freedom, when their leaders depend on a great many people. Conversely, the broad mass of people do worst when their government's winning coalition is tiny. These claims are probed more thoroughly theoretically in Chapters 2 and 3 and empirically in Chapter 6 when we investigate the conditions under which leaders alter institutions and in Chapter 7 when we assess how those changes influence the incumbent's prospects of remaining in power.

For leaders, the best form of government is not only one that depends on as few backers as possible but is also one that draws those supporters from as large a pool as possible. That is, the institutional mix that maximizes a ruler's prospects of political survival includes a small winning coalition drawn from a large selectorate, especially a large 'real' selectorate, with the selectorate defined as the pool of people with a say in picking lead-

ers.[1] Sometimes, however, conditions arise that momentarily shift a leader's commitment away from a small coalition of backers, inducing them to expand their winning coalition and make their government more accountable. Incumbents who fail to recognize and respond appropriately to such conditions lose their job and, as Italo Calvino reminded us, they sometimes lose their head.

The process of government reform and democratization is unlikely to be the consequence of a leader's enlightenment and is more likely to be a stabilizing response to a perceived threat under the circumstances of the moment. As we will establish in the extended selectorate theory, the circumstances of the moment depend on how long a leader has been in power, how proximate the incumbent's death is thought to be, how economically productive society is, and how willing coalition members are to continue to support the incumbent, or to throw their support behind a mass movement, or to seize the moment for themselves by ousting their leader, replacing her with one of their own.

Members of any incumbent's coalition of essential supporters have more complicated, institutionally-induced preferences than do rulers or subjects not in the winning coalition. Under the right conditions, the set of essential backers can benefit greatly from democratic government but those 'right' conditions are hard to attain. Under lots of other circumstances, they tolerate dictatorship provided that they are included among the very few whose support the ruler needs. They always want the proportion of essential supporters relative to prospective backers to be large. That way the leader is compelled to spend lots of money on the coalition's members just to keep their loyalty. Those in the incumbent's winning coalition can be satisfied when both the number of essential supporters and the number of prospective backers is small, as in a monarchy or military junta, or when both are large, as in democracy. That makes the incumbent's coalition members pivotal for political change or stability because under the right conditions their institutional incentives can be closer to what the incumbent leadership wants or to what the mass of the population wants. Chapter 3 will show us the conditions under which members of the ruler's winning coalition back her and work to preserve existing institutions, back a coup plotter to bring down the government and reshape its institutions, or align with the masses to foment a revolution that topples the incumbent and promises (perhaps falsely) to represent the interests of the people.

Leaders want few backers drawn from a massive pool. Citizens want their government's

[1] We define the nominal and the real selectorate in Chapter 2 and describe their measurement in Chapter 4.

winning coalition to be large in absolute numbers and also relative to the pool of possible members. Key supporters can be gratified with an essential coalition set-up that looks like what the leader wants (although with the coalition drawn from a small pool) or what the masses want. Consequently, most of the time it is impossible to satisfy everyone's desires. The main groupings of people in any society – the leaders, the winning coalition, the enfranchised, and the disenfranchised – inherently diverge from one another in terms of what constitutes the best form of government. Naturally, such divergent interests can lead to conflict over how to modify governance or how to topple the regime and replace it with one that might do better by those who bring the incumbent government down.

When a leader's hold on power is believed to be under attack, the ruler, her supporters, and her subjects must each confront difficult choices that will dictate the future direction of their government. These choices define a set of puzzles about the causes and the consequences of real or imagined political instability. Our goal is to better understand these puzzles and to clarify how they get solved. The essential puzzles that we tackle revolve around identifying the circumstances under which national leaders, their core backers, or the people are *expected* to challenge the existing institutions of their society to make them more or less accountable to the interests of the incumbent leader, the incumbent's inner circle, or the broad mass of people. A second set of puzzles addresses whether leaders, their support coalition, or those people who might challenge the regime, survive their efforts to modify governance or, instead, fall by the wayside. A third set of puzzles asks under what conditions the anticipation or realization of coups or mass uprisings lead to liberalization or 'autocratization' of the government.

These puzzles are at the heart of regime change, democratization and political purges, and are the drivers of rising or falling governmental uses of oppression, honesty, transparency and, most crucially, accountability. Potential sources of instability can not be understood in isolation. Each depends on and influences the prospects of the other. The impact on governance of a successful episode of coup d'état or rebellion is, as we will show, meaningfully and importantly different from the impact when the risk of such events is *anticipated* and responded to before a coup or rebellion actually occurs. The maneuvers to counter these threats induce substantially different, and perhaps surprising, effects compared to the actual realization of such events.

1.3 The Problem

All leaders are torn between fulfilling the interests of their subjects and the interests of their key backers. Fall below either group's minimal, baseline tolerance for what is being done and the leader had best contemplate the end of her run in power. That contemplation might help her see what corrective steps need to be taken to save herself. Sometimes those steps will prove feasible and she will survive. Other times, even if the right steps are taken, there just may not be enough resources or support to carry them out successfully. That, of course, is the worst outcome for any leader.

Subjects, like incumbents, can be torn between living with what they have or looking for a way, like rebellion, to make their lives better. They know that resources are being spent to help others at their expense. The challenge for them is to live with the situation for better or worse or gamble on insurrection with no guarantee either that it will succeed or that it will make them better off even if it does. Insurrectionists or revolutionaries profess to want to make the downtrodden better off and they may mean it while they are on the outside looking in. If their rebellion prevails, however, then, at least some of the time, rebel leaders end up with totally different interests than they had before they became rulers themselves. If they came to power behind the efforts of a close-knit, small leadership movement then their political-survival incentives are likely to motivate dictatorial behavior. If, however, their rise to power is on the back of a large movement of essential supporters, then more democratic, accountable government is likely to follow. Their incentives once in power are structurally-induced (Riker, 1962; Shepsle, 1979). We contend that the first structural feature shaping the incentives of successful revolutionaries is the size of their winning coalition. Second is the size of the real selectorate. Indeed, their own interests dictate that if they can reduce the size of their coalition and expand their selectorate then they will do so.

Essential backers of the regime are likewise torn. They want more for themselves but know that if they seek too much they might end up with nothing. If they are too greedy they might provoke a mass uprising by those who are asked to accept more deprivation. Or, they might be purged by the leader who cannot or will not pay their inflated price, especially if the ruler has many readily available substitutes waiting in the wings, eager to step in and become newly essential members of the inner circle.

The tension between the welfare of leaders, supporters, and citizens is the driver of political choices and the elemental foundation of threats to political stability. All leaders

want to stay in power and they know that they must treasure the loyalty of those whose support is needed to keep them in office. Those who rise to power always know that depriving those crucial loyalists of their rewards–even if it is in the cause of helping 'the people'–is the path to political defeat and upheaval. This logic explains why in autocratic regimes, like those in North Korea, Congo, Cuba, and so many more, the incumbent's inner circle grows rich while the people suffer. Though the effects are more muted and subtle–because the coalition of core supporters is so much larger–this is true in democracies too.

In democracies, for example, the incumbent party tries to raise taxes that are disproportionately drawn from their opponents and transfer money to their supporters (Bueno de Mesquita, Downs and Smith, 2017). In the United States, current-day Democrats seek to tax wealthier voters–who tend to be disproportionately Republicans–and provide benefits to poorer (and younger) voters–who tend to be disproportionately Democrats. Republicans try to cut subsidies and entitlements to the poor–read disproportionately those who vote for Democrats–to pay for reduced taxes on wealthier voters who, as it happens, are disproportionately Republicans.

Perverse as it may seem, those who last longest in positions of authority almost always deprive those citizens who are not part of their winning coalition. In particular, the 'people' lose one or more of peace, prosperity, good health, and the freedom needed to build a better future. The freedom of one's opponents, indeed, is almost always at the head of the list of benefits to be suppressed by those who wish to remain in power. Such political rights as a free press, free speech, freedom of assembly, and the unencumbered right to vote are economically cheap to provide– suppressing any of these is far costlier–but such rights are always a threat to continued incumbency as they make it easy for opponents to organize and coordinate with others in pursuit of the removal of the person in power. Indeed, these freedoms are so important that we treat them as a special category of policy that governments provide to a greater or lesser extent. We refer to them as *coordination goods* throughout our analyses.

Leaders know that they do best when they fulfill the wants of those without whose support they could not remain in power. The fewer the number of such core supporters, the easier and cheaper it is to keep them happy and, therefore, the better the leader does. Naturally, in satisfying as few as possible, incumbents almost inevitably deprive the many. With deprivation spread around inequitably, key backers may be kept happy but subjects grow uneasy, perhaps even contemplating rising up to try to overthrow the privileged few and spread the wealth and freedom to their many. The essential supporters of any regime

live in a complicated relationship with the masses and the incumbent power holder. Should the incumbent fall, the essential backers stand to lose their privileges. Knowing this, their first inclination is to work fervently to help their leader maintain authority. But, if they sense that the leader's hold on power is irreversibly slipping away, then trying to save their leader is not the way to preserve their own privileges; indeed, it is the path to guaranteeing the loss of rewards and, often, even their lives.

If the incumbent's coalition of critical backers thinks the incumbent is finished, then its members need to find another way to salvage their own well-being. That may mean aligning with the dissatisfied masses or aligning with one another against both the masses and the incumbent. Thus it is that the story of domestic political instability is the story of the interdependencies and disconnects that drive the actions of leaders, their backers, and ordinary citizens in any society. Each constantly contemplates the conditions, the interests, and the expectations of the others. Anticipate those interests and expectations correctly and society may smoothly transition from one state of affairs to another. But if any one of a polity's leaders, core backers, or ordinary citizens, gains even a momentary advantage in information or capabilities, society may unravel in a spasm of political instability.

1.4 Sources of Instability

We define political instability as any of the following: (1) significant changes in governmental institutions; (2) resource allocations that deviate markedly from day-to-day, temporal trends; or (3) leader replacement, or attempts to replace the leader, through irregular, non-lawful, non-standard means. These changes may be, but need not be, accompanied by violent events such as revolutions or coups. Indeed, the theory developed in Chapters 2 and 3 leads to the inference that *instability* can arise in the absence of either leadership change or a violent effort to alter government. We believe that the focus on instability in anticipation of expected threats is a substantial departure from the way much of the literature has thought about political instability (Geddes, Wright and Frantz, 2018; Kreiman, 2023; Skocpol, 1979), although not all (Brams and Ismail, 2022; Harsanyi and Selten, 1988; Kapuscinski, 2013; Sargent, 2009).

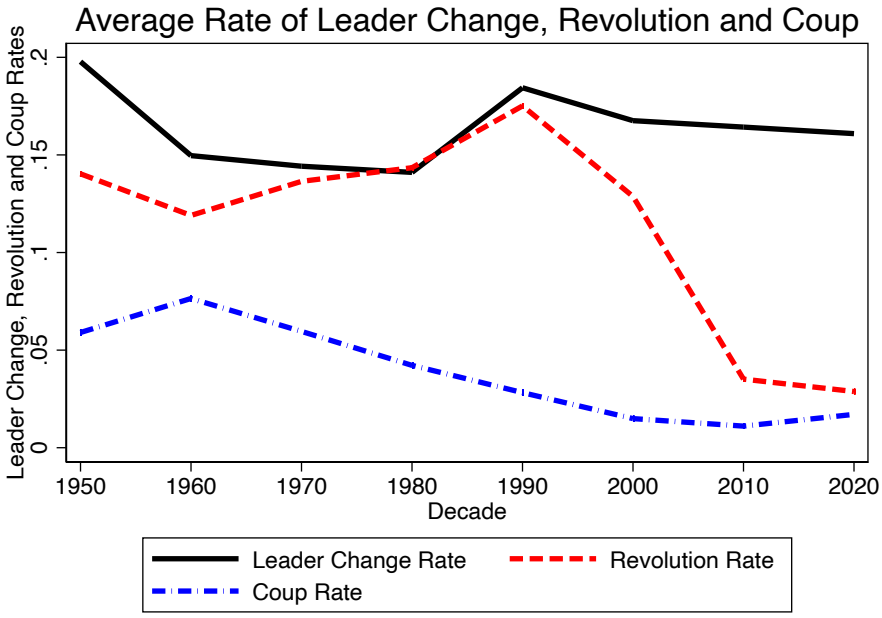
Swings in policy sometimes happen even though there are no shifts in the structure of political institutions or in the identity of leaders at the helm of the polity, but major policy changes, essentially constituting a reversal in direction, are relatively uncommon without leadership or institution change. It is more common for big policy adjustments to

accompany or, quite often, presage alterations in institutions or leaders. Indeed, we may think of large policy shifts, such as those instituted by Deng Xiaoping in China, Aung San Suu Kyi in Myanmar, and Gaius Galerius Valerius Maximianus in Rome, as adjustments that leaders make when they anticipate–and try to thwart–the prospect of their political demise. As such, even when policies are altered in the absence of institution or leader change, they may well be caused by the desire to prevent expected risks to the leader's or the government's institutional survival.

Although most leaders, most of the time, do what they can to cling to power, inevitably mortality, term-limits, or uprisings eventually catch up with them. Leadership change and disruptions to normal, every-day politics, are far from rare events. Figure 1.1 shows the percentage of leaders who were replaced each decade between 1950 and 2020. As well, the figure shows the percentage of countries that experienced coups or revolutions during each of the same decades. Although the graph covers highly dynamic periods including the immediate post-World War II years, the decolonization decade of the 1960s and the post-Cold War 1990s, the first thing the graph makes clear is that leadership turnover, revolution, and coup d'état occurred throughout the 70 years covered in the figure rather than just being the by-product of major events. Second, it may be noteworthy that leader turnover is commonplace and fairly steady at 15% to 20% while the frequency of revolutions has been much more volatile. Coups, after a long period of declining frequency, seem to be making something of a comeback in recent decades. But most fundamentally, the figure highlights the observation that all of these events persist throughout time and are a recurring source of changes to governance.

In contrast to the actual occurrence of disruptive events such as coups and revolutions or leader deposition, rulers might mollify those of their opponents who they believe could mount a credible threat. They can do this, for instance, by liberalizing or autocratizing the governance institutions under which they operate. Liberalization, as we use the term, means expanding the winning coalition, making the government accountable to more people. In contrast, by autocratizing we mean that the size of the leadership's winning coalition is reduced, thereby making the regime beholden to a subset of its original coalition or to a new, smaller group that includes former outsiders. Those who survive in the coalition are likely to have had their loyalty bought by the incumbent at the expense of those former coalition members who were purged, as well as at the expense of the broader public. Autocratization, as we will demonstrate, means fewer policies designed to benefit the broad mass of society, accompanied by more corruption, more kleptocracy, and more

Figure 1.1: Leadership Change and the Frequency of Coups and Revolutions.



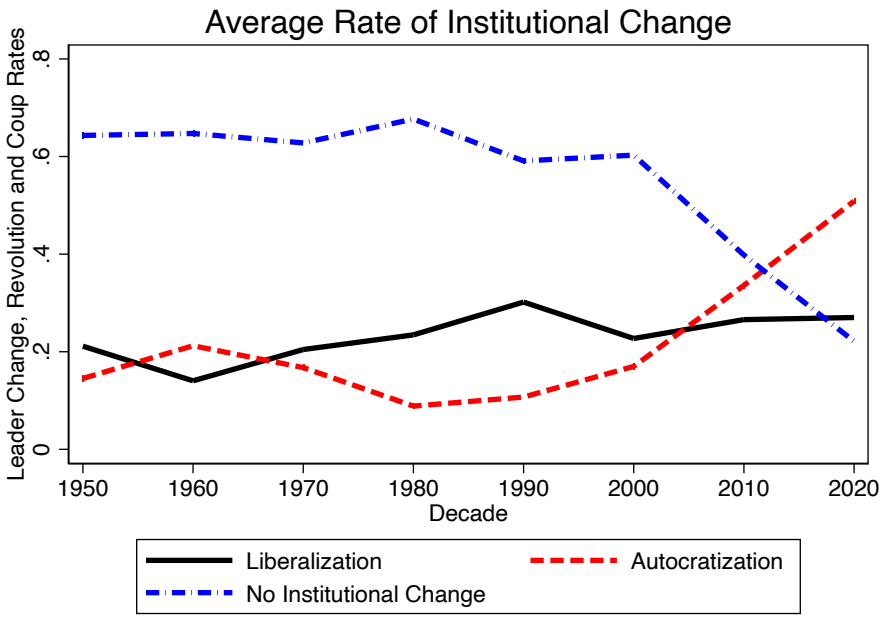
misery for those outside the inner circle of essential supporters of the incumbent.

The frequency of liberalization, autocratization and the absence of institution change is displayed in Figure 1.2.[2] Many of the cases of institutional rearrangements in Figure 1.2 happened in response to the expectation of threats to the regime rather than to observed actions against the leadership and its governance institutions. Consistent with an expectational view, the correlation between the change in winning coalition size and the occurrence of a revolution is only -0.006 and the correlation between changes in winning coalition size and the occurrence of a coup is -0.074. The bulk of changes in institutions seems not to be strongly associated with the occurrence of events designed to alter political institutions. The same can be said with respect to institution change and leadership turnover. The correlation between the change in winning coalition size and a change in the national leader is only 0.015. It seems the big institutional shifts are *expectational*, per-

[2]To be consistent with the subsequent analyses, we examine the change in winning coalition size between years $t-1$ and $t+2$ ($\Delta W = W_{t+2} - W_{t-1}$) and say democratization occurs if $\Delta W > 0.01$ and autocratization occurs if $\Delta W < -.01$, with W measured on a continuous scale from 0 to 1 as explained in Chapter 4. The figure reports the average rate of democratization and autocratization by decade.

haps driven by adjustments made *before* leadership replacement and not primarily driven by adjustments made after violent events or leadership replacement.

Figure 1.2: Institution Change: Democratization and Autocratization



The observation that actions are taken with the intention of thwarting threats is prosaic and yet often overlooked. Understanding what actions are taken in anticipation of prospective coups or mass uprisings is difficult for any of us as observers. Leaders look for signs of danger while we are accustomed to examining such overt manifestations of instability as coups, revolutions, or civil wars. Leaders and their backers can never afford to ignore signs of rising threats to their incumbency and to the many benefits they enjoy. When they detect signs of political unrest, they take action to offset the threat. Their actions are not, and cannot, always prove successful but they are an essential part of the fabric of instability, both realized and unrealized, and we must be attentive to such considerations at every stage in the analysis of political unrest. We need to devise systematic methods that facilitate our ability to recognize the signals of anticipated threats that leaders look for and react to. We develop such methods in Chapters 4 and 5.

Here we want to tell the story of the survival and the deposition of leaders and the

preservation or alteration of institutions. Each can occur on its own but often these two sources of potential instability–leadership change and institution change–are intertwined, each reacting to the forces driving the behavior of leaders, core followers, and the masses. Our objective is to thoroughly explore the sources of domestic instability, uncovering when each is the chosen path and explaining how deeply interconnected each of the prospective choices are. The account we offer is driven by a commitment to investigate the logic and the evidence regarding (1) the quest by leaders to remain in power and their inevitable failure ultimately to do so; (2) the earnest desire among the masses to overthrow their government when the pain of its continuation becomes too great and their less frequent choice to act on that desire through mass protests, revolution, and civil war; and (3) the concerns of any incumbent's key backers – the winning coalition – to preserve all or as much of their privileges as they can by undertaking bloody actions in support of their leader, by throwing their weight behind mass anti-government rebellions, or by rising up themselves through coup d'état to overthrow their erstwhile leader and to thwart the dangers that revolutions or other mass uprisings may entail for them.

1.5 Modes of Analysis

To understand the causes and consequences of political instability, peaceful change, and stable politics, we engage in three modes of analysis. We undertake a formal, game-theoretic analysis to get at the logic shaping the choices of the key players in any society. That logic will uncover new, readily estimated early warning indicators of when a government is getting in trouble and when it is not. It will, as well, indicate the expected nature of the trouble and the expected response to it. Additionally, the strategic analysis will uncover dynamic characteristics of leadership that reveal how resource allocations and policy emphases change as an incumbent grows more experienced in office (Melnick, Bueno de Mesquita and Smith, 2022).

Following the development of an expanded selectorate theory to explain oppression, leadership change, policy change, and institution change, we then use a variety of statistical analyses to evaluate the empirical accuracy of the implications of the strategic analysis. We will make extensive use of tables and graphs to demonstrate the nuanced implications of the statistical analyses, with further details, alternative tests, and robustness checks contained in appendices. As well, we engage in illustrative case analyses that are chosen to depict or to probe some of the subtle details of our theory of instability and its implications

for anticipating specific instances of different forms of political turmoil. We will show, for instance, that the theory developed and tested here could have been used successfully to anticipate well in advance which countries in the Middle East would experience the rebellions of the Arab Spring in 2011 and which would not. We will also see how the theory could have been used to anticipate which Middle Eastern regimes, in response to the pressures of the Arab Spring, would liberalize their governance, which would autocratize, and which would hold fast to their previous government structures and practices. We will do the same for other geographic neighborhoods and countries to help develop a sense of how the theory, evidence, and techniques introduced here might be used by policy makers to better anticipate political change throughout the world in a rigorous, reproducible, and timely manner.

To conduct the analyses implied by the theory, we must put ourselves in the shoes of the relevant decision makers. For instance, consider those who perceive themselves to be oppressed or suppressed by their government; that is, those revolutionaries among the masses who might contemplate rising up against their government in the hopes of alleviating their suffering. We probe the conditions that make them either so fearful or so content that they do not rebel and the conditions that, instead, convince them that rebellion is their best hope for a better future.

We also put ourselves in the shoes of core backers of the leadership, those whose support is essential to preserve the regime. These people are generally made up of the senior military who control the guns, the senior civil servants who often control the flow of money, perhaps family or clan members of the incumbent who have personal attachments to the ruler, and sometimes religious figures whose dictates can stymie or stimulate mass action. These groups of people must choose from among three courses of action. Faced with an imagined, a nascent, or a full-blown mass threat, they must work out what action will best protect their own interests. That may mean standing by their leader, crushing any supposed or real opposition. This, for example, was the choice of the Basij, an arm of the Islamic Revolutionary Guard Corps in Iran, when in June 2009 and again in October 2022 they suppressed demonstrators. In 2009 they were used successfully to crush those who questioned the legitimacy of then President Ahmadinejad's re-election. In 2022 they again were mobilized, this time to use force to put down a movement to alter the policies by Iran's religious leaders to restrict the freedom of women throughout the country. But what if, as in 1979 in Iran, core supporters believe instead that their leader is doomed to fall from power so that investing in protecting the leadership's interests may not be best

for the key backers? Then the choice of actions by the members of the winning coalition is likely to be quite different.

Back in 1979, the Iranian military and other members of the Shah's core supporters did not rally to destroy the revolutionary movement destined to overthrow his monarchy. Why did they fail the Shah but not the later Khamenei/military regime? Here, it is useful to recall that Mohammad Reza Pahlavi, the Shah of Iran, died on July 27, 1980, after having sought treatment for cancer in at least four countries (Robins and Post, 1995). His death came more than a year after he fled Iran (January 16, 1979) and after the collapse of his monarchic regime (February 11, 1979) under pressure from the Islamic revolution that brought Ayatollah Khomeini to power. Despite the intervening eighteen months between his flight from Iran and his death, his health and the occurrence of the revolution were intimately connected.

Seeing that the Shah repeatedly left Iran to seek medical care, it was surely evident to his backers that he was probably not long for this world. Recognizing that his demise was becoming imminent, they understood that he could no longer be counted on to deliver the substantial economic and social benefits they received from supporting him. With their privileges at risk and knowing that backing him was not the path to preserving their interests, they chose to sit on their hands while the revolution took place around them. Their hope, and for many it was a realized hope, was that by not obstructing the revolution they would help ensure a better future for themselves.

Of course, since it was known that the Shah was deathly ill, there was not much he could do to salvage his rule. When he was healthier he had successfully driven Khomeini and his backers into exile, keeping them, and their threat, out of Iran from 1964 until 1979, but with death at hand and the military eager to find a way that might secure their future, Mohammad Reza Pahlavi's paths to political survival had run out. And so the revolution came to power and the Shah went into exile where he later died.[3]

Backing a revolution against the incumbent is not, of course, the only path to political survival when core supporters believe their leader is no longer a reliable protector of their interests. If the winning coalition's members distrust the intentions of those leading a mass movement, then coup d'état may be the preferred alternative. Consider the calculations of Hosni Mubarak's military in 2011.

It was evident back in 2011 that Mubarak, in his 80s, was not likely to be in power much

[3]The case of the Shah's fall is examined in more detail in Chapter 5. It provides a nuanced example of the risks that sickly leaders face.

longer. Even worse from the perspective of his backers, he seemed to be losing leverage with the United States government as indicated by President Obama's reduction in the amount of foreign aid promised to Egypt, ostensibly cuts to democracy promotion funding but, in practice, money directly or indirectly likely to end up in the accounts of senior military leaders.[4] As the people took to the streets, occupying Tahrir Square, the military was confronted with the prospect of the regime's collapse. The first choice among Egypt's generals was to remain on the sidelines, waiting to sort out their best ultimate course of action. With the military on the sidelines, Mubarak's government was overthrown, replaced by a Muslim Brotherhood government elected by the people. A short while after the Muslim Brotherhood came to power with the tacit backing of Egypt's military, the military leadership then concluded that their welfare was not secure under the Muslim Brotherhood regime of President Mohamed Morsi. A year after Morsi assumed office, the Defense Minister, General Abdelfatah El Sisi, ostensibly part of Morsi's inner circle, launched a coup that propelled El Sisi to power. Once in power, he banished the Muslim Brotherhood and aggressively suppressed opposition to his government. Although he went through the charade of an election in May, 2014, one in which prospective candidates were carefully screened to ensure that they would not be a threat to El Sisi's victory, he emerged as a new dictator heading a new winning coalition that assures privileges to the military and others loyal to him.[5]

As these brief illustrative cases demonstrate, coalition members, seeing a threat to the regime from the masses or from the deteriorating circumstances of the incumbent, either defend the incumbent, as the Basij did in Iran in 2009 and 2022; allow the revolution to succeed, as Iran's military did in 1979 and as Mubarak's military did in Egypt in 2011; or launch a coup, as El Sisi's military did in Egypt in 2013. Incumbents, of course, can anticipate all of these developments at least as well as any of us can and almost certainly far better than we can. They, after all, have the most to lose if they miscalculate. So, putting ourselves in the shoes of incumbents, what actions are available to them to save themselves from real or imagined threats to their political survival and when are no such actions available or likely to succeed?

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[4]See `https://www.huffpost.com/entry/obama-cut-egypt-funding_n_815731` and `https://www.haaretz.com/2010-04-18/ty-article/obama-cuts-funds-to-promote-democracy-in-egypt-by-50/0000017f-e8a9-da9b-a1ff-eceff1900000`.

[5]Aid, previously restored, was again cut off following the fall of the Morsi government, and then was again restored to Egypt in 2015, months after El Sisi's election. See `https://www.theguardian.com/us-news/2015/mar/31/obama-restores-us-military-aid-to-egypt`.

1.6 Assessing Events: The Choice of Corrective Steps

Seeing, or believing, that their regime is in danger there are five courses of action incumbent leaders can pursue. Of course, they could step down, accepting that they are no longer wanted by enough people and concluding that it is wrong– or pointless – for them to try to continue. That is exactly what Yahya Jammeh, The Gambia's erstwhile president, did in January 2017. Having lost an election and facing an insurrection at home and foreign military intervention in defense of the electoral outcome, he reluctantly departed. He fled to Equatorial Guinea, from which, presumably, he might try to fight for power again in the future. Departed leaders, indeed, do sometimes rise up from their exile to try to take power again. That is, for instance, what electorally-defeated General Fulgencio Batista did in Cuba in March 1952; what Argentina's exiled Juan Perón did by winning a third term as President in 1973 after having been ousted in 1955; and what Haiti's Baby Doc Duvalier tried, unsuccessfully, to do in 2011. So, stepping down is a near-term solution to a threat to political survival and it is a solution that in the longer-term can foment new instances of instability. We touch on, but do not formally model, how the choice to go into exile could be added to our game theoretic expansion of selectorate theory in Chapter 3.

Stepping down is commonplace in democracies but it is neither the only nor the most common response to intense opposition in autocratic polities. With a leader's hold on power severely at risk, she can choose to modify government policies so as to mollify credible opposition threats. China's Deng Xiaoping was brought back from his internal exile in the late 1970s to institute his ideas for economic reform that had previously led to his banishment. With the economy and social order suffering in the aftermath of the Cultural Revolution, policy change opened the door to the Chinese Communist Party's revitalization. Deng rewrote the constitution, re-established merit-based national college exams, introduced greater market-driven economic and business incentives and private-enterprise that stimulated massive growth, perhaps saving the Party from revolution. And when, decades later, his policies seemingly resulted in growing demands by wealthy Chinese entrepreneurs for a greater say in how they are governed, Deng's successor many times removed; that is, Xi Jinping, cut back on Deng's economic opening and made China even more autocratic than it had been. In the process of doing so, Xi also secured his political survival for at least a third term as China's leader with the strong possibility that this will turn into a lifetime appointment, or, if enough people become sufficiently unhappy, into an uprising or into liberalization in preemptive anticipation of such an uprising.

Sometimes policy change necessitates or follows from a decision to liberalize governance institutions, expanding the size of the winning coalition and improving the conditions of the people, thereby obviating their desire for rebellion. Such institution change can preserve the leader, providing a new avenue through which the threatened incumbent may remain in power. For example, when Ghana's J. J. Rawlings experienced severe financial contraction that made it close to impossible for him to pay his military, thereby jeopardizing their loyalty to him, he understood that he faced his imminent political demise. Confronted with an economic collapse that precluded the provision of rich privileges to his small core of essential backers, he solved his problem by turning Ghana into a democracy. So popular was his effort that he, in fact, won election twice as Ghana's president (1992 and 1996) despite holding genuine, competitive elections. Constitutionally prohibited from a third term, he peacefully stepped aside, endorsing his vice president who was then defeated electorally in 2000 (but elected as president subsequently).

Stepping aside or instituting policy or political reform/liberalization are three of the five tools at the disposal of a threatened incumbent. The fourth and fifth responses are, however, probably the most common. Faced with a threat to the regime, the incumbent can suppress and oppress any citizens suspected of plotting a mass movement against her. This can only be done, however, with the backing of the members of the winning coalition, such as was the case we discussed earlier when Iran's Basij crushed those participating in anti-regime demonstrations. Suppressing opposition among the masses is the everyday business of autocrats who control the press, restrict free speech, and bar people from peaceful assemblies intended to protest the government. Depriving citizens of a free press, free speech and freedom of assembly makes it almost impossible for anti-government political entrepreneurs to coordinate with enough people to mount a credible threat of revolution or civil war. Hence, oppression and suppression of opponents is an essential, endogenous ingredient of small-coalition regimes. In such polities, leaders pay their core supporters enough so that, in return, the coalition's members are willing to engage in brutal acts to protect their government from its domestic opponents and as well to advance their own security.

Mass suppression is a tried and true means to prevent mass uprisings provided the leader's essential coalition is on board. But not all threats to a regime come from the masses, nor is the coalition of essential supporters always willing to defend the regime. An alternative to mass suppression is to purge the membership of the winning coalition, removing those thought to be insufficiently loyal and bringing in new prospects. If the

leader fears, rightly or wrongly, that a coup is in the offing or that the coalition will passively or actively back a rebellion, then replacing some or all of the coalition can be an effective means to salvage the regime.

When Saddam Hussein first came to power in Iraq, for instance, he called an assembly of Baath Party leaders, ostensibly to celebrate their victory and consolidate the regime. At the assembly, however, his cousin read out names, one-by-one, of senior Baath officials he alleged were plotting a coup. The meeting, available on video, shows the alleged plotters escorted out of the hall.[6] Many of the alleged coup-plotters were executed. Saddam's public purge of ostensible plotters ensured his hold on power with a diminished coalition for the next two and a half decades. Those who survived the purge understood the grave risks they faced if Saddam believed they were not staunchly committed to his political survival.

Of course, purges are themselves risky business. If coalition members can anticipate that they will be removed from the winning coalition, then they are incentivized to launch a coup even when they otherwise might not have. That, in fact, is exactly why Algeria's winning coalition deposed their leader, Ahmed Ben Bella, in 1965. Having foolishly announced his intention to shuffle his cabinet; that is, purge some members of his inner circle, Ben Bella was deposed by Houari Boumédiène in a bloodless coup. Sorting out when a coup is best averted by purging coalition members, as Saddam did, or by democratizing, as J. J. Rawlings did, is important to understanding what anticipatory actions leaders take. Chapter 3 helps to sort out the logic behind competing choices and chapter 7 establishes the empirical conditions under which shrinking or expanding the winning coalition works best for promoting the incumbent's political survival.

Each of the illustrative cases we have mentioned is cut from the same cloth. True, some involve revolution, others coup d'état, and still others policy change, political liberalization, purges or resignation, yet the logic of each event is essentially the same. Political instability manifests itself in a variety of logically interrelated ways that makes regime change predictable even as the individual methods by which it happens remain interdependent and sometimes individually difficult to anticipate. It is the very interdependence of choices that makes anticipating any one outcome so challenging although the early-warning indicators that flow from the theory will help sort out what sort of change is most likely under specific circumstances. Each player in the game of politics is deeply committed to trying to

[6] In Arabic with English subtitles, `https://www.youtube.com/watch?v=U9HgdVN9C_k`; with English commentary, `https://www.youtube.com/watch?v=kLUktJbp2Ug`.

anticipate the actions and reactions of each other. Hence, whoever has better information or feels more compelling urgency can drive the outcomes of episodes of instability, making them imperfectly, but at least partially, predictable and logically explainable.

Revolutions are the manifestation of dissatisfied masses but most prospective revolutions never happen. Those that do happen come primarily in two varieties: those who could have stopped it chose, out of their own interests, to let it happen instead, or the preconditions for revolution were not readily discerned. In the first instance, as we establish theoretically in chapter 3, circumstances exist in which even a failed revolution can prove beneficial for the masses in society. In the second situation, the failure to recognize the signs that a revolution was brewing means that counter-actions to thwart the uprising were not taken. Thus, revolutions can be realized because the people have incentives to let a revolt happen even if it is expected to fail or because the risk of such an event was missed. We will see, in fact, that while efforts at revolution are infrequent, successful revolutions are truly rare events! Most such efforts fail and while that is bad news for those who lead revolutions it may not be bad news for the downtrodden they ostensibly sought to help.

Coups, like revolutions, are more often contemplated than acted on. When a leader anticipates a coup from within the winning coalition, she takes actions to thwart it by shuffling the coalition's membership (routine purging), by contracting the coalition (a more severe form of purge), by liberalizing (expanding the coalition), or, less often, by stepping down. Standing in the shoes of each level of decision making, we will see when actors contemplate destabilizing action, when they decide not to act out of anticipation of overly costly consequences, and when leaders and institutions are preserved or overturned to make them, under identifiable conditions, more autocratic or more democratic. To do so, we shall set out a theory of the interdependence between mass uprisings against the government (whether revolution, civil war, or insurrection), coups d'état, mass suppression through torture and the extra-legal killing of subjects, political purges, autocratization, political liberalization and policy change. Then we will demonstrate that the empirical expectations that follow from the logic of instability are widely satisfied in analyses of thousands of nation-years and thousands of national leader-years.

1.7 Early Warning Signs

Central to the thesis set out here is that leaders, coalition members, and members of the masses try to anticipate each other's actions. The success of such anticipation depends

significantly on external signals that indicate whether the time is right for action. Early warning indicators are inevitably present, albeit any party that is contemplating action also has strong incentives to keep their intended action secret until the last moment.

Everyone within a polity has expectations about what the government will do for them. The mass of society hopes for policies that are broadly beneficial and recognize that how much effort is made to benefit them depends on how important their support is to sustaining their government. Likewise, members of the government's winning coalition – its insiders – expect personal privileges above and beyond the broader policies aimed at keeping the masses quiet. And the leadership expects to have discretion over the use of more or less revenue depending on how small or large their winning coalition is.

Give the masses less than they should expect from their government and the risk of rebellion rises. Give the coalition less – or more – than their expected personal largesse and they may launch a coup to improve their situation. If basic circumstances change, as they inevitably do the longer a ruler remains in office, then what constitutes correct compensation for the coalition or for the masses changes as well. Hence, watching for shifts in crucial conditions and in estimations of what constitutes over- or under-compensation of the coalition and the masses is central to anticipating instability and its corrective adjustments.

Besides deviations from expected benefits for the coalition or for the masses, there are at least two other clear early warning indicators of an elevated risk of political instability. These are due to changed circumstances involving discernible, serious health issues for the incumbent or the advent of significant negative shocks to government revenue. By watching for signs of an incumbent's deteriorating health or revenue shortfalls we may see signs of a growing risk of irregular government change unless resource allocations respond rapidly to the new circumstances.

It is not just bravura that leads a power-holder like Vladimir Putin to display himself bare chested on hunting or fishing expeditions, or to have himself filmed while engaged in demanding athletic activities. Autocratic leaders, like Putin, want friends and foes alike to know that they are in tip-top shape. That is, they are eager to demonstrate that they can be counted on to continue to deliver privileges to their loyalists and punishment to their opponents. Such displays of prowess become more important as Putin, or any leader, gets older or as circumstances change around them.

Zimbabwe's Robert Mugabe (1924-2019), when in his nineties, having then been in office since 1980, liked to be photographed in a cowboy hat and youthful, stylish attire.

And he liked to brag about his staying power, noting, "I have died many times. I have actually beaten Jesus Christ because he only died once."[7] It is also why he reported in 2017 that his physicians note that he has a "strong bone system."[8] Of course, he could not survive forever but he did manage to stay in office until very close to his death at 95. Likewise, we saw similar behavior by Uganda's Idi Amin. He proclaimed himself an Olympic athlete, a world-class swimmer and boxer. All these claims and displays serve one purpose: discourage uprisings and encourage coalition backers to believe that their leader can still be counted on to deliver plentiful bounty to them. Persuade them that you are in for the long-term and they are likely to remain loyal defenders.

Serious health problems often can be hidden from the masses, making them less certain that the time is right for rebellion. But health issues are harder to hide from a leader's inner circle, made up, as it is, of individuals who see and interact with the leader regularly. Sudden and frequent trips overseas without an obvious governmental purpose are likely to be perceived either as about personal consumption or about medical care. Zaire's Mobutu Sese Seko, suffering from prostate cancer, was ousted after 31 years in power. His health issues became an open secret and assured his political demise. The Philippines' Ferdinand Marcos, suffering from advanced Lupus, lost the backing of key supporters such as General Fidel Ramos and Juan Ponce Enrile, resulting in the collapse of his regime. He fled to Hawaii in 1986 where he died in September, 1989. Marcos had been in power for more than twenty years before serious illness contributed to the shattering of his winning coalition. And as we already noted, it was ill-health that contributed to the Iranian Shah's fall from power in 1979. More recently, health concerns weakened Ali Bongo Ondimba's hold on power in Gabon where he was President from 2009 to 2023. He suffered a stroke in 2018 and subsequently was often seen in a wheel chair. Amid claims of election fraud in the August 2023 Presidential election, the military seized power and arrested Bongo. He has subsequently been released so that he can seek medical attention overseas (Dahir, 2023).

Ill health, of course, is not the only signal of impending regime change and potential institutional instability. A leader lacking sufficient funds to maintain coalition loyalty is a leader at risk of deposition. Government revenue shocks arise both from exogenous and endogenous forces. Global recession, for instance, may adversely affect government revenue, making it difficult, at least in extreme cases, for an incumbent to continue to pay

[7] See https://www.telegraph.co.uk/news/worldnews/africaandindianocean/zimbabwe/9094942/Robert-Mugabe-I-have-died-more-times-than-Jesus-Christ.html

[8] See https://www.aljazeera.com/news/2019/9/6/robert-mugabes-most-famous-quotes

the military leadership and other essential supporters. Endogenous shocks, in contrast, are the cumulative consequence of years of government mismanagement designed to assure the flow of money to cronies now at the expense of the general economy both now and later. When Syria's Bashar al Assad began to face rebellion in 2011, he was already in the throes of economic stress at home. The government's economic deficit was burgeoning and unemployment was rising. Part of the problem stemmed from the impact of global recession but another part was the consequence of the self-serving way in which the Syrian economy had been handled by Assad and his father, Hafez al Assad, before him. Those who were outside the dominant Alawite clan of Shia elites were suffering most and they were also the people who chose first to rise up against the regime.

Assad's political survival, however, did not seem genuinely at risk until senior military officers began to desert. Why did they do so? One reason was that the government was cash poor and could not pay them on time. The desertions and defections to the opposition stopped, however, when the governments in Iran and Iraq handed over billions of dollars to salvage Assad's government. Without that external infusion of cash, probably his lack of revenue would have been enough to bring him down, as it helped bring down Nikita Khrushchev in the Soviet Union and Kwame Nkrumah in Ghana. If supporters are given too few benefits they inevitably shop around for a replacement. This, as mentioned earlier, seems to us to be the essential story behind Deng Xiaoping's political resurrection. Exiled from power for his economic–but not political–reformist ways, a bankrupt Chinese Communist Party looked for a way to salvage their future and they found it in the very ideas that had led to Deng's exile.

Health issues are generally clearly visible only to a select few. Revenue shortages are more often visible across society. Does that mean revenue shortages are a bigger threat to an autocrat's hold on power than deteriorating health? We believe not! First of all, political rivals rarely have an immediate solution to a revenue crisis and so face all the questions the incumbent faces with respect to their reliability as sources of future benefits. So, revenue shocks certainly are disruptive and raise an incumbent's risk but they are not the same as a serious health crisis. Members of the inner circle may count on someone else, in vigorous, good health, to deliver a flow of goodies to them at least for a while. A replacement leader is not likely to face an immediate health shock in the same way that a replacement leader will face an ongoing revenue shock. So health is the greater danger, especially for autocrats. It is less so for democratic leaders, as the theory we develop makes clear.

An awareness of health or revenue issues may embolden citizens to take to the streets as they become optimistic that they have ways to improve their own circumstances. We saw just such a development in Venezuela as revenue dried up after the death of Hugo Chavez. Revenue declined presumably due to the exogenous drop in oil prices accompanied by extreme (endogenously driven) inflation and expanded corruption in Venezuela. But even when there is no health issue (as there was for Chavez) or revenue issue (as there was for his successor, Nicolás Maduro, until first Russian aid and then high oil prices brought on by Russia's invasion of Ukraine provided the funds to keep his coalition's loyalty), people may still take to the streets. Their protests provide a clear early-warning indicator to the incumbent and to members of the winning coalition, each recognizing that there is a growing potential threat to the continuation of their cozy situation.

1.8 The Book's Structure

To understand decisions made under the threat of, or following the realization of, episodes of instability it is useful to begin with the key counter-factual circumstance: decisions under every-day, normal politics. Since the theoretical focus of this book is the extension of selectorate theory to circumstances under which incumbent leaders fear they will lose office or, in fact, do lose office, we begin in Chapter 2 with a brief review of the basic selectorate theory. Continuing in Chapter 2, we then extend the essentials of selectorate theory to better understand how the welfare of coalition members shifts with coalition size and with the efficiency with which different types of policy are produced. This extension will provide important insights into modernization theory and instability (Lipset, 1959). We then expand on the basic selectorate theory in Chapter 3. There we model circumstances under which leaders face, or expect to face, threats to their incumbency that either cannot be defeated or that can only be neutralized by departing from their choices in every-day politics. Chapter 3, as well, establishes new insights into how a ruler's length of time in office alters her survival-oriented spending requirements, loyalty to her, and the associated risks of coup or revolution as well as the impact of those risks on the likelihood and direction of change in political institutions. We see that a leader's life-cycle in power has important, subtle, dynamic impacts on resource allocations and on survival strategies.

Chapter 4 begins by listing hypotheses derived in Chapters 2 and 3. The chapter, as well, introduces the data we utilize and our empirical strategies for converting theoretical variables into observed, estimated quantities with which to conduct empirical tests. Thus,

for instance, we introduce techniques for calculating a set of early-warning indicators that inform most of our subsequent analyses.

Chapter 4 paves the way for Chapter 5 in which we develop country-year specific estimates of how core policy choices influence the risk of threats to the regime's survival. We determine whether core types of policies are under-provided, over-provided, or efficiently doled out on a country-by-country and year-by-year basis. These estimates facilitate the analysis of the predicted risk of destabilizing events regardless of whether such events actually occur or not. Indeed, as the title of this volume suggests, it is the anticipation of instability even more than the realization of violent destabilizing events, that drives changes designed to ameliorate feared threats to a regime's or leader's political survival.

Chapter 6 uses the threat estimates developed in Chapter 5 to explain and predict the uses of suppressive tactics, such as torture and extra-legal killing, and the use of changes in the winning coalition's composition to stymie threats. Chapter 6 then turns to an assessment of policy changes as a means of diminishing threats to political survival. It as well focuses on the consequences of policy change and resource provisions on subsequent adjustments to the government's institutional structure. Hence, in Chapter 6 we test responses to the theory's implications regarding the threats of and the actual realization of revolution, coups d'état, and leader change on the government's stability. These tests provide effective predictors of both when institutions are likely to change and the direction of change; that is to say, whether democratization or autocratization is more likely.

Chapter 7 then applies the results from Chapters 5 and 6 to evaluate the prospects of leader survival. Whereas Chapter 6 identifies how policy and institutions shift, Chapter 7 draws out the effects that those shifts have on how well leaders do at surviving in power. Here we discover whether and under what conditions increased or decreased spending on different types of policies enhances or limits political survival. With the theory tested and with strongly supportive results in hand, we then close with Chapter 8. In Chapter 8 we demonstrate numerous techniques, many as simple as cross-tabulations, by which the theory can be used to make out-of-sample projections of expected changes in policy and governance. We demonstrate practical methods for anticipating, for instance, the democratization or autocratization of specific governments over time. Thus, the focus of Chapter 8 is to explore how our theoretical findings and empirical techniques might prove useful in identifying and addressing the risks of instability in the contemporary world.

Chapter 2

Selectorate Theory I

The original statement of selectorate theory provides a straightforward way to think about how governments allocate resources when any prospective, routine threat to a leader's political survival is fully known (Bueno de Mesquita et al., 2002; Bueno de Mesquita et al., 2003). That is a helpful way to look at how leaders allocate resources under stable, everyday politics but, of course, every prudent leader is ever watchful for hints of uncertain and unknown risks and threats that call for a reassessment of spending, taxing, and security decisions. To understand those risks and the best responses to them we need to expand upon the basic theoretical formulation.

The first step in expanding the theory is to reiterate the original theory and elaborate on critical, previously overlooked, implications about governance that follow from it. Some new implications will be developed here while others are elaborated on in the Appendix to this chapter. We encourage those readers with a thorough knowledge of the original statement of selectorate theory to jump ahead to section 2.1.1. Following 2.1.1, they then might skip the subsequent material until section 2.3 although that will mean missing our demonstration of how selectorate logic fits within a Rawlsian normative perspective as well as in a positivist perspective.

Section 2.1.1 should be read closely because it elaborates on the distinction, previously only casually made, between the meaning of 'real' and 'nominal' selectorate composition and size. Real and nominal selectorates are now set out more clearly as distinct components of the selectorate (Bueno de Mesquita and Smith, 2011, 2022). The distinction is important. When we extend the theory in Chapter 3, for instance, we will derive hypotheses about changes to the size of the real selectorate while the nominal selectorate's size may or may

not also change. Hence, the concept of the 'real selectorate' plays a prominent part in our subsequent analyses of beliefs about conflict risks and about institution change.

Section 2.3 introduces newly derived, and we believe, important insights within the original theoretical structure. These new insights help to inform our investigation of instability risks as a function of the price of public goods and they lay the foundation for the expanded selectorate theory introduced in Chapter 3. Even those thoroughly familiar with the original statement of selectorate theory will be unfamiliar with the developments in section 2.3

Because the theory's original statement and empirical results are not the main focus in the rest of this book, we do not rehash all the details of this prior work. We just emphasize the portions of extant results that provide the necessary foundation for Chapter 3. There, we derive the expanded selectorate explanation of dynamic factors that shape risks to government stability and that alter choices over the suppression of opposition, the modification of government policies, and the alteration of institutions that make a government more 'democratic' or more 'autocratic'.

The theory as expanded in Chapter 3 will not only address prospective sources of instability and change under the extant leadership but will also identify conditions under which, despite their best efforts, rulers lose power to a usurper who succeeds in overthrowing them. That usurper might be an 'ordinary' challenger merely seeking to come to power; a coup plotter possibly seeking to rearrange the government's institutions and, hence, the rewards that insiders get; or a revolutionary who heads a mass uprising that says it wants to alter the essential institutions of governance. By identifying real or imagined threats to stability we will see that a great deal of what at first blush seems to be arbitrary or random changes in governments on closer theoretical examination are rational and predictable actions. Such anticipatory changes often are the consequence of what Thucydides, discussing the Mytilenaean betrayal of Athens, referred to as the "expectation of evil intended" (Thucydides [1959]) rather than from observed events.[1]

While none of the propositions regarding resource allocations as derived in the original statement of the theory are fundamentally altered by the revised, dynamic version in Chapter 3, the new specification leads to more nuanced expectations and to numerous new

[1]Thucydides was giving voice to the Mytilenaeans, explaining their decision to betray the Athenian leadership with whom they were aligned. The betrayal might be thought of as analogous to a coup d'état launched by winning coalition members against their leader because they fear that if they wait then their leader will purge them.

implications. The revised and expanded theory leads to novel predictions about shifting priorities between public and private goods spending over time; the uses and effectiveness of suppression to facilitate political survival; the conditions that lead to policy changes and their link to circumstances that result in institutional change. Thereby, the revised, extended and expanded selectorate theory may contribute to explaining the counter-measures available to rulers who believe they are at risk of deposition and provides a perspective designed to predict policy and institutional changes with or without leadership change and with or without – especially *without* – observable, overt challenges to their rule.

2.1 Selectorate Fundamentals

In the selectorate framework, all political organizations can be thought of as made up of four nested groups: the population (N) of people subject to the government's rule; the selectorate ($S \subset N$), which we divide into S_N and S_R as discussed below, members of which at least have a nominal say in choosing leaders; the winning coalition ($W \subset S$), whose support is essential to keep an incumbent in power; and an incumbent leader ($\mathcal{L}$) and a domestic challenger or challengers who are each referred to as an alternative leader ($\mathcal{A}$). Any alternative leader seeks to depose the incumbent in order to become the next $\mathcal{L}$ We are not consistent in referring to L or A using mathcal notation – should we say L and A here or use mathcal whenever we refer to the leader or the alternative or coup plotter? – Not a big deal either way, but we need consistency.. While we denote any generic challenger to the incumbent's hold on power as $\mathcal{A}$, when it helps with clarity we identify any coup plotter as $\mathcal{C}$. We designate everyone who is not in the winning coalition, not in the real selectorate (S_R), and not in the leadership as 'the masses' (M).

In this chapter, in keeping with Bueno de Mesquita et al. (2003), we treat the size of the winning coalition as an exogenous, fixed quantity. However, a central objective in Chapter 3 is to build on and go beyond earlier efforts to expand the selectorate theory to explain the magnitude and direction of endogenously-driven changes in government institutions (Bueno de Mesquita and Smith, 2009*b*, 2017). Thus, Chapter 3 and subsequent chapters identify and explain the strategic adjustments in coalition and real selectorate size expected to occur following leader change or expected to arise within a leader's tenure as equilibrium responses to alternative real or anticipated threats to leader survival.

Survival and Deposition: To survive in office a leader needs to maintain the support of her coalition. In an abuse of notation, we let W represent both the set of supporters in

the incumbent's coalition and the size of that set. In the simple exposition that follows, institutions are fixed and both the leader and challenger offer rewards to coalitions of size W. The leader is deposed if she no longer has the support of her coalition and the challenger is supported by W people. As a practical matter, this means the challenger needs to include some members of the incumbent's coalition in his coalition such that their defection would result in the incumbent having less than W supporters. This deposition rule is reminiscent of the German Parliament's constructive vote of no-confidence. It is not simply enough to remove support from the incumbent, the challenger also needs a governable coalition, that is to say W supporters. We also assume that all members of a coalition are treated the same in terms of rewards.

Other expositions of the selectorate theory have considered alternative deposition rules (Bueno de Mesquita et al., 2003; Bueno de Mesquita et al., 2002). For instance, and as elaborated on in Appendix A2.1, to depose the incumbent the challenger might only need to reduce the incumbent's coalition to less than W supporters (without needing to build a coalition of size W himself). In such a setting the incumbent needs to oversize her coalition. If the incumbent forms a coalition of size $w > W$, then to depose her the challenger needs to buy off $w - W + 1$ supporters in order to leave the incumbent with less than W supporters. By increasing w the incumbent forces the challenger to try to buy off more people, meaning that each gets less. Yet by increasing w she also increases the number of people who must be rewarded and that diminishes what each of her supporters receives. The extent to which the leader oversizes her coalition reflects a trade-off between these two factors.

Alternative deposition rule assumptions generate different equilibria. While we have obviously not examined the exhaustive list of all possible deposition rules, our experience is that the behavior within these equilibria responds to changes in institutions in a similar way. That is to say, the comparative statics remain the same across modifications in the deposition rule. Given this finding, we focus on the simple constructive deposition rule in which both the incumbent and challenger offer rewards to a fixed size of coalition, W. Under this rule, supporters remain loyal or defect depending on whether they expect to be better off under the incumbent or under the challenger. We believe this comparison captures the basic calculus that all people undertake when deciding whom to support.

2.1.1 Real versus Nominal Selectorates

While the selectorate (S) consists of all people with at least a nominal say in choosing leaders and who have a chance of being in the winning coalition, we now explain the distinction between the two sets of selectors who make up the selectorate: S_N and S_R. The real selectorate, denoted as S_R, differs from the nominal selectorate (S_N) (Bueno de Mesquita and Smith, 2011) in that the members of S_R have more than a nominal say in choosing rulers. Those in S_R are in such roles as party bosses, union leaders, military leaders, corporate executives, religious leaders or leaders of civil-action organizations, economic or social elites, other varieties of group leaders, and others, potentially including, for instance, some or even all voters who are in a position to exercise genuine influence on the selection of the political leadership either through their support or their opposition.

All members of S_R are members of S_N, and in the limiting case everyone in S_N has a real say in who is to lead. Under normal circumstances $S_R < S_N$, often by a great deal. When we introduce our measurement approach to S_R in chapter 4, our objective will be to capture the relative magnitude of each government's real selectorate rather than a detailed mapping of its constituent parts, a task for which the data do not currently exist. We believe, however, that identifying the constituent parts of any government's real selectorate would add considerable insight into the specific bundle of policies that are each government's priority. As a practical matter, we will suppress the subscript notation unless the distinction between S_N and S_R is essential for clarity. In general, when we refer to the selectorate, S, we are referring to the real selectorate, S_R, unless otherwise noted.

Societies are, of course, more complicated and more nuanced that this simple hierarchy of the masses ($N - S$), the selectorate, the winning coalition, and those seeking to be leaders. The nominal and/or real selectorate, for instance, may have blocs within them; that is, organized or implicit groups, that act in concert and so may induce the provision of bloc-oriented club goods beyond the private goods and public goods on which we focus (Smith and Bueno de Mesquita, 2019; Smith, Bueno de Mesquita and LaGatta, 2017; Catalinac, Bueno de Mesquita and Smith, 2020). Real selectors may be drawn from the military, an established religion, a royal or favored family, a dominant political party, or from other designated sources, including some or all of the blocs that might help organize the nominal selectorate.[2]

[2]The existence of such organized blocs may distort resource allocations and coalition size, both at the margin. These are important and interesting distinctions that, nevertheless, we put off for future expansions of selectorate logic. We believe they are a significant portion of the margin that remains to be addressed

The nominal selectorate in North Korea, for instance, consists of all citizens 17 years old or older thanks to the universal suffrage provisions in its constitution. By our estimation procedure (explained in Chapter 4), S_N in North Korea in 2022, the latest year for which we have data, is 1 on a scale normalized to fall between 0 and 1, with 1 denoting the relatively largest nominal selectorate. But, the nominal selectorate does not choose leaders in North Korea. The real selectorate, at 0.57 (on another scale normalized from 0 to 1) is much smaller. In fact, the difference between the size of North Korea's values for S_N and S_R is seventh largest in the world of 2022, with Mali having the largest spread (S_N=1, S_R=0.50).

North Korea's real selectorate consists of some portion of the Workers' Party of Korea (perhaps a mix of the Central Committee, some portion of the Central military Commission (CmC), and/or the Politburo), including key military leaders, and, of course, members of Kim Jong-un's family. In what we think of colloquially as democratic societies, there usually is relatively little difference between the nominal selectorate and the real selectorate. In Canada in 2022, by our estimation procedures, Canada's score on S_N, like North Korea's, is 1. Canada's score on S_R, however, is 0.96, making it one of the proportionately largest real selectorates in the world.

Despite the richer environment that could be examined, we focus on the basic set of nested groups, only occasionally wandering into a more complex picture of society. We do so because the basic set of interests, their characteristics, and interactions are sufficient to address the questions of political stability with which we are concerned. Selectorate theory imposes rigorous discipline and forces us to focus on the basic institutional features of all political entities (and, for that matter, any other organization and its structure): specifically, their relative, proportional winning coalition size and selectorate size. Despite the relative sparseness implied by collapsing political systems to these two simple dimensions, we believe the selectorate framework provides a parsimonious account of much of the variance we observe in politics, and it does so within an approach that can be applied to a wide array of circumstances. Other approaches may provide more nuanced assessments. For instance, Gandhi and Lust-Okar (2009), and Gandhi and Przeworski (2007) examine the role of legislatures in autocratic systems. Geddes (2003), Geddes, Wright and Frantz (2018), and Geddes, Frantz and Wright (2014), as well as Svolik (2012), examine dynamics within military regimes. However, their insights are applicable only to specific domains

but that the ratio of added complexity to marginal gain is insufficient to tackle their contributions here.

rather than encompassing all political regimes.

Selectorate theory is not the only approach to classifying institutions. There is a huge literature examining comparative electoral systems (for instance, Powell (1982), and Cox (1997)). Likewise, there is a long tradition of comparing democracies to non-democracies (Alvarez et al., 1996; Boix, Miller and Rosato, 2013; Bollen and Jackman, 1989; Collier and Adcock, 1999; Elkins, 2000; Gleditsch and Ward, 1997; Przeworski and Limongi, 1997*a*). There has been considerable debate as to whether it is better to measure degrees of democraticness or whether to focus on a simple yes/no dichotomy. Different behavioral, attitudinal, and institutional characteristics are often used to create a composite index of democraticness (Coppedge et al., 2011; Marshall, Gurr and Jaggers, 2016; Teorell et al., 2019). The Polity Project's much-used 21 point democracy scale, composed of five components, is an excellent case in point. Many scholars use this scale as a continuous measure of democraticness, while others set a cut-point to differentiate between democracy and autocracy.[3]

The systematic comparison of non-democratic regimes is a more recent development in the academic literature, but that literature has matured substantially in recent years (Coppedge et al., 2011; Gandhi, 2008; Gandhi and Lust-Okar, 2009; Gandhi and Przeworski, 2007; Koller and Kailitz, 2013; Marshall, Gurr and Jaggers, 2016; Teorell et al., 2019; Wintrobe, 1990, 2000). Geddes and coauthors classify autocratic regimes according to whether they operate as a single party system, personalist system, military rule, or joint variants of these systems (Geddes, Wright and Frantz, 2014, 2018; Geddes, 2003).

These studies, and the many other insightful approaches to democracy, autocracy, and comparative governance that we have not mentioned, have greatly advanced our theoretical and empirical understanding of differences across the categories of regime types they investigate. The objective behind selectorate theory is, in part, to capture the logic of their discoveries within a single, unified theoretical framework while adding new logically-derived and empirically-tested insights into as wide an array of political phenomena as we can. But we also hope to do more than that.

We are interested in discovering the commonalities across government 'types' as well as the differences. Hence, we begin with a set of assumptions that indicate that all politicians have the same objectives in mind. That means, to be a bit more precise, that we assume

[3]In particular, the Polity scale examines the Competitiveness of Executive Recruitment (XRCOMP); Openness of Executive Recruitment (XROPEN); Constraints on Chief Executive (XCONST); Regulation of Participation (PARREG); and Competitiveness of Participation (PARCOMP).

that there are no structural differences in, for instance, their utility functions. This is a departure from earlier analyses that assume that autocrats are interested, for example, in maximizing their wealth from office while democrats pursue the interests of the median voter (Acemoglu and Robinson, 2000; Downs, 1957; McGuire and Olson, 1996; Niskanen, 1997). Instead, the differences in utilities that politicians face are a function of differences in where their government is located in the at-least two dimensional institutional space defined by selectorate size and coalition size. We assume that each government's size of W and of S – rather than a one-dimensional regime-type continuum or a taxonomy of regime categories – shapes key institutional constraints under which all leaders operate. That means that we must not only understand what political leaders and their rivals do given the government's extant institutional constraints but also what maneuvers they engage in to change the institutions so as to make it easier for them to achieve their objectives.

2.1.2 Affinity Among Coalition Members

All people have idiosyncratic likes and dislikes. Leaders are no different in this regard. However, leaders have greater discretion over the choice of whom to rely on than do most people. We assume that leaders choose to surround themselves with those they believe are most inclined to be loyal to them. We refer to this sense of loyalty as "affinity" and use the term to approximate the medieval, feudal notion of fealty. That is, some individuals are expected to manifest loyalty towards their leader above and beyond whatever loyalty is induced by their receipt of tangible rewards from their ruler.

We confess to having no insight into the psychological, sociological, or cultural origins of the intangible sources of loyalty that determine any individual's affinity for their leader or their leader's affinity for them. Although that may be a subject worth investigating, our interest in the notion of affinity relates to its consequences more so than its origins. We believe that a ruler's discovery of variation in the degree of affinity across individual members of the winning coalition creates an incentive to reshuffle the coalition to include those with greater affinity and to exclude those whose fealty is determined to be wanting.

When a challenger attempts to seize power he cannot be picky about whose support he relies on. In order to come to power any aspiring leader needs defections from the incumbent's coalition, and he gladly accepts the support of anyone willing to back him. Yet, once he is established in power, he can replace any supporters found to be insufficiently trustworthy and loyal, replacing them with those whom he believes have higher fealty. In

the basic selectorate model presented in this chapter, a challenger's affinities for potential supporters become fully known once he attains the throne and becomes the leader. Once established as leader, the erstwhile challenger, now fully informed about affinities, reshuffles the coalition, removing those with low affinity and replacing them with high affinity supporters. This simple structure is revised in Chapter 3 to take gradual revelation of affinities into account.

Chapter 3 examines a learning process through which a leader gradually discerns the fealty (affinity) of supporters. That learning induces a set of political life cycle effects that introduce new empirical expectations that are tested in later chapters.[4] In this chapter, because we assume the affinity ordering of a challenger is revealed once he seizes power and, therefore, he can immediately reshuffle his coalition, it follows that any supporter of the incumbent who defects and helps put a rival on the throne faces the risk that once in power the rival will immediately shuffle them out of the coalition.

Learning whom you regard as trustworthy and replacing them is time consuming. An astute leader always assures her supporters that they are trusted and presumed to be loyal right up to the time they are removed from a position of political influence. Any supporter given advanced warning that they are about to be replaced should defect while their political support still matters. Likewise, a savvy supporter should say and act in the way they believe the leader wants them to; it is better to 'kiss the ring' than precipitate expulsion from the inner circle. Many cults of personality are little more than devices to make it costly for selectors to 'kiss the ring,' thereby demonstrating their fealty, and so enable leaders to differentiate between high and low affinity supporters (Crabtree, Kern and Siegel, 2020). For instance, in North Korea elites need to adopt prescribed hairstyles if they hope to retain their privileges.

In terms of modeling, each leader has an affinity, aff_i, for each selector i. With the exception of these affinities and whether a selector is in or out of the winning coalition, selectors are otherwise identical. The leader rank orders selectors: those she believes to have low affinity are at the bottom and those she believes have high fealty are at the top. For modeling tractability, we assume all selectors can be ordered uniformly between 0 and 1, and that ex ante all possible orderings are equally likely. The leader receives an affinity-related payoff of $\lambda_{affinity} E[aff_i | i \in W]$ that is proportional to the expected affinity

[4] An alternative interpretation of the learning process addressed in Chapter 3 is that a leader needs to find an opportunity to replace those she dislikes or distrusts. In this interpretation, even though the leader knows who she wants to replace immediately, it takes time to weed out the low affinity types.

of the members of the winning coalition. Our primary objective is to elucidate the role of institutions and so we tend to suppress the role of affinities when calculating the welfare of leaders. We do so by focusing on the case as $\lambda_{affinity} \rightarrow 0$; that is, where affinities are not decisive in the choices by incumbents that are of most interest here. This assumption is benign with regard to our purposes but it has important implications that might point the way for others to improve on our effort. By assuming that $\lambda_{affinity} \rightarrow 0$ we implicitly restrict the role of psychological, cultural, or sociological explanations for leader choices so that they have little or no influence on our theoretical results. Of course, the absence of these considerations may help account for variation that the expanded selectorate theory does not explain. We leave the exploration of such dimensions for others, contenting ourselves with an account of fundamental political choices that are motivated by optimal behavior in terms of political survival, policy benefits, and personal enrichment.

The net effect of the affinity assumptions is that an individual who helped bring a challenger to power has a $\frac{W}{S}$ probability of having high enough affinity to be retained in the newly-installed incumbent's coalition. We will see that a challenger's political prospects would be greatly enhanced if he could commit to keeping those who bring him to power in the coalition. Yet the basic requirements of subgame perfection; that is, that actors choose their best replies to the choices of others at each stage of a political game by looking ahead to the anticipated consequences of alternative actions, render such a commitment as not credible. A challenger coming to power wants to be surrounded by those he trusts to be loyal. If he can spend the same resources and survive surrounded by loyalists as he could surrounded by "frenemies," then he will reshuffle at some point to pick high-affinity loyalists. Because those lower affinity types anticipate being shuffled out of the coalition at some point, they have incentives to defect away from the incumbent and, therefore, the incumbent leader should get rid of them as soon as possible to avert their defection and her deposition. Removing low affinity coalition members is a best reply to their anticipated future defection, shifting future action so as to improve the prospects that the incumbent survives in office.

In practice, such psychological, sociological, and cultural factors as ethnic or religious groups, home town or old school ties, prejudices, and the like often play a prominent role in determining from where a leader draws her supporters. For instance, many, although not all, of Iraqi President Saddam Hussein's cronies were chosen from his home town of Tikrit. Liberia's Samuel Doe drew his supporters almost exclusively from the Krahn ethnic group. In contrast, his predecessors, who ruled from 1869 to 1980 under the True Whig Party, had

drawn their political support from amongst the descendants of former US slaves who were resettled in Liberia after the US Civil War. Posner (2005) examines shifts between linguistic and ethnic groups as the source of political power in Zambia. Jiang (2018) highlights how shared work and school experiences or hometown origins advance the careers of Chinese bureaucrats and Woldense (2018) provides a fascinating analysis of minister turnover in Ethiopia under Emperor Haile Selassie based on network connections.

In practice, members of certain identifiable groups have an enhanced chance of being brought into the coalition. If your authors were dictators then Yankee fans, Tottenham Hotspur fans and those with Oxford or Queens College degrees would likely be given preferential access to the coalition, while Red Sox and Arsenal fans and those with Cambridge degrees would likely find themselves on the outs. Of course, while being in a preferred group may improve the chances of being in the winning coalition, simply falling into a preferred group does not guarantee access to the coalition. And then too, it is not clear at the outset of a ruler's time in office which groups will be favored. Old school ties might trump hometown allegiance for some leaders but not for others. And even once a leader's preferred groups are identified, potential supporters cannot always be certain of their ranking within that group.

While on a case-by-case basis we might gain additional insight into which selectors are likely to be incorporated into the coalition, for the purposes of building a general model, we focus on the symmetric case in which all affinity orderings are equally like. A consequence of this assumption is that if the real selectorate is of size S and the leader needs a winning coalition of size W then each selector has a $\frac{W}{S}$ chance of being one of the highest affinity supporters. In practice this figure might be higher for those in a group that the leader chooses to form her coalition around. For those without membership in a potentially favored group, the odds of coalition membership might be lower. However, even if we factor in such considerations, the likelihood of being included in the leader's coalition is increasing in the number of supporters that the leader needs (W) and decreasing in the pool of potential supporters the leader can choose from (S). The ratio $\frac{W}{S}$ captures these comparative statics. When we expand the theory in Chapter 3, we relax this simplifying assumption. We derive new implications about the dynamic provision of benefits to the coalition and to society as a leader learns about the affinity of her coalition members over the course of her tenure in office.

2.1.3 What Leaders Do

The primary goal of leaders is assumed to be to survive in power. To survive, a leader needs to retain the support of her coalition. All else equal, the more rewards a leader provides, the more likely it is that her supporters will side with her rather than a political rival. While incumbents could use all of the government's revenue to secure the loyalty of their coalition, that would run against what we assume is their secondary goal. That goal is to retain as many resources as possible for themselves. Thirdly, as described above, leaders like to surround themselves with people they like and trust, or at least people they believe will be loyal (Calvert, 1985).

To achieve their objectives, we assume that incumbents do two things that distinguish them from everyone who is not in power: they raise revenue, R, and then they allocate that revenue between public goods, g, and private goods, z. We exam each of these key leader functions –revenue generation and spending decisions – in turn.

Generating Revenue Through Taxation

Leaders can generate their revenue from different sources.[5] They might, for instance, receive revenue in the form of rents from oil, diamonds, gold, or other natural resources, from foreign aid, or through loans, each of which we have addressed in detail elsewhere (Bueno de Mesquita and Smith, 2009*a*, 2010; Smith, 2008). The vast majority of revenue for most leaders, however, comes from taxing productive activities. In Bueno de Mesquita et al. (2003), the selectorate model includes an analysis of economic efforts and taxation while Bueno de Mesquita, Downs and Smith (2017) expands on that analysis, demonstrating that progressive taxation is especially attractive as the winning coalition gets larger and that tax rates are less progressive if the dominant component of the coalition is drawn from the wealthier parts of society than if it is drawn from poorer segments of the polity. In the basic, original model, the leader simply sets a tax rate, following which the citizens decide how hard to work. The leader uses the taxes that were collected from the citizens to provide public goods that benefit everyone and private goods for her supporters, with any left over revenue for her discretionary use.

[5]For a review of the of the literature on the political economy of taxation see Kiser and Karceski (2017). Meltzer and Richard (1981) model the impact of electoral rules on tax rates. Acemoglu and Robinson (2001) examine the tax rate under democracy and autocracy and how the threat of regime change affects redistribution.

As should be intuitively clear, as tax rates rise, the citizens do less work. Consequently, leaders face a trade-off. If they increase the tax rate, then they get a larger slice of the pie, but the pie is smaller because people work less. In order to draw comparisons, it is useful to think about the revenue maximizing tax rate. At this tax rate, if the leader increased taxes further, then her revenue would fall because the decline in productive effort would more than offset the increased share of resources for the government. Generally, no leader wants to increase taxes beyond this level.[6] However, in a small coalition system leaders pick tax rates that approach this revenue maximizing tax. Doing so gives them lots of resources with which to provide supporters with private goods, and of course to keep a sizable chunk for themselves. The taxes the ruler levies reduce the welfare of citizens as they see the efforts of their labors taken by the government. The coalition's members are also harmed by taxes along with the rest of society. However, when the coalition is small the leader can easily compensate her supporters for their lost opportunities due to taxation by transferring to them plentiful private rewards. A small coalition leader taxes at a level close to the revenue maximizing tax rate and lavishly rewards her supporters. Society is poor and unproductive but the leader and her limited number of supporters are rich.

High tax rates are a poor choice for large coalition leaders. Unlike the small coalition head who can cheaply compensate her few essential supporters, compensating the many supporters in a large coalition would eat away at the leader's revenue. It is better for the leader to tax at a lower level so as not to harm her supporters' economic welfare, which, as an added bonus, makes the society more productive.

Leaders in small coalition settings expropriate society's wealth. Leaders in large coalition systems keep taxes relatively low; doing so is politically expedient. As another bonus to the citizens of large coalition systems, the taxes that leaders collect are predominantly used for public goods provisions that benefit them directly and help make society productive.

Spending Decisions

Once revenue is raised, the leader then decides how much to spend on public goods and how much on private goods. We treat the term 'public goods' a bit laxly to mean government policies with broad, widespread positive externalities such that they apply to just about everyone subject to the government. While these policies sometimes satisfy the strict

[6] Padró i Miquel (2007) shows that in ethnically divided societies, leaders can enhance their survival by 'overtaxing' and compensating their group. In such a setting members of the ruling group are especially loyal as they fear being over-taxed and unrewarded should the other group attain power.

requirements of public goods; that is, being non-excludable and non-rival, we will be a bit lax about the strictness of either of these conditions, using the term 'public goods' as a convenient shorthand for a broader mix of constituent parts of benefits that are true and proper public goods and the more common, widespread distribution of club goods to large interest blocs such that these benefits have considerable spillover into the wider society (Rothbard, 2009, 1032-1033). We do so in the spirit of Galileo's assumption that one could roll a ball down a friction-free inclined plane; that is, something not strictly true but that, nevertheless, seems to facilitate a decent approximation of real-world conditions given the way the assumption is utilized. Private goods are closer to meeting the strict economic sense of the term as goods that are both excludable and rival. Hence, the benefits conferred by public goods are treated as if they apply to all and the private goods benefits of interest in selectorate theory, those allocated by government, apply only to members of the winning coalition.

In modeling the utility derived from public and private goods, we assume that those individuals lucky enough to be in W have an additively separable utility function, $u(g, z)$, that is smoothly and concavely increasing in both components and normalized such that $u(0, 0) = 0$. For those outside the coalition, their utility is denoted as $u(g, 0)$. Throughout we focus on interior solutions.[7] As a working example we consider $u(g, z) = \sqrt{g} + \sqrt{z}$. The results hold in more general settings. However, our intent is to illuminate the basic political logic rather than examine the limiting conditions for which the results hold.

Government leaders spend some portion of government revenue on public and private goods. We denote the price of a unit of public goods as p. Later we characterize this price in terms of the level of human capital and economic productivity and this extension provides insights into modernization theory and its implications for political change (Lipset, 1959; Przeworski and Limongi, 1997*b*). However, initially we take this price as a fixed parameter.

Since the size of the winning coalition determines the number of supporters who receive private goods, the implicit price of private goods is equivalent to the size of the coalition. The incumbent needs to provide enough public and private goods to retain the loyalty of members of the winning coalition but she wants to spend as little as possible subject to that constraint (with the characteristics of that constraint developed more fully in the next section). Then, whatever is left over after securing coalition loyalty can be used at the incumbent's discretion. Thus, the leader has R revenue and intends to spend $m \leq R$ of

[7] A simple way to ensure such interior solutions is $lim_{g \to 0} \frac{du(g,z)}{dg} \to \infty$ and $lim_{z \to 0} \frac{du(g,z)}{dz} \to \infty$.

it as rewards for her coalition. Since the cost of providing public goods is p and the price of private goods is proportional to the number of people who receive them, W, then the leader's budget constraint is

$$R \geq m = p\,g \,+\, W\,z \tag{2.1}$$

The leader seeks to maximize coalition rewards, $u(g, z)$, subject to this budget constraint.[8] Formally,

$$\underset{g\geq 0, z\geq 0}{\text{Maximize}}\; u(g,z) \text{ subject to } m = p\,g \,+ W\,z \tag{2.2}$$

Using the notation that the marginal utility from public goods, $u_g(g, z)$, equals $\frac{du(g,z)}{dg}$; that is, the amount by which the total utility from public and private goods changes as the quantity of public goods changes, this maximization allows us to state formally how coalition size affects the mix of goods leaders provide:

Proposition 1. *As coalition size increases, the ratio $\frac{g}{z}$ increases. In particular, an incumbent leader provides a mix of policies such that*

$$\frac{u_g(g,z)}{p} = \frac{u_z(g,z)}{W} \tag{2.3}$$

The proposition shows that the ratio of marginal value divided by marginal cost is the same for both public and private goods. If this condition did not hold, then the leader could provide less of the good with the lower ratio, provide more of the good with the higher ratio and deliver a higher level of rewards to her coalition (or alternatively deliver the same level of rewards but spend less). For our standard illustrative case in which $u(g, z) = \sqrt{g} + \sqrt{z}$, the leader's optimal policy provision is $g = m\frac{W}{p(p+W)}$ and $z = m\frac{p}{W(p+W)}$ so the ratio of public to private goods is $\frac{g}{z} = \frac{W^2}{p^2}$. This ratio tells us that as coalition size increases, the leader produces a greater proportion of public goods. Since the size of the winning coalition, W, effectively functions as a price for private goods, the cost of private goods increases as the coalition's size enlarges. Consequently, the leader buys more public goods rather than the increasingly expensive private goods. This finding constitutes our first key result:

Result 1. *The proportion of policy rewards in the form of public goods, $\frac{g}{z+g}$, increases as winning coalition size increases.*

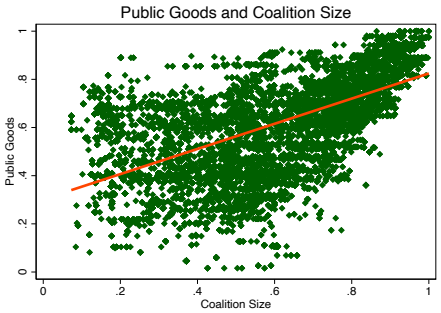
[8] Alternatively, we might ask how can the leader minimize spending while providing a certain level of rewards for the coalition's members. These maximizations are closely related.

Of course, selectorate theory is not unique in its contention that more democratic societies are more likely to provide public goods (and freedom, a type of inexpensive public good we discuss later) or that non-democratic polities are more likely to be corrupt. It does, however, provide foundational logic to indicate why these patterns hold. Nevertheless, it is important to recognize the rich literature on these themes. Deacon and Saha (2006) provides an excellent review of the literature on public goods provision, as well as excellent discussions of alternative perspectives. Deacon (2009) and Lake and Baum (2001) provide robust empirical evidence that democracies provide more public goods than non-democracies. Besley and Kudamatsu (2006) show democracies provide better health outcomes than autocracies. Cruz, Labonne and Querubin (2020) probe variation in domestic political fractionalization to tease out how the interaction of social network structure and political versus community control influences the provision of public goods in a democratic setting. Niskanen (1997) and McGuire and Olson (1996) provide important alternative approaches. Deacon (2009) addresses the possibility, pointed out by Alesina, Baqir and Easterly (1999), that heterogeneous tastes and disagreements over the specific features of public goods can affect public goods provision under any system of government. Persson, Roland and Tabellini (2000) and Persson and Tabellini (2005, 2004) investigate the influence of majoritarian versus proportional voting rules on policy choices, thereby examining the impact of institutional variance within democracies. Similarly, Besley and Case (2003) examine the policy effects of institutional variations that are more detailed than the coarse majoritarian versus proportional, and presidential versus parliamentary dichotomies. The institutions they consider are the presence or absence of poll taxes, the extent of voter literacy tests, policies that ease voter registration, open primaries, campaign spending limits, term limits for incumbents, and provisions for citizen ballot initiatives. All of these are, of course, important, nuanced variants on how institutions influence policy provision. None are incompatible with the general perspective offered here.

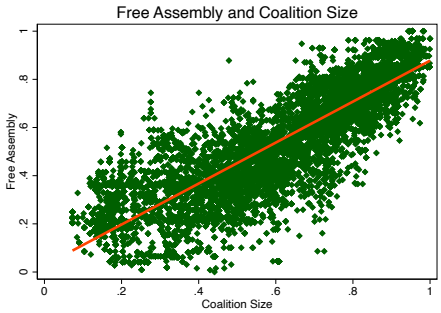
Although we do not turn to the question of serious empirical testing until Chapter 4, it is useful to at least provide some simple prima facie evidence for this first, core implication of selectorate theory. The four graphs in Figure 2.1 show scatter plots of some basic forms of policy provision against the size of W. The measurement of coalition size is explained in detail in Chapter 4 and, as well, in Bueno de Mesquita and Smith (2022). The graph's panels labeled as public goods, freedom of assembly, and private goods (corruption) display the distribution, respectively, of the V-Dem variables v2peapspol, v2caassembl, and v2excrptps for all countries for the years 1960-2022 (Coppedge et al. 2023). These

measure general access to public services, freedom to assemble peacefully, and executive bribery and corrupt exchanges. We normalize each to fall between 0 and 1. The fourth panel shows a measure of press freedoms produced by Freedom House (Freedom House, 2020). The solid line in each graph shows the best-fitting linear relationship between the y-axis variable (Public Goods, Assembly, Private Goods, or Freedom of the Press) and coalition size with no control variables whatsoever. Of course, these very basic graphs are purely to illustrate the face validity of our first result which, as we have noted, is more thoroughly tested elsewhere (Bueno de Mesquita and Smith, 2022; Morrow et al., 2008). Nevertheless, these first-cut scatters of the data clearly support one of the fundamental implications of selectorate logic: larger coalition governments provide more public goods, more coordination goods (freedoms) and fewer corruption opportunities (private goods) than do smaller coalition regimes.

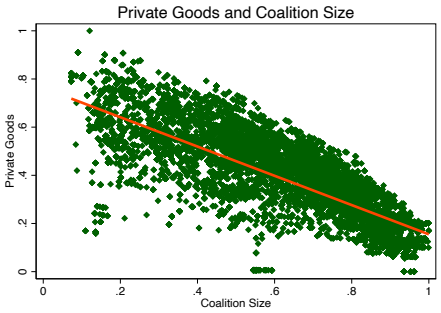
Figure 2.1: Policy Provisions and Winning Coalition Size



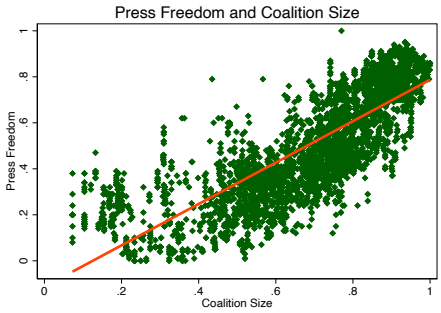
(a) Public Goods (V-Dem)



(b) Freedom of Assembly (V-Dem)



(c) Private Goods (V-Dem measure)



(d) Press Freedom (Freedom House measure)

With Result 1's claims supported by evidence, we now reflect on total regime spending

on public and private goods as coalition size changes. Doing so will provide the foundation for assessing institutional preferences among leaders, coalition members, selectors, and the disenfranchised according to basic selectorate logic. It will also take us to an evaluation of how the price of public goods (p) might modify those preferences. To undertake that analysis we begin with a key constraint: what does it take to survive threats from political rivals.

2.1.4 The Incumbency Constraint

Every incumbent leader has to work out what the right amount (m) is to spend on their coalition given that the leader wants to survive in power and, conditional on survival, wants to maximize the amount ($R - m$) that is retained for her own discretionary use. These discretionary uses might be as banal as outright kleptocracy. Alternatively, leaders might pursue their own pet policy projects. Solving these allocation choices highlights the fundamental problem that any leader faces. Spend too much on the coalition and there is less for the incumbent's discretionary use; spend too little and coalition members contemplate defecting to a challenger. In that case, the leader faces the problem eloquently laid out by Italo Calvino: there is always someone waiting in the wings, eager to overthrow the ruler, taking his scepter, his crown, and maybe even his head. Thus, leaders must work out how much they need to compensate their coalition to maintain its loyalty in the face of a rival. The amount they must spend defines their *incumbency constraint*; that is, the payment to their coalition that is just enough so that its members prefer to remain loyal rather than defect to a challenger.

Consider an infinitely repeated game where all players have a common discount factor δ. When viewed from the current period, the value of receiving a reward worth 1 in the next period is $\delta < 1$. This discount factor reflects a person's inherent level of patience.

The stage game is as follows:

1. Leader proposes a coalition of size W composed of the leader's highest affinity members of the selectorate and offers a provision of public and private goods, g_L, z_L

2. The challenger proposes a coalition of size W (that includes at least one member of L's coalition) and policy provisions g_A and z_A.

3. The members of the incumbent's coalition choose whether to remain loyal or defect. If any member defects, then the challenger comes to power.

4. The affinity ordering of the leader (be that the incumbent or the challenger) is revealed.

In this basic exposition of the theory we assume that both the leader and challenger reward coalitions of size W. As noted earlier, A2.1 and elsewhere we examine alternative deposition rules (Bueno de Mesquita et al., 2002; Bueno de Mesquita et al., 2003). The basic exposition also assumes that beyond differences in their affinity ordering, all leaders are inherently the same. Appendix A2.2 relaxes this assumption, assuming instead that leaders might differ in competence, modeled as leaders producing public goods at different prices. This extension shows how in large W systems incompetent leaders cannot survive, yet in small W systems policy incompetence presents little impediment to leader survival (Egorov and Sonin, 2011). Although such extensions show additional subtle results and demonstrate the flexibility of the selectorate modeling approach, the main results seen in the basic exposition persist. For tractability, we restrict our analysis to this basic approach.

To characterize the substantive results we examine the subgame perfect equilibrium (SPE) in which in each period the leader picks a coalition of the W highest affinity members of the selectorate, provides the optimal policies for survival, g^*, z^*, and survives while maximizing her level of disposable income $(R - m^*)$. That is to say, in each period she spends just enough to retain power and keeps the rest of the resources for herself.

To start our characterization of the leader's policies, we consider what the challenger can offer to potential supporters. Given that there are R available resources, the challenger can do no better than to offer to spend all of the resources optimally to reward those in the coalition he is trying to form. That is, the amounts g_A and z_A are proposed such that $R = p\, g_A + W\, z_A$ and the mix of goods is as described by equation 2.3. For the case of $u(g, z) = \sqrt{g} + \sqrt{z}$, our illustrative utility function, $g_A = R\frac{W}{p(p+W)}$, $z_A = R\frac{p}{W(p+W)}$, and $u(g_A, z_A) = \sqrt{R}\frac{\sqrt{p+W}}{\sqrt{p\,W}}$.

Naturally, a savvy challenger will promise to continue to spend all available resources on the coalition that brings him to power. But those selectors contemplating backing him should never believe such political promises. Once in power, the new leader can survive in office by paying a coalition of the W highest affinity selectors, giving them g^*, z^* in each period and keeping the maximum discretionary funds for himself $(R - m^*)$. A new incumbent could in principle pay more and retain those who brought him to power. But he prefers to surround himself with those he likes and save as much money as possible for himself. If the challenger becomes leader, then his long-term coalition will be the selectors

with whom he has highest affinity and he will pay them what he needs to in order to survive, but not more. Later we elaborate on the distribution of affinity and how it is revealed. However, for now we simply recall that each prospective defector to the challenger knows that his or her chance of being in the challenger's ongoing, future winning coalition is $\frac{W}{S}$, meaning that there is a $1-\frac{W}{S}$ chance of being excluded from the coalition and its private goods benefits.

The essential question every supporter of the incumbent must ask themselves is, will I be better off sticking with the incumbent or defecting to the challenger? As we have seen, the best any challenger can credibly offer is to spend everything today for the benefit of the coalition that brings him to power. That is worth $u(g_A, z_A)$ to each of his coalition members. Should the rival be in power tomorrow, however, then he will pick a coalition of the W highest affinity selectors and pay them g^*, z^* in every future period and survive. Given this best possible offer, coalition member i's expected value from deposing the incumbent is:

$$\begin{aligned} U_i(\text{depose incumbent}) &= \underbrace{u(g_A, z_A)}_{\text{immediate reward}} + \delta \left(\underbrace{\frac{W}{S} u(g^*, z^*)}_{\text{in coalition}} + \underbrace{\left(1 - \frac{W}{S}\right) u(g^*, 0)}_{\text{outside coalition}} \right) \\ &+ \delta^2 \left(\frac{W}{S} u(g^*, z^*) + \left(1 - \frac{W}{S}\right) u(g^*, 0) \right) + ... \\ &= \underbrace{u(g_A, z_A)}_{\text{immediate reward}} + \underbrace{\frac{\delta}{1-\delta} \left(\frac{W}{S} u(g^*, z^*) + \left(1 - \frac{W}{S}\right) u(g^*, 0) \right)}_{\text{Net Present Value of future rewards}} \end{aligned} \tag{2.4}$$

Thus, equation 2.4 says that any defector from the current winning coalition can expect to get a full complement of benefits today (when t=0). But tomorrow and every day thereafter ($t = 1, 2, ..., \infty$), the defector only gets the private goods benefit probabilistically ($\frac{W}{S}$) and with a $1-\frac{W}{S}$ chance is excluded from the long-term winning coalition of the challenger and so gets the benefit of whatever public goods are provided along with 0 private goods. Of course, the future value of benefits is discounted by δ^t in each subsequent time period t.

If coalition members remain loyal to the incumbent, then they can each anticipate

receiving

$$\begin{aligned} U_i(\text{retain incumbent}) &= u(g^*, z^*) + \delta u(g^*, z^*) + \delta^2 u(g^*, z^*) + ... \\ &= \frac{u(g^*, z^*)}{1-\delta} \end{aligned} \tag{2.5}$$

To survive, the incumbent needs to provide rewards at least as large as the challenger's best offer, meaning equation 2.5$\geq$ equation 2.4. Since the leader wants to minimize expenditures, the incumbent satisfies this comparison at equality.

Proposition 2. *The policy provisions (g^*, z^*) that characterize the Subgame Perfect Equilibrium provisions in which the incumbent rewards a coalition of the W highest affinity selectorate members satisfy*

$$\frac{u_g(g^*, z^*)}{p} = \frac{u_z(g^*, z^*)}{W} \tag{2.6}$$

$$\frac{u(g^*, z^*)}{1-\delta} = u(g_A, z_A) + \frac{\delta}{1-\delta}\left(\frac{W}{S}u(g^*, z^*) + \left(1 - \frac{W}{S}\right)u(g^*, 0)\right) \tag{2.7}$$

where

$$\frac{u_g(g_A, z_A)}{p} = \frac{u_z(g_A, z_A)}{W} \text{ and } p\, g_A + W\, z_A = R \tag{2.8}$$

For the simple case that $u(g, z) = \sqrt{g} + \sqrt{z}$, we can obtain explicit solutions for the policy provisions $g^* = \sqrt{R}\frac{(p+W)S(1-\delta)}{p(S-\delta W)+S(1-\delta)}\sqrt{\frac{W}{p(p+W)}}$ and $z^* = \sqrt{R}\frac{(p+W)S(1-\delta)}{p(S-\delta W)+SW(1-\delta)}\sqrt{\frac{p}{W(p+W)}}$ where the theory tells us that in equilibrium, spending is as follows:

$$\begin{aligned} \text{Ratio of pubic and private goods, } \frac{g^*}{z^*} &= \frac{W^2}{p^2} \\ \text{Proportion of resources spent, } \frac{m^*}{R} &= \left(\frac{(p+W)S(1-\delta)}{p(S-\delta W)+SW(1-\delta)}\right)^2 \\ \text{Coalition rewards, } u(g^*, z^*) &= \sqrt{R}\frac{\sqrt{p+W}}{\sqrt{pW}}\left(\frac{(p+W)S(1-\delta)}{p(S-\delta W)+SW(1-\delta)}\right) \\ \text{Non-coalition rewards, } u(g^*, 0) &= \sqrt{R}\frac{\sqrt{W}}{\sqrt{p(p+W)}}\left(\frac{(p+W)S(1-\delta)}{p(S-\delta W)+SW(1-\delta)}\right) \\ \text{Leader's discretionary resource, } R - m^* &= R\left(1 - \left(\frac{(p+W)S(1-\delta)}{p(S-\delta W)+SW(1-\delta)}\right)^2\right) \end{aligned}$$

Given these expectations that have been derived from the basic selectorate model, we can now generally characterize how institutional arrangements affect policy provision under the incumbency constraint as the second major result from the theory:

Result 2. *The leader spends a larger proportion of her available resources on policy rewards as W increases, S decreases, p decreases and δ decreases.*

The second result of the basic theory implies that leaders dislike large coalition, 'democratic' governments; that is, they do not want their government to have a large W in which $\frac{W}{S}$ is large. And perhaps surprisingly, as well as significantly, they seem to prefer that their society suffers from low economic efficiency; that is, productivity, so that p, the price of public goods, is high. We develop this implication much more fully later in this chapter. For now, it is evident from Result 2 that when p is larger, leaders can keep a larger proportion of government revenues for themselves. With these observations in mind, it seems important now that we examine just how the implications of Results 1 and 2 translate into the preferences over institutional configuration held by leaders, coalition members, and those in the masses.

2.2 Induced Preferences over Institutions

The basic selectorate model provides a means to characterize the preferences of different political groups over institutional arrangements based on the benefits those arrangements provide for them. Given the equilibrium policy provisions and our illustrative shape for utility functions, the coalition's rewards are $u(g^*, z^*) = \sqrt{m}\sqrt{\frac{p+W}{pW}}$, and those outside the coalition receive $u(g^*, 0) = \sqrt{m}\sqrt{\frac{W}{p(p+W)}}$, where $\sqrt{m} = \sqrt{R}\left(\frac{(p+W)S(1-\delta)}{(S-\delta W)+SW(1-\delta)}\right)$. Since there are always some private goods that go to coalition members, the rewards to individual coalition members are always greater than the rewards to individuals who are outside the coalition and are not in the leadership.

The welfare of those in the coalition depends on the mix of goods that a leader provides and how much of the available resources the leader spends to reward supporters. Of course the mix and effort considerations also affect the welfare of those outside of the coalition, but this occurs coincidentally and is not a consideration in the leader's choice: those outside the coalition do not determine the leader's political fate.

The mix effect, which we will also refer to as a dilution effect, means that for a fixed level of spending, m, the welfare of the coalition is decreasing in W. As W increases, the effective

cost of providing private goods increases. Simply put, any resources spent on private goods are spread over more supporters and so such dilution means that each supporter receives less. As W increases, private goods are less effective at rewarding supporters and so the leader changes the mix of policies to buy relatively more public goods. For any fixed spending level, coalition members experience a dilution in their private goods as W expands. However, there is a competing effect. As W increases, leaders spend more.

Institutional changes that increase coalition size also induce an increased effort effect, by which we mean the leader spends a greater proportion of her available resources as W increases so that the level of m is not fixed; instead, leader spending (m^*) increases with W. Formally, $\frac{m^*}{R} = \left(\frac{(p+W)S(1-\delta)}{(S-\delta W)+SW(1-\delta)}\right)^2$, which increases in W and decreases in S.
As W increases, leaders need to spend more of their available resources to keep their coalition loyal. The origins of this effort effect arise from two sources related to the cost and risk of being excluded from future winning coalitions. If a coalition member defects to a challenger, then they have a $(1-\frac{W}{S})$ chance of being excluded from the new leader's long run coalition, in which case they miss out on private goods in the future. However, as W increases both the consequences and the risks of such exclusion becomes less salient and so the incumbent needs to spend more to buy loyalty. First, an increase in W means leaders focus more on public goods than on private goods. Selectors receive these public benefits whether they are included in the coalition or not. The relative decline in private goods means supporters lose less if they are excluded and so the consequences of exclusion are less severe. Second, the risk of exclusion from the coalition, $(1-\frac{W}{S})$, declines as coalition size increases, holding selectorate size constant, since challengers needs more of the available selectors in their long run coalition. With the risks and consequences of exclusion from future private goods under a new leader lessened, defection becomes more attractive and so the incumbent must spend more to maintain her supporters' loyalty; that is, to satisfy the incumbency constraint.

Selectorate size also affects a leader's policy provision, but only through the effort mechanism. The selectorate size does not alter the ratio of public to private goods. However, S affects the effort a leader must make to satisfy the incumbency constraint: the proportion of the available resources a leader must spend on rewards, $\frac{m^*}{R} = \left(\frac{(p+W)S(1-\delta)}{(S-\delta W)+SW(1-\delta)}\right)^2$, is decreasing in S. An increase in S (at constant W) means that should a supporter defect then they have a reduced chance of being in the challenger's long run coalition and this reduces the expected value of what the challenger can offer. The incumbent can reduce

effort, spend less and still match the challenger's best offer.

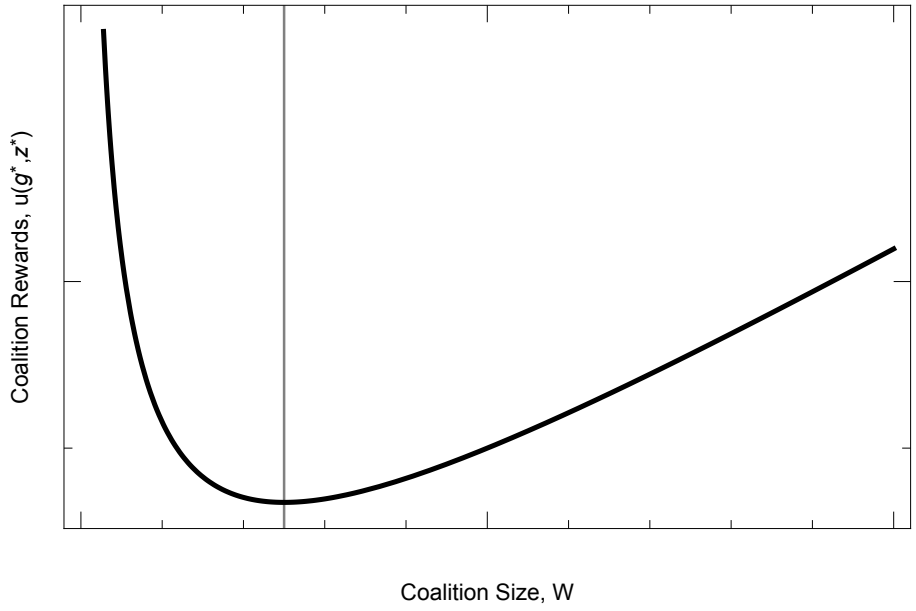
The policy mix and effort considerations provide a simple means to understand the preferences of different political groups over institutional arrangements. The leader's goals are to survive in power and retain as many discretionary resources as possible. While leaders like discretionary resources for their own sake, another useful way in which to conceptualize the amount of discretionary resources is as a buffer or cushion that the leader can use to compensate her supporters in the event of some unforeseen shock. The more slack the leader has in her budget, the easier it is to accumulate a rainy-day fund to make up for any errors she might make or shocks she might face. Retaining power is the essential goal of all leaders and more discretionary resources makes this goal more achievable.

Leaders must make greater effort and spend more of their available resources on maintaining coalition loyalty as coalition size increases. Mathematically, the leader's discretionary resources are $R - m^* = R\left(1 - \left(\frac{(p+W)S(1-\delta)}{(S-\delta W)+SW(1-\delta)}\right)^2\right)$ which is increasing in S and decreasing in W. These effects move in opposite directions. However, the coalition size effect dominates in the sense that if we consider a fixed ratio $w = \frac{W}{S}$, and a simultaneous increase both in W and S while maintaining the ratio w, leader welfare declines. Leader's like rigged electoral autocracies in which potentially anyone can be a member of the winning coalition (large S) and the leader needs few people to retain power (small W). In contrast, from the leader's perspective, mass-franchise democracy is the worst form of governance.

The selectorate members and the disenfranchised masses like large W and small S systems. Comparing a selector's desire for large W and small S, the former dominates the latter in the sense that if the ratio $w = \frac{W}{S}$ is fixed, selectors want both W and S to increase. The selectorate has a clear interest in enlarging the coalition based on both the mix of goods and the effort of leaders. As W increases, leaders focus on public goods that benefit those outside the coalition. Further, as W increases, the leader must try harder and spend a larger proportion of her resources. With more being spent and a focus on public goods in large W systems, it is small wonder that revolutionaries advocate for democracy. While perhaps sincere in these professed institutional changes when attempting to topple the incumbent regime, should the revolution succeed then revolutionary leaders will immediately see the benefit of a small W system.

While the institutional preferences of both those outside the coalition and those in

Figure 2.2: Winning Coalition Size and Equilibrium Rewards for Coalition Members: Swoosh Curve



the leadership are monotonic with respect to coalition size, the preferences of the winning coalition are more complex. Winning coalition members have mixed incentives that run counter to each other with respect to the size of the winning coalition. The dilution of private goods and the increased leader effort to sustain loyalty as W increases pull in different directions. Figure 2.2 graphically illustrates how the coalition's preferences are asymmetrically U-shaped with coalition welfare high at both extremes but lower at intermediate values. Of course, the exact shape of the function in terms of where its minimum occurs and how steeply the slope rises past the minima varies in important ways as explained later. We will sometimes refer to the shape of the coalition's welfare function as the 'swoosh' curve.

As coalition size increases, leaders shift the focus of their policy provisions towards public goods. For any fixed level of spending, the dilution of private goods associated with increasing W reduces the welfare of coalition members. However, leader spending is not constant. As W increases, leaders must spend more of their available resources to maintain coalition loyalty. Mathematically, these competing effects can be seen by differentiating

the coalition's equilibrium payoff by coalition size:

$$\frac{du(g^*,z^*)}{dW} = \underbrace{-\frac{\sqrt{R}}{\left(2\sqrt{\frac{W+p}{Wp}}W^2\right)}\frac{((p+W)S(1-\delta))}{(p(S-\delta W)+SW(1-\delta))}}_{\text{dilution of private goods}} + \underbrace{\sqrt{R}\sqrt{\frac{p+W}{pW}}\frac{(pS(p+S)(1-\delta)\delta)}{(p(S-W\delta)+SW(1-\delta))^2}}_{\text{increased effort}} \tag{2.9}$$

The dilution of private goods has greater impact than the effect of increased effort in small coalition settings so coalition welfare is decreasing in W when the coalition is initially small. In contrast, when the coalition is initially large, the effort effect dominates the dilution effect which means that the coalition's welfare is increasing in W. At the lowest point in the 'U'-shaped welfare graph, which occurs at a coalition size of $W = \frac{pS}{3p\delta+3S\delta-3S}$ and is indicated by the vertical line in Figure 2.2, the two effects perfectly cancel out.

With respect to selectorate size, the members of the winning coalition have clear monotonic preferences based on the level of effort made by leaders. Coalition members prefer the smallest size selectorate possible for any given W, with the proviso that W must be less than S. As the number of potential alternative supporters increases, the value of the challenger's offer diminishes. This is true because the risk of long-term exclusion for any coalition member rises as selectorate size increases relative to coalition size, and so the incumbent can spend less and still match the challenger's best offer. If we consider the ratio $w = \frac{W}{S}$, then as w increases the coalition's preferences have a similar 'U'-shape to that seen in Figure 2.2, with the minimum occurring at $w = \frac{p}{3\delta(p+S)-S}$. If the ratio $w = \frac{W}{S}$ is fixed and $w > \frac{3\delta-1}{2\delta}$, the coalition's welfare is U-shaped with a minimum at $S = \frac{(p(-1+w\delta))}{(w+w(-3+2w)\delta)}$. If $w < \frac{3\delta-1}{2\delta}$ then the coalition's welfare is always decreasing in S.

The asymmetric 'U'-shape of coalition welfare has simple theoretical origins but it has profound implications for instability. In large coalition systems, the interests of the coalition align with those of the selectorate and the disenfranchised. They all want to further increase W; only the leader opposes such expansion. In contrast, in the smallest W systems, the leader and the coalition's interests align against the selectors and the masses. Leaders and coalition members each desire further contraction of W, with, of course, the proviso that they are not the ones being purged. It is at intermediate values of W, near the low point in the welfare graph, that things get interesting and instability is most prevalent. Coalition members can be made better off by supporting the expansionary desires of the masses, but they can also be made better off by purges and increased autocracy.

Result 3 (Institutional preferences of different political groups)**.** *The institutional preferences of selectors, coalition members and leaders are as follows:*

- *The welfare of selectorate members outside of the coalition is increasing in coalition size and decreasing in S. If the ratio* $\frac{W}{S} = w$ *is fixed then the selectors prefer that both* S *and* W *increase.*

- *The welfare of winning coalition members is decreasing in* S *and is non-monotonic in* W *(and the ratio* $\frac{W}{S}$*), with intermediate values of* W *(and* $\frac{W}{S}$*) providing the lowest levels of rewards.*

- *The welfare of a leader is decreasing in* W*, decreasing in the ratio* $\frac{W}{S}$*, and increasing in S. If the ratio* $\frac{W}{S} = w$ *is fixed then the leader prefers that both* S *and* W *contract.*

2.2.1 Varying the Size of W and S Under Rawls's Veil of Ignorance

Throughout this book we analyze institutions and instability from a positivist perspective; that is to say, we study the consequences of institutions for the welfare of different groups and for their effects on the likelihood of instability. Under all but a very limited set of circumstances that we develop in the next chapter there are no Pareto improving institution changes. Increases in W or contractions in S harm the leader's welfare and change in the opposite direction harms the disenfranchised and those selectors outside the coalition. With very few exceptions, everyone cannot be made better off.[9] As scientists, we should characterize the properties of different institutional configurations rather than being advocates for one over another. Such advocacy is the job of philosophers and those seeking to change institutions. And we should note that in the latter case, those making arguments for change inevitably argue for changes that enhance their own welfare. However, in this section we will verge on advocating a normative point of view by looking at institutions from the Rawlsian perspective 'behind the veil of ignorance' (Rawls, 1971; Harsanyi, 1953). Rawls asks what one would choose from behind the veil of ignorance, meaning in ignorance of the role or condition that one will find themselves in after society chooses its action or configuration. The answer to Rawls's question also generates an important positive result which we use as our excuse for exercising our normative bias in favor of the welfare of the people over the welfare of the elites and leaders.

Rawls's arguments are far more sophisticated than our simple exposition here. In the context of the selectorate model, Rawls's question is effectively, what political institutions,

[9] If, however, a leader has a relatively large coalition and has a high probability of dying soon, then, for instance, expanding W could be in the interest of the leader, coalition members, selectorate members and the disenfranchised.

W and S, would you pick before you know whether your role in society will be leader, coalition member, selector, or a member of the masses. Placing one behind the veil, ignorant of one's role in society, then with probability $\frac{W}{N}$ a person could be in the winning coalition; with probability $\frac{S-W}{N}$ a person would be a selector outside the coalition; with some very tiny probability, ε, a person might be leader; and the rest of the time a person would be disenfranchised. In a large society the chance of being the sole person designated leader is incredibly small, so we do our utilitarian calculation of the Governance Value of the political system in the limit as $\varepsilon \to 0$. In the basic model, where leader change does not occur, the coalition's payoff is $u(g^*, z^*)$ and everyone else (selectors outside W and the masses) receive $u(g^*, 0)$. Given these payoffs and probabilities of being assigned to each role, the expected Governance Value is:

$$\begin{aligned}
\text{Governance Value} &= \frac{W}{N}u(g^*, z^*) + (1 - \frac{W}{N})u(g^*, 0) \\
&= \underbrace{\sqrt{R}\frac{\left(\sqrt{p+W}S(1-\delta)\right)}{p(S-\delta W)+SW(1-\delta)}}_{\text{effort}} \underbrace{\left(\underbrace{\frac{W}{N}\sqrt{\frac{p}{W(p+W)}}}_{\text{private goods}} + \underbrace{\sqrt{\frac{W}{p(p+W)}}}_{\text{public goods}} \right)}_{\text{mix of policy provisions}}
\end{aligned}$$

Rather than show the full calculus of Governance Value, we can rely on our results above. As seen earlier, leader effort is increasing in W, decreasing in S, and increasing in the ratio of $w = \frac{W}{S}$. Further if this ratio is fixed, then leader effort increases as W and S both simultaneously increase. Given that there is a limit on the ratio $w = \frac{W}{S}$ then leader spending is maximized when there is full enfranchisement ($S = N$) and the winning coalition is as large a fraction of the selectorate as possible. In practical terms, this means direct democracy with compulsory voting, in which case $w = \frac{W}{S} \to \frac{1}{2}$.

We turn next to the latter term in the Governance Value equation, the mix of policy provisions. For any given level of spending, those behind the veil have a $\frac{W}{N}$ chance of getting private goods and always receive the public goods. As W increases the value of private goods is reduced, but this is more than offset by the increase in public goods and the increased likelihood of receiving private goods. Behind the veil everyone chooses large W systems. The logic of this result has important positivist implications. Current coalition members are opposed to any contraction in coalition size if they each have an equal probability of being included in the contracted coalition.

Suppose a winning coalition of size W was offered a lottery. The lottery involves a contraction in the size of the winning coalition to W'. Being included in the contracted coalition means winning the lottery and losing is equivalent to being excluded from the contracted coalition. If a current supporter is include in the contracted coalition, then they will receive more private goods. However, they will only be included in the reduced coalition with probability $\frac{W'}{W}$. Even ignoring that the leader will spend less after the contraction (which further reinforces the argument), the concavity of the utility function $u(g, z)$ means that the lottery makes members of the coalition worse off. Formally, for $W > W'$ and constant leader spending, $m = m'$, coalition members are better off in the larger coalition with certainty than they are in a fair lottery over inclusion in the smaller coalition:

$$\underbrace{\sqrt{m}\left(\sqrt{\frac{W}{p(p+W)}}+\sqrt{\frac{p}{W(p+W)}}\right)}_{\text{public and private goods in } W} > \underbrace{\sqrt{m'}\left(\sqrt{\frac{W'}{p(p+W')}}+\frac{W'}{W}\sqrt{\frac{p}{W'(p+W')}}\right)}_{\text{public and chance of private goods in } W'}$$

Thus, behind the veil of ignorance, coalition members and non-coalition members are better off when the coalition and selectorate are as large as is feasible. There are other implications that build on these insights. In particular, the exact shape of a coalition member's utility function and how that function varies with the implicit price of private goods (W) and the explicit price of public goods (p) has, we believe, additional, important implications that provide a micro-foundation for the well-documented correlation between economic growth and democracy; that is, for the pillars behind modernization theory. It also has important implications for the conditions under which democratic governments are 'immunized' against successful coups or mass uprisings while non-democratic governments and low-productivity, high p, large coalition governments are susceptible to such destabilizing events.

2.3 New Insights within the Basic Selectorate Theory

The exposition thus far provides the very basic mathematical description of the selectorate model. This model has been extended in numerous ways. While these extensions uncover subtle nuances, the main results persist: leaders focus on public goods and spend more to reward their supporters as coalition size increases; leaders prefer small W systems; selectors

and the disenfranchised prefer large W systems, and the winning coalition's welfare is non-monotonic in W. In this section, we extend the basic theory by examining what happens if productivity improves, thereby reducing the price of public goods (p).

2.3.1 The Price of Public Goods and Modernization Theory

The central premise of Modernization Theory (Lipset, 1959) (for a review see Cheibub and Vreeland (2016)) is that economically developed nations are more likely to democratize (Burkhart and Lewis-Beck, 1994; Jackman, 1973; Treisman, 2015). The selectorate results we have reported offer micro-foundations for the central empirical regularities behind modernization theory. Although the contention that economic growth causes democratization has been largely falsified, the correlation between growth and democracy is well established primarily as a function of the relative frequency of survival of democratic institutions (Przeworski and Limongi, 1997*b*; Przeworski et al., 1996; Przeworski, 2005). The selectorate theory's explanation of institutional preferences as a function of p and W provides a novel explanatory perspective behind the correlations between variance in economic growth, changes in government accountability, and differences in institutional survival.

To understand how selectorate logic helps explain the empirical regularities associated with modernization theory we focus attention now on how coalition welfare and institutional incentives vary as the price of public goods varies. Of course, different public goods, such as health care policies, education policies, or infrastructure development, each have different price tags. We have in mind by p the average cost of providing access to a 'unit' of the social bundle of government-provided public goods rather than the individual monetary cost of any specific 'public' good policy. Although we believe this is a readily understandable economic and social construct, it is not to our knowledge a concept that has been previously studied or measured. With that in mind, we begin by assuming that bureaucratic and administrative competence, technological development, and the associated increases in labor productivity reduce the price (p) of providing public goods. This perspective is broadly in keeping with a large body of economics literature on the links between human capital, labor productivity, and economic growth (Becker, 1964; Card and Krueger, 1992; Galor and Weil, 2000; Glaser, 1963; Jones and Romer, 2010; Mankiw, 2020). But it departs from standard economic accounts by more strongly emphasizing the political nexus between changes in productivity, changes in the government's policy choices, and variations in democratization or autocratization as a function of coalition and selectorate

size.

To place the selectorate argument within the modernization discussion, we refer to productivity (or modernity) as inversely related to the price of public goods. As a society becomes more productive, it can produce public goods at a lower price, so the parameter p is assumed to be decreasing in productivity.

Looking back at the two fundamental equations of selectorate logic; that is, the optimal mix of public and private goods and the incumbency constraint (Proposition 2), we can assess how the price of public goods (p) and the implicit price of private goods (W) interact to shape fundamental policy choices and institutional dynamics. We can see, for instance, that as p decreases, meaning that productivity has increased, the range of W for which the welfare of the coalition is increasing is enlarged. Put another way, technological advancement and greater human capital reduce the cost of public goods, making the winning coalition's members more likely to support the expansion of their coalition. Coalition members support increased governmental accountability as a way to improve their own welfare as productivity improves. We can see this by investigating how the slope of coalition welfare (as a function of W) varies in response to changes in the price of public goods.

From a formal mathematical perspective, the modernization results follow as a consequence of

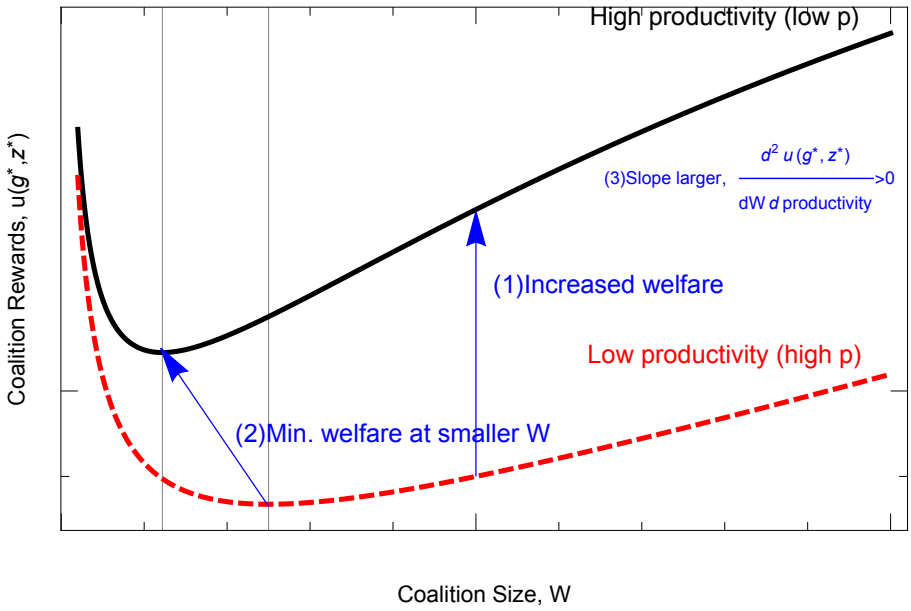
$$\frac{d^2u(g^*,z^*)}{dWdp} = -\frac{6(1-\delta)^2\delta^2S^2(p+S)(p+W)(S-W)}{(p(S-\delta W)+(1-\delta)SW)^4} < 0 \tag{2.10}$$

While the calculation involves numerous moving parts, the substance of the argument can be described graphically. The coalition's equilibrium welfare, $u(g^*, z^*)$, and coalition size is an asymmetric 'U'-shaped function that is derived from the dilution effect and the effort effect that is characterized in equation 2.10. Figure 2.3 shows the coalition's theoretical welfare in a low productivity (high price p) society (dashed line) and a high productivity (low price p) society (solid line), helping to generalize further the implications from Figure 2.2. As annotated on the graph, an increase in productivity has three direct consequences:

1. the welfare of the coalition increases, $\frac{du(g^*,z^*)}{dproductivity} > 0$,
2. the minimum of coalition welfare occurs at a smaller coalition size,
3. the slope of the coalition welfare curve increases, $\frac{du^2(g^*,z^*)}{dW\,dproductivity} > 0$

The implications captured in Figure 2.3 have important consequences regarding the

Figure 2.3: Winning Coalition Size and Equilibrium Rewards for Coalition Members



coalition's incentives for protecting or subverting democracy as a function of the price of public goods production.[10] For a sufficiently low price of public goods production, the upward slope of the swoosh curve (that is, the incumbency constraint at each value of W) is so steep that at a relatively small coalition size it exceeds the welfare function's local maxima that is achieved when W is as small as possible. If productivity is so high that public goods are sufficiently inexpensive, then coalition members can expect to be so much better off by further expanding W than they would be even if they survived a purge and were members of a tiny winning coalition, that they are incentivized to promote democratization and preserve democracy.

The coalition size at which the swoosh curve reaches its minimum depends on p. In non-productive societies, those in which p is large, the minimum welfare for coalition members occurs at a relatively large W. In contrast, the turning point in coalition welfare occurs at a relative small winning coalition size in productive societies (low p). This means that when society is productive, coalition expansion gains support at a smaller W. Unsur-

[10]Figure 2.3 assumes $R = 1$, $S = 2$, $\delta = 0.8$ and high and low productivity are represented by $p = 0.2$ and $p = 0.5$.

prisingly, societies that enjoy sufficient technological or human capital advantage that their price for providing public goods is very small, typically enjoy a high level of productivity that yields robust economic growth (Romer, 1994). This, of course, is exactly the key correlation behind modernization theory, although the causal logic and its implications are quite different here than in modernization theory.

Flipping things around, imagine what happens if the polity's technology is extremely primitive or society's human capital is minimal. As the price of a unit of public goods rises to an extremely high level, virtually no public goods are produced. Then once the coalition reaches its minimum welfare, it barely gets better because there are virtually no public goods to offset the dilution of private goods even as its coalition expands. In that case, the coalition's welfare may never surpass what it is when the coalition is tiny (before it reaches its minimum welfare). In societies where the cost of public goods is sufficiently high, growth is limited and it is easier to eschew democratization and, instead, benefit by shrinking the coalition. And, because changes in productivity or human capital acquisition are generally very slow moving, until there are substantial technological improvements or a significant spread in education and workforce skills, societies with a high cost for producing public goods are likely to be trapped in economically and politically difficult circumstances.

Putting these implications together, we can see that 'democracies' with very large winning coalitions and with technological advancement and a well-educated workforce, so that p is small, can make their subjects and their coalition members better off than they expect to be if the coalition is diminished. Such coalition members and subjects will vigorously defend preserving or expanding the democracy that makes them so well off. But if their polity lacks efficiency-enhancing technology, has a poorly educated labor-force, or otherwise suffers from an inability to produce basic public goods (p is large), then the coalition's welfare is not substantially improved by democratization. In that circumstance, democratic reform is unlikely to succeed because coalition members expect to be made better off by remaining loyal to the incumbent rather than pressing for reform. Thus, it matters how large a polity's coalition is for pricing private goods and it matters how efficiently the polity turns expenditures into public goods for the prospects of democracy's survival.

Figure 2.4 provides a graphic depiction that helps explain why high-productivity (low p), large coalition (democratic) nations rarely (or never, depending upon the precise empirics) autocratize. The figure envisions a 10 fold contraction in W from a moderately sized coalition ($W = 0.50$) to a very small coalition ($W = 0.05$). The arrows indicate

how the benefits to members of the winning coalition would differ before and after such a contraction.

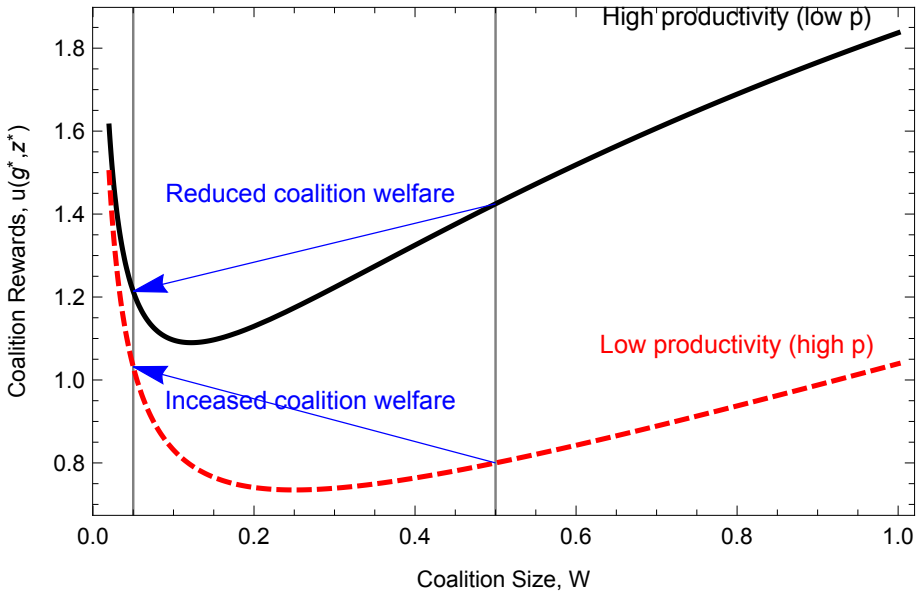
In the case of the low productivity country in Figure 2.4, the equilibrium coalition payoff following a contraction in W increases by about 17%, as indicated by the lower arrow. If a supporter survives the transition, by which we mean that they manage to remain in the coalition as it contracts, then they would be substantially better off. However, 90% of the pre-contraction coalition's membership becomes superfluous for sustaining the leader in power. So supporting such a contraction comes at a huge risk. Given such expectations, coalition members would prefer that a transition not occur, but that is rarely the choice that people face in political circumstances. More likely, they are confronted with a choice of which side to join: if invited, it is much better to be a 'purger' than a 'purgee', and all the more so if the leader pays a short term bonus. We develop a theory of just such choices in the next chapter.

While a leader in a low productivity nation might have a hard time convincing a fraction of her coalition to purge others in the coalition, she is substantially more likely to succeed at doing so than is an equivalent leader in a high productivity economy. The upper arrow in Figure 2.4 shows that an equivalent 10 fold contraction in coalition size would actually reduce the benefits to those surviving to be members of the winning coalition in the post-transition period. They would receive about 22% less than they got from their coalition membership before the coalition's contraction. Not only would supporters face a huge (90%) risk of being purged; even if they survived the transition they would be worse off. Getting supporters to go along with such a contraction would be a Herculean task for any leader.

Figure 2.4 demonstrates why selectorate logic leads to the inference that purges or coups (launched in anticipation of being purged) are much less likely in large coalition, high productivity states than they are in low productivity societies with equally-sized coalitions. Very similar logic applies to the risk of revolution. Citizens are always better off as the size of the winning coalition gets larger and, at any given size coalition, they are better off if productivity is high rather than low.

While we predict the relative security of large winning coalition systems in productive societies, in recent years numerous scholars have expressed concern over democratic backsliding. For instance, Boese-Schlosser et al. (2022); Przeworski (2019); Repucci et al. (2023); Waldner and Lust (2018) all send dire warnings that democracy is under threat. However, in a systematic examination of multiple data sources, Little and Meng (2023) find

Figure 2.4: The Difficulty in Shrinking Coalition Size in a High Productivity Country

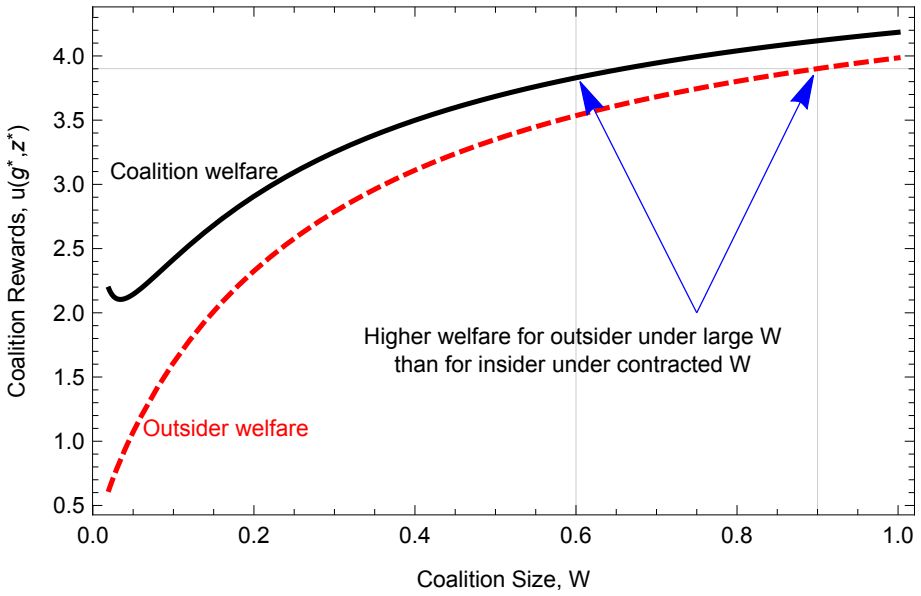


little evidence to support these alarmist claims. As they point out, even if the global average level of certain democracy measures are declining, this does not imply that democratic backsliding is taking place within the most democratic, large W, systems. However, even focusing on average trends for about 20 indicators, they find little support for the argument that democracy is in crisis. Likewise Brownlee and Miao (2022) argue the resilience of democracy and debate its causes.

Based on the modernization results above, we believe that productive large coalition systems are resilient. In modernization terms such systems would be referred to as wealthy democracies. Such systems are resilient precisely because people are concerned to maintain and improve their well-being. When W is large and the price of public goods is low, contraction of the coalition is in virtually no-one's interest. Figure 2.5 illustrates why. The graph plots the welfare of the coalition (solid line) and those outside the coalition (dashed line)[11]. The arrows indicate a contraction in W from 0.9 to 0.6. Such a contraction in W allows the leader to make less effort on behalf of her coalition. Fewer public goods are provided and the leader shifts to a greater private goods focus (although in absolute terms she might deliver fewer private rewards). As a result, the welfare of winning coalition

[11]Figure 2.5 is generated using $\delta = 0.8$, $S = 4$, $R = 10$, $p = 0.1$

Figure 2.5: The Resilience of Mature Democracies: better to be a loser in a large W system than an insider under less accountable institutions



members is diminished. However, what is key to our story is that this contraction is sufficiently severe so as to make the winners in the contracted coalition worse off than the losers (that is, those in S but not in W, or the disenfranchised, those in $N - S$) in a large coalition system. As the arrows indicate, it is better to be out of the coalition in a productive large W system than to be an insider in a contracted system. No one except the leader benefits from such a contraction when society is productive.

As an empirical reference, it might be useful to consider a selectorate account of the events of January 6, 2021 in Washington DC. Then U.S. President Donald Trump wanted to overturn election results. If he had succeeded in decertifying Electoral College votes, then the U.S.'s winning coalition requirements would have been diminished. If we project the implications of Figure 2.5 onto the U.S. case and evaluate the welfare implications, we can see why so few people participated in the insurrection. Even people who benefited from Trump's policies would be better off by retaining a larger coalition political system from whose coalition they were excluded than they would be if they were members of his attempted smaller-sized coalition. So even ignoring the risk of being pushed out of the coalition, many Trump supporters decided they were better off under an accountable, hard-

working Biden than they would be as insiders under a less accountable Trump regime. Such people did not join the insurrection and in the 2022 mid-term election voted to support the maintenance of the U.S.'s large coalition institutions.

2.4 Summation

The theoretical and empirical results we just reviewed remind us that the positivist perspective of selectorate theory provides a foundation for explaining a normative preference for what people more casually refer to as 'democracy.' At the same time it alerts us to a fundamental problem inherent in politics. The masses are better off with democratic governance, but their leaders, except under specific circumstances that are part of the focus of the rest of this study, almost always are better off in an autocracy that has a small coalition and a large selectorate. Given an initial coalition size, whether a greater or lesser degree of accountability is chosen depends on the magnitude of p. The coalition's members are the pivotal choosers. It is their welfare that shapes whether governments are authoritarian, monarchic, junta, or democratic.

The review and elaboration of the basic selectorate model introduced important new insights as well as highlighting earlier results. We have emphasized that the price of producing public goods alters the coalition size at which members of the coalition benefit from expanding it rather than gambling on shrinking the coalition to gain more benefits. Beyond a critical coalition size, democratization is the only way to improve coalition welfare. We will see that this has significant implications for political instability and for institution change.

The implications of the price of public goods, along with other results will be developed in the next chapter. There we expand the theory to identify dynamic changes in what leaders do to survive as their tenure in office grows. We as well introduce the analysis of health shocks, economic shocks, and the risks of coup d'état or mass uprising as threats to a leader's political survival. We exploit the magnitude of those threats to evaluate the conditions under which suppression is used to survive and the circumstances under which policy allocations and/or institutional arrangements change as strategies designed to help leaders retain office.

Chapter 3

Selectorate Theory II

With the fundamentals of selectorate theory clarified, including several new insights and basic, face-validity, illustrative tests of some key implications, we are now ready to expand the theory in new directions. We are interested, in particular, to focus on a more comprehensive version of the theory in which leaders can lose power even if they do all the right things to survive. In this more dynamic setting, the expanded theory helps to improve our understanding of threats to political survival, challenges to regime stability, and the maneuvers and counter-maneuvers that leaders, coalition members, and ordinary citizens undertake to alter their respective political conditions.

The expanded theory identifies the sorts of institutional changes that might be made in anticipation of or as a consequence of a revolution, coup d'état, or in response to conditions beyond an incumbent's control, such as the occurrence of a terminal illness or other forms of disaster that jeopardize a leader's prospects of political survival. These effects will, as well, be examined against an expanded theory that explores political life-cycle effects during a ruler's tenure in power. These effects will be shown to alter policy choices and the welfare of the polity's coalition and citizens as a function of how long the incumbent has been ruling combined with whatever threat the leader may anticipate facing (whether that anticipation is real or imagined). Life-cycle effects will also be seen to influence the risks of coup d'état or revolution against the backdrop of the incumbent's policy performance on all dimensions other than those required to maintain coalition loyalty against the incumbency constraint.[1]

[1]There is a long established literature, usually referred to as the political business cycle, that examines how democratic leaders alter fiscal and monetary policy as elections approach (Nordhaus, 1975).

These expansions of selectorate theory, proofs of which are sometimes densely mathematical despite being intuitively straightforward, will expose new propositions. We will see, for instance, an explanation of why many societies governed by a small coalition regime experience low economic productivity and why their government seems content not to improve that productivity. We will offer an explanation for diminished enfranchisement in anticipation of or following upon a coup, and we will see why leaders and coalition members sometimes adopt policies that involve the costly suppression even of loyal parts of their population. As well, the theory will identify the circumstances under which leaders expand, contract, or do not change the total allocation and/or the mix of benefits received by their coalition's members and the conditions that make a previously acceptable coalition member the subsequent victim of a purge. After developing these and other theoretical implications for political change and instability, the remainder of this study investigates the empirical evidence to assess how well the predictions that follow from the theory do at anticipating actual, observed patterns of action and change in the real world.

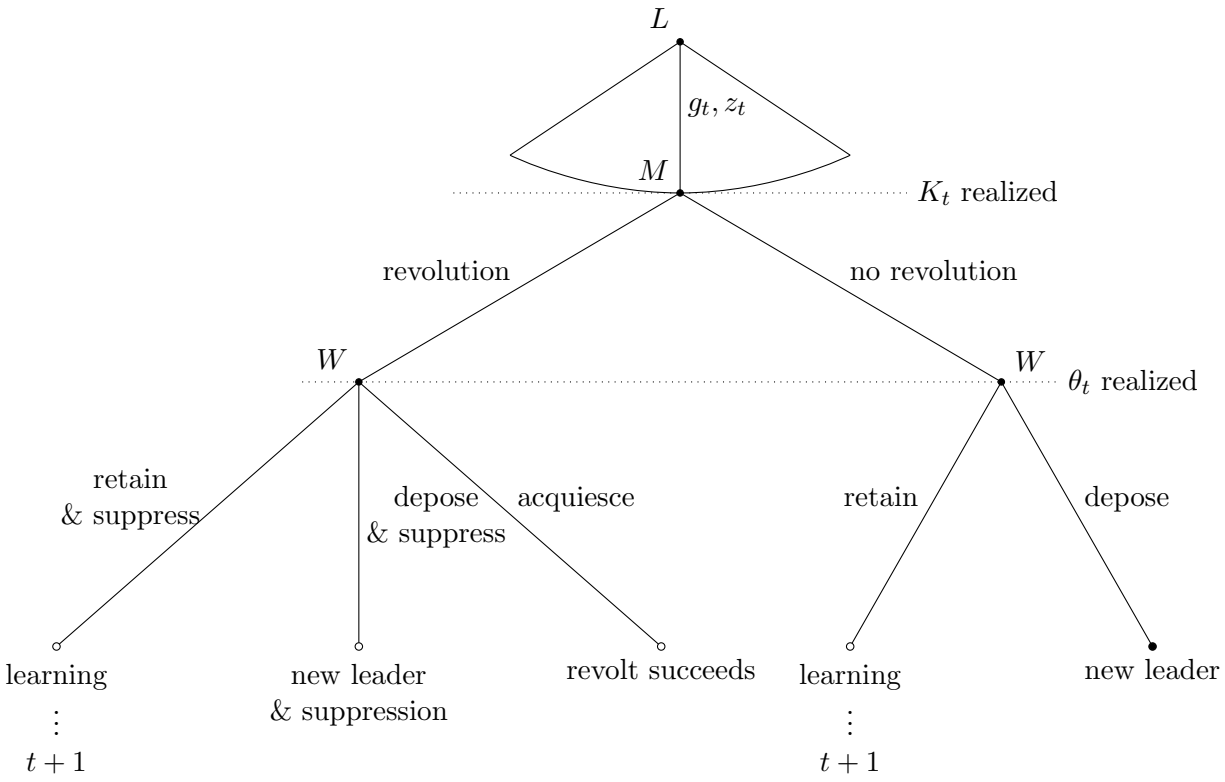
3.1 Coalition Loyalty and the Political Life-cycle

The very fact that a leader attains power changes everything. It changes what the leader does; what her coalition demands to remain loyal; and what citizens can expect from their government. Italo Calvino's king waits to be deposed but real-world leaders, wise to the risk of losing their throne, their scepter, their crown, and their head, do not just wait. They are strategists who constantly make adjustments that are designed to improve their chance of political survival. Consequently, the investigation of politics must take account of the fact that the actions of leaders are dynamically shifting in response to threats to political stability.

We develop a coalition loyalty game in the expanded selectorate theory to capture some of the strategic dynamics that we believe are central to analyzing political stability. Figure 3.1 depicts the sequence of play for the stage game as a tree. The stage game repeats indefinitely until the leader is deposed. In period t the leader provides g_t public and z_t private goods. The masses, who are treated as a unitary player, then observe the cost of rebellion K_t and decide whether to rebel or not. Rather than discrete individuals, we consider a mass of selectors of size S. The size of the winning coalition is W.

The winning coalition observes a valence shock, θ_t, that represents the incumbent's performance on all policy issues other the public and private goods provisions, For instance

Figure 3.1: Coalition Loyalty Stage Game



these shocks might include assessments of how the incumbent handled a foreign policy crisis, or a domestic political crisis, the sudden impact of an earthquake, a hurricane, or a significant economic reversal. Its value is the aggregate of all the day-to-day decisions leaders make.

Absent a revolution, the coalition decides whether to retain or depose the incumbent. If the masses have revolted, then the coalition decides whether or not to keep the leader and whether or not to suppress the revolution. The revolution succeeds should the coalition fail to suppress the masses. Should the leader survive, she learns additional information about the affinity of her coalition and reshuffles the composition of her coalition based on this information. The game then repeats in period $t + 1$.

The coalition loyalty game expands the basic selectorate theory articulated in Chapter 2 in three significant ways. First, the masses have an opportunity to rise up and, unless suppressed by the coalition, overthrow the existing political order. Second, in additional to public and private rewards, coalition members receive a valence shock, θ_t, that represents the leader's performance in period t on all other issues. As a consequence, leaders can be deposed on the equilibrium path. Third, the leader gradually learns about the affinity of selectors. In the basic exposition of the theory, a challenger's affinity ordering was fully revealed after he came to office. Instead, the model now examines a learning process such that leaders progressively learn information about the affinity of selectors.

The learning of affinity induces a political life-cycle. If the leader identifies a supporter as low affinity then she shuffles that supporter out of the coalition. When the leader first comes to power the rate of reshuffling is high. As leader tenure increases, the leader has already had the opportunity to find and replace many low affinity types within the coalition and so the rate of reshuffling declines. As tenure increases the coalition becomes denser with high affinity types, reshuffling becomes less frequent, and this induces greater political loyalty both by concentrating fealty and by increased expected tangible benefits. The value of being in the coalition stems from access to a flow of private goods; as tenure increases, supporters anticipate continued access to this flow and so become increasingly loyal.

The loyalty dynamics induced by the learning of affinity provide the basis of many of the results to follow. Therefore, prior to an examination of the coalition loyalty game we explain the learning dynamics in isolation. In particular, we derive a sequence $(\rho_0, \rho_1, \rho_2, ..., \rho_t, \rho_{t+1}, ...)$ that represents the retention probabilities in each period. As a leader's tenure increases, each supporter becomes more certain of being retained: $\rho_{t+1} > \rho_t$. The diminution of replacement risk increases the net present value of being in the coalition and this induces

political loyalty.

Dynamic games are necessarily complicated as anticipation of equilibrium behavior in future periods affects behavior in the current period and behavior evolves over time. While the formalization is complicated, we believe that the political intuition is straightforward. In the basic game in Chapter 2 the leader had an incumbency advantage over the challenger because the incumbent's supporters anticipated being kept in the coalition and therefore receiving a flow of private goods. The challenger could only offer access to the flow of private goods probabilistically. The incumbency advantage grows over time in the dynamic setting. As the learning process continues the incumbent weeds out low affinity types from the coalition. As this weeding out process continues, there are fewer and fewer low affinity types left in the coalition and so the rate of reshuffling declines. With greater certainty of being retained, supporters become more loyal and this allows leaders to actually do less for them and still survived at a higher rate. As the model will elucidate, as tenure increases coalition loyalty grows, leaders provide fewer rewards and a greater proportion of these rewards are private and leaders survive at higher rates.

At the risk of redundancy, we review the assumptions concerning affinity before exploring the learning mechanism.

3.1.1 Affinity Learning and Coalition Retention

Recall aff_i represents a leader's affinity for selector i. These affinities are uniformly distributed on the interval $[0, 1]$. In our model, the revelation of these affinities induces leaders to reshuffle their coalition[2]. The idea of a leader learning about her coalition and replacing its members is conceptually straightforward and can be justified in numerous ways. However, in terms of building a formal model, we need to specify precisely a particular learning mechanism. From the modeling perspective we keep the learning process simple such that coalition members maintain homogeneous beliefs about their likelihood of being retained. In particular we focus on a simple behavioral rule in which the leader replaces a supporter if she learns that the supporter has affinity below $\overline{aff} = 1 - \frac{W}{S} - \nu$. The leader needs W of S selectors in her coalition. The term $1 - \frac{W}{S}$ represents the lower bound for the highest affinity group the leader could find and still have enough supporters. However, as a practical matter there are costs (ν) associated with switching coalition members. At one

[2]Other studies consider the intrinsic trade-off between competence and loyalty (Egorov and Sonin, 2011, for instance).

extreme, those shuffled out of the coalition might need to be transported to and guarded in a gulag. At a lower extreme, the leader might need to update her address book or change the locks when she removes a former supporter. Since it is always costly to replace people, the leader is willing to satiate and keep supporters with affinity above $1 - \frac{W}{S} - \nu$.

In addition to the payoffs from office holding and resources retained for discretionary purposes that we formalize shortly, we assume the leader receives an affinity related payoff that is a function of the proportion of supporters in her coalition that is above the threshold $1 - \frac{W}{S} - \nu$. In particular,

$$\text{Leader's Affinity Payoff} = \lambda_{affinity} E[Pr(aff_i \geq \overline{aff} | i \in W)]$$

where $\lambda_{affinity}$ weights leader affinity concerns and $E[Pr(aff_i \geq \overline{aff} | i \in W)]$ is the expectation that a coalition member is a high affinity type. Our interest in affinity is that it leads incumbents to reshuffle their coalition. We are uninterested in its direct effect on leader welfare. For this reason, we interpret results for the limiting case as $\lambda_{affinity} \to 0$.

As discussed in Chapter 2, supporters have strong incentives to say and act so as to improve their prospects of being retained in the winning coalition. Given such mimicking behavior, leaders might not immediately be able to discern their affinity towards individual supporters. Hence, the process of learning affinities takes time. If a selector is a low type, $aff_i < \overline{aff}$, then the leader identifies this information with probability q for the first T periods.[3] An alternative interpretation of the learning process is that the leader is fully aware of her feelings towards each supporter but she needs to wait for an opportunity to replace them. If replacement opportunities arise with probability q, then the sequence of retention probabilities is the same as described here.

Let $\omega_t = Pr(aff_i \geq \overline{aff})$ represent the leader's belief that a supporter is a high affinity type at the start of period t. Given the assumption that affinities are uniformly distributed, when a ruler first comes to power ($t = 0$), $\omega_0 = 1 - \overline{aff} = \frac{W}{S} + \nu$. In each period, the leader has q probability of detecting that a selector's affinity is below the threshold $\overline{aff}$. If that selector is in the coalition, then the leader wants to replace them. Hence, the probability of being replaced in period t is $q(1 - \omega_t)$.

By Bayes rule,

$$Pr(aff_i \geq \overline{aff} | t \text{ periods}) = \omega_t = \frac{\omega_0}{\omega_0 + (1 - \omega_0)(1 - q)^t}$$

[3]For the reader uncomfortable with learning only occurring for T periods, the results hold as $T \to \infty$.

The second term in the denominator represents the chance that a low affinity type goes undetected for t periods. The key feature of ω_t is that it is increasing in t and converges to 1 as t becomes large: after many periods of rooting out enemies the leader is left with a coalition full of friends.

The probability that a leader replaces a supporter at the end of period t is $(1-\omega_t)q$; that is, the probability that the supporter is below the affinity threshold (after t periods) multiplied by the detection probability q. Hence the retention probability in period t is

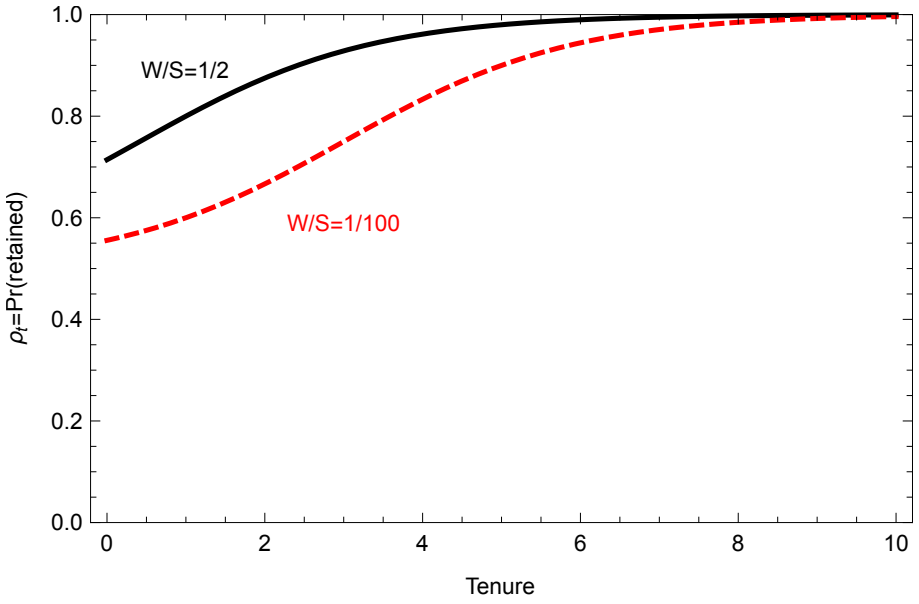
$$\rho_t = \omega_t + (1-\omega_t)(1-q) \tag{3.1}$$

The learning process is most easily seen graphically. Figure 3.2 plots the probability with which a current member of the winning coalition is retained in the coalition for the next period as a function of tenure and political institutions. The vertical axis shows the probability of being retained. The horizontal axis shows the leader's tenure in office. As the figure clearly shows, the probability of retention increases over time, eventually converging to 1. The solid and dashed lines illustrate how institutions affect retention. The solid line examines the case of $\frac{W}{S} = \frac{1}{2}$, as would be the case in a strongly democratic political system, while the dashed line shows that when the ratio $\frac{W}{S}$ is smaller (in the figure $\frac{1}{100}$), as in an autocratic system, then retention probabilities are lower. When the ratio of $\frac{W}{S}$ is small, the leader needs support from a much smaller fraction of selectors compared to the large ratio case and keeps only those supporters at the very top of the affinity ordering. In ordinary parlance, the implication is that dictators demand higher affinity among their coalition members than do democrats. For the latter, fealty is not inconsequential but they tolerate lower fealty within their larger winning coalition than autocrats do in their much smaller coalition.

We simplify the model by focusing on the leader's affinity for selectors without consideration of the selectors' views for the leader. This assumption, while perhaps unrealistic, greatly simplify the modeling as the selectors have homogeneous beliefs about the distribution of affinity among coalition members. If we took into account each selector's view of the leader (or differential knowledge about the leader's affinity for them), then each supporter would have slightly different criteria regarding the conditions under which they would remain loyal. Although we could integrate across these differences, we believe this would greatly increase the mathematical complexity without adding substantive insights. The learning mechanism indicates that the probability of being replaced decreases over

time[4]; as $t \to \infty$, $\rho_t \to 1$.

Figure 3.2: Learning Affinities, Reshuffling and Retention of Coalition Members



3.1.2 Cost of rebellion and performance shocks

Having observed the incumbent's policy provisions, the masses work out what they expect to be the cost of rebellion, K_t, and decide whether or not to rebel. We define the masses to be everyone in society outside of the real selectorate (i.e., $N - S_R$). We assume that the costs of revolution are independent in each period and are distributed such that $Pr(K_t < x) = H(x)$. To ease the signing of several of the comparative static results we focus on the simple case that H is the uniform distribution.

Consistent with most historical cases, we assume that a rebellion only succeeds if the coalition allows it to do so; that is, if the coalition fails to suppress the rebellion, then the revolution succeeds. If, instead, the coalition suppresses the rebellion, then we assume that the revolution fails (Chenoweth and Stephan, 2011; Lee, 2014). It is, of course, costly for the coalition to suppress the masses.

[4]To construct illustrative examples, throughout we assume $q = 1/2$, $\nu = .1$, and that reshuffling finishes after T periods, such that for $t \geq T$, $\rho_t = 1$ (and in the working examples we set $T = 8$).

Following the decision by the masses whether or not to rebel, the coalition's members observe a performance shock, θ_t. That shock helps them to decide whether or not to replace the leader and whether to suppress the masses. These valence shocks are assumed to be independently distributed in each period with distribution F, such that $F(x) = Pr(\theta_t < x)$. For ease of signing several of the comparative static results, we focus on the concave function in which $F(x)$ is the exponential distribution. However, we believe that our results hold for a much larger class of distributions. Our object here is to demonstrate the basic political logic rather than to prove the results for the most general case. Indeed, the subsequent numerical examples are constructed assuming that F is the normal distribution.

In an earlier extension of selectorate theory we incorporated an economic shock, along with a leader health shock, as an explicit component. Here, to reduce the already dense notation, we incorporate the impact of an economic shock at time t as part of the general performance shock, θ_t. We note, as previously demonstrated, that in anticipation that a shock might occur, leaders might spend additional resources to provide themselves with a cushion. Bueno de Mesquita and Smith (2017) explicitly considers different forms of shock and examines the conditions under which leaders are likely to succumb to policy failure or to economic crises. In terms of economic shocks, revenue shocks and shocks in other policy areas, we demonstrated that small coalition leaders are much more likely to survive than are large coalition leaders since they have a much larger surplus of retained resources that they might use to buy additional support. Yet, when it comes to health shocks, such as leaders being terminally ill, small coalition leaders are especially susceptible, hence our decision here to model health shocks separately but to lump economic shocks in with all other performance shocks.

We start by analyzing a single period of the stage game, the time line for which is given below:

1. Leader sets policy, g_t, z_t.

2. The masses see the cost of rebellion, K_t, and decide whether to rebel.

3. The coalition observes a performance shock, θ_t, and decides whether to retain or depose the leader and whether or not to suppress any mass uprising.

4. If the incumbent survives, then she learns more about affinities and replaces any supporter learned to have $aff_i < \overline{aff}$ with a selector who has not been identified as a low type.

The payoffs for the coalition loyalty game are given in Table 3.1. The term $u(g_t, z_t)$ represents the value of the immediate policy rewards. We assume this utility function is smooth, concave and additively separable. As in Chapter 2, throughout we use $u(g, z) = \sqrt{g} + \sqrt{z}$ as the working example. The term $y_{W,t}$ represents the expected future rewards for being in the coalition at the end of period t which is a function of the retention probabilities and policy provisions in future periods.

Table 3.1: Payoffs in the Coalition Loyalty Game

Mass Action	Outcome	Coalition Payoff	Mass Payoff
No Revolution	Leader Retained	$u(g_t, z_t) - \theta_t + y_{W,t}$	$u(g_t, 0)$
	Leader Replaced	a_W	a_M
Revolution	Leader Retained	$u(g_t, z_t) - \theta_t + y_{W,t} - \eta$	$u(g_t, 0) - K_t$
	Leader Replaced	$a_W - \frac{\eta}{2}$	$a_M - K_t$
	Revolution Wins	r_W	$r_M - K_t$

If there is no revolution and the leader is retained, then the masses receive $u(g_t, 0)$, the value of the public goods that are provided at time t. If the leader is replaced in the absence of a revolution, then the coalition's payoff is a_W and the masses payoff is a_M with a_W and a_M denoting their respective expected payoffs from an alternative, new ruler. Should the masses rebel, they incur the cost K_t.

If a revolution starts, then the coalition must decide whether to suppress it or allow it to succeed. If the revolution succeeds then the coalition's expected payoff is r_W, the net present value of the rewards they will receive under the revolutionary institutions. If the revolution succeeds then the payoff to the masses is r_M. The revolution only succeeds if the coalition fails to suppress it. Such suppression is costly. In particular, the coalition members pay a cost η to suppress the revolution if the incumbent remains in power. If the coalition replaces the leader, then they pay a reduced cost, $\frac{\eta}{2}$, to suppress the masses. Of course the factor of $\frac{1}{2}$ is arbitrary, but the lower cost reflects the reality that revolutions are targeted against an incumbent and so rebellions often lose their focus once the leader has been replaced, making it easier to suppress those still inclined to rebel.

Switching our attention now to the leader's payoffs, we stipulate that if the ruler survives, then she derives benefits from three sources. Ψ_t denotes the utility the incumbent attaches to holding office in period t. Additionally, the leader enjoys a monetary reward $l(R - pg_t - Wz_t)$ where $l()$ is an increasing concave function, normalized

to $l(0) = 0$, that reflects the value of the incumbent's retained, discretionary resources after paying off the coalition with private goods and paying off society (including the coalition) with public goods. Finally, the leader receives an affinity related payoff of $\lambda_{affinity} E[Pr(aff_i \geq \overline{aff} | i \in W)]$, where $E[Pr(aff_i \geq \overline{aff} | i \in W)]$ corresponds to the proportion of the coalition who are high affinity types.

3.1.3 Comments on Model Setup

Before diving into the analysis it is useful to highlight several features of the model. First, the substantively interesting features of the game follow from how coalition loyalty varies over time. That, of course, is why so many of the payoffs in Table 3.1 are now subscripted with t.

Second, for mathematical convenience and clarity we assume that the coalition is composed of a mass of supporters. This means that we treat the coalition as made up of a continuum rather than as made up of a set of discrete individuals. The assumption of a continuum of supporters rather than discrete individuals greatly simplifies the mathematical analysis as we can use population statistics rather than sample statistics. That said, for ease of language, we will frequently describe the logic of the argument in terms of discrete individuals while noting that we are dealing formally with a mass of individuals.

Third, in the coalition loyalty model all coalition members are assumed to act in concert, meaning that they can perfectly coordinate with one another. Given the mass assumption, no individual in the coalition is pivotal in influencing the outcome and to avoid a pathological case, where, for instance, all supporters take the action that is least in their interest, we focus on equilibria in which all supporters pick weakly undominated actions. This refinement can be thought of as stipulating that all the supporters vote sincerely for their most preferred action and then all coalition members carry out the action supported by the majority of coalition members. Later we consider a related global game in which we explicitly model the coordination dynamics of supporters and, provided that signals about the incumbent's strength are precise and so are highly informative, we obtain similar results.

Fourth, only coalition members receive the performance payoff, θ_t. We might equally well have assumed that the performance shock affects the masses' payoff too; however, since θ_t is revealed after the masses have decided whether or not to rebel the performance shock would only affect decisions by the masses through the expected value of performance shocks in future periods. The immediate shock would not affect decisions by the masses in

the current period. We treat the performance payoff as affecting only coalition members to keep the mathematics manageable with little or no sacrifice in the generality of results.

Fifth, $H(x)$, the probability that the costs of revolution are small enough that the masses rebel, provides a measure of the ease with which the people can protest and put pressure on their government. We think about the ease or difficulty of applying such pressure as being dependent on the government's provision of coordination goods. Coordination goods include rights, such as freedom of speech, a free press, and freedom of assembly. These goods and other public goods, such as effective transport networks, make it easier for the people to coordinate and attend protests. Reducing the costs of coordination makes it more likely that the people will rebel. Hence for any given x, $H(x)$ (weakly) increases in the level of public goods and coordination goods. Sixth, we assume that revolutionaries maximize on a period by period basis.

3.1.4 Analysis

To begin our analysis, we assume governance institutions W and S are fixed. Later we relax this assumption and consider endogenous institution change initiated from within the winning coalition or by the leader. However, for now we treat W and S as fixed unless overturned by a revolution. Let us first consider the branch of the game without a revolution. If the coalition retains the leader, then each member's payoff is $u(g_t, z_t) - \theta_t + y_{W,t}$. In contrast, their payoff for replacing the leader is a_W. It follows then that the coalition replaces the leader if and only if $\theta_t > \widehat{\theta}_t = u(g_t, z_t) + y_{W,t} - a_W$ and so the leader expects to be retained with probability $F(\widehat{\theta}_t)$.

If the masses rebel, then the coalition faces three choices: support the incumbent (suppressing the revolt) which gives a payoff of $u(g_t, z_t) - \theta_t + y_{W,t} - \eta$; depose the incumbent and suppress the revolt, which gives a payoff of $a_W - \frac{\eta}{2}$; and acquiesce to the masses and allow the revolution to succeed, which generates a payoff of r_W.

There are two cases to consider:

- **Case 1:** $a_W - \frac{\eta}{2} \geq r_W$: the coalition prefers to depose the incumbent and pay the cost of suppressing the rebels rather than allowing the revolution to succeed.

  In this case the coalition retains the leader (and suppresses the people) if and only if $\theta_t \leq \bar{\theta}_t = u(g_t, z_t) + y_{W,t} - a_W - \frac{\eta}{2}$ and so the leader survives with probability $F(\bar{\theta})$ if rebellion occurs.

- **Case 2:** $a_W - \frac{\eta}{2} < r_W$: the coalition prefers that the revolution is successful rather than that they depose the leader and suppress the people.

  The coalition retains the leader (and suppresses the people) if and only if $\theta_t < \tilde{\theta}_t = u(g_t, z_t) + y_{W,t} - r_W$ and if rebellion occurs the leader survives with probability $F(\tilde{\theta})$.

The coalition's actions are fully characterized by the thresholds $\widehat{\theta}_t$, $\bar{\theta}_t$ and $\tilde{\theta}_t$. If there is no revolution then the leader survives whenever $\theta_t \leq \widehat{\theta}_t$, which given the distribution of valence shocks occurs with probability $F(\widehat{\theta}_t)$. In contrast, when a revolution occurs, then if $a_W - \frac{\eta}{2} \geq r_W$ (case 1) the leader survives with probability $F(\bar{\theta}_t)$, and if $a_W - \frac{\eta}{2} < r_W$ (case 2) then the leader survives with probability $F(\tilde{\theta}_t)$. With the coalition's calculations specified, we can now evaluate the decision by the masses to revolt or not.

Decision to Rebel

If the masses do not rebel then their payoff is

$$U_M(\text{Don't rebel}) = (1 - F(\widehat{\theta}_t))a_M + F(\widehat{\theta})u(g_t, 0)$$

Under case 1, if the masses rebel then their expected payoff is

$$U_M(\text{Rebel}) = (1 - F(\bar{\theta}_t))a_M + F(\bar{\theta})u(g_t, 0) - K_t$$

Alternatively, under case 2, the expected payoff from rebellion is

$$U_M(\text{Rebel}) = (1 - F(\tilde{\theta}_t))r_M + F(\tilde{\theta})u(g_t, 0) - K_t$$

Whether the masses chooses to rebel depends on the cost K_t and the expected response by the coalition.[5] The cost at which the masses contemplate rebellion varies with the case they find themselves in. In Case 1 ($a_W - \frac{\eta}{2} \geq r_W$) to rebel the cost of rebellion needs to be less than $\bar{k_t}$:

$$K_t \leq \bar{k_t} = (F\widehat{\theta}_t) - F(\bar{\theta}_t))(a_M - u(g_t, 0))$$

[5]Tyson (2018) provides a global game approach to assessing the underlying coordination problem faced by regime supporters when deciding whether to suppress the people or not. Likewise Dragu and Przeworski (2019) model the various moral hazard problems facing potential suppressors.

In case 2 ($a_W - \frac{\eta}{2} < r_W$) in order for a rebellion to occur it must be true that:

$$K_t \leq \tilde{k_t} \quad = \quad \left(1 - F(\tilde{\theta})\right) r_M - \left(1 - F(\widehat{\theta})\right) a_M - \left(F(\widehat{\theta}) - F(\theta_t)\right) u(g_t, 0)$$

It is worth noting that in case 1 the masses rebel with no expectation that they will succeed. Rather, rebellion increases the range of valence shocks for which the coalition gets rid of the incumbent. As we will see shortly, rebelling even when the rebellion is expected to fail can be beneficial for the masses because leader replacement under a threat of revolution induces an increase in public goods provision by the new ruler!

The ratio of the institutions W and S provides significant insight into whether the coalition suppresses or acquiesces to a revolution; that is, whether it chooses case 1 or case 2. If a new (non-revolutionary) leader comes to power when the extant $\frac{W}{S}$ is small, then current coalition members have a relatively small chance of inclusion in the next coalition. Hence, deposing the current leader and crushing the disorganized rebellion is relatively unattractive. When a supporter is unlikely to be retained under new leadership, he might well throw his lot in with the revolutionaries (case 2). In contrast, when $\frac{W}{S}$ is relatively large, a coalition member is more likely to retain his privileged status under new leadership. In such a circumstance he is likely to be willing to crush the revolution under a new leader (case 1). Thus, for instance, a military junta, with a small selectorate composed mainly of senior military officers, is likely to respond to poor leader performance (large shock) and a revolution by simultaneously removing the leader and putting down the rebels. In contrast, in a corrupt electoral system in which virtually anyone can be brought into the coalition, supporters have a greater chance of siding with the rebels.

Leader payoffs and policy choice

Given the spending choice over policies, g_t, z_t, the thresholds $(\widehat{\theta_t}, \bar{\theta}_t, \tilde{\theta}_t, \bar{k}_t, \tilde{k_t})$ fully characterize play within the subgame following policy choice. We focus here on case 1 (the analysis for case 2 is very similar). Equation 3.2 characterizes the leader's payoff:

$$\begin{aligned} \mathcal{L} \quad &= \quad \underbrace{l(R - pg_t - Wz_t)}_{\text{unspent resources}} + \underbrace{\Psi_t \left(F(\widehat{\theta_t}) - H(\bar{k_t}) \left(F(\widehat{\theta}) - F(\bar{\theta_t})\right)\right)}_{\text{political survival}} \\ &+ \quad \underbrace{\lambda_{affinity} E[Pr(aff_i \geq \overline{aff} | i \in W)]}_{\text{affinity rewards}} \end{aligned} \tag{3.2}$$

The first component of the leader's payoff is the value of retained resources that can be spent on the leader's discretionary projects, simply stolen, or spent as a rainy-day fund to help bail out the incumbent in a survival crisis. The second component refers to the value of retaining office, Ψ, and the probability of being retained. If there is no revolution, which occurs with probability $1 - H(\bar{k}_t)$, then the coalition retains the leader with probability $F(\widehat{\theta}_t)$. If there is a revolution, which occurs with probability $H(\bar{k}_t)$, then the leader is retained if $\theta_t \leq \bar{\theta}_t$, which occurs with probability $F(\bar{\theta}_t)$. Aggregating these probabilities, the leader survives with probability $F(\widehat{\theta}) - H(\bar{k}_t)\left(F(\widehat{\theta}) - F(\bar{\theta}_t)\right)$. The final term corresponds to the leader's benefits from the affinity of coalition members; that is, being surrounded by those she trusts to show her loyalty independent of the tangible benefits she pays them.

The leader chooses policies to maximize her payoff. To reduce notation we will drop the dependence on t and let $u_g = \frac{du(g,z)}{dg}$ and $u_z = \frac{du(g,z)}{dz}$. We also focus on the interior case, where the leader retains some discretionary resources, and we examine the corner solution in the appendix. For case 1, the policies that maximize L's payoff are characterized by the First Order Conditions (FOC),

$$\frac{\partial \mathcal{L}}{\partial z} = (-W)l'(R - pg - Wz) + \Psi u_z \left(\underbrace{F'(\hat{\theta}) - (F'(\hat{\theta}) - F'(\bar{\theta}))(H(\bar{k}) + H'(\bar{k})\bar{k})}_{X_1 > 0} \right) = 0 \quad (3.3)$$

$$\begin{aligned} \frac{\partial \mathcal{L}}{\partial g} &= (-p)l'(R - pg - Wz) + \Psi u_g \left(\underbrace{F'(\hat{\theta}) - (F'(\hat{\theta}) - F'(\bar{\theta}))(H(\bar{k}) + H'(\bar{k})\bar{k})}_{X_1 > 0} \right) \\ &+ \Psi u_g \left(\underbrace{(F(\hat{\theta}) - F(\bar{\theta}))^2 H'(\bar{k})}_{X_2 > 0} \right) = 0 \end{aligned} \quad (3.4)$$

Note that the terms related to affinity do not appear in these first order conditions because they are not a function of the leader's policy choices.

Proposition 3. *If $a_W - \frac{\eta}{2} \geq r_W$ (case 1), then (for the interior case where the leader retains some discretionary resources) the leader's policy provisions (g, z) satisfy equations 3.3 and 3.4, which implies*

$$l'(R - pg - Wz) = \Psi \frac{u_z X_1}{W} = \Psi \frac{u_g (X_1 + X_2)}{p} \quad (3.5)$$

In case 2, there are analogous conditions to those in equations 3.3 and 3.4 in which the $\bar{\theta}_t$ and $\bar{k}_t$ terms are replaced with $\tilde{\theta}_t$ and $\tilde{k}_t$.

Appendix A3.1 contains a rigorous analysis and a thorough discussion of the second order

conditions, comparative statics and the corner solutions in which the leader spends all available resources. Here we provide intuition. Proposition 3 follows directly from the leader's maximization of her payoff with respect to public and private goods. The first term of Equation 3.5 is the marginal value of additional retained resources. The second and third terms of the equation show, respectively, the marginal impact of additional spending on private goods and public goods on the prospects of political survival (weighted by the value of office holding and costs of policy provision). The leader provides each policy up to the point that the loss from retaining fewer resources precisely matches the value from improved survival.

The term $X_1 = F'(\hat{\theta}) - (F'(\hat{\theta}) - F'(\bar{\theta}))(H(\bar{k}) + H'(\bar{k})\bar{k}) > 0$, found in each of the first order conditions (Equations 3.3 and 3.4), reflects the impact of additional goods on coalition loyalty and on the deterrence of rebellion. By spending more on private goods the leader increases her supporters' rewards. Those additional rewards make them more likely to back her. Mathematically, this means $\widehat{\theta}$ and $\bar{\theta}$ increase as private goods increase. Increasing coalition loyalty also deters rebellion. Since increased rewards increase loyalty, rebellions become less likely to succeed and hence less likely to happen ($\bar{k}$ declines).

Addition spending on public goods likewise increases coalition loyalty and therefore also deters rebellion. However, increasing the provision of public goods has a second effect on the likelihood of revolution. It makes the status quo more attractive to the masses. The numerator on the right hand side of equation 3.5 contains the term $X_2 = (F(\hat{\theta}) - F(\bar{\theta}))^2 H'(\bar{k}) > 0$. X_2 reflects the extent to which a marginal increase in public goods fulfills the demands of the masses.

In the basic selectorate model in Chapter 2 the leader equated the ratio of marginal values of each good with the ratio of marginal costs for each good ($\frac{u_g}{p} = \frac{u_z}{W}$). Relative to this efficient provision of rewards, the threat of revolution induces a bias towards public goods which we state formally in the following corollary.

Corollary 4. *Given Case 1: if* $H'(\bar{k_t}) = 0$*, then* $\frac{u_g}{p} = \frac{u_z}{W}$*. If* $H'(\bar{k_t}) > 0$*, then the leader 'over-provides' public goods:* $\frac{u_g}{p} = \frac{u_z}{W}\frac{X_1}{X_1+X_2}$.

The corollary follows directly from Equation 3.5 and has a simple interpretation. When there is no revolutionary threat ($H'(\bar{k_t}) = 0$), the leader spends efficiently on public and private goods such that the ratio of marginal benefits for the coalition of each policy equates to the ratio of marginal costs of these policies. Such a mix of goods maximizes the coalition's benefits for any given level of spending, or, equivalently, minimizes the spending required to give the coalition a specific level of rewards. This mix of public and private goods was seen earlier in the basic selectorate model. However, relative to this efficient spending, when there is a threat of revolution, the leader over-provides public goods. Doing so makes the status quo more attractive to the masses, thereby diminishing the risk that they will rebel. Thus, when a leader believes she faces a credible risk of revolution, we should expect that she increases public goods spending.[6]

[6]Later we introduce suppression as an alternative government response to revolutionary threat.

Comparative statics

We have just seen that the existence of a risk of revolution encourages extra public goods spending. We now show that the marginal spending on public and private goods also depends on the Net Present Value (NPV) of coalition membership at the end of the stage game. In the stage game this NPV is represented by $y_{W,t}$. When we examine the dynamics of coalition membership in a moment we will see that $y_{W,t}$ increases over a leader's tenure. To ease the exposition of the results we start by showing how the leader's policies in the stage game change in response to the NPV of coalition membership, that is $y_{W,t}$.

Proposition 4. *As $y_{W,t}$ increases,*

- *the leader spends less on rewards* ($\frac{d(pg_t+Wz_t)}{dy_{W,t}} < 0$)
- *the immediate value of policy rewards decreases* ($\frac{du(g_t,z_t)}{dy_{W,t}} < 0$)*, but not so much as to fully offset the increase in $y_{W,t}$,* $\left(0 < \frac{d(y_{W,t}+u(g,z))}{dy_{W,t}} < 1\right)$
- *the public goods bias is diminished,* ($\frac{d(g_t/z_t)}{dy_{W,t}} \leq 0$)
- *the leader survives more easily,* $\frac{dF(\widehat{\theta}_t)}{dy_{W,t}} > 0$, $\frac{dF(\bar{\theta}_t)}{dy_{W,t}} > 0$*, and revolution becomes less likely* $\frac{dH(\bar{k}_t)}{dy_{W,t}} < 0$.

Proposition 4 has a simple substantive interpretation. As the Net Present Value of future coalition membership increases, supporters are less likely to depose the incumbent; supporters are more likely to suppress a rebellion; the incumbent's bias towards public goods (characterized in Corollary 4) diminishes; and the leader provides fewer immediate benefits to supporters. This diminution of rewards does not fully offset the increase in the value of future coalition membership, thereby making the coalition's members content to remain loyal.

To see the mathematical logic behind these comparative static results it is useful to reconsider equation 3.5. As $y_{W,t}$, the NPV of coalition membership, increases, then $\widehat{\theta}_t$ and $\bar{\theta}_t$ increase and the threat of rebellion, $\bar{k}_t$, diminishes. As a result, the impact of policy rewards increases the probability of survival at a decreasing rate. The second and third terms of equation 3.5 therefore decline relative to the marginal value of retained resources (the first term of equation 3.5). To restore balance, the leader reduces policy provisions and retains more resources for herself. The concavity of the leader's preferences means that she is better off taking a mix of improved survival prospects and more discretionary resources rather than enjoying the improvement in the NPV solely in the form either of improved survival or of more discretionary resources. The convex combination of these two benefits, more survival and more discretionary resources, is worth more to the leader than all of one benefit and none of the other.

An increase in the NPV of coalition membership diminishes the public goods bias, $\frac{d\frac{g_t}{z_t}}{dy_{W,t}} < 0$. The logic behind this implication of the theory is somewhat complex but readily explained. The

presence of a revolution naturally increases a leader's vulnerability to deposition, a vulnerability that any ruler is keen to eradicate. To offset such a threat, the incumbent over-provides public goods, thereby diminishing the incentive to revolt among the masses (Corollary 4). However, as coalition loyalty grows over the ruler's time in office, the coalition's response to a revolution (or its threat) is more likely to be suppression rather than acquiescence or support. With less chance of being successful, the masses have less incentive to rebel and therefore the leader has a reduced incentive to buy them off.[7]

Proposition 3 provides a straightforward characterization of policy provisions as a function of the value of future coalition membership in any stage of the game. Above, in Section 3.1.1, we derived coalition retention probabilities as a function of leader tenure. We now combine the learning process with the properties of policy making in equilibrium to characterize the dynamics for policy provision, coalition rewards and leader survival.

3.2 Adding Dynamics to the Coalition Loyalty Game

Thus far we have investigated the coalition loyalty game as if choices were static, moment-to-moment decisions. Now it is time to unpack the constituent components of $y_{W,t}$, the payoff for being in the coalition at the end of period t. Because we regard t as the tenure of the incumbent leader, any time a new leader comes to power the counter is reset so that $t = 0$. We now parameterize the game in terms of leader health, h, and the likelihood that the leader retains a supporter in her coalition, ρ_t. In Section 3.1.1 we examined an affinity learning process such that there is a sequence $\{\rho_t\} = \{\rho_0, \rho_1, ..., \rho_t, \rho_{t+1}, ...\}$ such that for all $t < T$, $\rho_{t+1} > \rho_t$ and for all $t \geq T$, $\rho_t = 1$. This sequence implies that over time the leader becomes less likely to reshuffle and more likely to retain members of her coalition, with the affinity learning reshuffling process ending at period T.

We continue to assume that all selectors have a common discount factor, $\delta \in (0, 1)$. We introduce the notation $V_{in,t}$ and $V_{out,t}$ to represent the Net Present Value of being respectively *in* or *out* of the coalition at the start of period t. Terms denoting future expected payoffs, $y_{W,t}$, are now written in terms of these NPVs, health, and retention probabilities. In particular,

$$y_{W,t} = \delta \underbrace{h\,\rho_t V_{in,t+1}}_{\text{retain in coalition}} + \delta \underbrace{h\,(1-\rho_t) V_{out,t+1}}_{\text{supporter replaced}} + \delta \underbrace{(1-h) V_{in,0}}_{\text{leader dies}} \tag{3.6}$$

The first term corresponds to the prospect that the leader is healthy (is alive with probability h) and retains the supporter in her coalition (ρ_t) so that the supporter continues to receive time-discounted private benefits in the next time period ($\delta V_{in,t+1}$). The second term reflects the likelihood that

[7] Further, as coalition loyalty grows, the extent to which a revolution increases the deposition risk diminishes so that the consequences of a revolution are less severe for the leader (the difference $F(\widehat{\theta}_t) - F(\widetilde{\theta}_t)$ becomes smaller). With the impact of a revolution on leader survival reduced, the leader's incentive to buy off the masses is further reduced.

the healthy leader replaces the supporter, which occurs with probability $h(1-\rho_t)$ and results in a discounted future payoff of $\delta V_{out,t+1}$. With probability $(1-h)$ the leader dies (or is removed by any process exogenous to the political survival modeled here). If the leader dies, then a new leader comes to power. Since the leader is new, his tenure is set to $t=0$.

In attempting to come to power, every challenger makes the best offer he can to attract supporters. In particular, he offers policies g_0, z_0, such that

$$u(g_0, z_0) = max_{g_0, z_0 \in \mathcal{R}^+} u(g, z) \text{ subject to } pg_0 + Wz_0 \leq R \tag{3.7}$$

We assume that the new leader secures his initial hold on power with the same coalition that helped him topple the previous incumbent. That coalition includes at least one of the previous ruler's coalition. In terms of NPVs we can write the value of a new leader as

$$a_W = V_{in,0} = u(g_0, z_0) + \delta\rho_0 V_{in,1} + \delta(1-\rho_0)V_{out,1}$$

Note that we are assuming the challenger is healthy when attaining power ($h=1$).

3.2.1 Looking Ahead: Calculating Net Present Values

We have established that as time passes those still in the winning coalition become more confident that they will remain in the leader's circle of key supporters. With that confidence in hand, they naturally must ask themselves, as must leaders and members of the masses, what they can expect as their future benefits from the incumbent regime. Will they continue to enjoy the same total benefits with the same mix of public and private goods that they received before? Will they get more? Will they get less? Will the mix change? Will they get enough to keep them loyal? What circumstances might alter their assessment of whether they should expect to remain loyal in the future? It is now necessary to probe closely what the net present values look like for each type of subject in a society – coalition members, leaders, and those outside the coalition but subject to the regime – under each of the relevant future contingencies that might arise.

Given a strategy profile, the Net Present Values for being in or out of the coalition are defined recursively. Although establishing the net present values under the possible alternative conditions is necessarily mathematically dense, it is essential for understanding actions by the masses, the winning coalition's members, and leaders under the various contingencies that involve stable or unstable political conditions. Hence, we proceed with this dense analysis here for the case in which there is no revolutionary threat. The calculations of Net Present Values for coalition members, members of the masses, and for leaders when there is a revolutionary threat are in Appendix A3.2. These cases involve similar calculations to the assessment of Net Present Values in the absence of a revolutionary threat but include additional terms to reflect the contingent outcomes given the threat of revolution. Hence, the continuation values under a revolutionary threat are more complicated

because the game could end with the coalition members receiving the revolutionary payoff, r_W, or having to pay the suppression cost, η.

Net Present Value With No Revolutionary Threat

When there is no revolutionary threat ($H(\bar{k_t}) = 0$), then the Net Present Value is:

$$\begin{aligned} V_{in,t} &= \underbrace{\left(1 - F\left(\widehat{\theta_t}\right)\right)\left(u(g_0, z_0) + \delta\,\rho_0 V_{in,1} + \delta\,(1-\rho_0)V_{out,1}\right)}_{\text{leader deposed}} \\ &+ \underbrace{F\left(\widehat{\theta_t}\right)\left(u(g_t, z_t) + y_{W,t} - E[\theta|\theta \leq \widehat{\theta_t}]\right)}_{\text{leader retained}} \end{aligned}$$

where $y_{W,t} = h\rho_t\delta V_{in,t+1} + h(1-\rho_t)\delta V_{out,t+1} + (1-h)\delta V_{in,0}$. The term $E[\theta|\theta \leq \widehat{\theta_t}]$ is the expected value of the performance shock given that the realized cost θ_t is sufficiently small that the leader survives.

$V_{in,t}$ represents the value of being a coalition member at the start of period t. With probability $1 - F\left(\widehat{\theta_t}\right)$ the performance shock is sufficiently bad that the coalition defects. In this scenario, coalition members receive the immediate rewards $u(g_0, z_0)$ and with probability ρ_0 the new leader keeps the supporter (worth $\delta V_{in,1}$) and with probability $(1-\rho_0)$ the new leader immediately replaces the supporter (worth $\delta V_{out,1}$). If the performance shock is below $\widehat{\theta_t}$, then the leader survives and supporters receive the immediate policy benefits ($u(g_t, z_t)$) less the valence shock plus the value of future rewards, $y_{W,t}$. These future rewards ($y_{W,t}$) are worth $\delta V_{in,0}$ if the leader dies (which happens with probability $(1-h)$); but with probability h the leader lives, in which case, coalition members remain in the coalition with probability ρ_t and they are removed from the coalition with probability $1-\rho_t$.

Likewise, we define the Net Present Value of being out of the coalition as $V_{out,t}$. In this setting, the selector out of the coalition benefits only from the public goods that are provided. The term $\rho_{s,0}$ represents the probability that a former coalition member will be brought back into the coalition under a new leader (which in our working examples we set equal to zero).

$$\begin{aligned} V_{out,t} &= \underbrace{\left(1 - F\left(\widehat{\theta_t}\right)\right)\left(u(g_0, 0) + \rho_{s,0}\delta V_{in,1} + (1-\rho_{s,0})\delta V_{out,1}\right)}_{\text{leader deposed}} \\ &+ \underbrace{F\left(\widehat{\theta_t}\right)\left(u(g_t, 0) + \delta h V_{out,t+1} + (1-h)(\rho_{s,0}\delta V_{in,0} + (1-\rho_{s,0})\delta V_{out,0})\right)}_{\text{leader retained}} \end{aligned}$$

3.2.2 The Political Life-Cycle: Coalition Dynamics in Action

The intuition behind the calculations of net present values; that is, the expected flow of benefits in the future, is further developed in Appendix A3.2 and is quite straightforward. Coalition members, leaders, and the masses must think through what they expect their future welfare will look like if there is a mass uprising or if there is not; if the coalition backs an uprising or suppresses it; if the coalition backs the incumbent or deposes her; and if the leader remains healthy or becomes deathly ill. Thus, we have characterized the First Order Conditions for optimal policy provision, the decision to rebel, and the coalition's decision whether to depose the leader and whether to suppress the revolt as well as the Net Present Values of being leader, coalition member, or potential revolutionary. We have done so for each length of leader tenure.

Unfortunately, the large number of equations makes explicit solutions impractical. Conceptually, if we know the NPVs that the coalition's members associate with a new leader (a_W) and we know the same information for the masses (a_M) and we know the equivalent NPVs of a revolution (r_W, r_M), then the full dynamics of the system are readily solved by backward induction. For a tenure of length T or greater, retention in the coalition is certain and so the leader and coalition face a stationary set of decisions; every future period beyond T has the same expected value and for every player the same decisions are optimal in every period. Such a system is readily solved recursively and generates the NPV's for all periods $t \geq T$. Given that $\delta V_{in,T}$ and the other relevant terms are known, we can readily exploit computing power to illustrate the substantive implications of all of the NPV calculations.[8].

The two graphs in Figure 3.3 demonstrate how spending on policies and how leader survival prospects vary with coalition size and the leader's longevity in office. Similarly, Figure 3.4 illustrates the effect of coalition size and leader time in office on current coalition rewards and on the Net Present Value of continued coalition membership. The four graphs in these two figures illustrate the life-cycle impact of leader survival on the well-being of coalition members and their rulers.

Figure 3.3a demonstrates that policy spending is greater in larger winning coalition systems. However, within any given coalition size, spending decreases the longer the incumbent has been in office. Experienced leaders do not need to spend as much on public and private goods as do inexperienced incumbents, meaning that those in office for a longer time have a larger quantity of discretionary, rainy-day financial reserves at their disposal than is available for a newcomer to power in the same political setting. As a practical illustration, North Korean leader Kim Jong-il spent an average of about $300 million on luxury goods for his supporters. His son succeeded him in 2011 and increased the provision of luxury goods to $646 million in 2012[9]. Figure 3.3b, however, reminds us that even as policy spending decreases over a ruler's time in power, her prospects of political survival improve. The risks to incumbency are greatest for new office holders and smallest

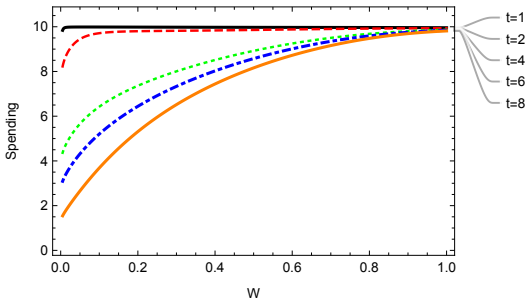
[8]DEFINE THE FUNCTIONAL FORMS and parameters

[9]https://www.independent.co.uk/news/world/asia/kim-jongun-spent-over-600m-in-a-year-while-north-korean-citizens
html

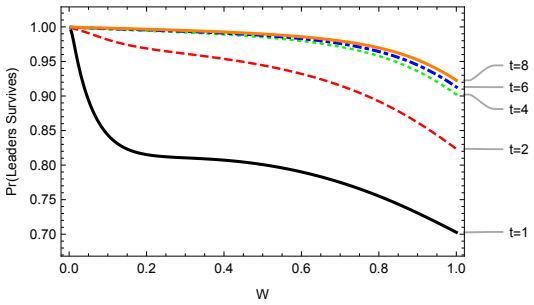
for the most experienced.

Figure 3.3: Political Life-Cycle: Leader Spending and Survival Probability

(a) Level of Spending



(b) Probability of Leader Survival



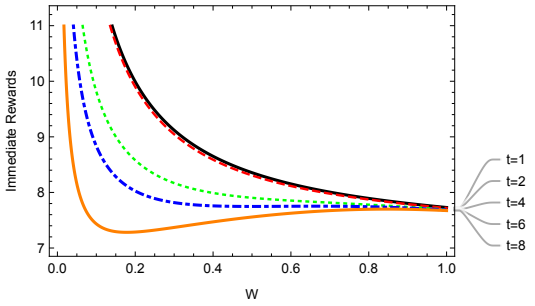
Serious illness also makes it difficult for a leader to survive. At least when the sickness is known by the coalition members, sick leaders need to spend more. Once supporters know that their ruler's death is likely, they know leader turnover is coming soon and that means a recomposition of the coalition. Since each supporter faces a high likelihood of being shuffled out of the coalition under the successor, the package that a rival offers looks relatively attractive. Under such challenging circumstances, a sick incumbent must increase the rewards she gives her coalition in her effort to maintain their support. Despite her best efforts, a grievously ill incumbent still finds it hard to survive. Later we will see empirical evidence that chronically ill leaders try harder, behaving much more like new leaders than entrenched leaders. Despite their increased efforts both chronically ill leaders and new rulers are at high risk of replacement. In contrast, leaders who die suddenly of an acute cause would have had no incentive to increase policy provision prior to their death because they did not know they were about to die. Shifts in the provision of policies that accompany a transition between a leader who dies in office of chronic illness and her successor are expected to be small. The chronically ill leader was working hard just as the new leader needs to work hard. In contrast, when an established leader dies suddenly, with little or no forewarning, policy provisions between the deceased leader and her successor are expected to shift markedly as the former leader was probably coasting while the new, replacement leader needs to work hard to survive.

The results in Figure 3.3 largely dictate the results shown for coalition members in Figure 3.4. These latter figures illustrate that the immediate rewards received by coalition members from a new leader exceed the rewards they get once the incumbent has been in power a long time. In contrast, the expected future flow of benefits – the net present value of rewards – is strictly higher for those in the coalition of a long-standing ruler than it is for those in a new incumbent's coalition. These claims hold regardless of coalition size, although we should note that the temporal effects on spending diminish as coalition size becomes larger. These figures highlight a counter-intuitive finding. The short-term interests of coalition members contradict their long-run interests. New incumbents

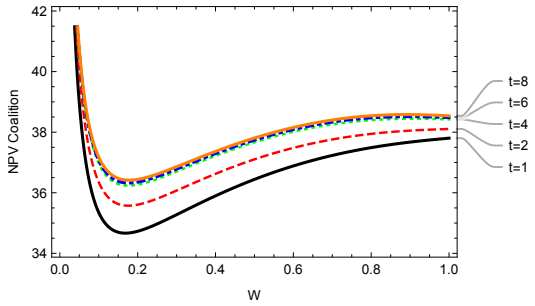
provide their supporters with more rewards than do established rulers. And yet, supporters are better off in the coalition of a well-established leader. Even though the long-established ruler pays them less in each period, she is more likely than a newcomer to keep paying them private rewards in the future. The prospects of a long-run flow of private benefits trumps being paid better in the short-term.

Figure 3.4: Political Life-Cycle: Immediate Rewards and NPV of Coalition Membership

(a) Value of Immediate Coalition Rewards, $u(g_t, z_t)$



(b) NPV of Coalition Membership, $V_{in,t}$



3.3 Who Wins or Loses Politically from Productivity?

Figures 3.3 and 3.4 show some of the major effects that the political life-cycle has on policy spending, leader survival, and short- and long-term coalition benefits. A key result in Chapter 2 alerted us, however, that each of these dimensions can vary with the efficiency with which a society turns public goods spending into public goods outputs. Now that we have analyzed the effects of the political life-cycle on key factors influencing political stability, we can combine those effects with differences in efficiency at producing public goods across different coalition sizes to peer more deeply into how political vulnerabilities may arise under different circumstances. We begin our deeper dive into leader, coalition, and mass well-being under the assumption that there is no credible threat of revolution. Then we examine the well-being of different parts of society when, in fact, there is a credible revolutionary threat.

3.3.1 No Threat of Revolution

Figures 3.5 – 3.9 show the political life-cycle model in action when public goods production carries a high cost (the left-hand, "a" panels) and when it carries a low cost (the right-hand, "b" panels). In each case, the graphs have been created under the assumption that there is no possibility of a

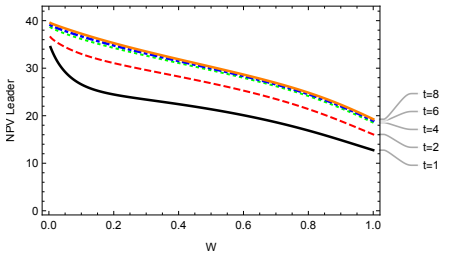
revolution.[10] Beyond the shape differences, it is important to note the differences in the vertical axes. Productive nations, which in this context means nations that have a low price for public goods production, prove in theory to have higher levels of welfare for coalition members and selectors than do nations in which public goods are high priced. In high-productivity nations, the leader spends a larger portion of the available resources to maintain coalition loyalty; survives less often; and enjoys lower personal welfare relative to leaders in low productivity nations.

We begin our analysis by considering how economic productivity affects the incumbent's welfare, as seen in Figure 3.5, and the incumbent's prospects of political survival, as shown in Figure 3.6. Survival and welfare – control over discretionary resources – are the two goals of all leaders within the logic of selectorate theory. Thus, the four panels that make up these two figures are central to understanding the political incentives of rulers. The figures differentiate those incentives across all sizes of winning coalition; across differences in a leader's tenure in office; and across differences in the society's ability to produce public goods more or less efficiently.

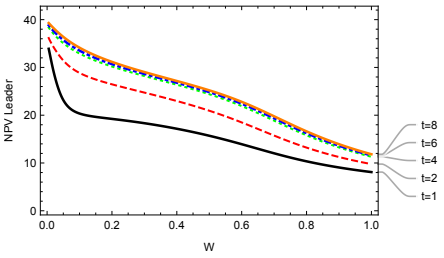
The leader's welfare in Figure 3.5 shows some clear patterns. First, established leaders are far better off than newer leaders. Second, smaller coalition leaders are better off than larger coalition leaders in terms of the proportion of revenue that they can control whether to pursue their own pet policy projects or to sock away in a secret bank account. Third, leaders who preside over high-cost, low productivity societies are expected to be better off in terms of personal welfare than are leaders in low cost, high productivity societies at any given level of leadership tenure given equal coalition size.

Figure 3.5: Political Life-Cycle: Leader's Welfare

(a) High Cost Public Goods



(b) Low Cost Public Goods



The story of leader survival prospects echoes the tale of leader welfare. Figure 3.6 focuses our attention on the assumed highest priority of incumbent rulers: political survival. As we examine the two panels in the figure it is particularly important to notice that the survival prospects delineated along the vertical axes are quite different. The left-hand panel, for low productivity polities, shows us that these leaders have substantially better prospects of remaining in power than their

[10]Parameters: $S = 2$, $R = 10$, $\delta = .8$, $H(x) = 0$, $\nu = .1$, $h = 1$, $\Psi = 5$. The prices of public goods are $p = .5$ and $p = .05$.

counterparts in high-productivity polities in which it is easier to produce a plentiful quantity of public goods. This claim is true for leaders with any given length of time in office and for any size winning coalition.

Leader welfare and leader political survival are both enhanced when rulers preside over a low-productivity polity. As society becomes more productive, incumbents find it harder to retain office and they have less discretion over how government revenue is spent. These theoretical findings, to be tested in the coming chapters, are in stark contrast to the standard assumption that leaders want to promote economic prosperity. That is, of course, a noble goal, but it comes at the leader's expense, even as it may serve the interests of coalition members or the broader society.

Indeed, these figures suggest an alternative take on modernization theory. Recall that the original formulation of modernization theory claims that economic development leads to political change and so democratization follows from economic growth. More recent formulations have focused on how economic development helps preserve democratic institutions. Alternative formulations argue that economic growth follows from democratization. We demonstrated earlier that selectorate theory provides an explanation for the positive correlation between growth and democratization although the causal account differs from prior arguments. We now see that selectorate logic provides reasons why leaders might avoid democratization and economic growth (Acemoglu and Robinson, 2000). Poverty traps might be terrible for the people but they might be beneficial for leaders (Kraay and McKenzie, 2014).

We can illustrate the tension between productivity and political survival at work in our theoretical figures by looking, for example, at Xi Jinping's China. Having enjoyed decades of growth as the pathway to securing the Communist Party's hold on power before Xi's rise, Xi Jinping today is cutting back on growth-oriented policies and freedoms as the price of preserving his authority. As Elizabeth Economy reported in *The Guardian* on June 29, 2018, "Before Xi Jinping, the internet was becoming a more vibrant political space for Chinese citizens. But today the country has the largest and most sophisticated online censorship operation in the world. . . . Chinese leadership has devoted more and more resources to controlling content online. Government policies have . . . silenced many of China's most important voices advocating reform and opening up the internet. It wasn't always like this. In the years before Xi became president in 2012, the internet had begun to afford the Chinese people an unprecedented level of transparency and power to communicate."[11] Economy's 2018 description of Xi's cutbacks on entrepreneurial opportunities through information exchange is equally true as we write this. For instance, *The New York Times* reported on February 17, 2023, "The state's hardening censorship and heavier hand have held back its tech industry; so has entrepreneurs' reluctance to invest for the long term. It wasn't always that way."[12] And the restrictions on information have only grown worse. The *New York Times* reported on June 4, 2024

[11]See "The great firewall of China: Xi Jinping's internet shutdown" at `https://www.theguardian.com/news/2018/jun/29/the-great-firewall-of-china-xi-jinpings-internet-shutdown`

[12]See `https://www.nytimes.com/2023/02/17/business/china-chatgpt-microsoft-openai.html`

that access to content about China or produced in China is disappearing. There are now more Polish or Persian websites than there are Chinese.[13]

Why cut back on innovation? Because leading innovators in China not only become rich but they also sometimes mobilize support against the government's censorship policies and its increasing focus on state-run rather than private-sector owned businesses. Leaders are not keen to nurture potential rivals. Indeed, successful entrepreneurs who look like emergent rivals in China find themselves "disappeared" or have been imprisoned.[14] The upshot, leaders last longer and the economy suffers.

While, of course, leaders have no problem seeing their economy expand if that can be achieved without improved productivity (because that might increase their revenue, R), they have strong reasons to limit or oppose growth produced by enhanced productivity or by an expanded winning coalition. Both high productivity and dependence on a large coalition diminish their political survival prospects and their welfare while in power. Hence, especially smaller coalition leaders may pursue growth if it is achieved through foreign investment; foreign aid; or on the backs of foreign labor, as is true for participants in China's belt and road initiative or many petro states where oil extraction is done by foreign firms. However, they are not likely to be as keen to see growth that is advanced through uncontrolled domestic innovation and entrepreneurship. Consistent with this view, the results imply depressingly that leaders, especially in smaller coalition settings, prefer to limit domestic human capital development beyond the education and health conditions required to sustain labor's efforts to produce revenue for the regime. Greater domestic human capital and its associated productivity apparently limit a leader's well-being and her political survival prospects, so far at least in the absence of a revolutionary threat.[15]

While leaders seem to be strictly better off governing a low-productivity, smaller coalition regime and apparently gain greater discretionary control over revenue the longer they remain in power, the same cannot be said for coalition members or for citizens outside of the winning coalition. As we see in the two panels that make up Figure 3.7, government spending goes up the larger the winning coalition – no surprise there – and rises more briskly as the coalition gets bigger in a low-cost, high productivity setting than in a high-cost, low productivity polity. The difference in the rate at which spending increases is particularly important because it shows us that even for coalitions as small as

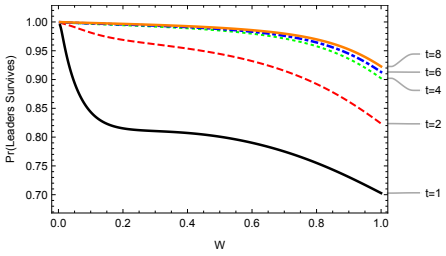
[13]See Li Yuan, "As China's Internet Disappears, 'We Lose Parts of Our Collective Memory'," *New York Times*, June 4, 2024. `https://www.nytimes.com/2024/06/04/business/china-internet-censorship.html`

[14]See "Why China's Billionaires Keep Disappearing," a CNBC report published April 15, 2023 available at `https://www.cnbc.com/2023/04/15/why-chinas-billionaires-keep-disappearing-.html`

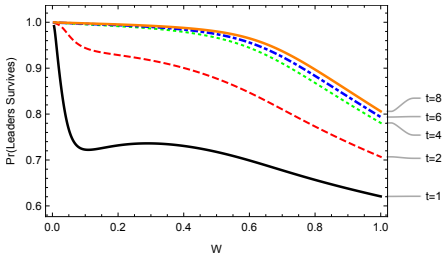
[15]While the pattern just described is generally consistent with the data on secondary and tertiary school enrollment across countries, China is an exception. Despite the increased censorship regarding ideas contrary to Xi's teachings, Chinese universities continue to improve in quality. For instance, only 2 ranked in the global top 100 in 2010 while 6 ranked in the top 100 in 2020. Still, nearly all of the world's top ranked universities are in large-coalition, high coordination-goods, high productivity societies and almost none are in smaller coalition settings.

Figure 3.6: Political Life-Cycle: Survival Probability

(a) High Cost Public Goods



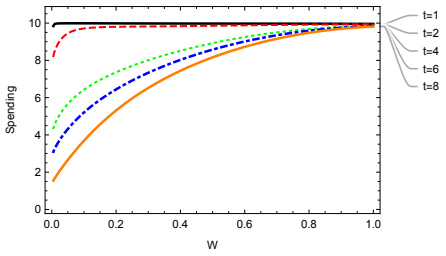
(b) Low Cost Public Goods



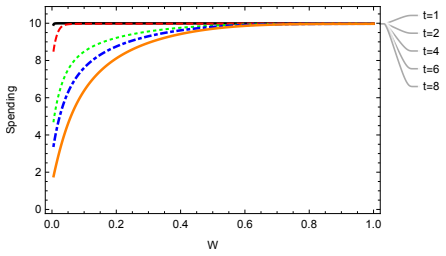
about 0.5 or 0.6 on our 0 to 1.0 scale, if public goods can be produced cheaply, then there is little discernible difference in government spending as a function of how long the incumbent has been in office. In contrast, governments spend noticeably less the longer a leader has been in power when public goods are expensive to produce. This difference in the magnitude of the political life-cycle effect has an important substantive implication.

Figure 3.7: Political Life-Cycle: Expenditure

(a) High Cost Public Goods



(b) Low Cost Public Goods

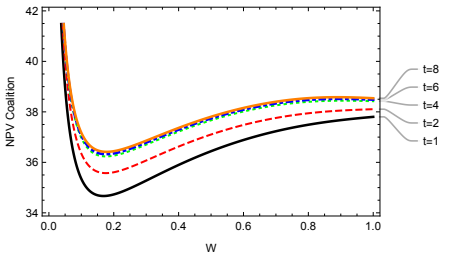


While new leaders in our model always spend more of their available revenue than experienced leaders at any given coalition size, the difference in spending is much larger in smaller coalition regimes (say $0.0 \leq W \leq 0.5$) across leader tenure if the society suffers from low productivity than if it enjoys high productivity. This means that the desire of the masses (though, typically, not the opportunity) to remove leaders in low-productivity environments is much larger than their desire either in high productivity settings or in larger coalition settings. Thus, while large coalition leaders overall are more vulnerable to losing power quickly than are smaller coalition rulers, we have identified a political force that operates against that incentive. The societal gains in resources expended always favor having a new leader over a long-standing one, but the magnitude of that effect fades as productivity increases. This difference across levels of productivity surely affects the utility attached to living with the incumbent in a productive society versus a low-productivity polity, but then the probability of successfully rebelling runs in the opposite direction (Bueno de

Mesquita and Smith, 2009*b*). We can readily imagine how important such considerations are for governance by leaders like Singapore's prime ministers or China's rulers after Deng Xiaoping, each of whom inherited power in a relatively high-productivity but relatively small coalition environment. The logic of selectorate theory tells us that higher productivity increases a leader's risk of routine deposition but, as we will see, increased productivity diminishes the risk of revolution and coup d'état.

Figure 3.8: Political Life-Cycle: NPV of Coalition Membership

(a) High Cost Public Goods



(b) Low Cost Public Goods

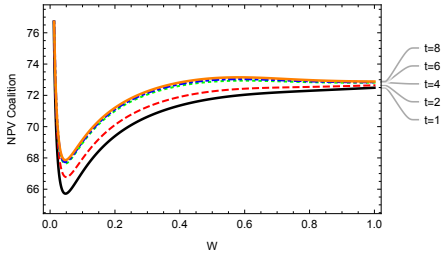
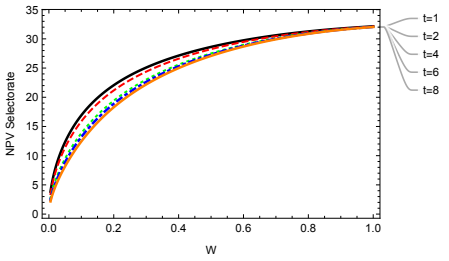
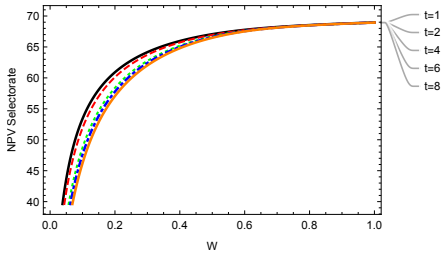


Figure 3.9: Political Life-Cycle: NPV of Selectorate Membership

(a) High Cost Public Goods



(b) Low Cost Public Goods



Figures 3.8 and 3.9 look at the long-term benefits expected by coalition members and by selectorate members who are not in the coalition; that is, it examines differences in net present values as a function of coalition size, leader experience, and societal productivity. It is critical here to notice how different the vertical axes are between the high-cost and low-cost societies. We see, unsurprisingly, that high productivity societies produce much larger expected future returns whether one is in the coalition or outside of it although, of course, there are always greater expected future benefits for those in the coalition than those excluded from it. Coalition membership, as demonstrated in Chapter 2, yields a non-monotonic expected return for coalition members with the minimum return reached at a smaller coalition size in low-cost polities than in high-cost societies. Furthermore, the difference in the net present value of coalition membership across the leader life-cycle is much

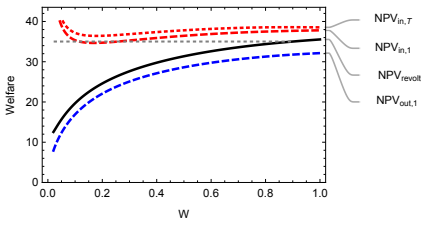
greater than the life-cycle effects for members of the selectorate and they run in opposite directions. Selectors are better off with a new leader because new leaders provide higher levels of both public and private goods. The net present value of coalition membership increases with leader tenure. That, of course, is why coalition members, having remained in the coalition for a long time, are more loyal.

3.3.2 A Credible Revolutionary Threat

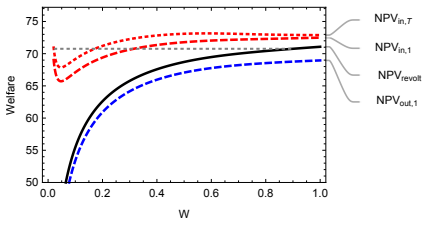
Having looked closely at how short- and long-term interests are affected by coalition size, life-cycle effects, and productivity in the absence of a revolutionary threat, we now turn to Figure 3.10. It provides substantive insights into when revolutions, or credible threats of revolution, are likely to occur and when the coalition's members are likely to back such revolutionary movements. The figure does so by comparing heuristically the value expected from supporting a revolution with the value expected if one remains loyal under existing institutions. To keep the discussion as uncluttered as possible, we suppress considerations of revolutionary costs. The left panel examines the case with a high cost for public goods (a low productivity country) and the right panel considers the more productive, low-cost setting. The figure is complicated but, we believe, highly informative. Its complexity means that it needs a detailed, thorough explanation to tease out its nuanced implications.

Figure 3.10: Political Life-Cycle: Considering a Lottery on Revolution

(a) High Cost Public Goods



(b) Low Cost Public Goods



Each panel shows four curves and a flat dotted line. The top line, labeled $NPV_{in,T}$, shows the net present value of being in the winning coalition at each possible coalition size after the leader has fully learned affinities ($t = T$). The second curve down also shows the net present value of being in the coalition, but this curve shows the value when the leader is new to office ($t = 1$). The lowest curve, labeled $NPV_{out,1}$, shows the net present value of being a selector outside of the winning coalition under a newly installed leader ($t = 1$).[16]

[16]Recall that the longer the incumbent is in office, the fewer public goods she is expected to produce, implying that $NPV_{out,1}$ is the best those outside the coalition can expect to do during the incumbent's time in office.

The third line down is labeled as NPV_{revolt}. This solid line depicts the value that a current member of the winning coalition expects to receive if he backs a successful revolution that then establishes post-revolutionary institutions. NPV_{revolt} is calculated as the risky lottery between being included ($V_{in,1}$) and being excluded from the new coalition ($V_{out,1}$).[17]

Suppose the revolutionary leader proposes creating a coalition of size W'. As a simple heuristic, let the expected value of being part of the revolutionary coalition be defined by the following lottery:

$$NPV_{revolt} = Pr(inclusion)NPV_{in,W',1} + Pr(exclusion)NPV_{out,W',1} \tag{3.8}$$

where the $NPV_{in,W',1}$ term corresponds to the net present value of being included in the post-revolutionary coalition in the first period under the new institution W' and $Pr(inclusion)$ corresponds to the probability of being included in that new coalition. For the purposes of this calculation we define $Pr(inclusion) = \frac{W'}{S} + \nu$.

The figure allows us to explore the incentives each part of society has to back a revolution. Recall that for a revolution to succeed it must be backed by revolutionaries from within the masses but it also must not be opposed by members of the winning coalition. The decision by the masses whether to back a revolution is straightforward. If the current government's winning coalition is of size W and the revolutionary proposes changing it to be W' then for those outside the winning coalition, the relevant comparison is between the bottom line in the figure, ($NPV_{out,1}$), compared to the lottery (NPV_{revolt}). As is apparent from the figure, for the masses any revolution that does not propose to diminish the coalition's size would be expected to be welfare improving.

For a revolution to succeed, however, it is not sufficient that the masses back it. If the coalition does not at least acquiesce to the revolution then the revolt will fail. Therefore, for a revolution to succeed it must be true that the lottery (NPV_{revolt}) yields a greater expected utility than coalition members receive in the current government; that is $NPV_{revolt} > NPV_{in,T}$ or $NPV_{in,t}$ (whichever is relevant). Thus, we see that for the coalition and the masses to back a prospective revolt, the proposed post-revolutionary coalition's size W' must be larger than the current regime's coalition of size W. These broad inferences from the figure help us understand why revolutions are rare or non-existent when W is very large or when it is very small. The masses want to revolt against their government when W is smaller than the proposed institutions following a revolution. Coalition members are especially inclined to back a revolt when their welfare under the incumbency constraint is close to the swoosh curve's minimum, meaning that their upside is largest if $W' > W$. No wonder that revolutionaries always say they are for lifting up the downtrodden and building a democratic society until they become successful. Then, all-too-often their incentives switch from those of a revolutionary, democratic reformer to those of an incumbent leader whose welfare is just about always better when their coalition is smaller rather than larger.

[17] We might be more precise in deriving this lottery by including immediate costs and benefits as well as the progressive learning process, but this simple definition conveys the core intuitions.

Given what we have discerned thus far, we shall construct illustrative examples regarding the risk and realization of revolution under the assumption that the revolutionary leader proposes that he will expand the coalition to $W' = .9$. The flat dotted line in the figure corresponds to the expected value from joining such a successful revolutionary coalition (absent immediate costs and benefits) and allows us to compare that expected value to any pre-revolutionary coalition size. One could project an equivalent dotted horizontal line from any point on the solid NPV_{revolt} line, reflecting the comparison of a post-revolutionary coalition of any size W' to the pre-revolutionary coalition size of W.

With this lengthy, detailed setup in hand, we are ready to consider more precisely the conditions under which revolutions occur, when they are likely to succeed, and whether coalition members are expected to support or suppress the revolution. To begin, suppose that a revolution occurs. If the coalition backs the protesters by joining (or at least not opposing) the revolution, then the pre-revolutionary coalition's members can expect a post-revolutionary payoff illustrated by the flat dotted line in Figure 3.10. Alternatively, if they stay loyal to their long-established incumbent leader, putting down the revolution, then they can expect a payoff given by the upper curve $NPV_{in,T}$ (ignoring the cost of repression, η). If, instead, the incumbent leader is newly installed in office, then the coalition's expected payoff from staying loyal is $NPV_{in,1}$, the second curve down (again absent the cost of repression).

The incumbent is likely to be secure against revolutionary deposition when the coalition's expected value of remaining loyal, supporting the incumbent and suppressing the revolution, is higher than the value of backing the revolution. In contrast, in circumstances under which the upper curves dip below the dotted line the incumbent leader faces a serious revolutionary threat and needs to take actions to avoid deposition. What, then, does the figure tell us about how the circumstances vary across pre-revolutionary coalition size, leader experience, and society's level of productivity?

First, it is evident that established leaders ($t \geq T$) are less vulnerable to revolution than new leaders. We know this because $NPV_{in,T} > NPV_{in,t}$ at any given pre-revolutionary coalition size or productivity. Second, leaders are most vulnerable to revolutionary threats at the range of coalition sizes at the bottom of the swoosh – that is when the net present value of coalition membership is minimized. Third, leaders in highly productive societies that have a relatively small winning coalition face greater revolutionary threats than do leaders in low productivity societies. We see this by comparing the welfare of coalition members in each panel of Figure 3.10.

In the first panel; that is, the low productivity society, there are few circumstances where the coalition's welfare dips below what they expect from backing a revolution that proposes to increase coalition size so that $W' = 0.9$. In contrast, in the second panel, the members of a small coalition would be better off by backing a successful revolution than they would be by maintaining their privileged status in the current leader's coalition. This is true despite the total welfare of coalition members being higher in the high productivity, small coalition environment than in the

low productivity, small coalition setting as is evident from the values displayed on the vertical axes of the two panels.

In Chapter 2 we observed that even large coalition, low-productivity societies might be vulnerable to mass uprisings, including separatist movements, civil war or revolution. Figure 3.10 gives us a further way to explore this risk and to draw inferences about when it is more or less likely to translate into a successful uprising that overthrows the incumbent regime. Looking at the left panel in the figure, we see that $NPV_{out,t}$ is well below the dotted horizontal line that depicts the expected value of a revolution. In the right-hand, high-productivity panel, the gap between the horizontal line depicting the value of a successful revolution that produces a coalition of size 0.9 and the value of being outside the winning coalition is a smaller proportion relative to gains from the government. If we relate the incentive to revolt among the masses to the expected utility from revolting versus the expected utility from remaining outside the coalition, we see that the marginal expected gain of a successful revolt is larger among those outside the coalition in a low productivity society than in a high productivity society but it exists in both types of settings. Thus, even larger-coalition, low productivity societies are likely to be vulnerable to mass uprisings although those uprising are unlikely to succeed given the coalition's welfare from sustaining the incumbent versus backing the revolutionaries. If we then add to the mass incentive to revolt the choice by the coalition to back the revolt or not, then we see that the coalition's pro-revolt, pro-masses incentive is greatest in smaller coalition, high-productivity polities.

In our illustrative numerical example in Figure 3.10, the pre-revolutionary winning coalition in a low-productivity setting is never incentivized to back revolution no matter what the expected size of the post-revolutionary coalition is. That is not true in the high-productivity illustrative example in the figure. Thus, the theory implies that successful mass uprisings are more likely in higher-productivity societies than in lower-productivity polities, all else being equal, clearly providing a reason for leaders to resist significant improvements in productivity, public goods provision and, given our indicator of p, limiting educational attainment in their society.

Putting ourselves in the leader's shoes, we see the tensions that arise in high productivity systems if the coalition's size places it toward the bottom of the swoosh curve. In such settings, the coalition is inclined to back a revolution, placing the leader's political tenure, and perhaps her life, in jeopardy. Two institutional responses are available to a leader in such jeopardy. She might increase the coalition's size by partially democratizing, thereby improving the coalition's likelihood of backing her against the revolution. But such a response reduces the incumbent's discretionary revenue. Alternatively, she can contract the coalition's size, enhancing her discretionary revenue but at the increased risk that coalition members will either launch a coup or support the revolution.

Now imagine that the post-revolutionary proposed coalition size, W', is expected to be smaller, say 0.5. This can be captured by drawing a dotted horizontal line that crosses the solid line, NPV_{revolt}, at pre-revolutionary $W = 0.5$. If a revolutionary leader indicated his intention to build a post-revolutionary coalition of size 0.5, there would be practically no prospect of attracting

supporters away from the existing winning coalition. This would be true whether the society enjoyed high- or low-productivity. Again this reminds us why revolutionaries always say they want to democratize their society. Thus, we see how dangerous revolutionaries can be from an incumbent's point of view when coalition members see the prospects of a more democratic polity in a high productivity society. Leaders surely are ever mindful of this danger. Fortunately for them, there are counter-maneuvers they can undertake to improve their survival prospects. We turn to those maneuvers now.

3.3.3 Remediation of revolutionary threats

Revolutionary threats increase the risk of deposition for leaders. Having worked hard and risked much to come to power, leaders do not want to simply wait to be deposed. Instead they take remedial actions to stay in power. There are three major maneuvers that can be taken to salvage the incumbent's political survival in the face of a credible revolutionary threat:

1. Policy changes: as characterized by the equilibrium to the game (Proposition 3), when revolutions are thought to be likely, leaders spend more of their available resources and specifically increase the provision of public goods. Spending more increases coalition loyalty. Public goods make the status quo more valuable to the masses and so discourages them from rebelling.
2. Increase the cost of revolution. In the formal model the cost of rebelling in period t is K_t, which is identically independently distributed, drawn from the distribution $H(x) = Pr(K_t < x)$. Although not a decision explicitly modeled in the game, policy choices that shift the distribution $H(x)$ towards higher cost reduce the likelihood of revolution. In the low productivity setting, there may be little need for the leader to actively increase the cost of rebellion because the absence of communications networks and transport infrastructure make it too difficult for people to organize against the government. However, if they perceive a credible revolutionary threat, then, regardless of productivity, leaders may want to increase the expected cost of revolution through additional suppression. Leaders can impose censorship (Egorov, Guriev and Sonin, 2009) and they can create secret police (Greitens, 2016), surveillance capabilities (Davenport, 2007), and other means that facilitate active spying on or betrayal and suppression of alleged dissidents (Guriev and Treisman, 2019; Gehlbach, Sonin and Svolik, 2016). They can follow up on anyone accused of being a dissident with imprisonment, torture, or, in extremis, extra-legal killing, although such actions come at a cost to the government's backers (η in the model) as well as to the prospective rebels (Bueno de Mesquita et al., 2024; Nandong, 2023).
3. Change institutions: As seen in the discussion of Figure 3.10, there are incentives to alter institutions when there is a credible revolutionary threat. Significant changes in policy allocations almost always necessitate changes in institutions. Separate from policy modifications,

revolutionaries say they will expand the winning coalition and they may do so if successful but they may also contract it. Leaders, to avert a revolution, may choose to expand or contract the coalition's size. In the next section, we explicitly model the circumstances under which coalition members, taking on the role of coup plotters, may likewise choose to modify the size of the winning coalition; and, leaders, anticipating coup plots may instigate their own modifications in the structure of government.

These adjustments and their effects vary, as we have seen, with the society's efficiency in producing public goods (p), its institutions (W and S), how long the incumbent has been in power (t), and their effects on political loyalty. In the next section we formally model a contest between a leader and a potential coup plotter over whether (and how) to change political institutions. By modeling which institutional changes are likely to be backed by the coalition's member and which are not we take admittedly tentative steps toward a theory of endogenous institution choice.

3.4 Leader and Coalition-Led Changes to Institutions

Changes to institutions can improve a leader's prospects by dissipating revolutionary threats and increasing their discretionary revenue. Such changes might be good for some coalition members, but may harm others. Dissatisfied coalition members contemplate replacing the regime with one that better serves them. Hence, both leaders and would-be coup plotters have incentives to alter institutions to better protect their respective interests.

When a coup is on the horizon, both the incumbent ruler and the would-be coup plotter need the support of coalition members if their cause is to succeed. The government's leader or the coup plotter might propose a change in institutions as a way to secure that support. If either party attempts institution change, then the coalition's members must decide with whom their interests lie and whom to back. The analysis here identifies the institution changes most likely to be backed by coalition members. We introduce a global game of coalition coordination that identifies the detailed circumstances behind institution change in the face of the anticipation of a threatened coup d'état. That game yields several perhaps surprising results that are tested in subsequent chapters.

The Institution Change Game probes not only changes in institutions, but also modifications in policy provisions that are designed to preempt the danger of a coup. The game reveals that if a leader anticipates a coup plot, then her best response is to spend her discretionary, rainy-day resources only on additional private goods. Additional public goods, as it turns out, have no influence on the outcome of competition with a coup plotter. Further, whether the coalition's members back the incumbent or the coup plotter is strongly driven by their prospects of inclusion in the post-transition coalition. The prospects of subsequent inclusion imply modifications not only to the size of the coalition but also to the size of the real selectorate.

Coups are more likely to succeed, and therefore, more likely to be attempted, when the coup plotter intends to reduce the size of the real selectorate. Such a contraction in who can be a

potential supporter greatly increases the chance for each potential coup backer that they will be in the post-coup winning coalition for the long term. Coups are more attractive to prospective backers if they are credibly expected to increase $\frac{W}{S}$. While the ratio of W to S can be increased by decreasing both, reducing W makes it harder, not easier, to attract support from within the existing coalition. Hence, a consequence of the anticipation of a coup d'état is that it is better countered by democratizing, increasing W and decreasing S_{Real}, making the polity more accountable.

The model uncovers an important relationship between leader tenure and institution change. Long serving incumbents have a diminished need to modify institutions as the mechanism to attract backers. Because their supporters have strong confidence in their continued flow of benefits, coup threats are less credible than when the incumbent is a newcomer. This impact of tenure creates a wedge in the magnitude and likelihood of institution change over the course of a leader's term in office. We now develop the Institution Change Game and derive these and other results.

3.4.1 Institution Change Game

To investigate institution change, we modify our earlier focus on selectorate politics with fixed institutions while, of course, preserving the insights previously derived from the theory. Now we expand the theory to better capture the prospects of strategically-chosen, endogenous institution change as a response to real or perceived threats to the leader's continued hold on power.

We begin by recognizing that occasionally a leader or a coup plotter might see a reason to change institutions. For modeling purposes, that opportunity arises with probability μ. Such a circumstance is assumed to arise after the leader has set policy (g_t, z_t) in period t. We treat such opportunities as sufficiently rare that we can use the Net Present Values derived in the previous discussion to characterize each actor's welfare under any institutional arrangement. A consequence of our assumption that μ is small is that after a successful change in institutions, subsequent alterations in W, S_R, or S_N (at least during an incumbent's time in office) are sufficiently uncommon that we can discount such a possibility when evaluating the welfare implications of new institutions. The assumption that $\mu \to 0$ is obviously made for technical convenience but, we believe, it also reflects a fairly realistic view. In the absence of this assumption, the analyses would have to account for every possible future institutional framework in calculating the welfare value of each institutional arrangement. Since significant changes in governing institutions are, in fact, relatively infrequent, not assuming that $\mu \to 0$ would mean undertaking a denser mathematical analysis with little expectation of additional substantive insight.

An opportunity to change institutions is manifested as the shift from W and/or S to the size of the coalition and selectorate under the new institutions. We introduce the notation $I_B = (W_B, S_B)$ to represent the new coalition and (real) selectorate when institution changes are undertaken by the continuing incumbent leader. The extant institutions are denoted as $I_0 = (W_0, S_0)$, with the '0' subscript to indicate that the existing institutions persist. We denote the institution changes that

are proposed by the coup plotter, C, as $I_C = (W_C, S_C)$. If there is an attempt to change institutions, then the coalition's members play a global game that determines whether the incumbent or coup plotter prevails, with the incumbent leader paying cost Δ_L, the coup plotter cost Δ_C, and the coalition's members cost Δ_W.

To capture the added implications if there is an opportunity to change institutions, we modify the coalition loyalty game:

1. The leader sets public and private goods allocations, g_t, z_t.
2. With probability μ, an opportunity arises to change institutions. If no opportunity arises, then the game proceeds as in the standard coalition loyalty game.
3. If an opportunity arises, the leader decides whether to use discretionary revenue on additional public or private goods, g_x, z_x.
4. Nature randomly decides whether the leader or coup plotter gets the first move, $Pr(\text{L first}) = \lambda_L$.
5. The first mover decides whether to attempt institution change.
6. If the first mover did not attempt institution change, then the second mover can attempt institution change.
7. If either the leader or coup plotter attempts an institution change, then the members of the existing winning coalition play the global game in which each member of the coalition decides whether to back the leader or the coup plotter.

In our assessment of the institution change game we make a few additional assumptions. In particular, in keeping with other models of political conflict, we assume that there is a first mover advantage, f, when the chance arises to change institutions (Bueno de Mesquita and Lalman, 1992; Kydd, 1997; Powell, 2006). To describe the game, we focus on the case in which the Leader moves first. This is just for convenience. As a further convenience, so as to focus attention on key new insights and to reduce the number of terms that we must keep track of, we remove health considerations by setting $h = 1$. Additionally, we assume that affinity learning is fully revealed as people choose sides during a coup. These assumptions are also made to reduce notation, simplify calculations, and focus on the features that are most essential.

Because the global game is sequential, it provides a unique characterization for the expected payoff of the leader and coup plotter under each of its possible paths, thereby providing a rich analytic environment. Should either L or C attempt to change institutions, the coalition's members must decide whom to back. We start our exposition by describing the global game that models this last decision. Later we will index the global game according to who is the first mover and L's spending decisions. However, to introduce the basic global game context we initially suppress this nomenclature.

The institution change game captures the power-sharing dynamics between a regime and its supporters (Meng, Paine and Powell, 2023; Svolik, 2012, 2009). Scholars point to the creation of institutional rules (Frantz and Stein, 2017; Gandhi and Przeworski, 2007; Gandhi, 2008; Kim and Sudduth, 2021) and coup proofing (Belkin and Schofer, 2003; Powell and Thyne, 2011; Powell, 2012; Quinlivan, 1999; Sudduth, 2017*a*,*b*) as events that trigger coups. In our anticipatory approach, coup plots and changes either in institutions or in coalition membership are mutual responses. Leaders want to preemptively remove 'disloyal' supporters and reshape institutions to help them survive. However, they are in a race to do so. Supporters do not want to lose access to the perquisites that coalition membership bestows. So when they think they are at risk of replacement they need to act first.

As with many mechanisms in politics, the dynamics of preemptive coups are driven by a commitment problem (Acemoglu and Robinson, 2001; Myerson, 2008; Powell, 2006). The leader cannot commit to keeping the coalition unchanged. Neither can supporters commit to refrain from plotting coups. Once either a subset of supporters or the leader suspects that the other party is planning a move then the first mover tries to preempt the other party's move. We return to this critical point later.

3.4.2 Analysis of the Global Game

The global game begins by assuming that there is a coup plotter who wants to change institutions and that the incumbent, anticipating the plot, recognizes that her political survival depends on some change in institutions. The institution change game is in part a contest of strength. By 'strength' we mean who can marshal more resources, the incumbent or the coup plotter. The incumbent's prospects of successfully surviving a coup threat depends on her relative strength (Ω), the proportion of the coalition that chooses to back her, and the first strike advantage if she moves first. The coup plotter's prospects of success depends on the proportion of coalition members who decide to back him and the first strike advantage if he moves first.

The game proceeds first with each member of the incumbent's winning coalition, i, receiving a signal, s_i, about the incumbent's strength relative to that of the coup plotter; that is, Ω. Given their signal, each coalition member independently decides whether to back the incumbent leader or the coup plotter. If the leader obtains sufficient support (defined below), then the political institutions shift to I_B and the leader survives. If the leader obtains insufficient support, then the coup plotter comes to power and the institutions shift to I_C.

The global game technology is an analytically convenient way to study how coalition members resolve their coordination problem. Provided that a technical condition concerning the precision of signals is met (derived below), there is a unique equilibrium characterized by two thresholds, $\widehat{\Omega}$ and $\widehat{s}$. Given this uniqueness result, should either L or C attempt institution change, the global game fully characterizes the expected payoff for all players. Of course, the precise details of the

global game depend on whether the leader spends her surplus resources on additional benefits for supporters and the precise details depend as well on who initiates institution change since the game includes a first strike advantage.

One key to the game's equilibrium results is set by whether $\Omega \geq \widehat{\Omega}$. The threshold $\widehat{\Omega}$ defines the cut-point for leader strength such that in the game's equilibrium if the leader's strength (Ω) is at or above this threshold then the leader survives in power. Further, in equilibrium, every coalition member who sees a signal above the threshold $\widehat{s}$, $s_i \geq \widehat{s}$, believes the incumbent is strong enough to prevail and so supports the incumbent. These two critical thresholds are uniquely determined by two conditions. The first condition, which we refer to as Conflict Technology, ensures that if $\Omega \geq \widehat{\Omega}$, the incumbent gains enough support to win and the institutions shift to I_B. If the leader's strength is below this level, then the coup plotter wins and the new government's institutions become I_C. The second condition, which we refer to as Supporter Indifference, ensures that given the signal $s_i = \widehat{s}$, supporter i would be indifferent between backing L or C. If the signal is higher, $s_i > \widehat{s}$, then the supporter strictly prefers to back the incumbent. If the signal is lower, $s_i < \widehat{s}$, then supporter i strictly prefers to back the coup plotter.

The random variable Ω is in many ways analogous to the performance shock, θ, that we used earlier. Indeed, we might equally well have set the model up as Ω being a relative preference between the leader and coup plotter, effectively serving a similar role to θ in the basic leader support game. The state variable Ω is normally distributed with mean zero and precision α_Ω: $\Omega \sim N\left(0, \frac{1}{\alpha_\Omega}\right)$. With f denoting the value of the first strike advantage, we now assume that L moves first but the case where C moves first is analogous with f replaced by $-f$ throughout the analysis. Each member, i, of the extant coalition sees a noisy private signal of the leader's strength, s_i, with precision β. Conditional on the state variable, these signals are independent and $s_i \sim N\left(\Omega, \frac{1}{\beta}\right)$. Having seen their signal, each coalition member decides whether to back the leader or the coup plotter. $Pr(\text{Support L})$ represents the proportion of the coalition who back L rather than C. The leader wins the global game if and only if the following condition holds:

$$\underbrace{Pr(\text{Support L}) + \Omega + f}_{\text{effective support for L}} \geq \underbrace{1 - Pr(\text{Support L})}_{\text{support for coup}} \tag{3.9}$$

The payoffs for the coalition members depend upon whom they support and whether the leader or coup plotter wins the global game. Later we examine the constituent components that make up the coalition members' payoffs. However, to start with, we abbreviate the payoffs as shown in Table 3.2. The key feature of the coalition members' preferences is that if the leader is going to win, then each coalition member wants to support the incumbent because the payoff from backing the winning leader is greater than the payoff from backing the losing coup plotter; that is, $X_L > Z_L$. In contrast, if the coup plotter wins then the coalition member prefers to have supported the coup: $Z_C > X_C$. Put simply, supporters want to back the winning side. Further, since there is a continuum of supporters (although for ease of language we will continually discuss them as though

they are individuals), no supporter is pivotal. The effective objective of each supporter is to back the winning side.

	Outcome	
Action	Leader Wins	Coup Plotter Wins
Support L	X_L	X_C
Support C	Z_L	Z_C

Table 3.2: Abbreviated Payoffs in the Global Game

Attempts at institution change result in conflict costs that are imposed on the incumbent (Δ_L), the coup plotter (Δ_C), and members of the existing coalition (Δ_W). These costs reflect, for instance, the violence, potential costs of exile, imprisonment, or death, and the psychological costs of purging fellow coalition members. As an extension, we might consider indexing these costs for coalition members by the types of institutional changes being contemplated. However, as we shall see, the costs imposed on the coalition members do not influence their choices in the global game and so such considerations are cosmetic.

If coalition member i supports a winning incumbent, then the leader retains supporter i under the new institutions (I_B) with probability ρ_t^B and purges them, shuffling them out of the winning coalition, with probability $(1-\rho_t^B)$. If retained, the supporter receives the immediate provision of private goods $z_t + z_x$ and the discounted NPV of being in the coalition under L's new institutional arrangements. If purged, then the supporter is a political outsider under the new institutions.

$$X_L = \underbrace{-\Delta_W}_{\text{conflict cost}} + \underbrace{u(g_t+g_x, z_t+z_x)}_{\text{immediate rewards}} + \underbrace{\rho_t^B\ \delta\ V_{in,T}^B}_{\text{retained}} + \underbrace{(1-\rho_t^B)\left(\delta\ V_{out,T}^B\right)}_{\text{purged}} \tag{3.10}$$

If coalition member i supports the incumbent but the incumbent is deposed, then the coup plotter excludes i from his coalition for sure. The erstwhile leader's loyal supporter receives no private goods from C and is made a political outsider under the coup plotter's new institutions. The payoff for the former leader's loyal supporter under this eventuality is

$$X_C = -\Delta_W + u(g_c, 0) + \delta\ V_{out,T}^C \tag{3.11}$$

Alternatively, if coalition member i supports the coup plotter but the incumbent leader retains power, then the disloyal i is purged by the incumbent. This generates a payoff of

$$Z_L = -\Delta_W + u(g_t+g_x, 0) + \delta\ V_{out,T}^B \tag{3.12}$$

If coalition member i supports the coup and the coup is successful, then i is retained in the coup plotter's long run coalition with probability ρ_t^C which allows him to benefit from immediate private

goods and from the benefits of being a political insider under the new coup institutions. With probability $1-\rho_t^C$ the supporter is purged by the coup plotter. Supporter i's expected payoff for backing a successful coup is

$$Z_C = -\Delta_W + u(g_c, z_c) + \rho_t^C \left(\delta\ V_{in,T}^C\right) + (1-\rho_t^C)\left(\delta\ V_{out,T}^C\right) \tag{3.13}$$

Let $Q = \frac{Z_C - X_C}{X_L - Z_L + Z_C - X_C}$ represent the ratio of supporter payoffs. Given this setup we can characterize perfect Bayesian equilibria for the global game.

Proposition 5. *Perfect Bayesian equilibria for the Global Game in which the incumbent moves first are characterized by the pair $(\widehat{\Omega}, \widehat{s})$ that solves equations 3.14 and 3.15*

$$2\Phi\left(-\frac{\alpha_\Omega}{\sqrt{\beta}}\widehat{\Omega} - \frac{\sqrt{\alpha_\Omega+\beta}}{\sqrt{\beta}}\Phi^{-1}(Q)\right) + \widehat{\Omega} + f - 1 = 0 \tag{3.14}$$

$$\widehat{s} = \frac{\alpha_\Omega+\beta}{\beta}\widehat{\Omega} + \frac{\sqrt{\alpha_\Omega+\beta}}{\beta}\Phi^{-1}(Q) \tag{3.15}$$

The incumbent wins the global game if and only if $\Omega \geq \widehat{\Omega}$ and each coalition member supports the incumbent if and only if their signal is sufficiently high, $s_i \geq \widehat{s}$.

If supporters' signals are precise, then there is a unique equilibrium:

$$\alpha_\Omega < \frac{\sqrt{\pi}\sqrt{\beta}}{\sqrt{2}} \tag{3.16}$$

As signals become precise, the critical state $\widehat{\Omega}$ becomes a linear function of Q. In particular, as $\beta \to \infty$,

$$\widehat{\Omega} \to 2Q - f - 1 \tag{3.17}$$

We now derive key features of the equilibrium. The formal proof follows standard global game logic and is contained in Appendix A3.2.1.

3.4.3 Key Features of Payoffs with a Credible Coup Threat

The structure of payoffs when there is a credible prospect of a coup implies some key characteristics that inform our analysis. First, as we have noted, each member of the winning coalition shares a common interest in supporting whichever side will emerge as the winner. If the incumbent wins, then the supporter wants to support her: $X_L > Z_L$. In contrast, the supporter wants to back the coup plotter if the coup will succeed: $X_C < Z_C$.

If supporter i believes that the incumbent will win with probability $Q = \frac{Z_C - X_C}{X_L - Z_L + Z_C - X_C}$, then the supporter is indifferent between supporting L or C.[18] If supporter i believes that L's chance of

[18]The derivation of the critical ratio follows from equating the following lotteries: $QX_L + (1-Q)X_C =$

winning is greater than Q, then i strictly prefers to support L. All else equal, the smaller the ratio of payoffs defined by Q, the more likely it is that supporters will back the incumbent. Given how Q affects the likelihood of winning the global game, the incumbent wants to pick new institutions and spending decisions that reduce Q. The coup plotter is more likely to win the global game when Q is large, and so is more likely to come to power via coup if he proposes new institutions that raise the ratio Q. This means that we learn about endogenous policy choices that result from the anticipation of coup or purge threats. We do so by unpacking the indifference condition for Q.

$$\begin{aligned} Q &= \frac{Z_C - X_C}{X_L - Z_L + Z_C - X_C} \\ &= \frac{u(0, z_C) + \rho_T^C \ \delta \ \left(V_{in,T}^C - \ V_{out,T}^C\right)}{u(0, z_C) + \rho_T^C \ \delta \ \left(V_{in,T}^C - V_{out,T}^C\right) + u(0, z_t + z_x) + \rho_T^B \ \delta \ \left(V_{in,T}^B - V_{out,T}^B\right)} \end{aligned} \tag{3.18}$$

Several features of the unpacked calculation of Q are noteworthy. The cost of a political transition from one set of institutions to another, Δ_W, has no impact on whom coalition members choose to back. This is so because the coalition's members pay this cost regardless of who wins. Supporters might see their payoffs adversely affected by these costs and they might very much prefer that there is no regime change attempt at all. However, individual supporters do not get to choose whether an attempt to change institutions is made. That decision is in the hands of L and C. Given such an attempt, each coalition member must choose a side.

We see, as well, that the provision of public goods plays no role in determining whom the existing coalition members support. Supporters receive public goods whether they are included or excluded from the subsequent winning coalition. When plotting institution change, L and C might offer additional private goods, but they gain no marginal advantage in attracting support by offering additional public goods.

Importantly, any coalition member's decision to support L or C depends on the probability of being retained in the coalition, the ρ terms, and the welfare difference between being inside or outside the coalition. To attract support, the coup plotter needs to persuade coalition members that ρ_t^C is large. The coup plotter also enhances support when the welfare difference between insiders and outsiders is large (the $V_{in,T}^C - V_{out,T}^C$ term). When both ρ_t^C and the welfare difference are large, then the numerator of Q is large. The coup plotter's problem is that it is difficult to credibly argue that ρ_C^t and the welfare difference between insiders and outsiders are both large.

A large difference in welfare between insiders and outsiders is a characteristic of a small coalition system. But in such small coalition systems a leader needs few supporters and so a transitions to such a system induces low retention probabilities. A potential coup plotter can partially offset this risk of exclusion by reducing selectorate size, creating a high $\frac{W}{S}$ ratio as in a junta or a monarchy.

$QZ_L + (1 - Q)Z_C$.

The global game setup is standard and so we exploit many well known results to ease the exposition (see Angeletos, Hellwig and Pavan (2007); Morris and Shin (2001); Shadmehr (2019)). Next we derive an equilibrium in which existing coalition members support the incumbent if and only if they observe signal $s_i \geq \widehat{s}$ and the leader wins the institution change contest if and only if $\Omega \geq \widehat{\Omega}$ based on the two conditions: Conflict Technology and Supporter Indifference.

Conflict Technology

We consider the case in which the incumbent moves first. All coalition members must choose between supporting the leader or the coup plotter. The incumbent leader wins and implements her new institutions, I_B, if the proportion of people who support her plus her relative strength, Ω, and the first-strike advantage, f, is greater than the proportion of coalition members who support the coup plotter. A coalition member supports the leader if the signal received about the leader's strength is strong enough; that is, $s_i \geq \widehat{s}$. Therefore, if the strength of the leader is Ω, then the proportion of the coalition who observe a signal above $\widehat{s}$, and hence support the incumbent, is $\Phi\left(\sqrt{\beta}(\Omega - \widehat{s})\right)$. Given $\widehat{s}$, the following Conflict Technology condition characterizes when the incumbent wins:

$$\underbrace{\Phi\left(\sqrt{\beta}(\Omega - \widehat{s})\right)}_{\text{support L}} + \underbrace{\Omega}_{\text{leader strength}} + \underbrace{f}_{\text{first strike advantage}} \geq \underbrace{1 - \Phi\left(\sqrt{\beta}(\Omega - \widehat{s})\right)}_{\text{support for coup}}$$

By rearranging this expression, we derive the Conflict Technology condition (CT) that characterizes the critical state threshold value, $\widehat{\Omega}$:

$$2\Phi\left(\sqrt{\beta}(\widehat{\Omega} - \widehat{s})\right) + \widehat{\Omega} + f - 1 = 0 \qquad (CT)$$

Given any threshold strategy $\widehat{s}$, the CT equation provides a unique critical state, $\widehat{\Omega}$.

Supporter Indifference

Given a conjecture that the incumbent wins if and only if $\Omega \geq \widehat{\Omega}$, we derive the conditions under which a supporter backs the incumbent and conditions under which the supporter instead defects to support the coup. That each supporter wants to back the winning side is a key feature of the preference structure. Given that signals are normally distributed with mean Ω and variance $\frac{1}{\beta}$, if coalition member i sees signal s_i, then, according to Bayes rule, i believes that Ω is normally distributed with mean $\frac{\beta s_i}{\beta + \alpha_\Omega}$ and variance $\frac{1}{\beta + \alpha_\Omega}$. Hence, supporter i assesses the probability that L will win the institution change competition as $Pr(\Omega \geq \widehat{\Omega} | s_i) = \Phi\left(\sqrt{\alpha_\Omega + \beta}\left(\frac{\beta s_i}{\alpha_\Omega + \beta} - \widehat{\Omega}\right)\right)$.

Rearranging the expected payoff difference between backing the incumbent and the coup plotter,

the coalition member backs the incumbent whenever

$$\Phi\left(\sqrt{\alpha_\Omega+\beta}\left(\frac{\beta s_i}{\alpha_\Omega+\beta}-\widehat{\Omega}\right)\right)\geq Q=\frac{Z_C-X_C}{X_L-Z_L+Z_C-X_C}\in(0,1) \tag{3.19}$$

That is, if i's belief that L will win is at least as large as Q, the probability at which i is indifferent between backing L and backing C, then i chooses to support the incumbent leader. The smallest signal of L's strength, $\widehat{s}$, that satisfies equation 3.19 is characterized by the following Supporter Indifference condition (SI):

$$\Phi\left(\sqrt{\alpha_\Omega+\beta}\left(\frac{\beta\widehat{s}}{\alpha_\Omega+\beta}-\widehat{\Omega}\right)\right)=Q \tag{SI}$$

By rearranging this equation we obtain the equilibrium condition 3.15

Given the derivation of $\widehat{\Omega}$ from the Conflict Technology condition and the derivation of the signal $\widehat{s}$ that induces the Supporter Indifference condition, equilibrium behavior is characterized by fixed points to these equations. By substituting $\widehat{s}$ from equation SI into equation CT, we obtain the single equation (3.14) that characterizes the critical state $\widehat{\Omega}$. If signals are precise, $\beta\to\infty$, then $\widehat{\Omega}=2Q-f-1$

The condition $\alpha_\Omega<\frac{\sqrt{\pi}\sqrt{\beta}}{\sqrt{2}}$ is sufficient to ensure uniqueness, but it is not necessary (equation 3.16). An intuitive interpretation of this result is that the supporters cannot know the leader's precise strength. If they did, and if it was a middling value, then there are two equilibria: all supporters back the incumbent and the incumbent wins, or all supporters back the coup plotter and the plotter wins. In such a setting, supporters ignore their signal. However, provided signals are sufficiently precise, supporters condition their choice on their signal and the equilibrium is guaranteed to be unique.[19]

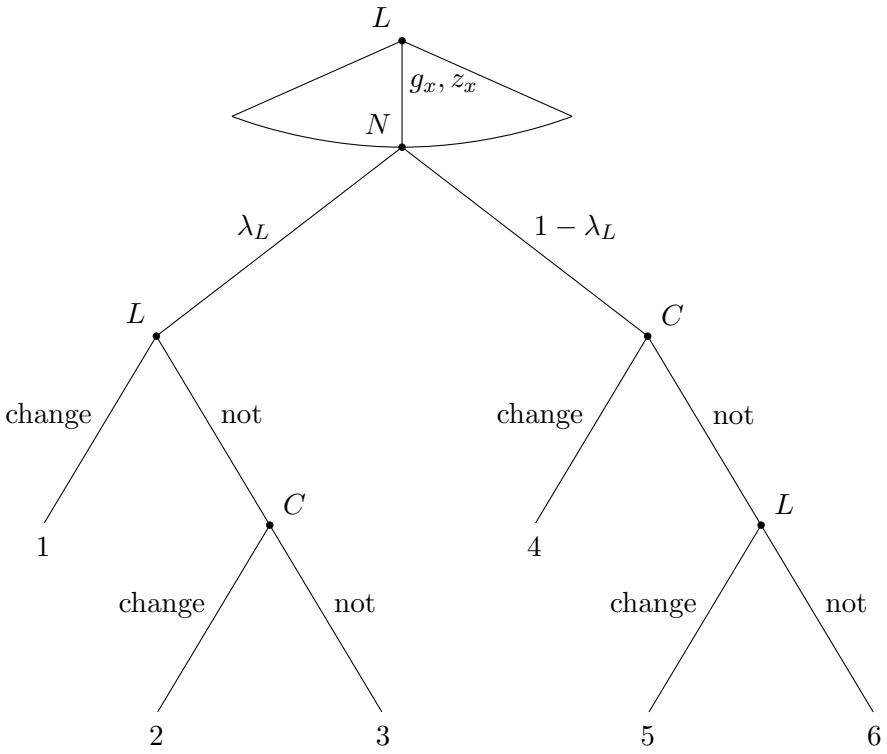
3.4.4 Policy and Likelihood of Institution Change

Should an opportunity for institution change arise, Figure 3.11 shows the actions L and C can take prior to the coalition playing the global game. Should either L or C attempt an institution change, L, C and coalition members each pay their institution-change cost, Δ_L, Δ_C, and Δ_W. Prior to coalition members playing the global game, choosing which side they will support, the incumbent, who is always keen to survive politically, can decide to distribute additional public and private goods to the coalition beyond those required by the normal incumbency constraint. This spending can be done by using her discretionary resources as a 'rainy-day fund' to salvage her incumbency in the face of the risk of a coup d'état.

[19] If the signals are relatively imprecise, then there might be multiple (odd number of) equilibria. If we labeled these equilibria, 1, 2, 3 etc.. according to the size of $\widehat{\Omega}$, then the even numbered equilibria would all be dynamically unstable: they are knife edge and would break down unless precisely balanced. All the odd number equilibria have the same comparative statics.

We have denoted this extra spending as (g_x, z_x) such that $Wz_x + pg_x \leq R - pg_t - Wz_t$. Nature then decides whether L or C moves first. The probability that L has the first mover advantage is λ_L. If the first mover initiates institution change, then the coalition plays the global game. If the first mover chooses not to initiate, then the second mover has an opportunity to do so. If neither L nor C attempts to change institutions, then the extant institutions, I_0, persist.

Figure 3.11: Selecting the Global Game



To streamline the exposition of L and C's choices, we introduce some additional notation. The global game is shaped by who attempts to change institutions and the leader's decision to provide extra rewards to the coalition. To encapsulate these decisions let $\widehat{\Omega_j^x}$ be defined as the solution to equation 3.14, where $j \in \{L, C\}$ is the first mover and x represents L's decision to provide additional rewards for the coalition. If C is the first mover, then the term f in equation 3.14 is replaced by $-f$.

Table 3.3 shows the payoffs for L and C from the global game. Outcome nodes 1 and 5 correspond to the outcome of the global game in which L initiates institution change. In these outcomes L wins the global game with probability $\Phi\left(-\sqrt{\alpha_\Omega}\widehat{\Omega_L^x}\right)$. In addition to the value of the retained resources, which we represent as $l(r_x) = l(R - p(g_t + g_x) - W(z_t + z_x))$, if L wins, then

Table 3.3: Leader and Coup Plotter's Payoff from the Institution Change Game

Game Outcome Nodes	Leader Payoff, $U_L(\#)$	Coup Plotter Payoff, $U_C(\#)$
1,5	$\underbrace{-\Delta_L}_{\text{conflict cost}} + l(r_x) + \underbrace{\Phi\left(-\sqrt{\alpha_\Omega}\widehat{\Omega_L^x}\right)}_{Pr(\text{L wins})}\left(\Psi + \delta NVP^B_{L,T}\right)$	$\Phi\left(\sqrt{\alpha_\Omega}\widehat{\Omega_L^x}\right)\left(\Psi + \delta NVP^C_{L,T}\right)$
2,4	$-\Delta_L + l(r_x) + \Phi\left(-\sqrt{\alpha_\Omega}\widehat{\Omega_C^x}\right)\left(\Psi + \delta NVP^B_{L,T}\right)$	$\Phi\left(\sqrt{\alpha_\Omega}\widehat{\Omega_C^x}\right)\left(\Psi + \delta NVP^C_{L,T}\right)$
3,6	$l(r_x) + \Psi + \delta \underbrace{NVP^0_{L,t+1}}_{\text{extant institutions}}$	0

she enjoys the immediate value of office holding, Ψ, plus the discounted value of being leader under institutions I_B. Should C win, he enjoys the immediate value of office holding plus the discounted net present value of being leader under institutions I_C. The payoff for outcomes 2 and 4 have a similar structure, with the principal difference being that the coup plotter, C, initiates institution change and so L is less likely to win. In the limiting case, $\beta \to \infty$, $\widehat{\Omega_C^x} = 2Q + f - 1$.

The characterization of the subgame perfect equilibrium follows directly from backwards induction. As is common with large extensive form games, a description of the full subgame perfect equilibrium is notationally dense and provides little substantive insight; hence we dispense with a full description and instead provide a series of lemmas that state the substantively interesting features of the equilibria. We first assesses features of the leader's spending decisions and whether or how any additional spending affects L and C's incentives to attempt to initiate institution change. After looking at these initial results, we move to the central focus of this chapter and examine which institution changes are likely to succeed and why.

Lemma 1. *If there is a first strike advantage, $f > 0$, then $\widehat{\Omega_L^x} < \widehat{\Omega_C^x}$ and the outcomes 2 and 5 shown in Figure 3.11 never occur in equilibrium.*

The first argument follows directly from equation 3.14, and the equivalent equation with $-f$ replacing $+f$ if C initiates first. For the limiting case $\beta \to \infty$, $\widehat{\Omega_C^x} - \widehat{\Omega_L^x} = 2f > 0$ and so L wins with a greater probability if she moves first. The second part of the claim follows from backward induction. If C will initiate as second mover, then L wants to preempt. Since the coalition will play the global game anyway, L wants the first strike advantage to improve her prospects of success. This logic leads to the following result: The existing institutions persist if and only if both L and C have a higher payoff from the continuation of those institutions than either would have if they used the first mover advantage to initiate institution change.

Lemma 2. *The extant institutions only survive an institution change opportunity if*

$U_L(outcome3) \geq U_L(outcome1)$ *and* $U_C(outcome3) \geq U_C(outcome2)$.

If the first mover advantage is large, then institution change might be *ex ante* Pareto inefficient: all actors would prefer that no institution change attempts occur. However, if the coup plotter will attempt a coup when he gets a first mover jump on the incumbent, then the incumbent will try to preempt; anticipating instability, as this volume's title implies, leads to instability.

Next we consider whether the incumbent will spend any of her discretionary resources on additional rewards for her coalition.

Lemma 3. *L never provides any additional public goods,* $g_x = 0$.

The leader never provides additional public goods as part of the coup-avoidance, institution change game. Since coalition members receive these goods regardless of who they back in the global game, additional public goods do not improve L's prospect of victory but they do reduce her discretionary resources. Formally, Q is independent of g_x.

The incumbent's decision to provide additional private goods is somewhat complicated, and in many ways is reminiscent of the security dilemma in international relations theory (Jervis, 1978; Herz, 1950). Provided that neither L nor C wants to initiate an institution change attempt, L will provide no additional private goods. To do so would simply waste discretionary resources, spending down her rainy-day fund when it is not raining. However, if C is likely to initiate a coup, then L wants to provide additional private goods for two reasons: 1) additional private goods increase coalition support, making it more likely that L wins: $\frac{d\widehat{\Omega}_j^x}{dz_x} < 0$, for $j = L, C$; and 2) additional private goods may deter C from attempting institution change. Yet, L's ability to deter C from attempting a coup may have the contradictory effect of making institution change inevitable.

When there is a high risk of coup, L wants to spend just enough on private goods so as to deter C from attempting a transition:

$$\text{Minimize } z_x \text{ subject to } U_C(\text{Outcome 2}) \leq U_C(\text{Outcome 3})$$

This level of additional private goods spending would deter C. However, such deterrence attempts can have a contradictory effect. The logic is as follows. Additional private rewards puts L in a better position should the global game be played, but if L increases z_x in order to deter C (that is meet the condition $U_C(\text{Outcome 2}) \leq U_C(\text{Outcome 3})$), then L also increases $U_L(\text{Outcome 1})$. If $U_L(\text{Outcome 1}) > U_L(\text{Outcome 3})$ then L initiates institution change. If C anticipates such a move, then he will want to strike first. As in the security dilemma, by defending herself against a coup, L makes institution change attractive for herself and so may inspire C to initiate a coup. The larger the first strike advantage becomes, the greater this risk becomes. In many cases, if C could commit to not launch a coup, then L would not provide additional rewards nor would she launch a purge.

While considerations of first strike advantages and the provision of extra private goods are interesting, they are not the primary focus of our analysis. Coalition dynamics lay at the heart of understanding coups and fears of being purged. To focus on these dynamics, moving forward we fix the extra private goods provisions, z_x. In what follows, our analysis of coalition dynamics holds for any given z_x, whether that increased allocation for private goods spending is optimal or not. In constructing numerical examples we assume that both L and C spend all resources not previously allocated to public goods as private goods.

3.4.5 Coalition Loyalty and the Likelihood of Successful Institution Change

In the global game L wins if $\Omega \geq \widehat{\Omega_L^x}$. With that in mind, the following comparative static is central to our results:

$$\frac{d\widehat{\Omega_L^x}}{dQ} = \frac{2\sqrt{\alpha_\Omega + \beta}\phi\left(-\frac{\alpha_\Omega}{\sqrt{\beta}}\widehat{\Omega_L^x} - \frac{\sqrt{\alpha_\Omega+\beta}}{\sqrt{\beta}}\Phi^{-1}(Q)\right)}{\left(\sqrt{\beta} - 2\alpha_\Omega\phi\left(-\frac{\alpha_\Omega}{\sqrt{\beta}}\widehat{\Omega_L^x} - \frac{\sqrt{\alpha_\Omega+\beta}}{\sqrt{\beta}}\Phi^{-1}(Q)\right)\right)} \frac{1}{\phi\left(\Phi^{-1}(Q)\right)} > 0 \tag{3.20}$$

To gain substantive insight it is useful to focus on the limiting case, $\beta \to \infty$, in which case $\frac{d\widehat{\Omega_L^x}}{dQ} = 2$. As $\widehat{\Omega}$ increases, it is more likely that C wins the global game. All else equal, factors that increase Q make the coup plotter more likely to attempt to change institutions; factors that decrease Q put L in a better position to win the global game.

In assessing whether to act on an opportunity to change institutions, we focus on three factors:

1. Direct costs: Δ_L and Δ_C
2. Value of new institutions for leaders, $NPV_{L,T}^B$
3. Probability of winning the global game, $\Phi\left(-\sqrt{\alpha_\Omega}\widehat{\Omega_L^x}\right)$

We believe that the third factor provides the most substantive insights into the conditions for institution change. Therefore, we quickly discuss the first two factors before delving into the features that determine success.

Direct costs: Attempts to change institutions become more attractive to leaders and plotters when the costs are low. Contractions in W require purging friends and that can be grizzly work. One might expect that moves to enlarge the coalition are less costly. Indeed, the leader might enjoy the historical legacy of being the person who brought about democracy in her country and so, in the expansion case, Δ_L might even be a benefit rather than a cost.

The costs for each side are key to determining whether an attempt is made to change institutions. If the leader faces high costs then she prefers to retain the existing institutions. However, if C's costs are low, then L will still initiate change because she knows that there will be conflict whatever she does and so she might as well try to seize the first strike advantage. Of course, if her costs are

really high and her prospects poor, then L might try to flee into exile. We do not model such a scenario, but we might imagine an additional move at the beginning of the institution change game to allow L to step down.

Value of new institutions to leaders: How desirable the institutional transition is for the leader is an important determinant of whether L will attempt to change institutions. Leaders prefer to change institutions to a configuration that will allow them to survive more easily. In general this means expanding the selectorate and contracting the winning coalition. From our analyses in Chapter 2 and earlier in this chapter we can see that in the absence of a revolutionary threat, leaders prefer small W and large S institutions. Transition to such institutions is highly attractive to leaders and to potential coup plotters too. In contrast, large W and relatively small S systems make future survival difficult and so unattractive to incumbents.

The leader's preferences over institutions are somewhat altered by the presence of a revolutionary threat. When the potential for revolutionary action is high, leaders may expand the coalition, leading to more public goods to buy off the would-be revolutionaries. Shrinking W means that some of the coalition's members will be purged, making them more likely to back the revolutionaries rather than the incumbent, but for those who remain in the coalition it means more private goods and, therefore, more loyalty. Thus, the incumbent's choice is somewhat conflicted in the face of a credible revolutionary threat. When the people can readily coordinate to protest and to revolt against their government, leaders are likely to avoid any institution shift that moves their government toward the minimum of the swoosh curve. They especially want to avoid such a contraction in W in productive societies in which the cost of public goods provision is low, making coordination among the masses easy. While the leader and coup plotters tamp down their desire to contract W and, perhaps, enlarge S in the face of a significant revolutionary threat, their most serious impediment to launching any effort to contract W is the risk of failure.

Likelihood of winning the Institution Change Game: Perhaps the most fundamental consideration of leaders who are contemplating a purge or plotters contemplating a coup is whether they will win. Defeat in such efforts, after all, almost always means dire consequences for the loser. With extra spending (x) if L gets the opportunity to move first, L wins the global game with probability $\Phi\left(-\sqrt{\alpha_\Omega}\widehat{\Omega_L^x}\right)$ and changes the institutions to $I_B = (W_B, S_B)$. With the complementary probability, C wins and changes the institutions to $I_C = (W_C, S_C)$. While extra spending improves L's odds and moving first is advantageous for L, here we focus on the central roles played by L's proposed changes to institutions and L's tenure in office.

As characterized above, $\widehat{\Omega_L^x}$ is increasing in Q, and linearly so as signals become precise. L wins when $\Omega \geq \widehat{\Omega_L^x}$. Therefore, L is more inclined to attempt institution change as Q declines. Consequently, it is useful to start the analysis by restating Q.

$$\begin{aligned} Q &= \frac{Z_C - X_C}{X_L - Z_L + Z_C - X_C} \\ &= \frac{u(0, z_C) + \rho_t^C \ \delta \ \left(V_{in,T}^C - V_{out,T}^C\right)}{u(0, z_C) + \rho_t^C \ \delta \ \left(V_{in,T}^C - V_{out,T}^C\right) + u(0, z_g + z_x) + \rho_t^B \ \delta \ \left(V_{in,T}^B - V_{out,T}^B\right)} \end{aligned} \tag{3.21}$$

Formally, we state the following:

Proposition 6. *For any given additional spending, x, L's probability of winning the Global Game increases as ρ_t^B and $V_{in,T}^B - V_{out,T}^B$ increase and ρ_t^C and $V_{in,T}^C - V_{out,T}^C$ decrease.*

Factors that reduce Q make it more likely that the incumbent wins. Q is reduced when the welfare difference between being in or out of the incumbent's post-transition coalition is large ($V_{in,T}^B - V_{out,T}^B$) and when members of the current coalition are likely to be retained in the incumbent's post-transition coalition (ρ_t^B large). In contrast, Q is increased and the coup plotter becomes more likely to win when $V_{in,T}^C - V_{out,T}^C$ and ρ_t^C are large. The shape of post-transition institutions have countervailing effects on these conditions for success. In general, small coalition systems induce a large difference in welfare between those inside and outside the coalition, but at the same time small coalitions reduce the likelihood of continuing coalition inclusion. However, with regards to this latter factor, an established incumbent has a significant advantage over coup plotters, thanks to the life-cycle effects. A newly installed leader does not have this advantage!

3.4.6 Coalition Retention During Institution Transitions

When a leader first comes to power, she does not know what her affinity is for any of her coalition members. The probability that any coalition member is a high affinity type when the ruler is new to office ($t = 0$) is $\omega_0 = Pr\left(aff_i \geq 1 - \left(\frac{W}{S} + \nu\right)\right) = \left(\frac{W}{S} + \nu\right)$. After t periods this value rises to $\omega_t = Pr\left(aff_i \geq 1 - \left(\frac{W}{S} + \nu\right) | \text{retained in coalition for t periods}\right) = \frac{\omega_0}{\omega_0 + (1-\omega_0)(1-q)^t}$. This expression follows directly from Bayes rule. The two terms in the denominator refer, respectively, to the probability that a supporter is a high affinity type (ω_0) and the probability that a supporter is a low affinity type who has escaped detection for t periods ($(1-\omega_0)(1-q)^t$).

We now provide some simple rules of behavior to describe the probabilities that L and C retain supporters in their coalition based on L's tenure in office and differences between the original and proposed institutions. To streamline the modeling, we assume that should an institution change occur, the winner of the global game fully learns the affinity ordering. The leader in office after a change in institutions, whether L or C, chooses the top selectors in the affinity ordering. In particular, the coup plotter will pick the top $\frac{W_C}{S_C}$ selectors in the affinity ordering. Hence, each coalition member who backs a successful coup by C has a retention probability of $\rho_t^C = \frac{W_C}{S_C}$. Note that we are ignoring the ν term here. If a coup contracts the coalition, then C will need to

purge supporters and since she knows the full affinity order she has no need to satiate; she just picks the W_C highest affinity selectors. If the coup plotter contracts the coalition, then current supporters face an increased risk of exclusion. However, if the plotter also contracts the selectorate then she diminishes the risk of exclusion. Small wonder that coups so often are associated with the suspension of electoral institutions, thereby reducing the number of possible coalition replacements (Thyne and Powell, 2016).

The situation is a little more complicated for the incumbent. Consider first a contraction in W, such that $\frac{W_B}{S_B} < \frac{W_0}{S_0} + \nu$. With probability ω_t a supporter has affinity that is greater than $1 - (\frac{W_0}{S_0} + \nu)$ and that is uniformly distributed between $1 - (\frac{W_0}{S_0} + \nu)$ and 1. Given the contraction in the coalition and full revelation of affinities, after institution change the leader will keep the top $\frac{W_B}{S_B}$ affinity selectors. Hence, each selector in the pre-purge coalition has the following chance of being retained:[20]

$$\begin{aligned} \rho_t^B &= \omega_t \frac{\frac{W_B}{S_B}}{\frac{W_0}{S_0} + \nu} = \frac{\omega_0}{\omega_0 + (1-\omega_0)(1-q)^t} \frac{\frac{W_B}{S_B}}{\frac{W_0}{S_0} + \nu} \\ &= \frac{\frac{W_B}{S_B}}{\frac{W_0}{S_0} + \nu + (1 - \frac{W_0}{S_0} - \nu)(1-q)^t} \end{aligned} \tag{3.22}$$

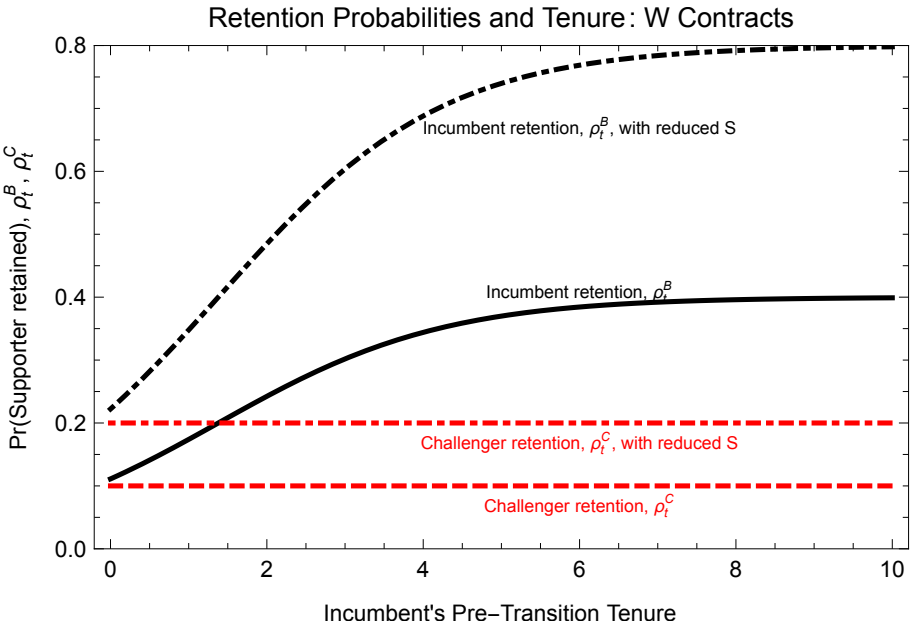
As a simple illustration, Figure 3.12 presents four scenarios that examine the prospects of being retained in a winning coalition over a leader's tenure and changes to the government's institutions. It considers what happens to the coalition member's retention prospects (ρ_t^B, ρ_t^C) when I_B or I_C retains the size of the selectorate and both L and C propose to contract the coalition's size from $W_0 = 1/2$ to $W_B = W_C = 0.2$. Under two scenarios in the graph, $S_0 = 2$ and remains at that size. The other two scenarios consider a contraction in the selectorate size from $S_0 = 2$ to $S_B = S_C = 1$.

The horizontal, dashed lines correspond to the probability that a coup plotter will retain a member of the incumbent's pre-coup coalition. Since the coup plotter has had no opportunity to learn about affinities, these retention chances effectively are the size of the new coalition divided by the size of the new selectorate. The upper line reflects that the coup plotter is simultaneously contracting the selectorate as well as the coalition.

The increasing curved lines show the probability that the incumbent retains members of her existing coalition following a transition. When the incumbent is new to office she has yet to replace those in her coalition who have low affinity. Since she has not yet learned affinities, a newly installed incumbent has no advantage over the coup plotter. However, as L's tenure increases, lower affinity 'supporters' have already been weeded out and so the remaining supporters are more confident of being retained. Once the leader has fully learned the affinities of her coalition, she will pick W_B

[20] We treat ρ_t^B as a simple behavioral rule. A full analysis of retention probabilities would need to consider the proportion of the selectors who back the losing side in the global game. This depends on Ω. If the coalition members' signals are very precise, $\beta \to \infty$, then no measure of supporters back the wrong side in the global game and so the simple behavioral rule converges to a full analysis.

Figure 3.12: Pre-Transition Leader Tenure and the Probabilities that Incumbent and Coup Plotter retain Extant Coalition Members During a Coalition Contraction



from her original W_0 supporters. In the example in the figure this corresponds to $\frac{W_B}{W_0} = .4$. If L simultaneously contracts the selectorate size, then she further increases the retention rate because there are relatively fewer available replacements waiting in the wings as shown by the dashed curved line.

Now consider the case where the coalition expands ($\frac{W_0}{S_0} + \nu < \frac{W_B}{S_0}$). After such an expansion, leader L will keep all supporters whose affinities are sufficiently high that they satisfy $aff_i \geq 1 - \frac{W_B}{S_0}$. With probability ω_t members of the existing coalition have affinities above $1 - \left(\frac{W_B}{S_0} + \nu\right)$ and all such selectors are included. With probability $1 - \omega_t$ supporters have affinities that are below this threshold and would eventually have been replaced under the former, pre-change institutions. However, more supporters are needed when the coalition is expanded. Consequently, supporters with affinities between $1 - \frac{W_B}{S_B}$ and $1 - \left(\frac{W_B}{S_0} + \nu\right)$ are kept in the coalition too. Hence, if the coalition is made larger then the probability that a supporter is retained after the transition is given by the following:

$$\begin{aligned} \rho_t^B &= \omega_t + (1 - \omega_t)\frac{\frac{W_B}{S_B} - \frac{W_0}{S_0} - \nu}{1 - \frac{W_0}{S_0} - \nu} \\ &= \frac{\frac{W_0}{S_0} + \nu + (\frac{W_B}{S_B} - \frac{W_0}{S_0} - \nu)(1-q)^t}{\frac{W_0}{S_0} + \nu + (1 - (\frac{W_0}{S_0} + \nu))(1-q)^t} \end{aligned} \tag{3.23}$$

This demonstrates an effective means for an incumbent to deal with the threat of a coup by expanding the winning coalition, placing a successful coup off the equilibrium path. But it implies considerably more than this.

Equations 3.22 and 3.23 view the prospects of retention in the coalition when the incumbent selects new institutions in response to the threat of a coup such that the coalition contracts or expands. These equations tell us that the probability of retention (ρ_t^B) increases with t and they also imply additional, more macro-level, results. In particular, we conjecture that the more experienced a leader is, the less likely she is to change institutions and if she changes institutions then the changes are likely to be small.

There are four factors that diminish the incentives for experienced leaders to change institutions:

- While contracting W improves the Net Present Value of being the leader, it does so by less for an experienced leader compared to an inexperienced leader;
- Attempts to contract winning coalition size generate an increased risk of irregular deposition. To offset this increased risk and make a change in institutions worthwhile requires a substantial improvement in leader welfare;
- Expanding coalition size nearly always reduces an experienced leader's NPV but can potentially increase the NPV for a leader new to office;

- As t increases, the incumbent's government becomes more stable and therefore faces fewer credible revolutionary or coup threats that necessitate a change in W or S. Hence, L can avoid the direct cost, Δ_L, associated with changing institutions.

Let us probe the differences we just enumerated between experienced and new leaders in the context of the institution change game. The first thing to note is that the experienced incumbent, with a more loyal coalition, has a greater chance of winning the institution change game than an inexperienced leader. However, by attempting institution change even an experienced leader places herself in jeopardy. If, for instance, she halves her coalition's size, then her supporters know they have a 50% chance of being purged. They might decide that they are better off supporting a coup. An established incumbent can avoid this instability risk simply by avoiding institution change. With the reshuffling of the coalition finished, its members are loyal and the leader has relatively little to fear from regular deposition (as shown in Figure 3.6). Attempts to change W engender a risk of irregular deposition and an established leader can generally avoid this risk. less experienced leaders, encumbered with a less loyal coalition, find it harder to avoid the necessity for institution change.

A further challenge for inexperienced incumbents is that coup plotters are more likely to succeed against them than against an experienced leader. For this reason, leaders new to office are attractive targets. Given the first strike advantage, likely targets need to be proactive and attempt institution change before a coup plotter does. The leader might well have preferred to stick with extant institutions, but if an irregular deposition attempt is likely, then she needs to act preemptively. An established leader is not likely to be targeted and so has less reason to change institutions. Although an established incumbent is more likely to win than a leader new to office, as we show in Figure 3.13, she gains less from institution change.

With all that we have just set out in mind, each panel of Figure 3.13 plots the Net Present Value of an inexperienced leader ($t = 1$, dashed line) and of an experienced leader ($t \geq T$, solid line) at different coalition sizes, with the figure being a simplification of Figure 3.5. To illustrate the logic behind the contention that as t increases leaders have weaker incentives to modify institutions, consider a contraction in coalition size from W' to $W'' = \frac{W'}{2}$, as shown in the first panel of the figure. Fundamental to our conjecture is the result that new leaders have yet to learn the affinities of their coalition members. In contrast, seasoned leaders have been in office sufficiently long to have fully reshuffled their coalition ($t \geq T$). For any given W, such as W' in the figure, the NPV is larger for the experienced leader than for the inexperienced leader because the experienced leader's coalition members anticipate being retained in the winning coalition while the new leader's coalition members do not. As t increases, coalition members therefore are more loyal to the established leader even though, as we have shown, they are given fewer rewards.

For the contraction of W from W' to W'' the figure illustrates the improvement in NPV for leaders. Given the assumption in the global game that affinities are rapidly learned in the turmoil of instability, both the inexperienced and experienced leader would end up at the same place on the graph if they won the global game. The improvement in NPV for the inexperienced leader, shown

in the figure as ΔNPV_1, is larger than the improvement in NPV for the experienced leader, shown as ΔNPV_T.

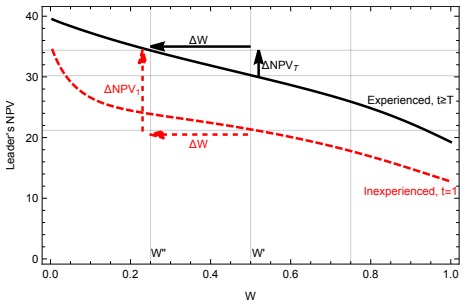
Initiating a contraction in W offers a larger potential gain for an inexperienced leader than an experienced ruler. Contracting the coalition is costly and risky as it may prompt a coup. Given that the less experienced leader anticipates a larger benefit, the inexperienced leader has a stronger incentive to take the risk of contraction. Hence, we expect that contraction is less likely to be chosen by experienced leaders compared to inexperienced ones.

Turning now to the choice to expand the coalition, the second panel of Figure 3.13 demonstrates that an increased coalition size from W' to $W''' = \frac{3W'}{2}$ can improve the NPV for an inexperienced leader (by moving rightwards and upwards along the dashed arrows from the dashed line to the solid line) but does not improve the NPV of an experienced ruler (as the solid line is downwards sloping).

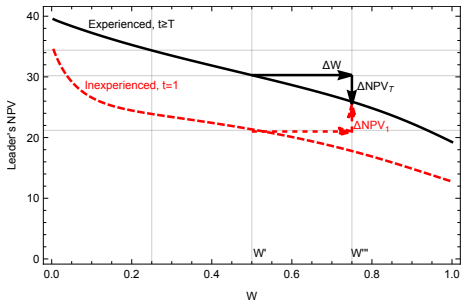
Experienced leaders have less to gain from successfully altering institutions than do leaders who are new to office. Further, such long serving leaders face lower risks of destabilizing events, such as coups and revolutions, that necessitate modifying institutions. As an incumbent's seniority rises, these factors create a wedge between their expected magnitude and frequency of institution change compared to changes under a new leader.

Figure 3.13: Leader Experience and Likelihood of Institution Change

(a) Coalition Contraction



(b) Coalition Expansion



Impact of revolutionary threats

When a leader believes that she faces a high risk of revolution, maintaining the coalition's size becomes less attractive than it had been in the absence of such a threat. This is so because to buy off or ameliorate the revolutionaries the threatened incumbent may increase the provision of public goods, leaving either fewer private goods for coalition members or less money in the incumbent's rainy-day fund. Either of these situations naturally make her political survival harder and, of course, leaves her with fewer resources.

When coordination goods are high such that the people are in a relatively powerful position

to threaten the incumbent, coups and purges become relatively unlikely for two reasons. First, contractions in the coalition size becomes less attractive to L and C; and second, the imperative of being on the winning side is diminished. But if coordination goods are not overly abundant, then a solution to a revolutionary threat might be an increase in private goods to encourage the coalition to suppress a threatened rebellion. But that increase in private goods might, as well, foreshadow a purge to bring coalition size and private goods provision back in proper, equilibrium, alignment. That means that there might be an incentive for a preemptive coup d'état. That motivation, for a coup, however, is quite different from other reasons for a coup as we now explore.

3.4.7 Coup d'état via Three Mechanisms

The theory identifies three distinct mechanisms that lead to a heightened risk of a coup d'état. It also identifies the different conditions that are likely to activate each mechanism and the policy and institutional consequences of each mechanism. While each type of coup might be observationally equivalent on the ground, each is motivated by different political incentives, occurs under different circumstances, and the responses by leaders that best ameliorate each source of coup threat is different.

The extended selectorate theory identifies three conditions under which coalition members are likely to defect and support political rivals. In small coalition systems in which there are few routinized rules by which leader replacement occurs, irregular deposition through a coup d'état is not uncommon. Coalition members who are under-provided with rewards and so are unhappy with their lot under the incumbent leader will depose her and install a rival in the hope that he will be a better source of rewards. Coalition members might also depose their leader to dissipate a revolutionary threat and they might undertake a preemptive coup if they fear they are about to be purged. Such preemptive coups, as the theory highlights, are associated with an over-provision of private goods.

Coups motivated by the under-provision of benefits (hereafter referred to as under-provision coups) occur because leaders provide fewer rewards for their supporters than are required to satisfy the incumbency constraint. If the leader fails to meet the incumbency constraint; that is, the valence shock is sufficiently costly i.e. $\theta_t > \widehat{\theta}_t$, then the coalition defects to a rival. Since the threshold $\widehat{\theta}_t$ depends on coalition rewards, it is incumbents who under-provide for their coalition who are most susceptible to such deposition. In Chapter 5, the empirical analyses will show that particularly the under-provision of private goods makes leaders especially susceptible to such forms of deposition. Chapter 6 shows that the circumstances likely to lead to such under-provision coups often result in democratization and the expansion of the winning coalition (Albrecht, Koehler and Schutz, 2021; Chacha and Powell, 2019; Debs, 2016; Derpanopoulos et al., 2016; Harkness, 2016; Marinov and Goemans, 2014; Thyne and Powell, 2016). Key to our anticipatory approach, the democratization associated with under-provision coups does not require that a coup actually

occurs. Rather, democratization is an effective way for a leader to ameliorate the threat of an under-provision coup, putting such a potential coup off the equilibrium path before it actually happens.

Coalition members also depose incumbents to dissipate revolutionary threats. This mechanism was seen in case 1 of the extended selectorate model. If the leader fails to satisfy the incumbency constraint, $\theta_t > \bar{\theta}$, then the coalition turns on the incumbent and appoints a new leader. Since the incumbent leader serves as a focus of rebellion and protest, the coalition can dissipate the revolutionary threat by replacing the incumbent.

Revolutions and mass protests increase the cost to the coalition of keeping the incumbent in power. Chenoweth and Stephan (2011) examine the impact of non-violent campaigns on elite loyalty (also see, Stephan and Chenoweth, 2008). Suppressing the masses is an unpleasant job. Unless the incumbent's supporters anticipate a high flow of rewards, they are likely either to allow the revolution to succeed (Chenoweth and Stephan, 2011) or to preemptively depose the incumbent (Koehler, Ohl and Albrecht, 2016; Kim and Sudduth, 2021; Powell, 2012). Koehler and Albrecht (2021) refer to coups motivated to dissipate a revolution as 'endgame coups' and argue that threats from the masses reduce the threshold at which loyal supporters turn to coup plotters. This finding is entirely consistent with the theoretical results derived above. Johnson and Thyne (2018) emphasize how protest signals regime illegitimacy. Such illegitimacy reduces the coordination costs between plotters and diminishes the likelihood of punishment by the international community. Casper and Tyson (2014) provide the most theoretically sophisticated account of the dynamics between revolutionary threats and coups. Using global game techniques, they show that the ability to suppress a mass uprising provides a noisy signal to members of the elite about the loyalty of other coalition members and this signal helps them coordinate whether to support or depose the incumbent.

Preemptive coups occur when supporters fear they are about to be purged from the winning coalition. If coalition members sense they are about to be removed from the coalition they try to organize a coup before they lose their access to privilege and power (Aksoy, Carter and Wright, 2015; Chin, Carter and Wright, 2021; Kim and Sudduth, 2021; Kim and Kroeger, 2018; Sudduth, 2017*c*). As the BBC reported on the coup in Niger in July 2023, "It is thought that the men who carried out the coup did so for very personal reasons. They were about to lose their powerful jobs."[21] Those who fear they are about to be replaced plot preemptively. As we show in Chapter 5, such preemptive coups (and the purges they seek to preempt) are associated with an over-provision of private goods that is, as well, coupled with an increasing provision of such goods, as alluded to earlier in this chapter when we touched on the problem of credible commitment and the risk of purges.

We are not, of course, the first to treat coups as a collection of different types of events rather than being a single phenomenon (for a comphrensive review of civil-military relations see Feaver,

[21]BBC Radio 4. Today Show. 5 August 2023

1999). Many scholars have attempted to identify the circumstances that lead to coups (Belkin and Schofer, 2003; Jackman, 1978; Powell, 2012). For instance, consistent with our arguments regarding productivity, Londregan and Poole (1990) find that poverty greatly enhances the risk of a coup. However, recent literature has moved away from searching for global causes of coups and has instead differentiated between coup types and examined the mechanisms at work within a subset of coup events. As Albrecht, Koehler and Schutz (2021) note, there is a growing research program that differentiates between discrete types of coups. For instance, Harkness (2016) and Roessler (2016) differentiate between coups based on social and ethnic groupings. Other scholars focus on the rank and seniority of those who participate in coups (Albrecht and Eibl, 2018; De Bruin, 2020; Kandeh, 2004; Singh, 2014).

Chin, Carter and Wright (2021) create a typology with two categories: leader reshuffling coups and regime change coups, topics of significant importance in our analyses as well (Aksoy, Carter and Wright, 2015; Chin et al., 2022; Kim and Sudduth, 2021). In the former category, coups replace leaders without significant change to institutions.[22] In the latter category, plotters initiate a coup with the intent of changing institutional rules as well as who is the leader. In common with this literature, the selectorate theory identifies three distinct mechanisms for the irregular removal of leaders by the coalition. Each mechanism operates under different circumstances, has different consequences for institution change, and, perhaps most importantly within our anticipatory approach, induces different responses from leaders.

3.5 Summation

We have demonstrated several new theoretical results, many of which have testable implications. The expanded selectorate theory demonstrates that there is a leadership life-cycle effect. For instance, the longer a leader is in office, the less the incumbent must pay the coalition to retain the loyalty of its members. New leaders, therefore, lavish more benefits on their coalition than do seasoned rulers and the extra resources reflect a theoretically-identified pro-public goods bias. The existence of that bias helps explain why new leaders in autocracies or monarchies so often are thought to be reformers when, according to selectorate logic, they are no less opportunistic than long-serving autocratic incumbents. Instead, they are all simply following the political-survival imperatives of their specific circumstance.

As well we saw that improved economic productivity can be a liability for small-coalition incumbents. This may well help explain why so many small coalition regimes (especially when they are without natural resource wealth) seem to be in a poverty trap; a trap by design rather than misfortune (Acemoglu and Robinson, 2000; Kraay and McKenzie, 2014). Additionally, we saw

[22]Mattes, Leeds and Matsumura (2016) differentiate between instances of leader turnover depending on whether the elite supporting the new leader is similar or significantly different from the coalition of the previous leader.

that the imperatives to shift policies and institution sizes vary with whether a leader believes the primary threat to her survival is from the masses or from within her winning coalition. These considerations highlight the tensions incumbents face when they are confronted with circumstances that can easily lead either to a revolution or to a coup d'état. The right response to one often is the wrong response to the other. Thus, a fundamental challenge to political survival arises whenever coalition members, believing that a mass uprising is in the offing, contemplate a preemptive coup to replace the incumbent, stall the revolution, and save themselves. But we also saw that coups have three observationally equivalent, but motivationally distinct causes of which the preemption of a revolutionary threat is but one.

Coups may arise as a response to the under-provision of benefits to members of the winning coalition. In such cases, coalition members, receiving fewer rewards than implied by the incumbency constraint, are open to the deposition of their leader. If incumbent rulers foresee this problem then they correct their provision of benefits or adjust the coalition's size to be the equilibrium size for the mix and quantity of benefits they are providing. Finally, the over-provision of benefits when not corrected by decreasing them so that they converge on the incumbency constraint provide a signal that the ruler may be contemplating a purge designed to reduce the coalition's size. In that case, coalition members have an incentive to coordinate with one another in pursuit of a coup d'état to salvage their benefits by replacing their leader. These and many other implications derived in Chapters 2 and 3 constitute the foundation for the empirical tests to follow.

Chapter 4

Estimating Key Quantities

The expanded selectorate theory implies a great many hypotheses, many of which are testable. To test them we need to measure a set of key variables and we need to devise estimation procedures to evaluate some of the more nuanced implications of the theory. We begin this chapter with a statement of some of the hypotheses implied by the logic in Chapters 2 and 3. While recognizing some degree of overlap, we organize the hypotheses into subject areas: effects of institutions and productivity on policy and welfare; life-cycle effects; leader health; economic shocks; risks of revolution or coup; and institution change. Then we provide an explanation of the methods we use to measure the variables essential for testing the relationships between selectorate theory, political instability, and changes in policies, institutions, and leaders.

4.1 Summary of Hypotheses

The central explanatory variables in selectorate theory involve the size of each polity's winning coalition and selectorate; the cost it must pay to produce public goods; the life-cycle effects that alter both the mix and the quantity of revenue that leaders must spend on public and private goods to keep their coalition loyal in the face of threats to the regime; and considerations of the leader's health and its effects on expectations about the flow of future benefits to coalition members.

Effect of Institutions on Policy and Welfare

- As winning coalition size (W) increases, then
  - more public goods are provided;
  - the ratio of public to private goods increases;
  - leaders spend more resources on rewards for the coalition;

  - leaders have fewer discretionary resources;
  - societal welfare improves;
  - tax rates are lower, less is expropriated from the people;
  - leader survival decreases.

- As real selectorate size (S_R) increases (for fixed W), then
  - leaders spend fewer resources on rewards;
  - leaders have more discretionary resources;
  - societal welfare diminishes;
  - leader survival increases.

Productivity

- As societal productivity increases (low price p for public goods production),
  - leaders produce more public goods and produce higher levels of rewards for coalition members and society;
  - leaders reduce the ratio of private to public goods;
  - leaders retain a smaller proportion of discretionary resources ($\frac{R-m^*}{R}$);
  - leader survival decreases;
  - the value of membership in W increases and the institutional arrangements that minimize coalition welfare arise at a smaller coalition size;
  - events that contract the winning coalition size become less likely.

Life-cycle Hypotheses

- As a leader's time in office increases, so too does the amount of available discretionary resources, $R - m^*$.
- New leaders are more vulnerable to removal, revolutions, and coups than are experienced leaders and these effects are stronger for smaller coalition leaders than larger coalition leaders.
- As tenure increases, the value of rewards to the coalition members decreases.
- As tenure increases, public goods decrease.
- As tenure increases, the ratio of private to public goods increases (although the quantity of private goods can either increase or decrease).
- As tenure increases so does the net present value of coalition membership.

- When a threat is perceived, established leaders (those with long tenure) make smaller adjustments to coalition size and selectorate size than leaders with shorter tenure.
- When leader change occurs, the new leader spends more on the coalition than her predecessor, and this difference in spending is larger the longer the replaced leader was in office.

Health

- When a leader is observed to have a serious chronic illness, both the overall level of rewards to coalition members and the provision of public goods increase.
- When a leader is observed to have a serious chronic illness, she is likely to increase winning coalition size (W).
- If an established leader (significant tenure) dies of an acute illness or accident, then public goods, coalition rewards, and economic growth rates are likely to increase more after her death than would have been the case if the leader had died of an observed chronic illness.
- Chronically ill or aged leaders face an elevated risk of deposition.

Economic Shocks

- Economic shocks increase the risk of leader deposition more in larger coalition systems than in smaller coalition systems (Bueno de Mesquita and Smith, 2017, 2018).

Risks of Revolution or Coup d'état

- Revolutions and coups are more likely to occur at intermediate coalition sizes than at either extreme.
- As tenure in office increases, the risk of revolution decreases.
- As tenure in office increases, the risk of a coup d'état decreases.
- Even if the masses initiate a failed rebellion, their welfare may nevertheless improve if their action induces a successful coup to pre-empt the revolution.[1]
- When the leader believes there is a credible revolutionary threat she either increases public goods spending or increases suppression.
- A risk of coup induces leaders to increase private goods but not public goods.

[1] Coups that successfully pre-empt revolutions improve welfare for the masses by resetting tenure in office to 0 under a new leader, thereby inducing the provision of more public goods.

- Since extra private goods are expected to be allocated to deter a coup plotter, private goods may rise when there is no observed coup attempt but there is an elevated ex ante probability of a coup.
- Suppression is used to quash revolutionary threats, especially in smaller W systems.
- In smaller W systems with low productivity, successful revolutions are unlikely, although the demand for revolution is high.
- A high risk of coup or the realization of a successful coup is expected to lead to a reduction in real selectorate size.
- Coalition members are expected to be more likely to support a coup than a revolution when S_R is small, and this effect is expected to be strongest when $\frac{W}{S_R}$ is large and S_R is small.

Institution Change

- In large W systems, revolutions, coups, and substantial contractions in W are rare and become even less frequent as productivity increases.
- Transitions to small W systems are more likely to occur in low productivity societies than in high productivity societies.
- When there is a mismatch between the policies a leader provides and the policies anticipated (given institutional arrangements, productivity and tenure), institution change is likely.
- If leaders over-provide private goods (and particularly when the level of private goods is increasing), then contractions in W are likely.
- If leaders over-provide public goods and freedom of assembly, then expansion of the coalition is likely.
- Coup attempts that try to contract the real selectorate are likely to be successful.

4.2 Perspective on the Tests

The recent tendency in testing hypotheses tilts toward causal identification and quasi-experimental design. Of course these approaches are extremely valuable and are methodologically the state of the art. However, we strongly reject the notion that we can only learn from these processes. A common phrase is to look for one's keys under the street lamp. That is to say, sometimes there is a tendency to address questions that methods allow us to answer well rather than addressing the questions that are central to understanding politics.

While we examine some genuinely exogenous shocks, such as, for instance, leader disease onset, many of our analyses rely on observational data. Rather than relying on answering a single question

extremely precisely, we adopt a more Lakatosian approach of testing predictions across a wide range of hypotheses (Lakatos, 1976). The selectorate theory predicts many relationships. The reader should not be convinced by any one test or result. Each of the tests has limitations in terms of methods, measurement, data, and presentation. We hope to convince the reader that our theory might have some bite because it accounts for so many relationships between diverse political, economic, and social phenomena within the same theoretical framework.

To test the selectorate account of when political circumstances remain stable and when they become unstable we must measure coalition and selectorate size, longevity in office, the price of public goods, and whether the regime over- or under-provides public and private benefits relative to expectations. We develop these essential variables now, followed by measures for other key factors, such as leader health, policy change, the expectation of and the realization of such events as coups d'état, mass uprisings (revolutions, civil wars), coalition membership shuffles, and coalition contraction or expansion. With these estimates in hand, we can test many of the empirical implications of the theory. Doing so allows us to identify prospective political changes that are wrought by the anticipation, rather than the actualization, of destabilizing events. Our analyses provide us with a toolbox of indicators that might prove useful in predicting future modifications in government suppression, policy changes, and any reconfiguration of government institutions.

4.3 Coalition and Selectorate Size

The size of the winning coalition can be thought of in two distinct ways: as the proportion of people a leader is beholden to in order to retain power or as the absolute number of such people. We can make a similar distinction with regard to the nominal and real selectorates. While we will provide a means to estimate these quantities each way, our analytic focus is on the proportionate size of the winning coalition and the selectorate, mindful that, as appropriate, we will control for population size as an element, in conjunction with the proportionate size, that shapes the absolute size of the coalition, the nominal selectorate, and the real selectorate. The proportionate quantities on which we focus dictate the prioritization of public and private goods in any society. Real or anticipated deviations from those resource allocations are key factors that theoretically increase the risk of political instability.[2]

The literature is rich with alternative ways to measure government types. Hyde and Saunders (2020), for instance, review different measures of autocracy. Many of those measures and measures of democracy (Alvarez et al., 1996; Boix, Miller and Rosato, 2013), as well, emphasize important

[2]Because we focus on proportional sizes, normalized to be bounded between 0 and 1, dividing coalition size by selectorate size, as in $\frac{W}{S}$, should be highly correlated with the actual ratio of W to S but it is not a precise statement of that ratio. Our estimation procedures, for instance, do not assure that W as a proportion is smaller than S_{Real} as a proportion. This is not consequential for any of our fundamental results but, nevertheless, should be kept in mind. Numerous possible transformations can correct so that, as implied by the theory, the value of $\frac{W}{S}$ falls between 0 and $\frac{1}{2}$.

behavioral characteristics of governments. Many, as expected, are highly correlated with our indicators of coalition size and selectorate size. Our concern is not to produce different indicators of regime type but rather to test as closely and precisely as we can the multidimensional institutional details of the empirical implications of selectorate theory. Indeed, to assure that our results are robust and not dependent on the specific indicators we design, the online appendix at www.xxx replicates all essential results using the more conventional Polity Democracy-Autocracy indicator (Marshall, Jaggers and Gurr, 2002) and, as well, we have tested many other results using a wider range of alternative indicators (Bueno de Mesquita and Smith, 2022). The results in the appendix are comparable to what we report here with our indicators of W and S, reassuring us that the findings are robust and not determined by our measurement procedures.

Since coalition size (W), nominal selectorate size (S_N), and real selectorate size (S_R) are conceptualized as institutional features, the indicators of these concepts should be based on the (often de facto) rules and procedures that govern attaining and retaining political power rather than on the behavioral patterns that we seek to explain. For instance, selectorate theory provides a means to explain such factors as whether there is a free press, whether elections are free and fair, and the turnover of leaders. That means that an assessment of these factors *must not* be included as a component in the measurement of a government's institutional features. Furthermore, it is important that the indicators of W and S_R be as continuous as possible. The theory indicates that even small proportionate changes in coalition size, selectorate size, or in the ratio of coalition to selectorate size influence outcomes that shape political stability. It is these considerations and, especially, the selectorate theory's focus on institutions as an explanation of behavior, that motivates the development of specific indicators of W and S_R rather than using extant indicators that blend, rather than isolate, institutional factors, attitudinal indicators, and behavioral or outcome features of governance.

4.3.1 Measuring Coalition Size

We create a continuous index of coalition size, W, based on institutional variables in the V-Dem data set, version 14 (Coppedge et al., 2024). The V-Dem project is a broad and encompassing endeavor that codes virtually all nations since 1789 on a vast array of issues, including political competition, policy outcomes and freedoms. Including key variables from other sources, V-Dem provides values for more than 500 variables. The V-Dem project is based on expert surveys and uses Bayesian item response methods to generate latent measures of the underlying concepts (Pemstein et al., 2023). These Bayesian approaches use Monte Carlo procedures to draw a random sample of latent variable measures. Although V-Dem reports a number of statistics for these random draws, we utilize the reported means of the latent variables.[3] Using just 6 of the more than 500 variables,

[3]In Bueno de Mesquita and Smith (2022), we tested the robustness of the assumption of relying on the mean estimate. In particular, we drew from the random sample of latent estimates reported by V-Dem and constructed our variables based on these random draws rather than on the mean estimates.

we build a core indicator of coalition size, W, based on national values since 1789. However, given the limited availability of other data, most of our analyses focus on the years from 1960 onward. Our measures use indices on the following four institutional dimensions[4]:

1. Autonomy of election monitoring body (v2elembaut)
2. Opposition parties' autonomy (v2psoppaut)
3. Barriers to political party participation (v2psbars)
4. Closed Succession: Indicators of succession by heredity or within a military or single party setting (constructed from v2x_ex_hereditary, v2x_ex_military, and v2x_ex_party)

The first element, autonomy of the election monitoring body, establishes the extent to which the administrative body responsible for monitoring elections is controlled by the government or other central authorities, like the military, or, instead, is institutionally independent and applies election laws impartially. This first component in our indicator of W assesses the extent to which there is an institutionalized mechanism that allows a large class of selectors – the electorate – a say in choosing the government or, instead, restricts that say to a smaller class of selectors, such as the incumbent regime or the military. Clearly, the size of the prospective winning coalition increases as the autonomy of such a board is institutionalized, assuring its independent operation.

An autonomous election monitoring board is an important element in assuring the opportunity for a large number of selectors to determine leadership succession but it is far from sufficient. After all, a one-party state, whether it has an autonomous election monitoring body or not, still restricts the set of people needed to form a winning coalition to those who endorse the one approved party. Hence, the second component of our indicator of W, the autonomy of opposition parties, is V-Dem's measure of the degree to which political parties can operate independent of the incumbent regime. If a government has institutionalized a one-party state, such as Cuba has done, or if a government has institutionalized its authority to select parties (and candidates) that are permitted to compete in elections, as Russia and Iran have done, then the government has restricted the size and composition of a winning coalition to members or supporters of authorized parties only,

We then examined how this sample of W measures accounted for the distribution of government policies. One significant disadvantage of using V-Dem mean variables is that with each annual release of the data, there are new mean estimates of each latent variable. Since our measure of W relies on these estimates, each new release of V-Dem means new values for W; although the resulting estimated values are similar. The correlation between the W measures based on versions 12 and 13 of the V-Dem data is 0.9993 for the post-1960 period which covers most of our empirical analyses. Looking at all possible years, the correlation between the V12 and V13 measures is 0.9941. Another difficulty with the way V-Dem variables are constructed is that the coding of each variable may be influenced by ex post knowledge of developments in the countries covered. To guard against this risk, our online appendix replicates our results using Polity's measure of Democracy-Autocracy as an alternative to our indicator for coalition size and yields comparable results.

[4]Much of the discussion of the measurement of coalition size is taken from or based on (Bueno de Mesquita and Smith, 2022).

shrinking the subset of selectors needed to sustain a leader in power. If, instead, there are many genuinely independent political parties competing for power, then more selectors will probably be attracted to participate in choosing a successor leadership and that means more support – a larger winning coalition – is likely to be needed to win and to sustain power. As Levitsky and Ziblatt (2018) note, democracy dies if there are not at least two political parties realistically competing for power.

The first two variables in the indicator for W ensure preconditions that influence the size of a winning coalition. While the resolution of each may satisfy a necessary condition for a larger (or a smaller) winning coalition, they are not sufficient. Having autonomous, impartial mechanisms for enforcing election laws and independent opposition parties are important for accountable government but they fail to complete the requirements for such a government if selectors are encumbered in their *right and their opportunity* to form parties that can compete for control of the government. That is why the third element in our indicator of W evaluates the degree of encumbrance in participating in the government-selection process. There can be a large winning coalition only if the political structure has institutionalized an unencumbered right to form competitive parties; if the system has institutionalized the right to have multiple parties; and if the competition takes place over a substantial portion of the population.

The extent of institutional fulfillment of the three variables – autonomous monitoring, autonomous opposition party participation and unencumbered rights to form parties – are, we believe, collectively necessary and sufficient institutions to shape an *electoral* political system's winning coalition size. The more an electoral government falls down on one or more of these conditions, the smaller its coalition is likely to be. The more an electoral system has institutionalized the absence of encumbrances to party formation, the right to oppose the government, and the right to have outcomes determined impartially and in light of the law, the larger the coalition is likely to be. But, not all political systems today, let alone over most of history, are electoral. Monarchies and military juntas, for instance, may not bother even with rigged elections. Thus, to cover all types of government, we need to add a final set of conditions as part of our estimation of relative coalition size.

We construct a final component to W from V-Dem's variables $v2x_ex_hereditary$, $v2x_ex_military$, and $v2x_ex_party$. As their labels imply, these last three variables assess the extent to which a person's opportunity to lead a government is limited and depends on their hereditary status, their military position, or is determined by a ruling party even if they have widespread support outside of these eligibility constraints. Institutionalized succession that is determined by any one of these three criteria assures that a government has a smaller winning coalition, consisting, for instance, of a royal family (as in current Saudi Arabia) or a group of generals or other military leaders (as in current Egypt), or a small cadre of party leaders (as in current North Korea).[5] We take the

[5]Even these governments have held rigged elections, although not for their national leader in the cases of Saudi Arabia and North Korea.

maximum value for each country-year from among hereditary, military, and party and reverse its direction. That is, we rearrange these variables so that smaller values mean greater dependence on hereditary, military or party control and larger values indicate less reliance on such constraints on leadership selection.

Winning coalition size is constructed by summing the 4 standardized parts and then dividing by 4 to take their average standardized score. Specifically, let j index the component, i index nation, and t index year.

$$w_{i,t} = \frac{1}{4} \sum_{j=1}^{4} \frac{x_{j,i,t} - \bar{x_j}}{sd(x_j)}, \tag{4.1}$$

where $x_1 = v2elembaut$, $x_2 = v2psoppaut$, $x_3 = v2psbars$, and $x_4 = -max\{v2x_ex_hereditary$, v2x_ex_military, $v2x_ex_party\}$ and $\bar{x_j}$ and $sd(x_j)$ are the mean and standard deviation of x_j across all nation-year observations.

For ease of comparison, we normalize many of our variables so that they lie between 0 and 1, as follows:

$$norm(x) = \frac{x - min(x)}{max(x) - min(x)} \tag{4.2}$$

In the case of our measure of relative winning coalition size, this normalization $W_{i,t} = norm(w_{i,t})$ (we suppress the indexing moving forward) ensures that the coalition size indicator falls between 0 and 1. This method provides thousands of unique values for W in the data spanning the years from 1789 to 2023.

4.3.2 How Coalition Size Has Evolved Over Time

Figure 4.1 displays the distribution of W between the years 1960 and 2023 for a small sample of countries that cover a wide range of scores on coalition size. As is clear from the figure, some governments have undergone dramatic changes in their coalition size during this time span while others have remained highly stable. Russia, for instance, began the period as a markedly small-coalition, autocratic country but then flirted with democracy in the first decade after the collapse of the Soviet Union. Since 2000, when Vladimir Putin came to power, the regime's coalition size declined and then stabilized as a middling regime, clearly not 'democratic' and clearly not highly 'autocratic' either. India, by comparison, began the period shown in the graph as a pretty large-coalition polity, pulled back during Indira Gandhi's efforts in the mid-1970s to amend the constitution in her favor, resumed its democratic ways and then, during the prime ministership of Narendra Modi, began a lengthy retreat in coalition size that is ongoing as we write.

The graph for South Korea, formally the Republic of Korea, illustrates that nation's path towards democratization. After the first President, Syngman Rhee, was deposed amid massive popular protests in 1959, Yun Posun became the democratically elected President in 1960. However, as clearly seen in the figure, that nascent attempt at democracy was snuffed out in 1961 by a coup

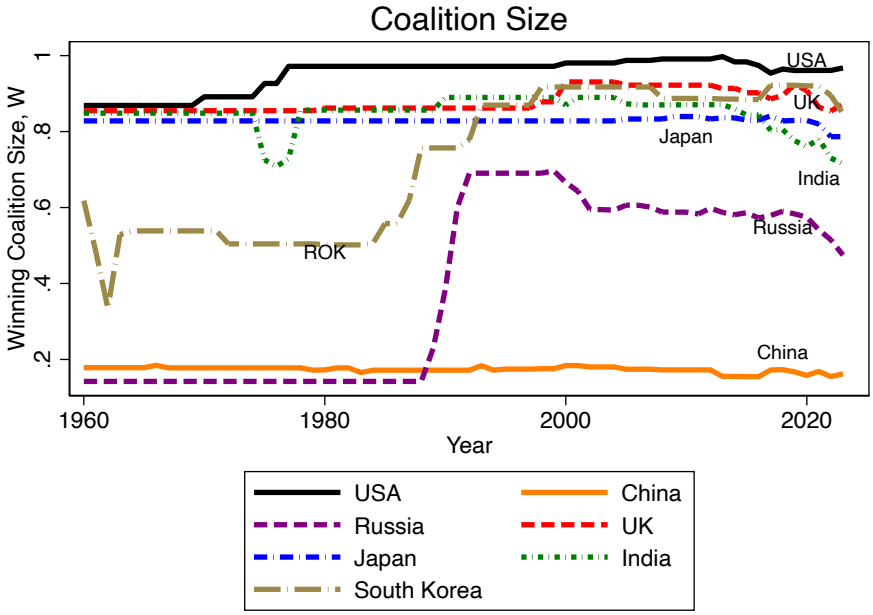


Figure 4.1: Sample of Country Coalition Sizes, 1960-2023

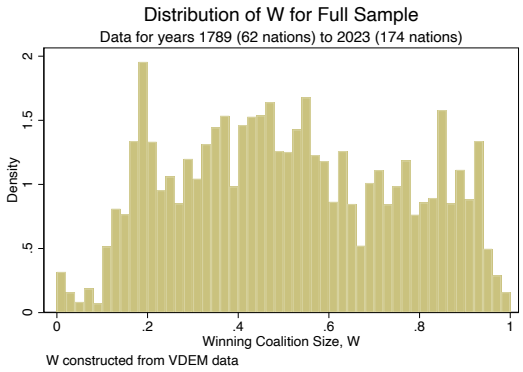
organized by Park Chung-hee. Park served as Korea's third President until his assassination in 1979. Successor Presidents Chun Doo-hwan and especially Roh Tae-woo implemented substantial democratic reforms that continued under subsequent leaders. Korea's democratization is explored more fully in Chapter 6. Today, South Korea is a highly democratic society and has one of the largest winning coalitions. Among our selected, illustrative sample of nations in Figure 4.1 only the USA has a larger contemporary winning coalition by our measure although, of course, many other nations (e.g., Germany, Costa Rica) have larger winning coalitions than any of the countries shown in the figure.

A broader view of the distribution of coalition sizes over time can be gained from Figure 4.2a which shows the distribution of W for the largest possible sample. Figure 4.2b shows the distribution of W in the contemporary era, from 1960 onward. These figures show the high variance in political institutions. As we would anticipate, the latter figure shows a greater density of large coalition systems than in the longer time period, consistent with greater democratization in the modern era.

Figure 4.3 shows box plots of the distribution of coalition size by decade, where the decade labeled 1800 includes the years 1800 to 1809, 1810 includes the years 1810 to 1819, etc. The line in the center of each of the shaded boxes represents the median winning coalition size in the decade and the top and bottom of the shaded boxes represents the 75th and 25th percentiles. Figure 4.3 shows

the remarkable transition in governance in the period since U.S. independence. In the 1780s the mean coalition size was a mere 0.27, almost exactly the size of today's winning coalitions in Vietnam and Eritrea. The most representative polities in the 1780s; that is, those with the largest Ws, were the United Kingdom ($W = 0.71$), USA ($W = .79$) and Poland ($W = .79$). In the same decade, those among the smallest coalition systems included Oman ($W = 0$), Nepal ($W = 0.04$), Modena ($W = 0.04$), and Norway ($W = 0.05$). By the 2010s the average winning coalition size had increased to 0.70. The UK, USA and Poland have significantly increased their coalitions sizes with decade averages of 0.91, 0.97 and 0.91 respectively, although Poland's and, to a lesser extent, the U.S.'s coalition contracted as 2020 approached. These and other coalition-size changes will be discussed at length in Chapters 6 and 7. Twenty-eight nations had a coalition size that averaged more than 0.9 in the 2010s. Costa Rica topped the scale with an average coalition size of 0.99. Of course, improvement in governance has not been universal. Such countries as Laos, Qatar, Vietnam, Saudi Arabia, China, Oman, Cuba, and UAE, for instance, continue to maintain coalition sizes below 0.2.

(a) Distribution of W, 1789-2023



(b) Distribution of W, 1960-2023

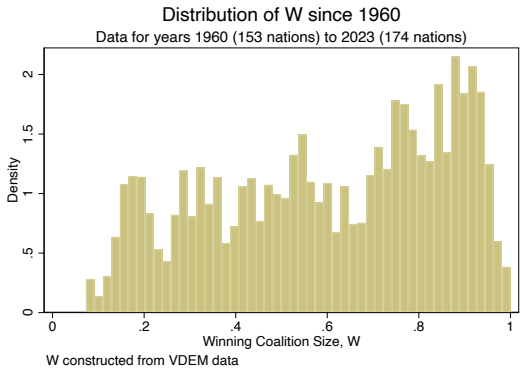
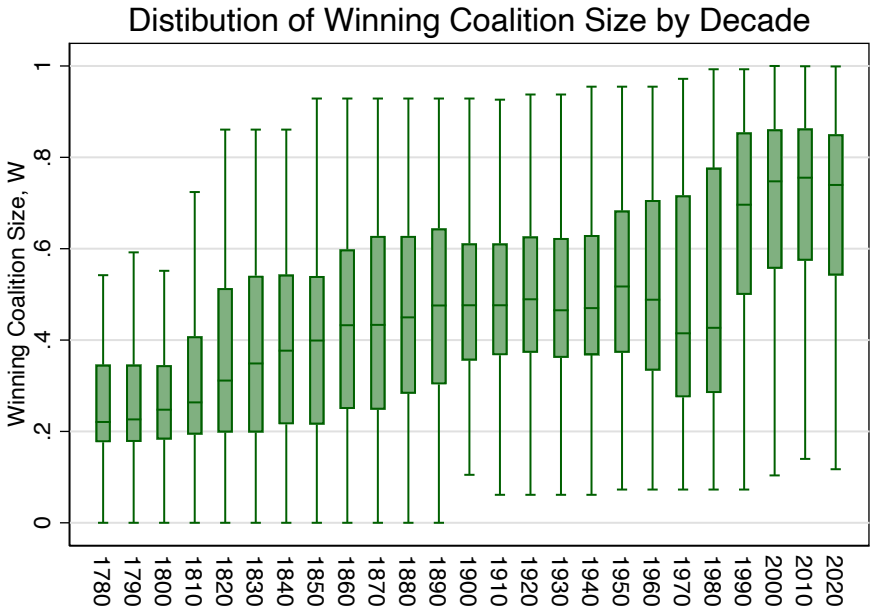


Figure 4.2: Distribution of Winning Coalition Size, W

While Figure 4.3 shows a general enlargement in coalition size over time, the 1960's, 1970s, and 1980s saw a decline in average coalition size as recently decolonized states fell into autocracy and Cold War superpower rivalry led the U.S. and USSR to prop up despotic regimes. The end of the Cold War saw a large jump in the average size of W, from a mean of 0.50 in the 1980's to 0.65 in the 1990's.

In recent years there has been a great deal of discussion and speculation about the decline of democracy (Repucci and Slipowitz, 2022; Waldner and Lust, 2018; Boese-Schlosser et al., 2022) and the rise of Chinese-style quasi-market autocracies. Figure 4.3 does show a slight decrease in the average winning coalition size, although the decline is very small. Little and Meng (2023) undertake a comprehensive examination of the quantitative data and conclude that fears about backsliding

Figure 4.3: How the Distribution of the Winning Coalition has Changed Over Time



are probably over stated. Much of the apparent backsliding is explained primarily by two very large countries (India and China) and as a function of coder bias. Additionally, we note that the backsliding argument is backed up by a very short-term, narrow view of political development. For instance, it is true that we observe a decline in the global mean value of W between about 2013 and 2023 but the decline is small, from a high in 2013 of 0.71 to 0.68 in 2023. However, if we take a bit of a longer term view we discover that the mean for W has persistently been on the increase, with only small wobbles up or down, since 1965. Whether the current small decline from the peak a few years earlier will be sustained is, of course, a crucial question but the longer-term pattern certainly favors the further spread of democracy rather than autocracy. According to the indicator for W, there were 53 countries with coalitions smaller than 0.30 in 1978, the peak year for autocracies since World War II by our reckoning. In 2023 there were only 12 such national governments. Of course, it is always important to monitor the rise and decline of democracies and autocracies, but the current concern about the decline of democracy may have little foundation.

4.3.3 Measuring Selectorate Size

The size of the selectorate is measured, as indicated in Chapter 2, by distinguishing between the nominal selectorate and the real selectorate. Naturally, as reflected in the estimates, S_N, the nominal selectorate, is less selective than S_R, the real selectorate.

V-Dem provides a variable, v2x_suffr, that specifies the proportion of a country's population that is enfranchised. After replacing missing data with 0 for cases without enfranchisement, this variable, with a range between 0 and 1, is our indicator of nominal selectorate size.

The construction of the real selectorate's size takes into account political constraints that undermine or limit the authority of the nominal selectorate to choose leaders. Those constraints hark back to the construction of our indicator of coalition size, W, which, of course, is a subset of S_R. The real selectorate is constructed from four V-Dem components. These include V-Dem's variables $v2x_ex_hereditary$ and $v2x_ex_military$ as used in the estimation of the size of W; v2x_suffr, and V-Dem's indicator of the centralization of legislative candidate selection.

The first component is the variable v2pscnslnl, V-Dem's indicator of the centralization of legislative candidate selection. Because this variable focuses on *legislative* candidate selection rather than leader selection, we believe it presents the most slippage from the theoretical concept of the real selectorate among the component parts we use. Nevertheless, it is the closest available information on non-military and non-hereditary limits on who selects officials. The lowest score for this component, as coded by V-Dem, arises when "National legislative candidates are selected exclusively by national party leaders." The extensiveness of candidate selection increases as values rise on this variable, culminating in its maximum value when "National legislative candidates are chosen by constituency groups or direct primaries" (Coppedge et al., 2023b, p.96-97). Because we will compare this component's size to that for V-Dem's variables $v2x_ex_hereditary$ and $v2x_ex_military$, which restrict who has a say based on hereditary or military ties, we must first normalize the legislative selection indicator, v2pscnslnl, to fall between 0 and 1 and then reverse its direction (1-norm(v2pscnslnl)) so that higher values, as in the military and hereditary indicators, reflect more restrictiveness in who can choose leaders.

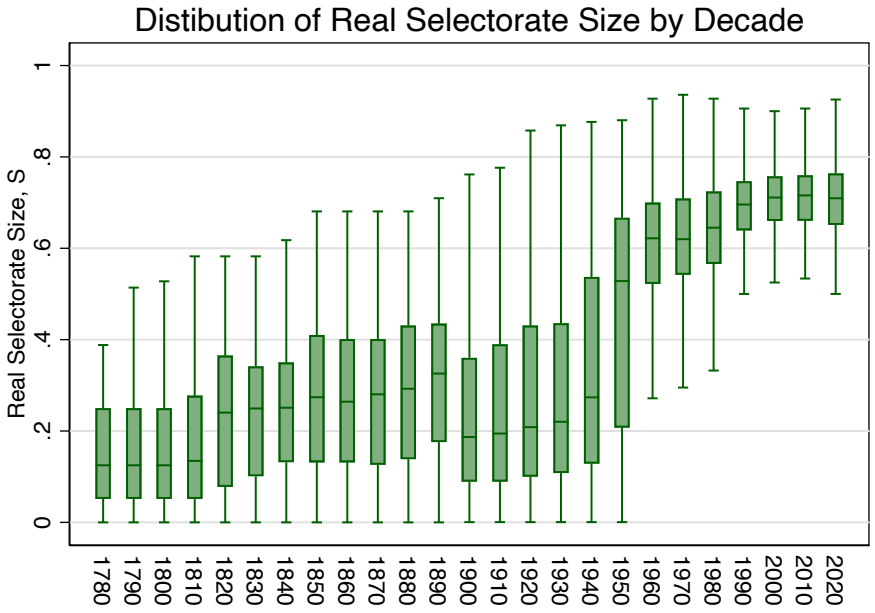
Using the same-directional versions of the variables for legislative selection, hereditary selection, and military selection, for each country-year we select the component with the maximum value, reflecting the greatest restrictiveness in who has a say in choosing leaders. The resulting value's direction is then reversed so that smaller values indicate a smaller real selectorate. We then add that reversed maximum component to S_N and divide by 2, to capture the relative impact of S_N so that, as expected by theory, S_N will play a large part in defining S_R in large coalition democracies and will play a smaller part as a political system become more autocratic (the reversed direction indication of v2pscnslnl), more monarchic, or more military-junta like.

The correlations between W and S_N and S_R for the years from 1960 through 2023 are 0.29 and 0.59 respectively, while the correlation between S_N and S_R is 0.81 (N=10,492). For our empirical analyses we utilize the real selectorate.

4.3.4 How Selectorate Size has Evolved Over Time

Figure 4.4 shows the decade-by-decade evolution of real selectorate size. In the 18th and 19th centuries enfranchisement tended to be limited even in the more democratic states (Cox, 2005; Jensen, 2007). There is a substantial jump in the size of the selectorate following World War II and this trend continues through the decolonization period of the 1950s, 60s and 70s. While the establishment of mass franchise electoral systems increased selectorate sizes, in many cases post-colonial leaders proved very effective at contracting coalition sizes. Today, the norm in the vast majority of nations is voting rights for all adult citizens, equivalent to a nominal selectorate of size 1. However, as Figure 4.4 shows, real influence in determining who will be leader is still effectively restricted to a smaller group.

Figure 4.4: How the Distribution of the Real Selectorate Size has Changed Over Time



4.4 Measuring Productivity

In Chapter 2, the parameterization of the price of public goods provided a theoretical account of many of the findings of modernization theory. In particular, the theory predicts that in productive societies; that is, those that can produce public goods at a low cost, once a large coalition system

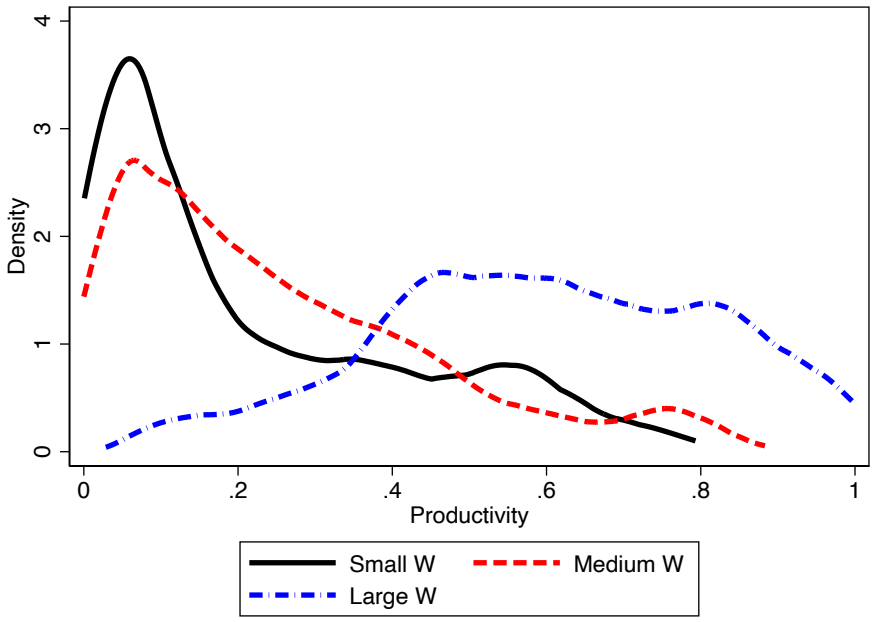
is established, it becomes very difficult for leaders to find sufficient elements of the population to support a contraction in W. Ideally, to estimate the price of public goods we would follow the assumption in virtually every introductory economics textbook (Mas-Colell et al., 1995; Gruber, 2005), that the cost of such goods is a function of labor productivity. Unfortunately, labor productivity data are not widely available outside of democracies for any significant time series. In lieu of such data we follow another lead by economists and assume that productivity increases as the education of the labor force increases, thereby increasing human capital (Becker, 1964; Feenstra, Inklaar and Timmer, 2015; Mankiw, 2020). We use the variable e_peaveduc found in the V-Dem data to estimate the average educational attainment in years of those 15 years old or older and we normalize this quantity to fall between 0 and 1. We refer to this normalized variable as productivity: the more educated the labor force is – the higher its productivity – the lower the unit price of public goods.

Figure 4.5 shows the distribution of productivity (years of education) for small ($W \leq .4$), medium ($.4 < W \leq .75$) and large ($W > .75$) winning coalition systems. As the figure makes clear, productivity and coalition size, while having distinct theoretical effects, are strongly associated with one another. There are relatively few high-productivity, small coalition political systems. Likewise, there are relatively few low-productivity, large coalition polities. But when coalition size is large and productivity is low or coalition size is small and productivity is high, then, as we have shown theoretically, we expect greater risks to the stability of the government. We will, of course, test this and other expectations in the chapters to come.

When we turn to testing the theory, we will demonstrate that our education indicator of productivity is very highly correlated with the logarithm of per capita income. This latter indicator is available for a much larger and more representative set of country-years than the education indicator. Hence, we will generally use the per capita indicator (taken from the World Bank's development indicators). This ensures broader, more representative data and, as well, satisfies the general expectation that country-year data analyses should control for per capita income. With these caveats in mind we note that none of the productivity results change their sign or meaningfully change in significance by relying on per capita income compared to educational attainment. However, when we investigate changes in institutions in Chapters 6 and 7 we gain substantially in the number of observations since many African countries changed their institutional configurations in the 1960s and 1970s when they attained independence and we have per capita income data for them but educational attainment data are missing.[6]

[6]We believe that per capita income is endogenous to educational attainment and that changes in education are partially endogenous to technology development and partially endogenous to W. As well, technological development and innovation is partially endogenous to W (Romer (1994),(Bueno de Mesquita, 2022, p.280-282)).

Figure 4.5: The Distribution of Productivity for Different Coalition Sizes



4.5 Measuring Public and Private Goods

The theory indicates that public goods provision is increasing as coalition size gets larger; private goods provision decreases as coalition size increases; and the collective welfare of coalition members based on both the public and private benefits they receive from the government first decreases and then turns upward and continues to increase as coalition size expands. Now it is time to specify how we estimate the generic relationships between goods provision and coalition size so that we can then determine if and when policy provision is above, on, or below the expected level for any given coalition size.

As briefly mentioned in Chapter 2, we use the V-Dem measure v2peapspol as our generic indicator of public goods provision and refer to it as Public Goods, normalizing its values to fall between 0 and 1 for ease of interpretation. Larger values indicate more public goods provision. V-Dem defines the Public Goods variable as "Access to public services distributed by political group." The values for this variable are based on expert opinions in response to the following question: "Is access to basic public services, such as order and security, primary education, clean water, and healthcare, distributed equally across political groups?" (Coppedge et al., 2023b, p.218-9).

Second, we estimate the key political freedom that lies behind our notion of coordination goods.

Freedoms, of course, also are public goods. Indeed, they even more strongly match the technical meaning of public goods than does access to public services. They are non-excludable and non-rival. It is valuable for people to be free to go where they want, to meet with whom they want, and to say what they want. We consider a single aggregate measure of such freedoms, V-Dem's Freedom of Peaceful Assembly, (v2caassemb), which we will refer to as Freedom of Assembly, or as Assembly for brevity. Here too we normalize the variable to fall between 0 and 1 with higher values indicating greater freedom (Coppedge et al., 2023b, p. 227).

Freedoms differ politically from other forms of public goods in important ways. Unlike 'standard' public goods such as are measured by v2peapspol, freedoms are essentially costless to provide; it is limiting freedom through censorship, suppression and repression that requires costly effort by the government. Additionally, freedoms differ from 'standard' public goods in that freedoms directly facilitate coordination by the masses against the government. It is through freedoms that people discover others are dissatisfied with the government's performance and it is through freedoms that coordination can occur to organize against government policies whether through civil disobedience or through open, violent revolution. Thus, any small coalition regime that over-provides freedom of assembly (perhaps, unwittingly) facilitates coordination among residents who are dissatisfied with other aspects of government performance, increasing the risk of instability according to the theory's logic. Of course, over-provision in a large coalition setting could have the same effect but then large coalition governments should be providing ample public goods that mitigate any interest in rebellion and an over-supply of Assembly means a surplus of some public goods benefits.

To measure Private Goods we would ideally want to know all transfers, gifts, graft, and policies that reward coalition members but are unavailable to the general public. Unfortunately, such measures are unavailable across a large number of nations. Instead we rely on the level of corruption as coded by V-dem's measure of public sector corrupt exchanges (v2excrptps). This concept measures the overall scale of public corruption within society. While corruption certainly functions like a leaky bucket so that some individuals outside the coalition may benefit from government corruption, still, corruption disproportionately benefits members of the winning coalition and, in the absence of good measures of other forms of private goods, it is our measure of private rewards for coalition members.

In order to align the corruption measure with the theoretical concept of private goods requires that we rescale the measure. In the theoretical model people benefit from the public and private goods provided, g and z. In terms of public goods, the total level of public goods provision and a person's share of these goods are the same: by definition public goods are non-rival in nature. We articulated the theory in terms of the private goods that each coalition member receives, z. However, the measure of public sector corruption looks at the overall scale of corruption and not the level of rewards that corruption generates for each supporter. To make this distinction clearer, suppose that corruption was worth $1 million. Of course, we can rarely measure corruption in such clear quantitative ways, but that said, suppose the leader had a coalition of just 10 people. Each

supporter could expect private rewards on the order of $100,000, a substantial amount. If instead the leader had a coalition of 1,000,000 supporters, then the per capita private rewards would be a miserly $1.00 for each coalition member; better than nothing, but hardly likely to generate great loyalty.

Measures of corruption assess the overall scale of corruption, but the theory is articulated in terms of the rewards that individuals get. Ideally, we want the dollar value of corruption per coalition member. While we do not have measures of the monetary value of corruption, the V-Dem measure describes the size of societal corruption. Our measure of winning coalition size, W, reflects the magnitude of the number of coalition members. We define Private Goods = $\frac{v2excrptps}{exp(W+1)}$. The numerator is the amount of corruption from V-Dem and the denominator is the number of people who share in this graft, with the exponentiation to convert the order of magnitude of our coalition size measure into a cardinal scale (with the +1 in the denominator to ensure that the measure of coalition members is positive).

We suspect that some readers will initially be somewhat suspicious of this transformation, especially since many of our analyses will also have W on the right hand side. Yet such transformations to per capita measures are extremely common in social science. For instance, few of us would recoil from an analysis of per capita income that contains a measure of log(population size) on the right hand side; yet this is effectively the setup we use in terms of private goods. The theory forces us to focus on how much each coalition member gets paid (or is allowed to steal) and we cannot get away from the reality that this quantity depends on the total rewards to be distributed divided by the number of recipients. As with many of our other concepts we normalize the provisions of Public Goods, Freedom of Assembly and Private Goods to lie between 0 and 1.

It is often tempting to think that corruption is bad for the economy and that if the government eliminated corruption it could raise more taxes and pay its supporters more. However, such a view overlooks two key factors. First, it is costly to operate an efficient tax system and leaders become beholden to those who collect the taxes for them, which effectively increases the winning coalition size. Second, governments do not turn a blind eye to public sector corruption in general. Instead, government leaders implicitly grant the right to be corrupt as a benefit for coalition members (Besley and McLaren, 1993; Mauro, 1995).

Allowing coalition members to 'help themselves' rather than collect and redistribute resources has numerous advantages. The leader can dispense with the bureaucracy necessary to tax the people. That is a survival-enhancing move by the incumbent. If the bureaucrats become good at collecting money and dispensing rewards to coalition members, the bureaucrats might decide that they can do without the leader; and no leader wants to empower a rival (Egorov and Sonin, 2011). Allowing the coalition's members to pursue their own corrupt endeavors may help reduce how much of the government's revenue must be directly allocated to buying loyalty. That frees up more money for the incumbent's discretionary use. And allowing corrupt practices creates a two-edged sword. As long as coalition members remain loyal they can enrich themselves but if they appear to be

weakening in their loyalty to the incumbent then they can be punished for the corrupt practices that were meant to incentivize their loyalty.

Indeed, many of the most corrupt nations have strict laws against corruption. Xi Jinping in China, for example, has used the law to crack down on corruption but apparently his use of such law enforcement, targeted at more than 4 million cadres (Albert, Xu and Maizland, 2020), was highly selective at the top. He used corruption to punish those in his predecessor's winning coalition and against those, such as Politburo member Bo Xilai, who was thought to be a potential rival (Fiol-Mahon, 2018), or Zhou Yongkang, former head of security and once described as China's third most powerful leader (Jiang and Hanna, 2015; Kaiman, 2014). Zhou Yongkang's main deficiency may well have been that he was suspected of backing Bo Xilai although his official flaw was that he amassed a fortune estimated by the BBC to be worth about $14 billion (Wu, 2015). His opportunity to do so was provided by the fact that he was clearly one of China's most powerful politicians at least between 2007 and 2012 when Xi rose to power.

By 2014, a year after Xi Jinping consolidated his political control by adding the position of President of China to his posts as General Secretary of China's Communist Party and Chairman of the Central Military Commission, Zhou was charged with corruption. He began serving a life sentence in 2015. Many others, such as former Premier Li Keqiang, his possible successor, Wang Yang, and future leadership prospects such as Sun Zhengcai all fell victim to the anti-corruption campaign. In contrast, Xi Jinping's family is reported to have sold off hundreds of millions of dollars in investments at Xi's request to limit political fallout. As the New York Times reported on June 17, 2014, "No investment stakes have been tied directly to Mr. Xi or his wife and daughter. But the extensive business activities of his sister and brother-in-law are part of a widespread pattern among relatives of the Politburo elite, who have built up considerable fortunes by trading on their family's political standing" (Forsythe, 2014). These loyal family members of the inner circle have escaped the corruption charges faced by powerful, rival figures such as Zhou Yongkang and Bo Xilai.

4.5.1 Why Not Other Measures?

We rely significantly, although certainly not exclusively, on V-Dem variables to estimate policy provision in the form of public goods, private goods, and coordination goods (freedoms), as well as the source for our estimation of institutions.[7] Because V-Dem's estimates are based on expert surveys there are reasons to be concerned about whether the expert time-series evaluations are biased by ex post knowledge. A country might, for instance, be rated too harshly in year t regarding corruption because it was known to be corrupt in $t + 1$ and so assumed, as well, to be corrupt earlier. These are reasonable concerns although we hasten to note that it seems unlikely that expert knowledge translates into biased estimates that favor the nuanced, detailed predictions of selectorate theory. One might readily imagine, for instance, that corruption is believed by experts

[7]For a discuss of the limitations of governance measures see Kaufmann and Kraay (2008).

to decrease and public goods to increase as countries become more democratic but it seems unlikely that they structure the data on these two dimensions to match the asymmetric, non-monotonic shape of the coalition welfare function predicted by selectorate theory.

Despite the low probability that the V-Dem variables we use to measure policy provision are biased by the expert survey process to favor our hypotheses, one might still reasonably inquire why we do not focus more on other indicators such as those provided by the World Bank, Freedom House, Transparency International, and other sources. For instance, why not measure public goods provision as government expenditures on health and education or on the prevalence of measles vaccination, each readily available from the World Bank. Why not measure corruption using the Transparency International Corruption Index (International, 2020)? We have, of course, explored these variables and, in fact, they are quite significantly associated with our indicators of coalition size and productivity in the ways predicted by the theory. Despite that fact, we chose not to use them for three primary reasons.

First, the coverage in the World Bank's development indicators, like coverage on corruption by Transparency International, is more limited than the coverage in V-Dem's data despite the fact that we have limited our analyses primarily to the years since 1960. For instance, the World Bank's Health Expenditure variable provides 3,722 non-missing values while V-Dem's public goods indicator gives us 10,369 non-missing values for the same time span. In general, V-Dem provides more than twice as many observations as the World Bank data for the years from 1960 through 2023.

Second, and more importantly, the data that are missing from the World Bank (but not missing from V-Dem) are not randomly distributed. Quite to the contrary, when we code whether a given observation on a variable such as Health Expenditure or Education Expenditure or measles vaccination is missing or is observed we discover that missingness is systematically related to government institutions (W and S). Of course, missingness that is a function of government institutions precludes proper tests of our hypotheses or any other hypotheses that link these variables to government type (Bueno de Mesquita et al., 2003; Hollyer, Rosendorff and Vreeland, 2011, 2015, 2014, 2018). In contrast, the V-Dem indicators that we use show no such missingness bias that systematically eliminates data coverage for smaller coalition regimes.

Other data sets that might provide indicators for public goods, such as Freedom House (Freedom House, 2020), or for corruption, like Transparency International, are non-continuous indicators that, like V-Dem's data, are the judgment of experts and like the World Bank data, provide less extensive coverage. Still, we use Freedom House's estimates of press freedoms as an alternative to freedom of assembly in robustness checks.

Our third concern with the use of government expenditures to evaluate public goods provision, as suggested, for instance by Keefer and Khemani (2005), is inherent in what these variables measure as distinct from what we might like to believe they measure. Education expenditures may, for instance, reflect the polity's effort to educate its population or they may reflect efforts by the

regime to buy the support of a bloc of teachers. We cannot separate how much of national security spending or health or education or social welfare spending is used in an effective effort to advance the stated purpose of the spending and how much it is used as a means to dole out private benefits, such as salaries or bloated procurement contracts, to select groups in order to secure their political support. Thus, we cannot tell how much of the expenditures are private goods and how much are providing public goods.

By way of example, consider how much the Russian government spent in the years from, say, 2000 to 2023 on its military. Their military had the fourth largest military budget in the world (after the USA, China, and Saudi Arabia). Ostensibly, this expenditure is supposed to advance national security, a public good. Yet the Russian military was readily held at bay by Ukraine's military in 2022 even before the NATO powers began giving Ukraine significant lethal military assistance. How much of the Russian military budget was used to buy quality weapons, train soldiers, and provide them with protective gear and how much was spent to line the pockets of Russia's senior military staff? We cannot know but ex post observation certainly suggests that expenditures are not inherently good indicators of the public goodness of the policy. Hence our decision to use V-Dem's indicator of the extent to which 'access' to public goods is not politicized rather than an indicator of expenditures on such goods.

4.6 The Leader's Characteristics

There is a substantial literature examining how individual characteristics such as a person's upbringing, education, family status, and profession affect the choices of political leaders (Horowitz, Stam and Ellis, 2015; Horowitz, McDermott and Stam, 2005). Our focus is on tenure in office and leader health (Hummel, 2020; McDermott, 2007; Robins and Post, 1995). The life-cycle aspect of the theory indicates that the mix and quantity of policies provided by leaders, coalition loyalty, and prospective threats to a leader's political survival are all partially contingent on how long a leader has been in office. When examining data at the nation-year level of analysis we focus on the leader in office at the beginning of the year. The data are drawn from the Archigos data set as updated by us through 2024 (Goemans, Gleditsch and Chiozza, 2009; Bueno de Mesquita and Smith, 2018; Smith, 2022).

All social science concepts are difficult to measure as people have incentives to obfuscate and deceive. The incentive for opacity is especially strong when it comes to a leader's health. A leader should regard information about any health condition she may have as the greatest of state secrets. If the information escapes, then loyalty is undermined and she has to pay her coalition more. Hence, attempting to find reliable contemporary information on the health of leaders or who knew about the leader's health is an impossible task. However, once a leader is dead, the incentives for secrecy are greatly diminished and so information on the causes of death are often available in such sources as obituaries. While such sources do not provide a detailed autopsy, they often give important clues

as to whether a leader was chronically ill. Phrases such as "X had been seeking medical treatment", "X died after a long illness", or "X had been looking increasingly frail and her public appearances had become rare" all indicate that the leader knew they faced a serious health problem and it is likely that at least some insiders also knew. Such knowledge places leaders in political jeopardy.

In contrast, leaders who died in an accident or after a short or sudden illness were unlikely to have faced an increased political risk prior to death because their imminent death was unanticipated. Using the procedures explained in detail in Bueno de Mesquita and Smith (2018), we code information about the cause of death. In particular, for all leaders who die within 10 years of leaving office, we examine obituaries to find out if they were likely to have been suffering from a chronic disease. We treat the health of leaders who are killed, for example by execution after a transition, as censored information. Effectively they are assumed to be healthy since they died by other means before their health failed. Unfortunately, since leaders who are unhealthy are the ones most likely to be deposed, many chronic health conditions might go undetected by this procedure.

With these procedures and considerations in mind, the leader health-related variables that we consider are each leader's age relative to life expectancy and whether the leader had a chronic illness, a factor that is generally only known by us ex post but may well have been known by coalition members or even prospective rebels ex ante (Bueno de Mesquita and Smith, 2018; Smith, 2022). We define the variable, Sick, to indicate that a leader will die from a chronic disease within 5 years.

While contemporaneous health is generally unobservable for those outside a leader's inner circle, age is readily measured and is a sure sign of diminishing vigor (Brownlee, 2007; Zhou, 2023). Given developments in health care, people live longer today than they did in the past. Hence, we compare a leader's age to life expectancy in Sweden (Roser, 2017). Sweden has top notch healthcare, similar to the quality of healthcare to which leaders have access (Siverson and Johnson, 2014). We combine the age and chronic illness indicators to form a dichotomous variable, Old or Sick, that equals 1 for leaders satisfying our coding of chronic illness or whose age put them over Sweden's life expectancy in that year.

4.7 Data on the Occurrence of Political Events

Leaders can lose their positions through numerous means. They may face such threats as coups d'état, mass uprisings (including revolutions and civil wars), assassination, natural death, or regular removal through term limits, retirement, or electoral defeat. Coalition members, as well, may confront multiple challenges to their continued receipt of private benefits. They may be ousted in purges or as a consequence of leadership change, with such changes potentially arising for the various reasons just enumerated under which leaders lose power and coalitions are recomposed. Hence, we examine now the measurements and data we use to evaluate events that might culminate in leader and coalition turnover respectively.

4.7.1 Mass-based political events

We primarily rely on data from Banks and Wilson (2020) to code revolutions. Based on the definitions derived from Rummel (1963), the Banks cross-national time-series (CNTS) dataset codes a revolution as "[a]ny illegal or forced change in the top government elite, any attempt at such a change, or any successful or unsuccessful armed rebellion whose aim is independence from the central government."[8] Based on newspaper accounts, these data record the number of revolutions in each nation-year since 1919. The analyses to follow focus on whether any revolutionary event occurred in a nation-year observation or not.

The Banks's CNTS data have been rightfully criticized for focusing only on main-stream English language media that results in many events being missed. There are numerous more recent databases that collect data on mass protests, insurgencies, and revolutions (Raleigh et al., 2010; Salehyan et al., 2012). For instance, Armed Conflict Location & Event Data Project (ACLED) data contains incidents of violent conflict and popular protests and the date and region for these events. Likewise, the Social Conflict Analysis Database (SCAD) records similar data for African nations since 1990. Although these data improve on the simple nation-year level data in Banks's CNTS, they still miss many events (Demarest and Langer, 2018).

Other data sources focus on the occurrence of armed conflict. For instance, Uppsala's Conflict Data Program provides data on civil conflict, while NAVCO provides data on non-violent campaigns against the government (Chenoweth and Lewis, 2013; Chenoweth and Ulfelder, 2017; Chenoweth and Stephan, 2011).

While many of these data sources offer more disaggregated and more numerous actions by the masses against their government, we elect to use the Banks data on revolution for several reasons. First, and most importantly, the more detailed data lack extensive coverage. For instance, ACLED protest data are only available from 1997 for 48 nations. Although the range of coverage improves for more recent years, it still covers too few years to test arguments about institution change. Second, our measures of government policy and institutions are at the yearly level and so the yearly measure of mass-based attempts to overturn government provides a convenient and appropriate unit of measurement for our purposes. Of course, it would be wonderful to examine the relative impact of different forms of mass based actions but that is simply beyond the scope of what we can realistically achieve here.

4.7.2 Elite-based political events

The primary means by which elites within the coalition reform institutions is through a coup d'état. We use Powell and Thyne's (2011) data on the occurrence of coups. They define a coup as "illegal and overt attempts by the military or other elites within the state apparatus to unseat the sitting executive" (p. 252). Their paper also provides a comprehensive summary of other definitions of

[8] `https://www.cntsdata.com/`

coups commonly used in the literature. Their data have been updated through 2024.[9] Other commonly used data on coups are found in Marshall and Marshall (2019) and Banks and Wilson (2020). Although we do not report any results using these alternative data, we replicated relevant analyses with these other measures and they produce similar results.

4.7.3 Leader-based political events

Leaders can take many actions to secure their hold on power above and beyond making policy choices. In particular, in this section we review data related to a leader's choice to reshuffle the membership of her coalition and to engage in suppression.

The theory identifies two major instances in which leaders alter the composition of their coalition. First, a leader reshuffles her coalition members, replacing those supporters whom she dislikes or whom she deems untrustworthy with higher affinity selectors. Second, a leader might change the size of her coalition; purging some existing members if the coalition is contracted or bringing in additional members if the coalition expands. In an ideal world we would have data on all the members of each leader's coalition and be able to identify those entering and those leaving the coalition. Unfortunately such data do not exist. Instead, we use changes in cabinet membership and the turnover of military elites as proxies of overall changes in coalition composition.[10] redXXXXX clean up following para There is a considerable literature on the turnover of cabinet ministers within government (Berlinski, Dewan and Dowding, 2010; Dowding and Dumont, 2007; Flores and Smith, 2011; Flores, 2016; Francois, Rainer and Trebbi, 2014; Huber and Martinez-Gallardo, 2008; Mitra, 1980; Woldense, 2018). There is a long literature studying cabinet turnover in democracies (Huber and Martinez-Gallardo, 2008, for instance). Such analyses have been extended into the nondemocratic realm (Arriola, 2009; Francois, Rainer and Trebbi, 2014; Siegel, 2018). A major consideration in many studies is how turnover affects stability (Kroeger, 2020; Nadporozhskii, 2023; Woldense, 2022). In a particularly innovative study, Montagnes and Wolton (2019) model how a leader decides whether to retain or purge a supporter based upon their perceived effort to sustain the regime[11]. With a focus on commitment, Myerson (2008) argues that if governance is organized such that the court can depose the leader, then the leader can commit to reward the court and the court works to keep her in power.

[9] `http://www.uky.edu/~clthyn2/research.htm`

[10] The Banks CNTS data also codes for purges. However, those data code a purge as "[a]ny systematic elimination by jailing or execution of political opposition within the ranks of the regime or the opposition." Unfortunately this definition does not distinguish between repression against the masses or the reshuffling (often with associated punishment) of coalition insiders. We found similar results when examining these data but given the inability to determine whether the leader actions are against political insiders or others we do not present these data here.

[11] Rosenfeld (2017) offers evidence of political insiders being more supportive of the government by showing that middle class public section workers are much less likely to join protests than middle class private sector workers.

We assume that as political insiders, cabinet ministers are coalition members. Nyrup and Bramwell (2020) code who is in the cabinet for a large sample of governments and provide numerous metrics about the rate of ministerial turnover. We focus on the measure of the proportion of people replaced in the cabinet. Of course, there are generally many more coalition members than cabinet members and so significant coalitional change could occur with the cabinet remaining constant. However, we believe changes in cabinet composition correspond to changes in the coalition. These data are recorded at the nation-year level.

Sudduth (2021) codes turnover within military regimes. In such systems, many among the military elite are also coalition members and so the replacement of military officers generally indicates a change in coalition membership (Sudduth, 2017*b*, 2021). As with the cabinet data, there are, of course, coalition members who are not in the military. Still, a change in military personnel, particularly within senior ranks, is indicative of a change in coalition membership. Her data report turnover at the leader-year level.

Suppression, Torture, and Extra-Legal Killing

Threats of mass uprisings are suppressed through the use of such devices as extra-legal political killing and torture that are designed to deter opposition and to extract information about actual or potential conspirators attempting to organize a mass uprising. We use V-Dem's variable, freedom from torture (v2cltort), reversing its direction, to assess the prevalence of torture year by year and regime by regime (Coppedge et al., 2023b, p. 176). This variable, in its original coding (before reversing its direction), asks whether the society experiences freedom from torture whereas our construction asks instead how widely does the government use torture. Torture is defined by V-Dem as "the purposeful inflicting of extreme pain, whether mental or physical, with an aim to extract information or intimidate victims, who are in a state of incarceration. Here, we are concerned with torture practiced by state officials or other agents of the state (e.g., police, security forces, prison guards, and paramilitary groups)" (p. 176). The variable's values range from a high score if "Torture is practiced systematically and is incited and approved by the leaders of government" to a low score if "Torture is non-existent." Because V-Dem uses Bayesian estimation methods, the ordinal variable is converted to an interval scale with higher values meaning more use of torture.

V-Dem's variable v2clkill is defined as the use of political killing where "Political killings are killings by the state or its agents without due process of law for the purpose of eliminating political opponents. These killings are the result of deliberate use of lethal force by the police" (Coppedge et al., 2023b, p. 176). We reverse the direction of v2clkill, calling it Political Killing, so that high values mean wider use of such executions. We test the expectations regarding the suppression of mass uprisings separately with torture and with political killing, the latter being the toughest level of the suppression of the regime's opponents.

4.8 Economic, Demographic, and Other Data

We use the World Bank's World Development Indicators as our primary source of economic and demographic data (World Bank, 2023). Most of our analyses include measures of the logarithm of per capita GDP, the economic growth rate, logarithm of population and resource rents as a percentage of GDP. These data are generally available for most nations after 1960 or 1970 depending on the variable. The temporal domain of most of the analyses are restricted by data availability.

Occasionally we wish to extend our analyses to look at earlier events. To do so we use economic and demographic data from Fariss et al. (2022) that is available for a wider time period. Natural resource data are not widely available for these earlier periods and so these extensions exclude resource variables.

Table 4.1 summarizes the measures of our core explanatory variables (1960-2023).

Table 4.1: Summary Statistics for Core Variables (1960-2023)

Variable	Observations	Mean	Std. Deviation	Max	Min
Coalition Size, W	10,492	0.60	0.25	0.07	1.00
Selectorate, Nominal	10,492	0.94	0.22	0.00	1.00
Selectorate, Real	10,492	0.65	0.15	0.00	1.00
Productivity	7,924	0.48	0.26	0.00	1.00
Public Goods	10,369	0.63	0.21	0.03	1.00
Assembly	10,388	0.55	0.25	0.00	1.00
Private Goods	10,451	0.40	0.19	0.00	1.00
Leader Tenure	10,069	8.57	8.09	1.00	57.00
Old or Sick	10,069	0.20	0.40	0.00	1.00
Log(GDPpc)	9,528	8.27	1.46	4.81	12.34
Resource Rents	8,634	7.21	11.24	0.00	88.59

4.9 Model Specification and Robustness

Before embarking on analyses it is useful to pause to discuss some of our general approaches to methods and model specification. We believe that statistical analyses should reflect the theoretical predictions being tested, be flexible enough to allow the data to speak, and be easy to interpret. Unfortunately, simultaneously fulfilling these goals is often very difficult. In terms of model fit statistics we found that interacting most of the independent variables with quadratic terms for winning coalition size (i.e. including X, $W_{t-1}X$ and W_{t-1}^2X) generally provided the best fit. However, the improvements from such specifications over the simple specifications that we present were small and made simple interpretations of the results very difficult. One potential resolution of this dilemma is to present numerous model specifications. However, given the already large

number of tests, we feared overwhelming the reader with many tests that all lead to largely similar substantive results. We resolved to present straightforward model specifications and to maintain relatively uniform specifications throughout.

A gold standard for assessing model fit is to examine out-of-sample predictions. The best way to assess the predictive power of the analyses is to wait to see how well they predict over the coming years. However, in lieu of waiting multiple years, most nation-year analyses report out-of-sample bootstrapping tests as well as standard, in-sample tests. These out-of-sample tests probe the robustness of findings to alternative sets of observations. To implement bootstrapping, we first divided the data into 6 groups by time period.[12] Second, we excluded the data in the first group and estimated the model using only the remaining data. Third, we used the estimates that excluded the first group to generate predictions for the first group. Fourth, we repeated stages 2 and 3 for each of the other groups.

Once each group has been sequentially excluded we are left with out-of-sample predicted values for the dependent variable for observations in each of the six groups. To provide an assessment of the model fit we report the appropriate model fit statistic to compare the observed data with these out-of-sample predicted values. For instance, when examining regression models we report the R^2 statistic. For discrete dependent variables we report the Receiver-Operator-Characteristic (ROC). Tables reporting results include the number of observation included in this bootstrap procedure and the appropriate out-of-sample model fit statistic. While our analyses generally include year fixed effects, in the bootstrapping analyses we cannot estimate these fixed effects for the excluded group. A cubic year time trend is estimated in lieu of the year fixed effects. Throughout we report results with robust standard errors based on clustering observations by nation.

When estimating the occurrence of such events as revolutions and coups we generally present logit models. Linear probability models with nation and year fixed effects or logit models with fixed effects have become increasingly popular approaches. Beck (2020) provides a recent balanced discussion of the relative value of these different approaches and some of the common pitfalls. We found similar results when using different statistical modeling approaches but decided against overburdening the reader by showing all the results in triplicate. The evidence suggests our findings are robust. We provide all of our data and code and invite those who advocate other methods to replicate our analyses using their preferred approaches.

4.10 Estimating Coalition Welfare: The Swoosh Curve

Coalition members benefit from the provision of public and private goods. According to the theory, the ratio of public to private goods increases as coalition size expands. When coalition size is small leaders focus on the provision of private goods; when coalition size is large leaders focus on providing

[12] In particular we divided the data into 1971-1979, 1980-1986, 1987-1994, 1995-2002, 2003-2011 and 2011-2023.

public goods. In addition to shaping the mix of goods that leaders provide, coalition size influences how many resources the ruler spends on the coalition. As coalition size expands the leader can retain fewer and fewer discretionary resources and must spend a larger proportion of available resources on the coalition's welfare. As discussed in detail in section 2.2, the interaction of the policy mix and resource spending by the leader results in the non-monotonic coalition-welfare swoosh curve whose value equals the incumbency constraint for any given value of the key theoretical variables.

Before embarking on a systematic test of the theory, we provide a measure of the welfare of the winning coalition and examine how it is affected by coalition size and productivity. As a heuristic introduction to the analyses of instability in subsequent chapters, we demonstrate that most leaders provide close to the level of coalition welfare that the theory anticipates. As we will see, leaders who deviate from the swoosh curve engender instability.

According to selectorate theory, a coalition member's well-being is a function of the mix of public and private goods they receive. They should be expected to get exactly the quantity and mix of goods indicated by the incumbency constraint. Thus, they should receive the equilibrium mix of public goods (Public), coordination goods (Assembly), and private goods (Private). In our approach to estimating coalition welfare (denoted hereafter as CW), we weight Public Goods by the logarithm of the country's per capita income in the year in question, with the log of per capita income as reported by the World Bank. The idea here is that the quantity of public goods (but not freedoms) that could be provided depends both on the commitment to such goods and to the scale of the economy from which these goods must be purchased. Hence, we convert Public to Public*log(GDP per capita) and normalize this measure to take values between 0 and 1. Likewise, the magnitude of private goods depends on the size of the economy and so we also weight the value of private goods by the size of the economy (and also normalize to take values between 0 and 1). Freedom of assembly is nearly free to provide and so we do not weight its provision. The coalition welfare estimate is then normalized to fall between 0 and 1.

$$CW = norm\left(norm(Assembly) + norm(Public * log(GDPpc)) + norm(Private * log(GDPpc))\right) \tag{4.3}$$

where $norm(x) = \frac{x - min(x)}{max(x) - min(x)}$. The construction of CW puts equal weight on each of the three components: public, private and assembly. Of course, such a weighting scheme is arbitrary; a critique that could be leveled at any other weighting for CW or any other index (as in the Polity Scale for instance). However, we are constructing CW primarily for heuristic purposes. The main analyses use the individual components and so, de facto, any weighting is a product of the statistical output rather than an arbitrary choice.

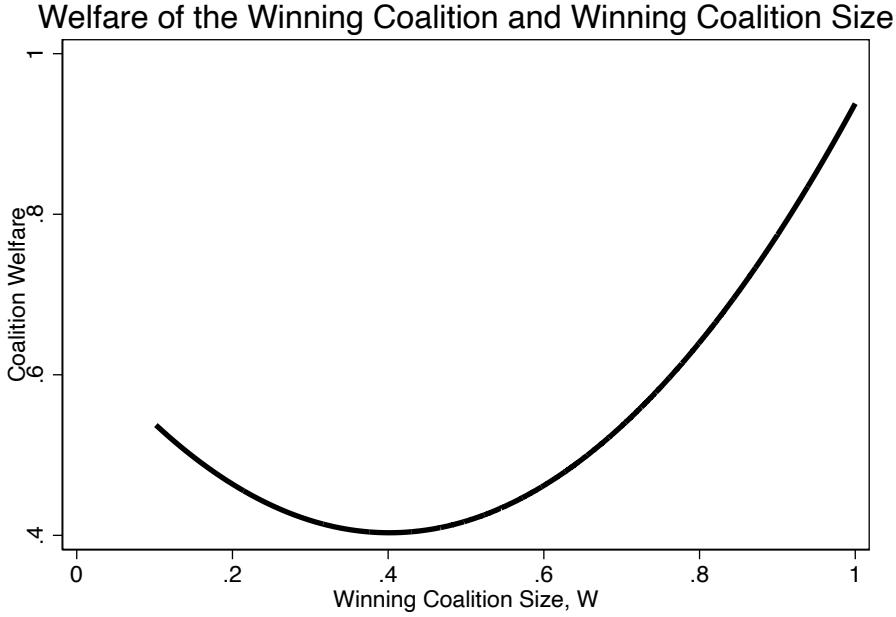
To assess the efficacy of our coalition welfare estimation, the variable CW, we undertake two evaluations. First, we adopt a fractional polynomial regression approach as a convenient means to summarize the relationship between total coalition rewards and winning coalition size. The

fractional polynomial approach estimates:

$$CW = \beta_0 + \beta_1 W^{p_1} + \beta_2 W^{p_2} + ... + \beta_m W^{p_m} \tag{4.4}$$

Thus, the fractional polynomial regression ascertains whether W's effect on CW is, as anticipated, not only non-monotonic but also asymmetric. The resulting statistical pattern is shown in Figure 4.6.

Figure 4.6: The Welfare of the Winning Coalition and Coalition Size: Swoosh Curve



The figure displays the statistical estimate of average welfare provided by the government for coalition members in every size of winning coalition over time. The statistically-estimated function that translates W into the expected value of CW looks very much like the swoosh shaped curve derived from the theory. In small coalition systems leaders provide large amounts of private goods. As the coalition expands, the leader needs to work harder, spending more of her available resources, but the private goods she provides need to be shared among more supporters. When the predominant means of rewarding supporters is private goods, as is the case in very small coalition systems, the impact of the dilution of private goods dominates the increased effort leaders make to secure loyalty and so coalition welfare declines as coalition size expands. However, as coalition size continues to expand the relative provision of private goods declines and the increased spending

effort starts to dominate, leading to increased welfare for each coalition member.[13] Central to our arguments about instability, there is a coalition size, illustratively located at about 0.4 in Figure 4.6 when we assume all else is equal (as, of course, it never is), that minimizes coalition welfare and, from this minimum, coalition welfare can be improved either by contracting W (autocratization) or by expanding W (democratization).

However, to evaluate whether the distribution of coalition welfare is consistent with the theory, we must relax the assumption that all else is equal. Doing so is more demanding. As well as being more demanding, it is not easily graphed. We know from Chapters 2 and 3 that the overall benefits to coalition members are expected to look like the 'swoosh curve' and they do. But the exact shape of the 'swoosh curve' and the magnitude of benefits are theoretically expected to change as a function of the price of public goods (productivity) and the length of time that a leader has been in office. Specifically, the slope of the curve is greater as productivity increases; the location of the curve's minimum is expected to shift to the left – toward a smaller coalition – as productivity increases; and total benefits are expected to decline, meaning the entire curve shifts downward, the longer a leader has been in office. This is equivalent to saying that there is a blurry continuum of possible swoosh curves whose exact characteristics vary with each country's values on W, p, and the leader's time in office, Log(Tenure).

To test whether these important predictions are also borne out we undertake four regression analyses. The four model specifications, displayed in Table 4.2, allow us to ascertain whether changes in coalition welfare follow the theoretical expectations. The first regression model is the most basic. It looks at the relationship between the theory's key independent variables and the value of CW with no fixed effects. Here, as in all subsequent results, we report robust standard errors based on clustering observations by nation. Model 2 replicates the basic model but now includes country and year fixed effects. Model 3 and Model 4 replicate Models 1 and 2 respectively, but replace the measure of productivity with the log of per capita income as an alternative. We have data on 164 countries for the 52 years from 1971-2022 that are being tested when we substitute the log of per capita income for the educational-attainment indicator of productivity. In contrast, we have data on only 128 countries for these years when productivity is included in our estimation. Thus, we face a trade-off. Models 1 and 2 are closer to theoretical demands than are 3 and 4, but models 3 and 4 include 7,136 observations while Models 1 and 2 only include 5,782 observations, a difference of more than 1,300 nation-years (and disproportionately excludes small W systems).

While Models 2 and 4 include country and year fixed effects because, for good reasons, this has become standard statistical practice, we note that we think that Models 2 and 4 are conceptually somewhat problematic. We say they are problematic because several of the key variables, especially

[13] Although increased spending is accompanied by an increased focus on public goods spending, it should be understood that this need not mean an absolute decrease in private goods spending. As the spending pie expands, it is, of course, possible for a smaller percentage but an absolutely larger amount to be allocated to private goods. Remember, by way of a prosaic example, $\frac{1}{8}$ of an 18 inch pizza is larger than $\frac{1}{6}$ of a 12 inch pizza.

Table 4.2: Provision of Coalition Welfare

	(1) CW	(2) CW	(3) CW	(4) CW
W_{t-1}	-0.764***	-0.563**	-0.270	-0.542**
	(0.148)	(0.179)	(0.174)	(0.186)
W^2_{t-1}	0.962***	0.748***	0.829***	0.650***
	(0.141)	(0.172)	(0.147)	(0.170)
Productivity$_{t-1}$	0.320**	0.241^{+}		
	(0.0997)	(0.124)		
W_{t-1} * Productivity$_{t-1}$	-0.0666	-0.0822		
	(0.129)	(0.151)		
W_{t-1} * Productivity$_{t-1}$				
Log(GDPpc$_{t-1}$)			0.0919***	0.0616***
			(0.0119)	(0.0134)
W_{t-1} *Log(GDPpc$_{t-1}$)			-0.0492***	0.0104
			(0.0146)	(0.0207)
Log(Tenure)	-0.0433**	-0.0300**	-0.0403***	-0.0232**
	(0.0144)	(0.00915)	(0.0112)	(0.00782)
W_{t-1} *Log(tenure)	0.0515**	0.0368**	0.0441**	0.0252*
	(0.0184)	(0.0119)	(0.0149)	(0.0105)
Old or Sick	-0.00890	-0.0275^{+}	0.0407^{+}	-0.00440
	(0.0312)	(0.0161)	(0.0207)	(0.0133)
W_{t-1} * Old or Sick	-0.00693	0.0368^{+}	-0.0736**	0.00543
	(0.0406)	(0.0207)	(0.0271)	(0.0178)
Log(Population$_{t-1}$)	-0.00459	-0.0383	-0.00340	-0.00485
	(0.00491)	(0.0259)	(0.00368)	(0.0166)
Growth$_{t-1}$	0.000213	-0.0000146	-0.000511	0.000125
	(0.00104)	(0.000722)	(0.000687)	(0.000446)
W_{t-1} *Growth$_{t-1}$	0.0000787	0.000987	0.000907	0.000331
	(0.00151)	(0.00106)	(0.00102)	(0.000746)
Resource Rents$_{t-1}$	0.00549***	0.00308***	0.00131	0.00209***
	(0.00140)	(0.000863)	(0.000976)	(0.000541)
W_{t-1} *Res. Rents$_{t-1}$	-0.0102***	-0.00565**	-0.00333*	-0.00420**
	(0.00230)	(0.00169)	(0.00162)	(0.00129)
Observations	5782	5782	7136	7136
Number Nations	128	128	164	164
Years	1971-2022	1971-2022	1971-2022	1971-2022
Nation FE	N	Y	N	Y
Year FE	N	Y	N	Y
Fit: R2	0.703	0.907	0.732	0.913
Fit: R2 within		0.285		0.321
Bootstrap N	5782	5774	7136	7120
Bootstrap Fit	0.699	0.866	0.725	0.877

Standard errors in parentheses

Robust Standard Errors Clustered by Country

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

coalition size and productivity in Models 1 and 2, inherently tend to be slow moving. That means that much of the variance in Model 2 is absorbed by country fixed effects, as it were, "Throwing Out the Baby with the Bath Water," as the title of Beck and Katz (2001) argues. Even with the fixed effects, however, as is evident in Table 4.2, the core variables of the theory perform strongly and in the direction in each case that is predicted by the theory. It is also noteworthy that the bootstrapped indicator of goodness of fit for each model is very similar to the goodness of fit when all observed cases are included in the analyses.

The models demonstrate that coalition welfare initially declines as coalition size increases and then turns up and continues to grow, as we saw in Figure 4.6. The turning point at which CW rises after falling as W increases occurs when W equals 0.40, 0.38, 0.16, and 0.42 as we move from Model 1 to Model 4, indicating a consistent pattern that echoes the turning point when using the fractional polynomial regression approach that excludes all variables other than powers of W.

Table 4.2 also demonstrates, as anticipated, that the deeper a ruler gets into the leadership life-cycle, the more the coalition's welfare is diminished. This tenure effect is smaller in large coalition systems, as anticipated and as evidenced by the negative coefficient estimate for Log(tenure) and the positive coefficient estimate for W_{t-1}Log(tenure). Conversely, high productivity (that is, a low price for public goods) increases coalition welfare. Without fixed effects, Models 1 and 3 explain about 70% and 73% of the variance respectively.

As we noted earlier, replacing the productivity indicator with the logarithm of per capita income greatly increases country coverage which will be important when we turn our attention to the central concerns of this book: elements of political instability, but the gain in observations comes at a loss in theoretical precision in estimating CW. Fixed effects make up for much of that lost precision, confirming our speculation that the effect of productivity, as a slow moving variable, is largely absorbed by the fixed effects. That observation may prove important in our selection of how best to estimate the extent to which coalition payments deviate from the incumbency constraint, swoosh curve function, a crucial topic in Chapter 5.

In shifting our estimation procedure away from educational attainment to per capita income, we note that the two variables are highly correlated at 0.815 (N=6,794) for the countries for which we have data on both between 1960 and 2022. As the regression analyses in Table 4.2 make clear, the results are very similar whether we use productivity or per capita income. Given the great similarity in results, from this point forward we use the log of per capita income in place of educational attainment as our measure of the price of public goods unless we indicate otherwise.

Putting the results of these regression analyses together, we estimate the coalition's welfare in each year and for every country for which we have data. As a heuristic, we calculate the deviations between the expected benefits (using Model 4 of Table 4.2) and the actual benefits in each country in each year.

Figure 4.7 provides two examples of the empirically estimated swoosh curve, displaying deviations from the anticipated provision of coalition benefits for selected East European nations (with

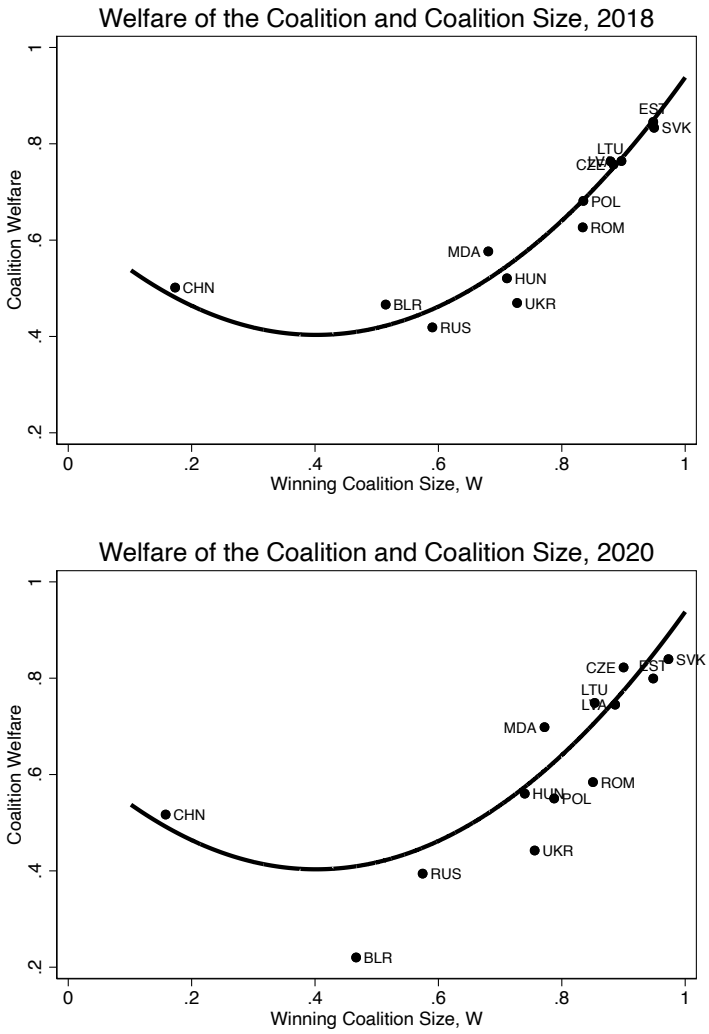
China included to anchor the coalition scale near its lower end) in the years 2018 and 2020. We chose these two years to illustrate several important aspects of the linkage between coalition benefits and the risk of instability.

The first notable feature of the two graphs in Figure 4.7 is how many more of the countries in East Europe provided coalition benefits almost exactly equal to the incumbency constraint in 2018 than in 2020. Only Russia (RUS), Ukraine (UKR), Romania (ROM), and Hungary (HUN) under-provided benefits in 2018 by a consequential amount while Moldova (MDA) and Belarus (BLR) meaningfully over-provided benefits. Another notable feature is how different the picture is for 2020. Belarus falls well below the incumbency constraint provision of coalition benefits in 2020, as does Poland (POL), Ukraine, Romania, and Russia, with Slovakia (SVK) and Estonia (EST) somewhat below as well.

The theory tells us that coalitions whose benefits are well below the swoosh curve are likely to face a high risk of instability either in the form of events like coups or revolutions or in the form of counter-maneuvers by leaders to salvage their hold on power. Interestingly, the graphs indicate that Belarus was at much greater risk in 2020 than in 2018 and, indeed, in 2020 Russian troops had to enter Belarus to save the regime from being overthrown by a mass uprising. No such event arose in Belarus in 2018. One might also note that the results indicated that Ukraine was at significant risk in both years that have been plotted and that the risk was greater in 2020 than in 2018 and, looking at the 2021 results (not shown), we see that the threat to Ukraine's stability continued unabated. We can only speculate, of course, about whether this was a factor in Russian President Vladimir Putin's decision to invade in February 2022.

Remembering that the values plotted for year t are based on regression estimates using independent variables that were lagged by one year $(t-1)$, we see that 2019 data signaled much higher instability in 2020 than 2017 data signaled for 2018. In Chapter 5, we demonstrate in some detail how the residual value for each policy allocation is used to estimate instability risks with the residual defined as the deviation from the swoosh curve; that is, the deviation from the incumbency constraint. Chapters 6 and 7 will then use those estimation procedures to anticipate changes in policy allocations and their impact on political survival while Chapter 8 will illustrate how these estimation techniques can be applied to practical, real-world, real-time analyses of the risks of instability and the optimal counter-moves designed to offset those risks.

Figure 4.7: Deviations From Anticipated Coalition Welfare



Chapter 5

Anticipating Threats and Risks

The main empirical concern in this chapter is to assess the anticipated risks of destabilizing events such as revolutions, coups d'état, and other causes of irregular leader change. Anticipating these risks is a central concern of any survival-oriented political leader. Once a leader has estimated the risks she faces she can turn her attention to the actions that will best ameliorate those threats. That is, she will sort out what, if any, changes in tactics, policies, and institutions can help her stay in power.

Estimating the threat of destabilizing events is a tricky business. The theory provides insights into what we should expect to observe. However, there is no method of which we are aware for measuring or assessing any leader's actual perception of the threat that she will be destabilized and possibly overthrown. Rather, we can only observe whether any of the destabilizing events – coups, revolutions, or leader change – did or did not occur and if they did, whether the conditions anticipated by the theory were or were not prevalent beforehand, and if prevalent, how strongly. Of course, if incumbents look for and detect signs of such events; that is, the prevalence of factors associated with destabilizing events, then much (maybe most) of the time these events are thwarted before they actually take place. That means that the events we observe are, in some important sense, outliers where leaders either failed to see the danger looming in their future or failed to possess or use adequate counter-measures to nip the threats in the bud.

Given that leaders are expected to try to neutralize perceived threats, we should expect a meaningful, but relatively poor, statistical fit between the observation of actual destabilizing events and the statistical models used to assess the risk of such events. If, however, the theory proves to be consistent with expectations, then the *predicted risks*, derived by saving the predicted values from our regression analyses across all cases regardless of whether a destabilizing event occurred, should be indicative of each leader's perceived need to take corrective measures to head off threats to their rule. The statistically estimated risks capture the record of domestic and leadership circumstances that elevated or depressed the expectation that a threat to political survival is in the leader's future.

Hence, we contend that the circumstances leading to elevated predicted risks are the sort of things that incumbents are attentive to as signals of whether trouble is brewing.

To capture the circumstances that shape how leaders formulate their anticipation of threats we need first to derive more precise and decomposed estimates of what leaders expect to observe under non-threatening conditions than was provided in Table 4.2. There we provided a heuristic estimate of the swoosh curve allocation of total coalition benefits but did not decompose coalition welfare into its constituent parts. That decomposition gives us a more thorough, theoretically-informed assessment of the allocation choices leaders make regarding public goods, private goods, and coordination goods, as well as overall coalition welfare when they believe they face everyday political challenges. That way we, like them, can compare baseline, everyday conditions to changes that might raise their concern that a threat is on the horizon. The decomposed elements that make up the aggregated calculation of risk will prove especially important when, for example, we attempt to distinguish the causes, and corrective actions, behind different types of coup threats.

5.1 The First Business of Leaders: Everyday Survival

Our starting place for thinking about estimating leader beliefs is to assess the extent to which rulers do what the selectorate theory anticipates they 'ought' to do to survive in office. The theory instructs us that coalition size, productivity, and leader longevity in office, with health concerns not too far behind, are the fundamental theoretical elements behind the baseline allocation of rewards. Therefore, we begin by evaluating the aggregate effect of each of these variables on the provision of public goods, private goods, coordination goods, and overall coalition welfare. Once we are satisfied that the evidence is consistent with expectations for each variable, we then capture the deviations from those expected allocations. The extent to which policy provisions differ from expectations form foundational building-blocks for our estimation of leader beliefs about threats to their political survival.

To start, we examine empirically the decisions that theory tells us maximize each leader's chance of political survival under normal, everyday circumstances while also maximizing their control over discretionary revenue. Those decisions revolve around getting the allocation of public goods, private goods, and coordination goods right, meaning providing just enough that neither the coalition nor the masses think they would be better off by rising up against the incumbent than they are by continuing to live under the current ruler's leadership.

Tables 5.1 and 5.2 evaluate the extent to which leaders work out what policy benefits they are expected to provide under normal circumstances if they act in accordance with selectorate logic. The first table contains basic regression models, while the second table includes fixed effects for nations and years. Both sets of analyses include interactions between the main regressors and coalition size, such that the analyses allow the marginal impact of a regressor to differ across the range of coalition size.

Table 5.1: Provision of Public Goods, Private Goods, Assembly and Coalition Welfare

	(1) Public	(2) Private	(3) Assembly	(4) CW
W_{t-1}	-0.711**	-0.0575	-0.0772	-0.270
	(0.212)	(0.212)	(0.194)	(0.174)
W^2_{t-1}	0.982***	-0.0860	0.687***	0.829***
	(0.183)	(0.160)	(0.149)	(0.147)
Log(Tenure)	-0.0425**	0.00820	-0.0470**	-0.0403***
	(0.0162)	(0.0152)	(0.0161)	(0.0112)
W_{t-1} *Log(tenure)	0.0476*	-0.0102	0.0517*	0.0441**
	(0.0216)	(0.0216)	(0.0230)	(0.0149)
Old or Sick	0.0367	0.00738	0.0331	0.0407+
	(0.0302)	(0.0366)	(0.0313)	(0.0207)
W_{t-1} * Old or Sick	-0.0757+	-0.00205	-0.0662	-0.0736**
	(0.0399)	(0.0466)	(0.0426)	(0.0271)
Log($GDPpc_{t-1}$)	0.0416**	-0.0108	0.00849	0.0919***
	(0.0153)	(0.0171)	(0.0138)	(0.0119)
W_{t-1} *Log($GDPpc_{t-1}$)	-0.0156	-0.0403*	-0.000443	-0.0492***
	(0.0181)	(0.0195)	(0.0190)	(0.0146)
Log($Population_{t-1}$)	-0.00648	0.0108***	-0.0121**	-0.00340
	(0.00474)	(0.00307)	(0.00387)	(0.00368)
$Growth_{t-1}$	0.000529	0.000599	-0.00178+	-0.000511
	(0.000896)	(0.000970)	(0.000913)	(0.000687)
W_{t-1} *$Growth_{t-1}$	-0.000374	-0.00135	0.00247+	0.000907
	(0.00133)	(0.00134)	(0.00141)	(0.00102)
Resource $Rents_{t-1}$	-0.000381	0.00156	0.000473	0.00131
	(0.00145)	(0.00126)	(0.00103)	(0.000976)
W_{t-1} *Res. $Rents_{t-1}$	-0.00275	-0.000155	-0.00246	-0.00333*
	(0.00246)	(0.00188)	(0.00186)	(0.00162)
Observations	7142	7152	7150	7136
Number Nations	164	164	164	164
Years	1971-2022	1971-2022	1971-2022	1971-2022
Nation FE	N	N	N	N
Year FE	N	N	N	N
Fit: R2	0.586	0.767	0.777	0.732
Bootstrap N	7142	7152	7150	7136
Bootstrap Fit	0.580	0.758	0.770	0.725

Standard errors in parentheses
Standard Errors Clustered by Country
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5.2: Provision of Public Goods, Private Goods, Assembly and Coalition Welfare

	(1) Public	(2) Private	(3) Assembly	(4) CW
W_{t-1}	-0.491**	-0.245	-0.466*	-0.542**
	(0.180)	(0.169)	(0.190)	(0.186)
W^2_{t-1}	0.504***	0.110	0.624***	0.650***
	(0.144)	(0.134)	(0.158)	(0.170)
Log(Tenure)	-0.0147$^+$	0.000390	-0.0332**	-0.0232**
	(0.00852)	(0.00748)	(0.0103)	(0.00782)
W_{t-1} *Log(tenure)	0.0117	0.0112	0.0291*	0.0252*
	(0.0108)	(0.0100)	(0.0128)	(0.0105)
Old or Sick	-0.0277$^+$	-0.000927	0.0205	-0.00440
	(0.0142)	(0.0172)	(0.0158)	(0.0133)
W_{t-1} * Old or Sick	0.0301	0.00770	-0.0285	0.00543
	(0.0184)	(0.0211)	(0.0222)	(0.0178)
Log($GDPpc_{t-1}$)	0.00723	0.0148	-0.0292$^+$	0.0616***
	(0.0208)	(0.0127)	(0.0151)	(0.0134)
W_{t-1} *Log($GDPpc_{t-1}$)	0.0234	-0.0428$^+$	0.0574**	0.0104
	(0.0254)	(0.0223)	(0.0194)	(0.0207)
Log($Population_{t-1}$)	0.0245	0.00759	-0.0235	-0.00485
	(0.0207)	(0.0167)	(0.0203)	(0.0166)
$Growth_{t-1}$	0.000510	0.000365	-0.000577	0.000125
	(0.000435)	(0.000433)	(0.000499)	(0.000446)
W_{t-1} *$Growth_{t-1}$	-0.000377	-0.000712	0.00125	0.000331
	(0.000678)	(0.000690)	(0.000903)	(0.000746)
Resource $Rents_{t-1}$	0.00155*	0.000686	0.00192**	0.00209***
	(0.000606)	(0.000492)	(0.000662)	(0.000541)
W_{t-1} *Res. $Rents_{t-1}$	-0.00455***	0.0000741	-0.00426**	-0.00420**
	(0.00112)	(0.00103)	(0.00151)	(0.00129)
Observations	7142	7152	7150	7136
Number Nations	164	164	164	164
Years	1971-2022	1971-2022	1971-2022	1971-2022
Nation FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Fit: R2	0.928	0.934	0.901	0.913
Bootstrap N	7126	7136	7134	7120
Bootstrap Fit	0.890	0.906	0.859	0.877

Standard errors in parentheses
Standard Errors Clustered by Country
$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

To begin our baseline assessment, we note that coalition size is the primary theoretical determinant of policy provision in selectorate theory. The pattern is clear. As coalition size increases leaders produce more public goods, allow freedoms to flourish, and limit corruption and other forms of private goods. There is a large literature that shows that democracies have more public goods and freedoms and less corruption than non-democracies (Lake and Baum, 2001; Deacon, 2009). However, the continuous nature of the W measure also allows assessments of policy provision within these institutional categories (Bueno de Mesquita and Smith, 2022; Schwarz, 2023). The continuous estimates provide the means for generating subtle expectations about how any government is doing relative to assessments conditioned by where the incumbent is in the leadership life-cycle, its exact coalition size, and the price for pubic goods.

As we noted in Chapter 4, some of the theory's key variables – like the indicators of productivity (educational attainment and per capita income) – are slow moving, meaning that much of their effect may be absorbed by fixed effects, masking their impact. However viewed, with or without fixed effects, the tables suggest that leaders do a rather good job of working out how many and what mix of policies help them politically. That is, allocations are consistent with the theory's expectations. The regression equations approximate what each policy allocation looks like on average given the theory's incumbency constraint. The regressions do so while also taking into account anticipated deviations from the expected impact of coalition size that are due, for instance, to a leader's ill health, very old age, access to 'free' resources in the form of rents from oil, gold, diamonds, and the like, or, most importantly, tenure in office.

The regressions as well take note of country scale by correcting for population and take account of changing economic circumstances by controlling for annual economic growth. There is an extensive literature that emphasizes the importance of economic growth for political development.[1] The selectorate theory indicates that disruptions in economic growth destabilize the leadership in large coalition systems but much less so in smaller coalition settings. The results throughout our empirical investigation find that economic growth has a relatively small impact on political stability compared to the core variables in selectorate logic.

As is evident from the tables, the provision of public goods and coordination goods both rise as coalition size gets larger, although public goods initially decline from a slight peak when the coalition is very small and then turns positive. This public goods peak when W is very small reflects the great wealth of petro states that can afford to provide their relatively few subjects with public goods. These petro states have a small selectorate and winning coalition. Their high $\frac{W}{S}$ ratio necessitates that their leaders spend heavily on the coalition.

Freedom of assembly is virtually non-existent in smaller coalition regimes and then rises steeply as coalition size increases while corruption opportunities – private goods– decline in quantity as coalition size increases. The anticipated provision of each of these policies make up the constituent

[1]For an early review Alesina and Perotti (1994). For a more recent review, see Ghardallou and Sridi (2020)

parts of the swoosh curve. The patterns for the provision of each good reported in Tables 5.1 and 5.2 are as predicted by the theory. As their tenure increases, leader provide fewer public goods, fewer freedoms and less coalition welfare, although the impact of tenure is diminished in larger coalition systems. As the price of public goods falls (Log(GDPpc$_{t-1}$) increases), leaders provide more public goods and greater coalition welfare. Leaders avoid instability by staying close to these prescribed provisions. As the rest of this chapter demonstrates, leaders who deviate from these prescribed policies place themselves in jeopardy.

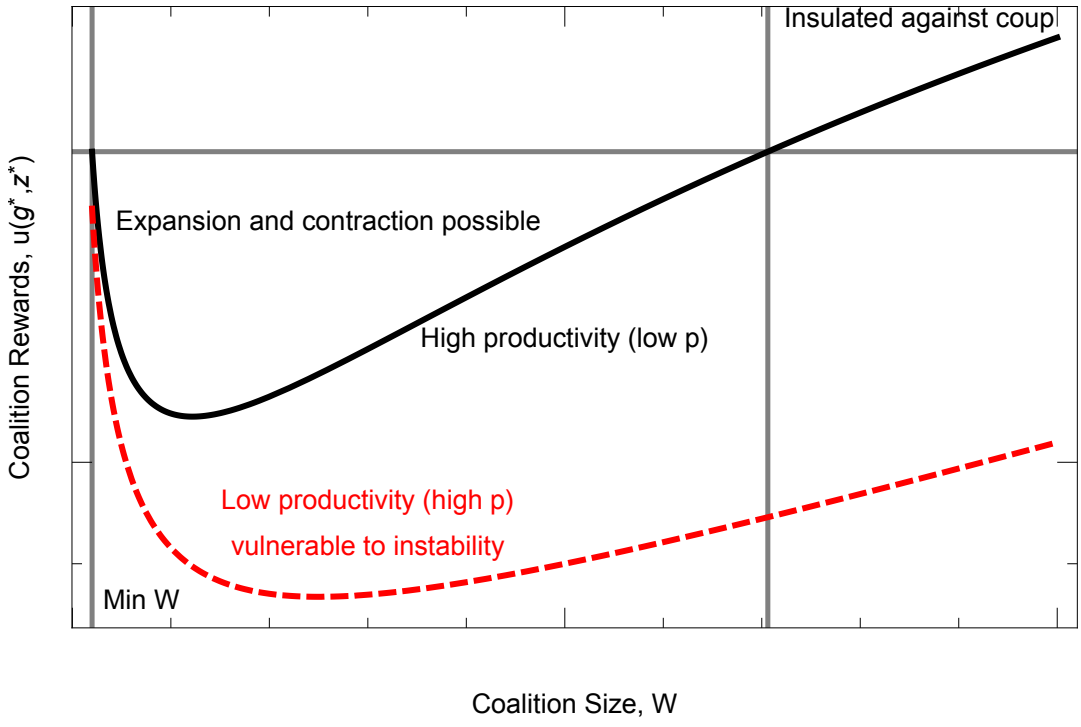
5.2 Coalition Size, Productivity and Risks to Leaders

Figure 5.1 provides us with a more nuanced view of the expected coalition welfare function than we have previously considered. The horizontal line that extends across the figure reminds us that in productive societies coalition size can increase sufficiently such that the expected welfare of any coalition member eventually exceeds the local peak that arises when the coalition is at its minimal size. The vertical line when W is sufficiently large denotes that critical dividing line above which coalition members are better off if the coalition gets larger than they would be even if they were part of the smallest of coalitions. Once beyond that critical point, it is close to impossible to assemble a consequential subset of the winning coalition whose members expect to benefit from a coalition-reducing coup d'état or from a revolution. Coalition members beyond that critical point can only expect to be better off if the winning coalition expands. Hence, polities with a winning coalition above that cut-point have leaders who, on the one hand, have weak coalition loyalty ($\frac{W}{S}$ is very large) and so are highly vulnerable to regular removal but, on the other hand, are virtually immune from irregular, destabilizing events.

The left vertical line, whose exact location is a function of W and p, likewise denotes a critical value. That line reminds us that if the coalition is sufficiently small then citizens have so few public goods – and so few coordination goods in particular– that their prospect of success by revolting is too small to make the expected value of a rebellion greater than the expected value of continuing to live with the miserable status quo they face (Bueno de Mesquita and Smith, 2009*b*). Hence, to the left of that left vertical line, the government faces a very low probability of a credible revolutionary threat. Additionally, because the coalition members are doing so well, the polity is also unlikely to experience a coup d'état. Thus, selectorate logic tells us that coups and revolutions are more likely in the interior of the range of coalition size than at its extremes. If this is empirically correct then leaders must implicitly have an inverted U-shaped view of the impact that coalition size has on their risks of irregular deposition through events like coups and revolutions. We test that expectation after we first tie its form to variation in productivity; that is, the price of public goods provision.

We saw in Chapter 2 (Section 2.3.1) that when productivity is high (as p decreases), then each coalition member's welfare, even at a relatively modest coalition size, exceeds the maximum magnitude it can attain when the coalition is at its smallest. However as productivity declines (p

Figure 5.1: Coalition Size, Coalition Welfare, and Safe Havens



becomes large), welfare of coalition members in a small W setting dominates the level of coalition welfare that can be obtained in even the largest winning coalition systems.[2]

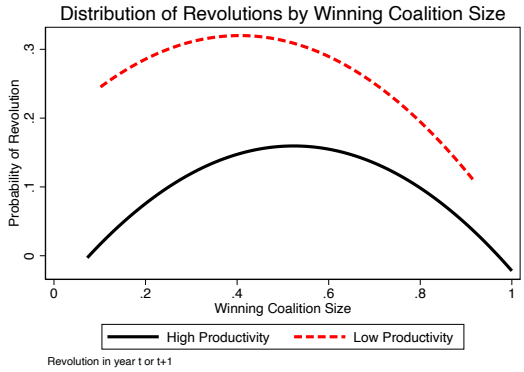
Not only does the size of the coalition at which the critical cut-point arises vary with the price at which public goods can be produced, so too does the location of the minimum value of coalition welfare (the bottom of the swoosh curve). As the price of public goods increases, that minimum arises at a larger coalition size, meaning that the range of circumstances under which the coalition's individual members might benefit from a smaller coalition (assuming they survive a purge) increases. These theoretically derived results mean that the lower productivity is, the larger the coalition must become to make revolutions and coups no longer attractive. Thus, when productivity is poor, regime opponents have more opportunity for destabilizing events even in relatively large coalition systems. And, conversely, higher productivity means that the critical coalition cut-point arises at a smaller coalition size, meaning that when p is smaller, then smaller-sized coalition regimes remain unlikely to face mass uprisings.

Figure 5.2 tests these expectations. Each panel in Figure 5.2 splits the sample of nation-years into high and low productivity nations based on whether per capita income is above or below the median level. The predicted risk of revolution or coup is constructed by regressing a simple quadratic specification of coalition size for the relevant productivity sample on a dichotomous dependent variable valued at 1 if a revolution occurred in the current or subsequent year and at 0 otherwise, with an equivalent construction for coups. As is evident from the figure, the risk of revolution reaches its peak when the coalition's size is about 0.4 and declines fairly symmetrically as it deviates from that level. Further, revolutions are more likely in low productivity societies than in high productivity societies. We observe similar patterns when looking at the occurrence of coups. Critically, both coups and revolutions have near zero probability of arising if the coalition is very large or very small. Figure 5.2 tells a straightforward story: threats to instability are most frequent as a government moves toward the interior of the coalition scale and those threats are exacerbated by low productivity at any coalition size, but especially at smaller coalition sizes (Bodea, Elbadawi and Houle, 2017).

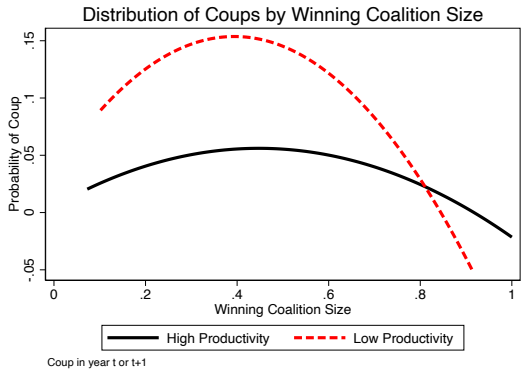
Table 5.3 gives us another data-driven depiction of the risks of destabilizing events as a function of coalition size. It divides regimes from 1960 onward into three coalition-size categories ($small = W \leq 0.40$, $medium = 0.40 < W < 0.75$ and $large = W \geq 0.75$) and continues to split productivity as above or below the median level of per capita income. The table uncovers what percentage of the time the set of governments in the different coalition bundles and with different income levels experienced irregular leader removal or political instability; that is, either a coup or a revolution in either the current or subsequent year. Thus, the numbers in parentheses represent the number of observations in the category divided by the total observations by coalition size and income level. The percentages equal the proportion of actual cases of instability or of irregular leader removal in

[2]Formally, from equation 2.10, as p becomes large, coalition welfare is decreasing in W for all ranges of W.

Figure 5.2: Coalition Size, Productivity and the Risks of Revolution and Coup



(a) Coalition Size and Revolution



(b) Coalition Size and Coup

each cell. The distribution of instability and coalition size is significant statistically. The prospect of instability within the coalition-size bundles is much lower in high productivity settings than in low productivity environments as anticipated.

When we turn our attention to the distribution of irregular leader removals that did not involve foreign intervention or natural death in office, we see that such irregular removal is nearly non-existent in the larger coalition political systems. The smaller coalition polities also have less irregular removal of leaders if they are highly productive compared to their lower-productivity coalition lookalikes. Irregular removal, although still infrequent, is more common in the mid-range of coalition size. Of course, as befits rational leaders who engage in counter-maneuvers to preserve their hold on power, irregular removals are relatively infrequent in general. While irregular removal is infrequent, we see that coalition size and productivity, measured as the logarithm of per capita income, taken

together, are strongly associated with the risk of irregular removal in the subsequent two years. As demonstrated in the next chapter, leaders are good at detecting threats and taking effective counter-steps to diminish them.

Table 5.3: Coalition Size, Productivity and the Occurrence of Instability (Revolution or Coup) or Leader Change by Irregular Means in Year t or t+1

	Instability		Irregular Leader Change	
Coalition Size	Low Productivity	High Productivity	Low Productivity	High Productivity
Small W	31.77% (360/ 1,133)	10.85% (51 / 470)	9.13% (104 / 1,139)	4.70% (23 / 489)
Medium W	29.80% (695 / 2,332)	17.22% (134 / 778)	8.26% (199 / 2,410)	6.03% (48 / 796)
Large W	18.78% (145 / 772)	4.92% (125 / 2,539)	2.72% (20 / 736)	1.20% (32 / 2,659)

The Pearson χ^2 statistics associated with the contingency table for each column are respectively 43.78, 124.96, 30.47, and 65.72.

Table 5.3 only tells part of the story. Coalition size interacts both theoretically and empirically with other factors to paint a more thorough picture of the conditions that raise the risk of instability. We have emphasized three such factors, two as basic conditions inherent in any leader and one as a consequence of deviations from expectations given institutions and basic personal leader conditions. The first concerns each leader's time in office up to the year being examined; the second assesses his or her health; and the third evaluates whether the ruler is providing too few, too many, or the efficient amount of benefits needed for coalition members to beat back threats to the incumbent's hold on power. All leaders aim to be on the incumbency constraint. However, the real world is noisy and leaders can make allocation mistakes whether by miscalculation, misinformation, inability, or the impact of exogenous shocks. Our concern here is less with the causes of misallocations and more with their potential consequences and corrective efforts.

5.3 Life-cycle Effects

Theory tells us that while coalition size is the key predictor of how benefits are doled out, its effects are moderated by how long an incumbent has been in office. In particular, as a leader's tenure in office grows, her supporters become more loyal, anticipating that they are increasingly likely to be kept in the leader's coalition over the long term. This means fewer goods for the coalition's members in the immediate term, a greater expected future flow of benefits (NPV) from continued coalition membership, and more loyalty from them. The reduction in current rewards for coalition members is evident in the analyses in Tables 5.1 and 5.2. The negative coefficient estimates associated with

the variable Log(Tenure) indicates that in the smallest coalition systems, an increase in tenure from the first year to about the third year, or from the third year to the ninth year, results in a reduction in public goods equal to 0.043 on the 0 to 1 scale on which policy outputs are measured. As coalition size increases, the reduction in public goods associated with longer tenure is diminished. In the largest coalition systems, the tenure-related reduction is statistically indistinguishable from zero. The effect of tenure on freedom of assembly is of a similar magnitude to that described for public goods. Likewise, the analyses indicate that tenure reduces overall coalition welfare, again with the effect being strongest in small coalition systems and minimal in large coalition systems. The lot of the democratic leader is that she must continue to work hard throughout her tenure. Her autocratic counterpart, in contrast, can start to slack off once the hard, early work of reorganizing her coalition is done. Finally, we see that increasing tenure has little effect on the provision of private goods, a result consistent with theoretical expectations. The theory predicts that as tenure increases, a leader spends less overall, but she also shifts the focus of her policy provision towards private goods; these effects are offsetting. Although we do not report the results here, in Melnick, Bueno de Mesquita and Smith (2022) we show that the ratio of private to public goods increases with tenure. The analyses in Tables 5.1 and 5.2 support the theoretical predictions concerning life-cycle effects.

5.3.1 Beware of New Rulers Bearing Reforms

When a small coalition leader initially comes to power her policies are relatively liberal as she needs to offset the inherently elevated revolutionary risk that new leaders face as established by equation **??**. Over time, however, as she becomes more confident about her political survival, she shifts towards more private goods (relative to public goods), fewer public goods, and greater restrictions on political freedoms. This pattern is reinforced by the growing confidence among supporters that they will be retained in the coalition as a ruler's tenure increases. By having relatively liberal policies early in one's term, the leader can allay the instability-inducing concerns of her supporters that they might become outsiders. Coalition members recognize that the risk of being pushed out of the inner circle is greatest early in an incumbent's time in power but the cost associated with that risk is diminished in an environment that emphasizes public goods provision. Once supporters are fairly certain that they will be retained in the winning coalition, their leader can disproportionately focus on private goods at the expense of public goods even as total benefits decrease. The diminution of public goods, a benefit not unique to coalition members, and the relative rise in private goods makes remaining loyal even more valuable to coalition members.

Because a newly installed leader needs to work harder and provide a higher level of rewards than her predecessor, new rulers tend to enact policy liberalization with increased public goods and freedoms and a diminution of corruption. While sometimes we might be pleasantly surprised that reforms last, we should not expect that liberalization is more than the manifestation of a

short-term, survival-induced tactic. Unfortunately, The Who's adage, 'meet the new boss, same as the old boss' is true. The new leader is not a better person driven by altruistic desires. Rather, she simply survives better if she temporarily acts as a 'better leader'. Once she has structured her coalition by filtering out low affinity members, she can be just like the 'old boss': provide fewer rewards overall with a shift toward more corruption and less freedom.

Anecdotally, from time to time we observe declarations by journalists and government leaders that some newly ensconced 'liberalizer' has come to power in this or that autocratic country. This was, for instance, exactly the response by U.S. Secretary of State Hillary Clinton following Myanmar's 2015 election in which the opposition emerged victorious. As she stated at the time, "The Burmese election on Sunday was an important, though imperfect, step forward in the country's long journey toward democracy. . . . "[3] Rather than being a step forward on the long path to democracy, Myanmar's experience demonstrated that the new boss, Nobel Peace Prize recipient Aung San Suu Kyi, long lauded as a promoter of democracy, turned out to behave much like the old boss. The Myanmar government under her leadership inflicted terrible abuses on the minority Rohingya population. Her presumptive commitment to democracy began to evaporate a short while after her party won the 2015 election. And then, the growth of democracy was further stymied by a military coup in 2021.

Optimism over reform, of course, has been misplaced in many more instances than the shocking reversal of fortunes in Myanmar. We saw a similar, though less shocking story when Cuba's Fidel Castro, in poor health, stepped down. When Raúl Castro took over from his ailing brother, first temporarily in 2006 and then permanently in February, 2008, Reuters reported that Raúl "has raised hopes of change by inviting Cuba's 11 million people to complain openly about economic inefficiencies, poor services and shortages of consumer goods. . . . Such reforms seemed radical a few years ago under Fidel Castro but are not as much of a surprise under his brother, an admirer of China's economic development via capitalist-friendly communism."[4] Raúl Castro's commitment to reform, however, was short-lived. As The Guardian headlined on November 18, 2009, "Cuban repression has continued under Raúl Castro, says watchdog."[5]

These illustrative anecdotes reinforce the statistical analyses in Tables 5.1 and 5.2. New leaders often appear more enlightened and offer more liberal policies than their predecessors, and the differences in policy are likely to be marked if the replaced leader had a long tenure. Selectorate theory indicates that the appearance of enlightenment is not because the selection of new leaders somehow yields better, more reform-minded people in power, but rather because new rulers have yet to reshape their coalition and so must satisfy the public goods bias identified in equation **??**. When a leader succeeds in replacing her frenemies with those she trusts, then those supporters who

[3] `https://www.cnn.com/2015/11/12/politics/hillary-clinton-myanmar-election-role/index.html`.

[4] `https://www.reuters.com/article/us-cuba-castro-raul-newsmaker/from-enforcer-to-reformer-raul-castro-takes-over-idUSN2410236520080225`

[5] `https://www.theguardian.com/world/2009/nov/18/political-repression-raul-castro`

were retained in the coalition anticipate that they will be retained in the long run and, therefore, become more loyal. As the theory in Chapter 3 demonstrates, this growth in loyalty allows the new boss to switch to being like the old boss by adopting many of the pernicious policies of her predecessor.

The expectation that the longer coalition members have survived in the incumbent's winning coalition, the more loyal they become is a central feature behind the life-cycle predictions of selectorate theory. We have seen that the shifting distribution of benefits is consistent with the predicted life-cycle effects, but there are other predicted effects that we have not yet explored. Specifically, a critical feature of the theory's life-cycle's expectations is the idea that not everyone in a ruler's initial winning coalition remains in that essential group over the span of the incumbent's time in office. Selectorate logic predicts a decline in the rate at which supporters are shuffled in and out of the coalition as tenure increases. We now turn to testing that aspect of the life-cycle predictions.

5.3.2 Coalition Turnover and Leader Longevity in Office

We can see the workings of a leader's seniority on the stability within the inner circle by examining the shifting composition of government cabinets and, for the subset of nations in which the military plays a prominent role, the turnover within the military leadership. Certainly, many leaders have winning coalition members who are not in their cabinet or in the senior military ranks but, we believe, leaders are unlikely to have many in their cabinet or in the senior military ranks who are not, as well, members of the winning coalition. Observing the rate of turnover within these subsets of the coalition should provide an indication of overall turnover within the coalition, its diminution over time, and reinforce the expectation that policy provisions shift with leadership's tenure.

Table 5.4 examines the retention rate of cabinet ministers. As the results reported in the table demonstrate, we see that cabinet retention is reduced by about 24% when there is a change in leader. Conversely, the longer a leader remains in office, the greater the level of cabinet retention. Compared to a leader's first year in office, cabinet retention is about 6% higher in a leader's second year in office and about 20% higher in a leader's 10th year in office. It seems, indeed, that leaders are sorting out those cabinet members they believe have low affinity, making each cabinet minister's survival in the coalition a better prospect the longer the incumbent has been in power.

As expected, when a new leader takes over there is high turnover in the cabinet and as leader tenure increases the rate of cabinet turnover diminishes (Flores, 2016; Flores and Smith, 2011). Moderately sized coalitions face the highest turnover in cabinet members, followed by large coalition leaders who generally turn over their cabinets more frequently than do the most autocratic leaders. Further, when initially coming to power, large coalition leaders replace a greater proportion of cabinet members than do their new, small coalition counterparts. Political competition in larger coalition polities depends more heavily on successful policy performance than it does in smaller coalition settings. Presumably, democratic leaders are seeking the ministers who can provide the

Table 5.4: The Impact of Leader Tenure on Turnover of Cabinet Members

	(1) Turnover	(2) Turnover	(3) Turnover	(4) Turnover
W_{t-1}	0.430**	0.460**	0.686^{+}	0.858**
	(0.156)	(0.148)	(0.365)	(0.317)
W^2_{t-1}	-0.379**	-0.400**	-0.516	-0.666*
	(0.145)	(0.148)	(0.345)	(0.305)
Log(Tenure)	-0.0886***	-0.0868***	-0.0391	-0.0234
	(0.0103)	(0.00793)	(0.0368)	(0.0288)
Leader Change	0.247***	0.240***	0.186^{+}	0.220*
	(0.0212)	(0.0193)	(0.112)	(0.104)
Log(GDPpc$_{t-1}$)	-0.00727	-0.00170	-0.00795	-0.000332
	(0.00720)	(0.0162)	(0.00709)	(0.0157)
Log(Population$_{t-1}$)	0.0117*	0.0369	0.0117*	0.0340
	(0.00520)	(0.0241)	(0.00518)	(0.0249)
Growth$_{t-1}$	-0.00280***	-0.00233***	-0.00280***	-0.00233***
	(0.000725)	(0.000629)	(0.000719)	(0.000627)
W_{t-1} *Log(tenure)			-0.135	-0.190
			(0.177)	(0.135)
W^2_{t-1} *Log(tenure)			0.0722	0.115
			(0.180)	(0.131)
W_{t-1} *Leader Change			0.261	0.00848
			(0.467)	(0.430)
W^2_{t-1} *Leader Change			-0.225	0.0300
			(0.424)	(0.383)
Observations	6534	6530	6534	6530
Number Nations	162	162	162	162
Years	1964-2019	1967-2018	1964-2019	1967-2018
Nation FE	N	Y	N	Y
Time Trend	N	Y	N	Y
R2	0.161	0.277	0.162	0.278

Standard errors in parentheses

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

most effective public policies (Berlinski, Dewan and Dowding, 2010; Dowding and Dumont, 2007; Huber and Martinez-Gallardo, 2008), while their smaller coalition counterparts are not (Arriola, 2009; Egorov and Sonin, 2011; Francois, Rainer and Trebbi, 2014; Konrad and Mui, 2017; Woldense, 2018; Zhou, forthcoming).

Turning now to the Military Purges in Dictatorships (MPD) dataset, Sudduth (2021) provides information on the replacement of military personnel within military regimes. We see a similar pattern in the Sudduth (2021) data to the pattern we observed for cabinet turnover rates over time. Merging our data with the Sudduth data, there is turnover of senior military personnel in 611 observations across 106 authoritarian nations between 1965 and 2005. Her data provide information on the rank and number of officers replaced and whether their replacement involved violence or not. Although our analyses are similar if we look at different forms of replacement, for instance violent or non-violent, in Table 5.5 we focus simply on whether there was any change in military personnel. Model 2 includes nation fixed effects.

Table 5.5: Replacement of Military Personal in Authoritarian Regimes

	(1)	(2)
	Turnover	Turnover
purge		
W_{t-1}	3.787*	1.414
	(1.577)	(2.146)
W^2_{t-1}	-5.039**	-1.711
	(1.696)	(2.449)
Log(Tenure)	-0.167*	-0.181$^+$
	(0.0758)	(0.0931)
Log($GDPpc_{t-1}$)	-0.116$^+$	-0.116
	(0.0627)	(0.270)
Log($Population_{t-1}$)	0.209***	0.340
	(0.0490)	(0.845)
$Growth_{t-1}$	-0.00997	-0.0118
	(0.00761)	(0.00946)
Observations	2825	2724
Method	logit	logit
Number Nations	106	97
Years	1965-2005	1965-2005
Nation FE	N	Y
Time Trend	Y	Y
ROC	.62	.73

Standard errors in parentheses

$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Sudduth provides data at the leader-year level rather than the nation-year level as has been used in our previous analyses. In keeping with our focus on nation-year data, whenever there were multiple leaders in a particular year we examine turnover only in the first leader to hold office in each year.[6] Thus, Models 1 and 2 assess whether there were any changes in senior military leadership using logit analysis and the reported measure of fit is the receiver-operator characteristic.

As with the analysis of cabinet turnover, the pertinent result to focus on is the impact of tenure. As evidenced by the statistically significant negative coefficient for the tenure variable, leaders replace senior military personnel at a higher rate earlier in their tenure than they do later in their tenure. The analyses also indicate that the rate of replacement tends to be largest in mid-sized coalition governments. However, given these data are only available for authoritarian nations, the range of coalition size is relatively restricted so we must interpret this implication cautiously.

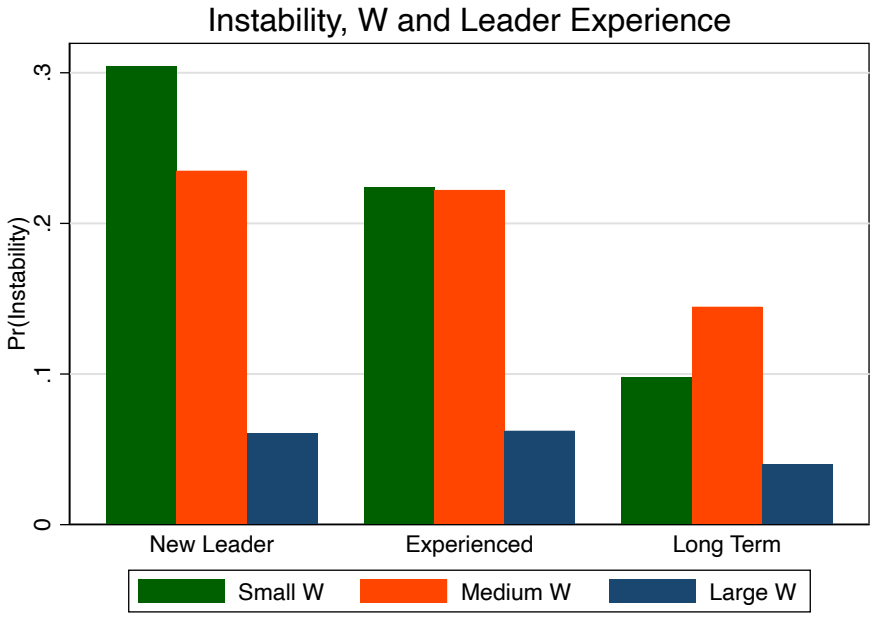
5.3.3 Life-Cycle Effects on the Risk of Coups and Revolutions

The theory indicates that the impact that coalition size has on the risk of destabilizing events changes as an incumbent gains experience and consolidates coalition loyalty. In particular, the logic of the modeling suggests that the risk of coups and revolutions for longer-serving leaders is lower than the risk for newer incumbents, holding coalition size constant. Figure 5.3 looks at the occurrence of coups or revolutions (referred to collectively as Instability) as a function of leader experience and coalition size to probe these expectations. Inexperienced leaders are defined as those who have been in office for less than three years. Experienced rulers have held their leadership position for between 3 and 8 years, while Long Term incumbents are defined as those who have been in power for more than 8 years.

Figure 5.3 makes clear that inexperienced leaders, as hypothesized, are most vulnerable to destabilizing events while the most experienced rulers are least vulnerable to such occurrences. It also makes evident that years of experience matter little for the occurrence of destabilizing events among those who lead the largest coalition regimes, while indicating that those who lead smaller coalition governments and are new in office are particularly vulnerable to threats to regime stability. These results are as anticipated. Large coalition leaders are expected to experience virtually no coups or revolutions and, indeed, as we have seen, that is the case.

[6] Analyses at the leader-year level are very similar.

Figure 5.3: Instability, Winning Coalition Size, and Leader Experience



What leaders provide to their coalition under normal, everyday circumstances depends on coalition size, productivity, and where they are in the incumbency life-cycle. These primary effects are secondarily expected to be altered by the leader's health and age. These effects are secondary in the sense that they apply to a more limited set of leaders since many do not survive in office long enough to face mortality.

5.4 Health Shocks

The health of a leader may diminish or magnify threats to political survival from destabilizing events in a number of ways. If, for instance, a leader is believed to be terminally ill, either because of a chronic illness or because of extreme old age, then coalition members can no longer count on their incumbent to provide a future flow of rewards and so they may shop around for a replacement leader. That replacement might come through a coup d'état or by the coalition throwing its support behind a revolutionary. A sickly leader has two ready defenses against these dangers. First, the leader can make an intense effort to keep the facts of her declining health a secret. Indeed, such secrecy about health is commonplace, especially in smaller coalition regimes. However, it is not a readily available solution in the toolbox of a very old leader. Age might be lied about but it is

awfully hard to disguise one's true age by more than a few years.

Second, if the leader's ill health is thought to be known by the coalition and perhaps even by some in the public, then the leader can compensate the coalition, and maybe the public too, sufficiently so that neither chooses to oust her. In fact, a leader known to be seriously ill needs to provide rewards that are more commensurate with a newcomer in office than with someone healthy and established. If the coalition and the public get enough compensation, then coalition members and perhaps the masses too may wait patiently for the ruler to die in her sleep.

If a leader primarily fears a coup then more private goods may be the very thing needed to keep the coalition from ousting her when she is sickly. If, instead, revolution is feared more than a coup then the ruler might expand public goods provision enough to buy-off and neutralize the threat of an uprising or pay the coalition so much that they remain loyal, making a successful revolution close to impossible. Of course, if the incumbent believes she faces credible threats both from her coalition and from the masses then picking the best response is difficult. Whatever the circumstance, since the leader is likely to know well ahead of others that she is terminally ill, she might be expected to take the optimal steps that allow her to alleviate the threat of instability given her beliefs about the rising risk before it is on the horizon. However, taking those ameliorating steps is itself a risky business.

A sickly leader who, at least for a time, successfully hides a terminal illness may signal the existence of that very illness by taking steps to alleviate an as-yet unrealized threat. A change in the incumbent's tactics, policies, or institutions that seem to arise out-of-the-blue are likely to trigger new beliefs within the coalition or the masses about the ruler's ability to deliver future benefits and about the incumbent's fear of a coup or revolution. We will illustrate this point later with the fall of the Shah of Iran in 1979.

Taken all together, we can infer that sickness, if not widely known to exist, may be hidden by taking no corrective steps or, if it is expected to become known in the near-term, then it may be intentionally revealed by taking corrective measures. Revealing it prematurely can exacerbate threats to the leader's political survival. Thus, we should expect important differences in the impact that severe chronic illness has on the risks of instability compared to old age.

The existence of a severe chronic illness is expected to be a noisier indicator about potential future losses of benefits than is age for the coalition and for the masses. True, one is never sure when a leader will fall from power whether due to the exigencies of illness or of old age, but it is clearly much harder to hide old age than severe illness. What is more, as we have emphasized, ameliorating steps can reduce the threat of instability for a terminally ill incumbent but those steps may reveal the existence of impending death when otherwise that danger is unknown. Ameliorating steps do not have the same cross-pressures when the leader's 'terminal' illness is old age but then few leaders who are new in office – and hence particularly vulnerable – are also likely to be exceptionally old. Thus, given the selection effects that are inherent in age and leader survival, we combine age and health, as noted in Chapter 4, into one variable indicating a leader at risk: Old or Sick.

While Chapter 6 is the place to test for ameliorating maneuvers to thwart threats, here we can test for the claim that ill health, including extreme age, alters the risk of destabilizing events. We test the expectations regarding health and age now by comparing the advent of revolutions, coups, and leader change (regular or irregular) among old or ill leaders (Old or Sick) and healthy (and not aged) leaders. Later we will probe the arguments behind these tests more deeply with extensive regression analyses.

Table 5.6: Health and the Occurrence of Revolutions, Coups, Instability (revolution or coup), Leader Change and Leader Change by Irregular Means in year t or t+1

Health	Revolution	Coup	Instability	Leader Change	Irregular LC
Healthy	18.94%	6.64%	19.90%	26.40%	4.50 %
	(7475)	(7859)	(7552)	(8098)	(8243)
Old or Sick	14.67%	5.70%	15.37%	34.42%	5.50 %
	(1847)	(1930)	(1861)	(1964)	(1999)

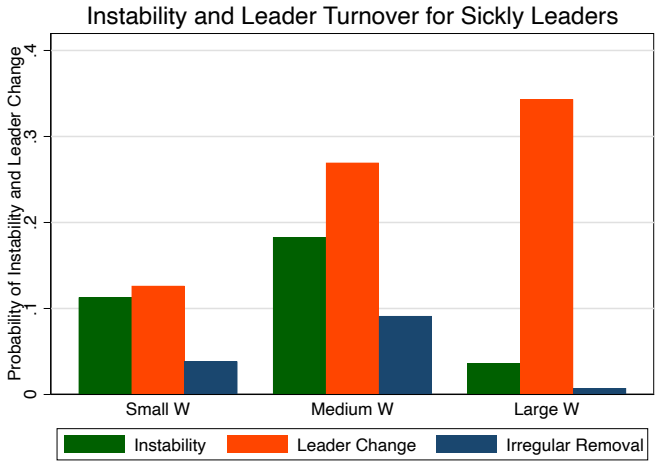
The first three results columns of the table – whether a revolution, a coup, or either a revolution or coup occurred in the subsequent two years –show clearly that ill health or extreme old age trigger a change in risks. The actual change may be more complex than the table suggests. The table, read superficially, might be interpreted to say that healthy, younger leaders are at greater risk than older, sicker leaders. But, of course, we have argued from the outset that the occurrence of destabilizing events, like coups and revolutions, are anomalies. While their actual occurrence should be hard to predict, leaders have strong incentives to formulate anticipatory beliefs about threats to their well-being. When a leader anticipates a threat (rightly or wrongly) then, most of the time, the leader can and will take counter-steps to diminish or neutralize the perceived threat so that neither a coup nor a revolution actually occurs. That, we believe, is what Table 5.6 reflects. Counter-moves are frequently – but certainly not always – effective at diminishing risks to the leader's continuation in power.

Leaders know if they are chronically ill, suffering from a terminal sickness, and they know if they have lived beyond life expectancy. Thus, they know that coalition members and, perhaps, others in society, may have their appetites whetted for a leader transition and that those appetites might be put on hold by the right shift in tactics or rewards. Healthy, young leaders, all else equal, have less reason to anticipate that they are at risk. Hence, again if all else is equal, they have less incentive to make adjustments designed to ward off a threat since such a threat is otherwise less likely. It remains for the next chapter to explore the shifts in leader actions that may ameliorate threats, but it is in such shifts that we anticipate lies the reason why sick, elderly incumbents are less likely to face destabilizing events intended to depose them from power.

To further probe the impact of health on instability, we now mirror our analysis of leader experience in office, substituting health issues for leader experience. Just as experience interacts

with coalition size to alter the risk of destabilizing events, so too does chronic illness. Figure 5.4 divides the conditions under which leaders may expect to face threats into three categories: (1) Instability; (2) Leader Change; and (3) Irregular Removal. In this analysis, however, the observations are leader-years rather than country-years since our concern is leader deposition. The category Leader Change excludes only two forms of deposition, those incumbents deposed by a foreign power and those leaders who died in office of natural causes. This latter criterion is especially important in examining sickly leaders. The definition of Leader Change treats leaders who die in office (of natural causes or accidents) as censored observations, so the removals that occur among sickly leaders refers only to removals prior to death. Such depositions might include removal by election, term limits or leaders who voluntarily step down. Irregular Removal means that the leader is ousted outside of the rules, norms and conventions of the political system. In practice, irregular deposition means removal by revolution, loss in a civil war, coup or assassination.[7] As a practical matter we can think about such irregular removals as cases in which the instability events considered in Table 5.3 resulted in the leader being deposed. As a consequence, comparisons of the rates of instability events and the rates of irregular deposition indicate that revolutions and coups are more likely to be successful when a leader is ill.

Figure 5.4: Instability and Leader Turnover When Leaders are Chronically Ill and Close to Death



[7]There are no cases in our analysis of leaders coded as sick who were assassinated. If a leader were assassinated or otherwise killed during a transition, then our ability to observe their health is censored. It is worth noting that this inability to observe the health of leaders who were killed biases against finding support for our hypotheses. If, as we predict, poor health encourages irregular deposition and such removal often involves the leader being killed, then the illness that prompted the instability is unrecorded.

The first result that jumps out at us as we examine Figure 5.4 is that large coalition leaders who are close to death because of a chronic illness are virtually *never* subject to irregular removal from office. The data reinforce the theoretical implication that they are relatively immune from successful coups and revolutions. The second important feature of the results in Figure 5.4 is that chronic illness exacerbates the risk of deposition for leaders in all sized coalitions, and the risk is especially elevated for mid-sized coalition leaders. Third, ill health among medium size W leaders increases the likelihood that instability succeeds in displacing the leader. Serious illness increases the success rate of coups and revolutions when they happen.

As the analysis of variation in health, tenure, and productivity reminds us, the precise allocation of benefits that is consistent with the incumbency constraint for any given coalition size depends on the value of each of these variables. Knowing that, we now turn to an assessment of whether the right amount of benefits are being allocated and what it means if an incorrect amount is provided.

5.5 Estimating Deviations from the Swoosh Curve

We now exploit the estimation of the provision of public goods, private goods, and freedom of assembly to give us a more nuanced way to anticipate threats to stability based on whether coalition welfare or any of its constituent parts are over- , under-, or efficiently provided. We use deviations from the country fixed effects regression analyses reported in Table 5.2 to capture the residuals that indicate the extent to which the good in question complies with or deviates from the provision expected given the baseline incumbency constraint.

We save the residuals from the appropriate regressions, $y_{i,t} - (x_{i,t}\hat{\beta} + \hat{\mu_i})$, as the variables $Res(Public)$, $Res(Private)$, $Res(Assembly)$ and $Res(CoalitionWelfare)$, sometimes abbreviating the latter as $Res(CW)$. These residuals reflect the extent to which each of a leader's policy provisions differ from the provisions that supporters and the people should anticipate given political institutions, productivity, tenure, and other factors. Policy provisions that deviate from expectations are expected to influence the likelihood of threats to and responses to the regime's or leadership's survival.[8] An efficient leader just satisfies the incumbency constraint, meaning that the coalition's benefits sit right on the swoosh curve. Underpaid coalitions fall below the curve and over-paid coalitions fall above the curve. Figure 5.5 illustrates the distribution of the residuals resulting from our estimation of the coalition welfare curve and the equivalent incumbency-constraint deviations from expected allocations for public goods, private goods, and freedom of assembly derived from Table 5.2. Of course, the mean of the calculated residual values must be zero but, as the figure makes evident, a surprisingly large proportion of the estimates are close to zero, consistent with the large R^2 values in the fixed-effect regressions used to generate the residual values. Leaders

[8]While $Res(Public)$ and $Res(Assembly)$ are positively correlated, $r = 0.323$, the correlation between $Res(Private)$ and $Res(Assembly)$ is a modest $r = -0.178$ and correlation between $Res(Private)$ and $Res(Public)$ is low, $r = -0.028$.

apparently are very good at paying their coalition just enough to satisfy the incumbency constraint. This precision is most especially true of the provision of private goods, a costly form of benefit, and decreases as we move to public goods whose cost is somewhat less dependent on the number of recipients and to freedom of assembly, essentially a costless benefit.

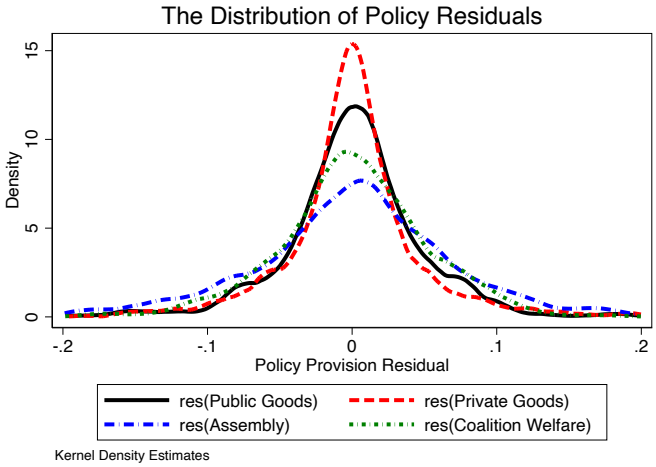
Selectorate theory predicts that leaders in large coalition systems have little discretion in terms of policy provision. Leaders should deviate little from prescribed policies in such systems. In contrast, government heads who rely on small or intermediate sized coalitions have much greater discretion. They not only have proportionately more discretionary say over how revenue is used; they also probably have lots more resources in a rainy-day fund, especially if they have been in office for a while. Thus, they have more resources with which to take corrective steps and therefore their policies are likely to deviate more from anticipated policies than is true for large coalition incumbents. Appendix A5.1 tests these expectations using heteroskedastic regression analyses in which the variance of the error term is modeled as a function of coalition size. Although these analyses test important implications of the theory, they require significant technical setup and are not essential to the exposition of the fundamental features of instability. Hence, we simply note here that policy provisions and coalition welfare are significantly more volatile in small and intermediate sized coalition systems than in large coalition systems and reserve the technical details for the appendix.

The theory implies that leaders are at risk of defection by members of their winning coalition if those members are under-compensated. It also implies that leaders are vulnerable to a mass uprising (a revolution) if the masses are under-compensated. Finally, the theory also implies conditions under which over-payment of specific goods either to the masses (e.g., freedom of assembly in a small coalition setting) or to coalition members (e.g., too many private goods in a mid-sized coalition setting) can precipitate destabilizing events. Armed now with the variables $Res(Public)$, $Res(Assembly)$, and $Res(Private)$ we illustrate how deviations from the efficient allocation of benefits can influence threats to stability by returning to the case of the sickly Shah of Iran. Then, building on that illustrative case, we examine more fully and rigorously how the residual estimates of over- or under-provision of each policy benefit in fact influence the risk of a coup, revolution, or irregular leader change.

5.5.1 The Risks of Ill-Health: The Fall of the Shah

As we have noted, ill health changes what policy provisions leaders make to remain in power. The challenges that sickness implies for leader survival were clearly manifested over the several years, roughly from 1973 onward, that marked the struggle of Iran's Shah to stay in power, a struggle that he ultimately lost in 1979. To begin, we take note that Mohammad Reza Pahlavi, the Shah of Iran,

Figure 5.5: The Distribution of Differences between Policy Provisions and Anticipated Policy Provisions



held that position from 1941 until his ouster in 1979.[9] Our interest is in his final, ultimately fatal illness and in the shifting policy choices he made presumably to diminish threats to his continuation in power.

The Shah, who died in 1980, short of his 61st birthday, was probably known or believed to be fatally ill at least by his inner circle as early as October 1973. Khoshnood and Khoshnood (2016) report that the Shah's wife noted in her diary on October 22, 1973 that her husband was suffering from Waldenstrom's disease, a form of bone marrow cancer. On that same day, the Shah held a meeting with his Prime Minister and the leaders of Iran's military and apparently spoke of his "political testament," probably indicating that they were informed of his condition (Khoshnood and Khoshnood, 2016). If they did not actually know how sick he was in 1973 then it is likely that by 1974 they knew or believed he was terminally ill.

During a skiing vacation that year, the Shah is reported to have felt a lump in the left upper portion of his abdomen and to have sought out medical attention. Two French physicians diagnosed the Shah as suffering from Waldenstrom's macroglobulinemia.[10] It is difficult to imagine that this was not discussed by his coalition's members. In the event that his inner circle was still oblivious to the overt indications of severe illness, there can really have been no meaningful remaining doubt by 1975 when the *New York Times* reported that, "An official spokesman for the Shah of Iran [...] denied persistent rumors in Tehran's diplomatic community that the reason why the Shah appears

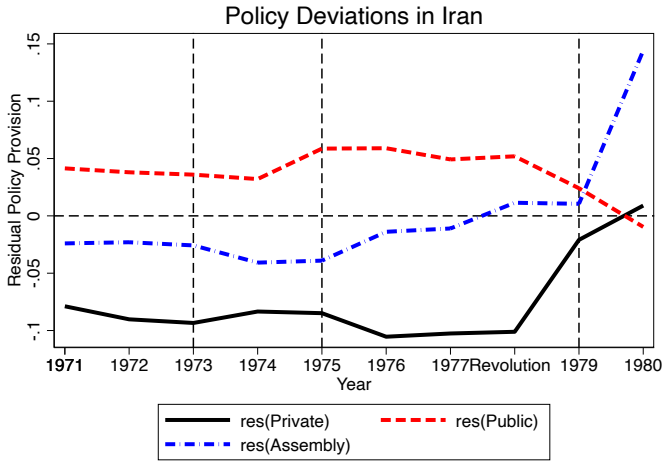
[9]The Shah experienced a brief pause in his rule when Prime Minister Mohammad Mosaddeqh took control of the government in 1953 before being deposed in the same year.

[10]`https://www.nytimes.com/1981/05/17/magazine/the-shah-s-health-a-political-gamble.html`

drawn, worn and thin is that he is suffering from a lingering and increasingly grave malady."[11] Of course, a report in any major media outlet like the *New York Times* was likely to have reflected knowledge or beliefs in the broader Iranian population.

Using selectorate-type thinking, anyone watching the change in policies in Iran during this period could have anticipated that something was amiss although when the revolution actually took place (January 1978 through February 1979) it was, in fact, seen as a surprise in the international community. Our key indicators of potential instability (all based on ex ante data that, in principle, could have been known at the time) show that the Shah's government signalled that something significant had changed as early as 1973 or 1974. As we see in Figure 5.6, there was a very slight decline in private goods provision relative to the incumbency-constraint level (denoted by the value '0' on the vertical axis) in 1971-1973 even though they were already being provided below expectations. During this period, there was no reason to believe that the Shah was ill. But, the decline in private goods provision reversed directions between 1973 and 1975 as members of the inner circle began to learn that the Shah was terminally ill. Likewise, freedom of assembly, under-provided by a constant amount before 1973, declined and settled at a lower level through 1975. Public goods, over-provided in the early 1970s, decreased (relative to the incumbency constraint) very slightly up to 1975 when they reversed direction. Although not shown, we also find that W decreased from 0.48 in 1973 to 0.43 in 1975.

Figure 5.6: Changes in the Shah's Policy Provisions: Signalling Illness



The changes up to but before 1975 suggested that the Shah's initial response to his illness was to tighten control and focus on assuring the coalition's loyalty to him. Since, by our calculations

[11] https://timesmachine.nytimes.com/timesmachine/1975/09/23/80060200.html?pageNumber=32

(based on methods we will elaborate on shortly), he perceived the risk of a mass uprising as much higher than the risk of a coup (absolutely and relative to global risks), his initial response seems sensible from his political survival perspective. But then in 1975, with the publication in the *New York Times* of rumors that he was seriously ill and, presumably, with rumors flying everywhere about his illness, his response changed.

As we see in Figure 5.6, from 1975 onward to 1978 the Shah's government mostly severely under-provided private benefits for the coalition relative to their expectations given the incumbency constraint; it over-provided public goods; and it greatly improved coordination goods as seen by the fairly steep, continuous rise in freedom of assembly relative to the incumbency-constraint indicated level. The reduction in corruption opportunities was likely to have made his coalition less loyal when he needed them most. And the improved benefits for the masses made it easier for them to organize against his regime. As we will see in Chapter 7, the leader's survival is better protected by becoming more autocratic ('autocratizing') when faced with a revolutionary threat than by democratizing; the Shah did the opposite of what he 'should' have done.

The Shah, under enormous pressure from the U.S., liberalized and his liberalization made it easier for his opponents to organize and mount a rebellion while diminishing the likelihood that his coalition would stand firmly behind him. He could not guarantee the coalition's members that they would receive future benefits from his regime given his terminal illness and he failed, from 1975 forward, to provide ample immediate rewards to buy their continued loyalty. Probably, given the changes in policy that began in 1973, not only his coalition but also revolutionaries among the masses would have perceived that the unexpected alteration in policy was consistent with the belief that the Shah was gravely ill. The result was that his coalition sat on their hands during the revolution and he was forced to live out the brief remainder of his life in exile.

5.6 Deviations from Expected Policy Provisions and Threats

The Shah's story, like the theoretical developments in Chapters 2 and 3, alerts us that deviations from expected policy provisions are likely to be associated with the risks of instability. Their effects, however, are not expected to be the same when one contemplates the dangers of a coup compared to the risks of a mass uprising.

The anticipated threats of revolutions, coups, and leader change are products of the complex web of institutional arrangements and their interactions with a country's productivity and a leader's seniority, health, and effectiveness in providing efficient quantities of public goods, private goods, and coordination goods. As Figure 5.5 showed us, leaders do an excellent job of estimating the efficient provision of policies. Still, the complexity of the governance challenges they face and the inherent uncertainties in real-world politics may lead to errors in how much they provide relative

to how much they should provide. They may make these errors because they mistakenly believe they have provided enough or because they think they can get away with providing too little or they over-compensate by providing too much. Whatever the reason for deviations from the 'right' amount, the errors, we believe, are indications of their uncertainty about the security of their position. Hence, we believe that the errors are good early-warning indicators as to when leaders face an elevated instability risk.

With the belief that the residual estimates of the provision of goods plays an important part in determining risks that leaders anticipate, we turn to Table 5.7. Here we show the logit estimates of the probability of an actual revolution, coup and irregular leader removal in either the current or subsequent year (t or $t+1$) as a function of the deviation from the incumbency constraint in the provision of each policy good plus our core theoretical variables; that is, institutions, productivity, leader longevity, and leader health. As well, the models include control variables chosen to capture temporal effects and country scale features such as population size and general economic performance. Models 4-6 also include interactive terms that incorporate changes in the provision of private goods between years $t-1$ and t: $\Delta Res(Private) = Res(Private)_t - Res(Private)_{t-1}$. The variable $\Delta Res(Private)$ indicates whether private goods provisions are increasing or decreasing relative to expectations.

Using the estimates from Models 4-6, we generate predictions of the perceived risk of each instability event (in the form of estimated $X\beta$, although for presentation purposes we will often plot these risks as probabilities, i.e. $\frac{1}{1+e^{-X\hat{\beta}}}$). In particular, we create the variables $\widehat{Rev}$, $\widehat{Coup}$, and $\widehat{LC_{irreg}}$ as the perceived likelihood of revolution, coup, and irregular leader change in years t or $t+1$ for every nation in our sample. These risk assessments play a central role in Chapters 6 and 7 when we examine leader responses to perceived threats, whether realized or averted.

Table 5.7: Policy Provision on the Occurrence of Revolutions, Coups and Irregular Leader Change (Logit)

	(1) Revolution	(2) Coup	(3) Irregular LC	(4) Revolution	(5) Coup	(6) Irregular LC
main						
W_{t-1}	7.021***	10.65***	9.631***	6.997***	10.44***	9.276***
	(1.931)	(2.256)	(2.428)	(1.935)	(2.266)	(2.386)
W^2_{t-1}	-7.030***	-11.48***	-9.955***	-6.963***	-11.22***	-9.596***
	(1.770)	(2.210)	(2.143)	(1.770)	(2.227)	(2.116)
Res(Public)	-2.479+	-0.397	-1.420	-2.440+	-0.523	-1.481
	(1.345)	(1.166)	(1.627)	(1.336)	(1.174)	(1.641)
Res(Public)^2	1.185	-9.612	-22.67	1.388	-10.93	-22.64
	(12.42)	(15.11)	(18.63)	(12.20)	(14.48)	(16.84)
Res(Assembly)	-1.170+	-0.211	-0.741	-1.166+	-0.239	-0.731
	(0.678)	(1.102)	(1.092)	(0.685)	(1.102)	(1.088)
Res(Assembly)^2	7.811	9.222*	4.587	8.024	9.961*	5.224
	(5.881)	(4.432)	(5.209)	(6.089)	(4.091)	(4.701)
Res(Private)	-0.312	1.715	1.818	-0.244	1.898	2.027
	(1.029)	(1.470)	(1.539)	(1.061)	(1.466)	(1.706)
Res(Private)^2	12.34	3.545	-1.831	14.15	6.023	-8.506
	(9.983)	(7.590)	(7.733)	(11.62)	(10.17)	(13.60)
ΔRes(Private)	0.563	2.722*	2.417	0.536	2.216	3.174
	(1.174)	(1.317)	(1.797)	(1.389)	(1.784)	(2.375)
Δ Res(Private)^2	16.64+	22.05**	41.95**	29.29*	33.52*	30.52
	(9.955)	(8.214)	(13.09)	(12.74)	(14.82)	(19.18)
Log(Tenure)	-0.313***	-0.386***	-0.391***	-0.308***	-0.372***	-0.373***
	(0.0796)	(0.0973)	(0.102)	(0.0809)	(0.0979)	(0.106)
Old or Sick	-0.434*	-0.0114	0.489*	-0.438*	-0.0146	0.517*
	(0.190)	(0.248)	(0.245)	(0.192)	(0.250)	(0.247)
Log(GDPpc$_{t-1}$)	-0.396***	-0.505***	-0.250**	-0.391***	-0.496***	-0.241**
	(0.0784)	(0.0978)	(0.0820)	(0.0796)	(0.100)	(0.0841)
Growth$_{t-1}$	-0.0215**	-0.0149	-0.0100	-0.0212**	-0.0140	-0.0103
	(0.00794)	(0.0101)	(0.00924)	(0.00782)	(0.0101)	(0.00909)
Log(Population$_{t-1}$)	0.253***	-0.0945	-0.0873	0.256***	-0.0915	-0.0835
	(0.0613)	(0.0761)	(0.0603)	(0.0617)	(0.0756)	(0.0590)
Resource Rents$_{t-1}$	0.0172*	-0.00959	-0.0258**	0.0172*	-0.00934	-0.0262**
	(0.00807)	(0.00919)	(0.00962)	(0.00812)	(0.00922)	(0.00925)
Δ Res(Private)*Res(Private)				43.26*	102.2**	145.0**
				(21.59)	(37.21)	(46.43)
Δ Res(Private)*Res(Private)^2				-254.0*	-119.4	-58.84
				(123.6)	(140.3)	(176.1)
ΔRes(Private)^2*Res(Private)				202.7	93.52	-61.81
				(128.3)	(154.5)	(199.9)
Δ Res(Private)^2*Res(Private)^2				-1369.8*	-3304.1***	-2991.8**
				(595.0)	(944.3)	(1118.9)
Method	Logit	Logit	Logit	Logit	Logit	Logit
Observations	6770	6914	6971	6770	6914	6971
Number Nations	164	162	164	164	162	164
Years	1972-2021	1972-2022	1972-2022	1972-2021	1972-2022	1972-2022
Nation FE	N	N	N	N	N	N
Time Trend	Y	Y	Y	Y	Y	Y
ROC	0.801	0.826	0.766	0.804	0.831	0.773
Bootstrap N	6758	6900	6957	6758	6900	6957
Bootstrap Fit	0.780	0.797	0.711	0.780	0.798	0.711

Standard errors in parentheses
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results in Table 5.7 for the core theoretical and control variables have straightforward interpretations. Since these effects are similar to those described in the previous sections we will not belabor the point. We briefly interpret their effects before moving to the more complicated assessment of how policy deviations affect the occurrence of destabilizing events.

Instability and irregular leader change are most likely to occur in intermediate sized coalition systems. Across all six models in Table 5.7 the coefficient estimates on the W_{t-1} and W_{t-1}^2 variables are of similar magnitude and opposite sign, indicating that the highest risks of revolution, coup and irregular leader change occur in the center of the coalition size scale. Productivity, as measured by per capita GDP, reduces instability. The highly statistically significant negative coefficient estimate for the Log(Tenure) variable indicates that instability declines as leader tenure increases. A leader who is Old or Sick appears relatively good at avoiding the occurrence of revolutions and coups, but her age or illness make her significantly more vulnerable to being removed by these methods if such events occur. Economic growth, or more often its absence, is often highlighted as a determinant of instability and leader change (Alesina et al., 1996; Barro, 1991). The analyses show negative coefficient estimates for economic growth indicating that economic growth reduces the occurrence of destabilizing events. However, these estimates are significant at the 5% level only for the occurrence of revolutions.

Since growth is often cited as a major determinant of political development, it is useful to compare the economic growth rate required to reduce the risk of a coup by the same amount as a unit increase in the log of tenure. Such an increase in tenure corresponds approximately to going from the first to the third year in office, or from year 3 to 8 in office. To attain the same reduction in the risk of a coup d'état as is provided by a unit increase in the log of tenure requires that a leader maintain an economic growth rate of about 25%, a level of growth few leaders ever attain and none sustain for a significant period.

5.6.1 How Policy Deviations Influence Instability

Given the complexity of pulling out the separate effects of under- or over-provision of goods (and the change in over-provision over time), we rely on a set of graphs to help see the effects. The set of graphs follow a common structure, each reflecting the results for the relevant event modeled in Table 5.7.[12] Specifically, Figure 5.7 shows the impact of the over- or under-provision of policies for the risk of revolution, based on Model 4 in Table 5.7. Figure 5.8 produces a comparable graph derived from the table but for the risk of coup d'état based on Model 5. Figure 5.9 shows the impact of deviations in policy allocations from the incumbency constraint on irregular leader removal based

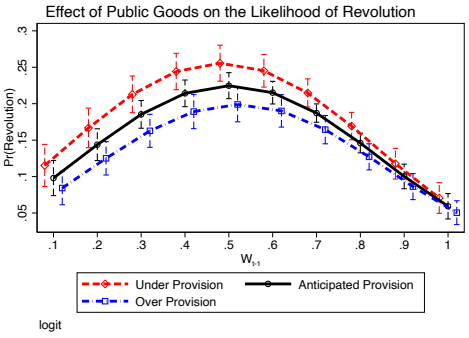
[12]In the appendix Tables A5.7 and A5.8 replicate the analyses in Table 5.7 using linear probability models with nation and year fixed effects and logit models with nation fixed effects and a time trend. Table A5.9 uses logit models looking at interactions between levels and change in public goods and assembly in an analogous manner to the interaction for private goods show in Table 5.7.

on Model 6 in Table 5.7[13].

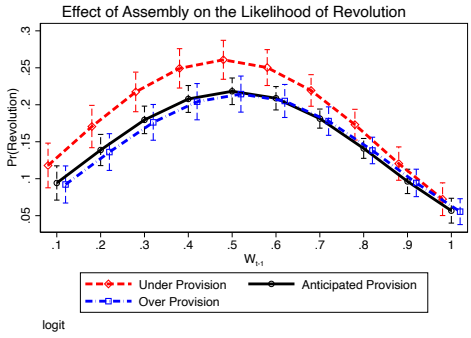
Figure 5.7 compares the risk of revolution under three sets of conditions: when (1) the policy satisfies the expected level of provision (solid line); (2) the policy is under-provided (dashed line, 10th percentile); and (3) the policy is over-provided (dash-dot line, 90th percentile). As we see, the under-provision of public goods or of assembly increases the risk of revolution. At overly high levels of public goods and assembly the effects on the risk of revolution deviate only slightly from the incumbency-constraint expectation. Too many public goods and assembly mean that the people could easily coordinate to bring down their government but, with so many benefits, they have relatively little to complain about. The abundance of benefits that the public enjoys limits their incentive to rise-up against their government. In the aggregate, the results suggest that the dampening of demand outweighs the increased ease of rebelling.

Figure 5.7: Policy Provisions and the Likelihood of Revolution (based on model 1 logit analysis in Table 5.7)

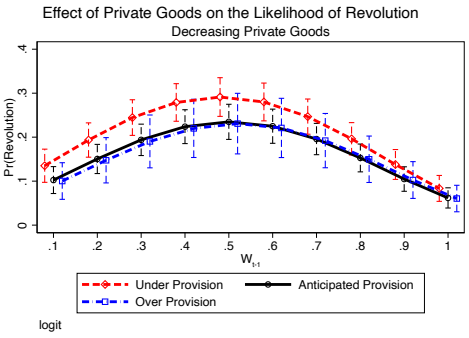
(a) Impact of Public Goods on Revolution



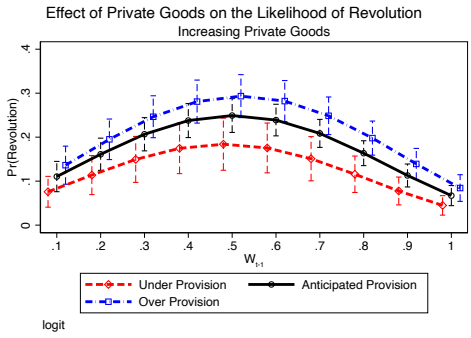
(b) Impact of Assembly on Revolution



(c) Impact of Private Goods Provision When Private Goods are Declining



(d) Impact of Private Goods Provision When Private Goods are Increasing



[13]In the appendix Figures A5.2, A5.3, and A5.4 present analogous plots based on regression models with nation fixed effects and a cubic time trend.

The third panel of Figure 5.7 examines the impact of private goods when their quantity is declining ($\Delta Res(Private) < 0$). Such rewards go only to insiders and so do not ameliorate the demands of the people. However, few revolutions succeed unless the coalition allows them to do so (Chenoweth and Stephan, 2011). When the coalition's members remain aligned with the incumbent, rebellion has a poor chance of success and so is unlikely to happen. So, an essential element of the decision to rebel is the likely response of the coalition. If the coalition is paid less than expected and its payment is decreasing (as we saw in the Shah's case), then its members are likely to waver in their defense of the regime. This makes rising up against the government relatively more attractive to the people. In contrast, if the coalition is overly well rewarded but their over-payment is decreasing, then the people appear to be deterred from attempting to rebel as the coalition, converging on their expected payment, is likely to remain loyal to the government. In this circumstance, the risk of a revolution is essentially the same as it is when the coalition receives the expected quantity of private goods.

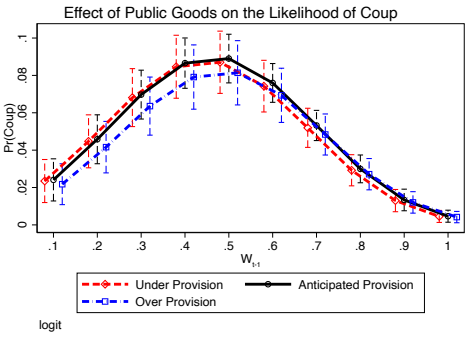
The fourth panel, like the third, examines private goods provision to the coalition but now when private goods are increasing, that is to say ΔRes(Private) is positive. We see that when private goods are under-provided and increasing (converging on the expected quantity) revolution is unlikely but when private goods are over-provided and increasing then the chances of a mass uprising are elevated across all coalition sizes.

Earlier we saw that overly well rewarded coalitions are not immune from coup plotting. Figure 5.8 returns to the question of specific policy provisions and the likelihood of a coup. We do not discuss the graph regarding the provision of public goods because whether public goods were under-provided, over-provided, or provided at the efficient, expected level makes little difference to the likelihood of a coup. Public goods are not the main driver of coups d'état. Coups are about the benefits insiders get and not about the benefits to society writ large.

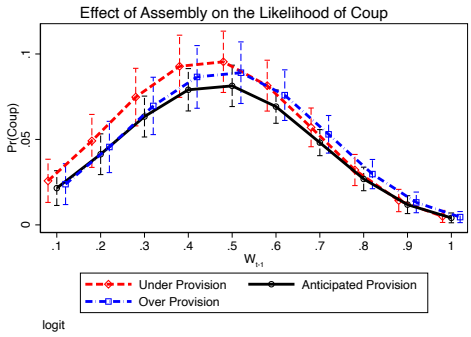
Like public goods, freedom of assembly does not play a major role in the risk of coups. Coordination among coalition members is not heavily constrained by restrictions on freedom of assembly when the coalition is small; it is mass coordination that is constrained and that constraint only indirectly affects the risk of a coup designed to pre-empt a revolution. The second panel of Figure 5.8 shows that over or under provision of assembly is moderately associated with a heightened risk of a coup relative to the efficient provision of assembly. It is probably a mistake for a leader of a smaller to mid-sized coalition regime to make it easier for people to coordinate and assemble against the regime. Such assemblages may ignite a revolution or stimulate a preemptive coup d'état by the winning coalition as the means to save their own hides.

Figure 5.8: Policy Provisions and the Likelihood of Coup (based on model 2 logit analyses in Table 5.7)

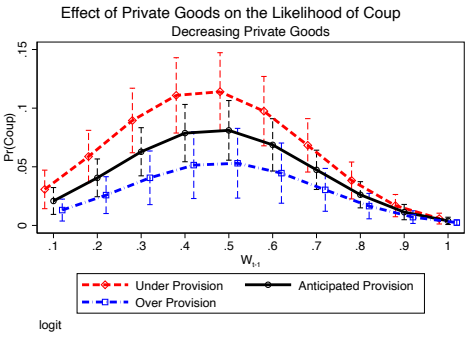
(a) Impact of Public Goods on Coup



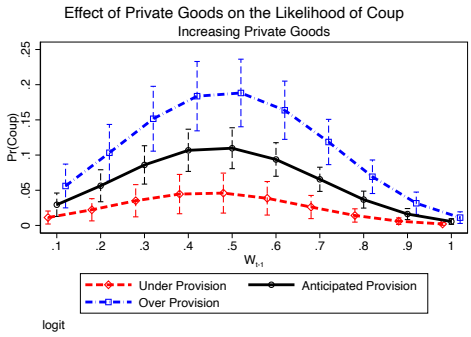
(b) Impact of Assembly on Coup



(c) Impact of Private Goods Provision When Private Goods are Declining



(d) Impact of Private Goods Provision When Private Goods are Increasing



The third panel of Figure 5.8 examines private goods provision when these benefits are decreasing over time. As the theory leads us to expect, too few and decreasing private goods make coups more likely while too many but decreasing private goods (and so converging toward the incumbency constraint) diminish the risk of a coup. In contrast, as seen in the fourth panel of the figure, when private goods are over-provided and increasing over time then the risk of a coup is significantly elevated while the under-provision of private benefits when the amount of those benefits is increasing over time decreases the likelihood of a coup. Thus, in the fourth panel we see the seemingly counter-intuitive result that high levels of private rewards for the coalition are associated with an elevated risk of a coup, a result implied by the institution change global game in Chapter 3. As we discussed earlier, paying the coalition better than expected does not stop its members from plotting and, in fact, may encourage them to plot against the regime in response to their fear that the incumbent may be planning to purge coalition members.

We should note that in our statistical models of coup risks we included terms corresponding

to more precise year on year changes in private goods than can be seen in our graphic presentation. In particular, the models include $\Delta Res(Private) = Res(Private)_t - Res(Private)_{t-1}$. This continuous variable takes positive values when the extent to which the leader is overpaying her coalition (relative to expectations) is increasing, a development that coalition members must view as inconsistent with the leader's effort to maximize her discretionary control over revenue. That is, an increase in over-payment looks like a signal that the leader could be plotting purges that will improve her discretionary use of revenue by paying individual coalition members more in a smaller coalition. We believe the patterns we observe reflect the rational expectations of coalition members who are attentive to any shift in private goods and to the risk they face of being removed from the coalition.

Supporters should question why they are are being over-rewarded. It might be the case that their leader is especially generous. But this is unlikely. A leader would do better to stash funds away for a rainy day rather than overpay the coalition now. A suspicious supporter should worry that the over-provision is commensurate with the policies of a smaller coalition system. The over-payment should alert supporters that there is a real risk of a coalition-reducing purge. Once purged and out of the coalition a former supporter has lost their influence. So, if they suspect a purge, then they should strike first by engaging in a coup. But then leaders also have rational expectations and if they anticipate a coup is being plotted they should increase rewards to buy up support and purge those in the coalition that they suspect are disloyal. Overall, both purges and coups are more likely when coalition payments deviate meaningfully from expectations regardless of direction. Coups and purges happen more often when coalitions are inefficiently compensated as compared to when supporters receive their expected payment.

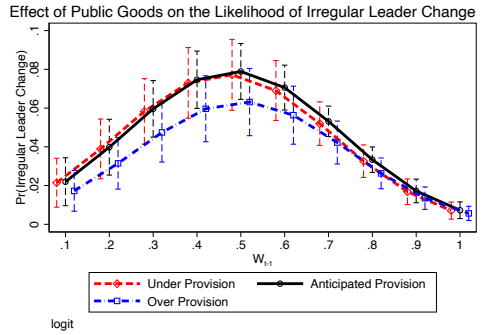
It is not surprising that under-payment triggers coups but it is very useful to keep in mind that an over-provision of private goods can also trigger or signal the coming of such events. Still, overall, paying supporters well helps ensure coalition loyalty. While as analysts we might be focused on the occurrence of coups, from the leader's perspective it is staying in power that matters most. While some scholars have argued that the expected post-tenure fate of leaders affects their decision making (Debs and Goemans, 2010; Krcmaric, 2020), the simplest way to avoid an unpleasant post-tenure fate is to anticipate risks, take appropriate actions and thereby stay in office.

With a focus on leader deposition by irregular means, the graphs in Figure 5.9 parallel the earlier figures and examine the impact of deviations in policy provision based on the logit analysis in Model 6 from Table 5.7. Irregular leader removal, of course, is the consequence of a successful revolution, a successful coup d'état, or a successful assassination. As such, the patterns in Figure 5.9 essentially combine and closely parallel those in the figures for revolutions and coups. As the figure shows, leaders who provide too many public goods are unlikely to suffer irregular removal. The under-provision of private goods, if decreasing over time, or the general under-provision of coordination goods exacerbates the danger of irregular ouster. As dramatically shown by the fourth panel of Figure 5.9 an increasing over-provision of private goods greatly increases the odds that a leader

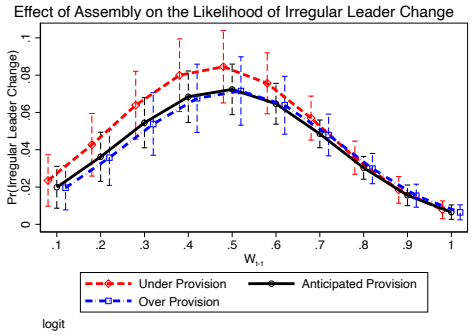
will be deposed by irregular means. Now that the implications of Table 5.7 have been shown graphically and explained, we turn our attention to a nuance of the theory with regard to coups d'état, illustrating with three case studies the distinct ways in which coups can arise according to selectorate logic.

Figure 5.9: Policy Provisions and the Likelihood of Irregular Leader Removal

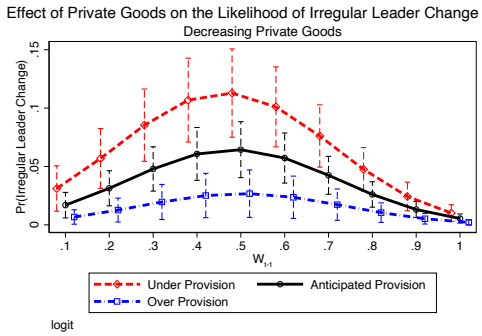
(a) Impact of Public Goods on Irregular LC



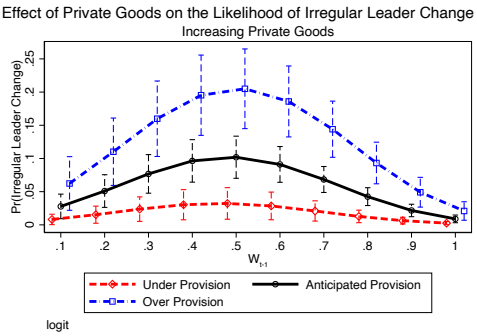
(b) Impact of Assembly on Irregular LC



(c) Impact of Private Goods Provision When Private Goods are Declining



(d) Impact of Private Goods Provision When Private Goods are Increasing



5.7 A Tale of Three Coups

Considerable thought has been given to understanding what leads to coups d'état, what their consequences are, and how they might be avoided. Recently, for instance, De Bruin (2020) has provided a thoughtful study of coup-proofing and its deficiencies. She reports that parallel security apparatus, like militias and militarized police, diminish the risk that the military rises up against the regime but she also notes, as do others, that the creation of these counterbalancing security apparatuses may create resentment that exacerbates the risk of a coup (Greitens, 2016; Reiter, 2020).

DeBruin also inquires when paying the military well, or paying them poorly, diminishes the threat that they will depose the regime they are supposed to protect. We believe she, Greitens, Reiter, and others are on the right track. We have suggested a general theory in which coups are but one part of a larger picture of political choices and political survival. As well, our theory provides a deductive structure from which to assess whether a given coalition in a given year is being over-paid, under-paid, or efficiently compensated. For these and other reasons, we believe the selectorate framework offers a helpful way to understand the large body of research into coups d'état that facilitates making comprehensive sense of many well-documented empirical regularities. To further illustrate the general framework we have proposed, we offer three case studies of different causal mechanisms that selectorate theory identifies as being behind coups.

There are three conditions under which coups are likely to emerge. First, when facing a threat of revolution, the coalition might depose the leader to dissipate opposition to the regime within the masses in an effort to preserve their own privileges. We develop the logic behind this condition in Case 1 of the coalition loyalty game (Section 3.1.4). Second, the elite defect, bringing the incumbent down, if she provides them with insufficient rewards. This non-revolutionary deposition is developed in the coalition loyalty game in Section 3.1.4. Third, members of the winning coalition plot a coup in an attempt to preempt a leader's reorganization and purge of the coalition, as shown in Section 3.4.4 of the institution change global game. Observationally, these three distinct motivations behind launching a coup are virtually indistinguishable. Coup plotters take the actions most likely to succeed (Luttwak, 1968). In each case the military and other elites are likely to seize vital government buildings and detain the leader as coalition members attempt to seize power outside of any formal rules. Yet, the circumstances that lead to each event are quite different, even as their reality on the ground looks very similar Chin, Carter and Wright (2021); Chin and Kirkpatrick (2023).

We illustrate these different sources of coup d'état beginning with the 1988 coup against Ne Win in Burma (now Myanmar), an instance in which the threat of revolution was high and prompted a coup to prevent the people from taking control away from the military. We follow the Burma example with the experience of Portugal's democratizing coup in 1974 brought about in part by the coalition's under-payment. We close the illustrative examples with Erdoğan's concerns for a coup against his government in Turkey in 2016 as he over-paid his coalition.

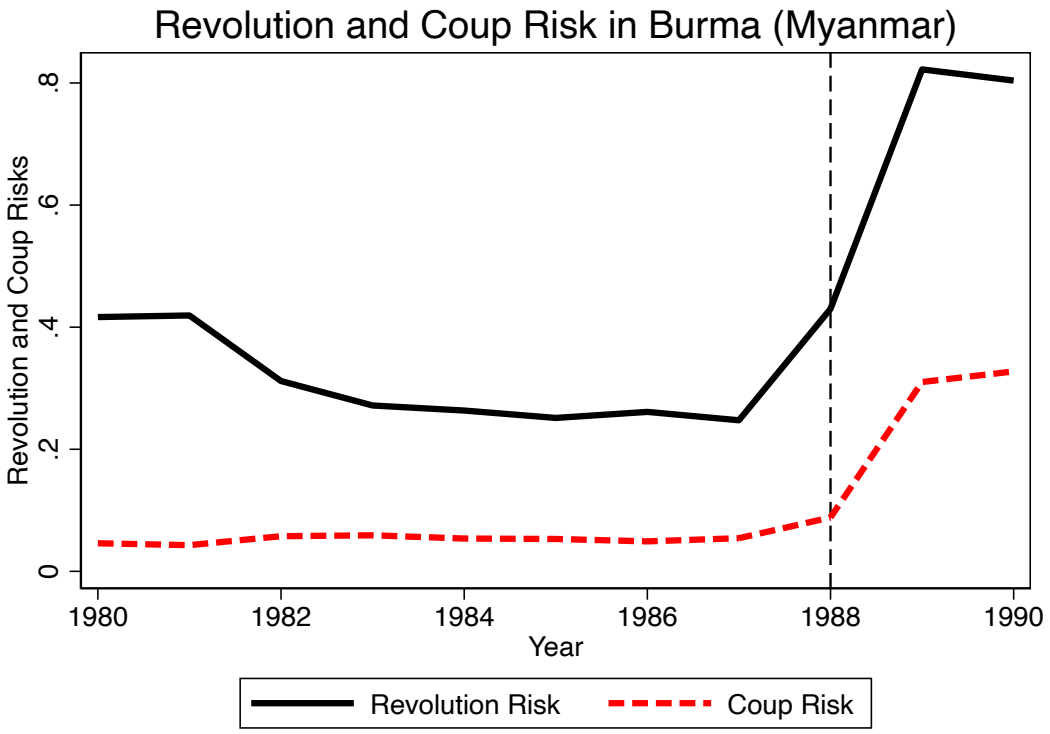
5.7.1 Pre-empting Revolution: The Burma Coup of 1988

The life-cycle effects predicted by selectorate logic instruct us that the longer a ruler has been in power, the lower the probability that the winning coalition's members will rise up in a coup d'état. But a lower probability, of course, is not a zero probability. And, as we have seen, the probability of a coup is elevated even for a long-serving ruler if ill health or old age raise questions about the incumbent's reliability as a future source of rewards for coalition members. The experience of

Burma's President Ne Win illustrates the case in which a regime's long-serving incumbent, who was more than 9 years older than Swedish life expectancy in 1988 (although seeming to be in good health), faced a pre-emptive coup that removed him from office. Ne Win's removal by his own coalition was not prompted by their dissatisfaction with his performance but rather by their interest in negating a revolutionary threat. Had there been a successful mass uprising against Ne Win's government, then in all likelihood not only would he have been removed from power but so too would his coalition's members.

Ne Win had been in office for 26 years when he confronted a rapid rise in the risk of a mass uprising ($\widehat{Rev}$) against his regime between 1987 and 1988. At the same time, he also confronted a notable increase in the likelihood of a coup d'état ($\widehat{Coup}$). The rising risks of mass uprising and coup d'état can be seen in Figure 5.10. As we learned in Section 3.1.4 of the coalition loyalty game, the conditions faced by Ne Win were a strong signal that his coalition was likely to depose him to save their own hides. That, in fact, is exactly what happened.

Figure 5.10: 1988 Coup Against Ne Win in Burma (later Myanmar)



The anticipated risk of a revolt was realized when thousands of students rose up to demonstrate

against the government and its rent-seeking, corrupt policies. The military responded with live gunfire, killing approximately 3,000-10,000 students. To ensure their power and privileges, the military then established a junta. Ne Win, then 78 years old, stepped down; although reportedly he remained a power behind the scenes at least into the 1990s. Later he was placed under house arrest, dying in 2002 when in his 90s.

Burma's 1988 coup highlights one of the three key motivations that induces a leader's coalition to initiate a coup against the incumbent. It is not, of course, a unique case. Incumbents who have incurred the wrath of the masses (as Ne Win had), or were perceived to have 'won' an election fraudulently (as in the 2023 coup against Ali Bongo in Gabon[14]), or who were terminally ill and unable to promise a continued flow of private rewards (as in the case of Abdelaziz Bouteflika in Algeria[15]) are especially at risk of preemptive deposition or desertion by their coalition.

The result derived in Section 3.1.4, demonstrates that coalition members often prefer to undermine a mass threat by deposing their leader when the real selectorate is relatively small. In contrast, when the selectorate is large, indicating that there are many potential replacement supporters, elites have less incentive to defend the extant regime or launch a coup. Instead, they are more likely to defect and allow a revolution to succeed (Lee, 2014; Neu, 2022). By our reckoning, out of 154 countries for which we have S_R estimates in 1988, Burma had the 37th smallest real selectorate, placing it in the the bottom quartile in real selectorate size.

The key choice for coalition members is always about what is most likely to preserve their privileges. In situations such as Ne Win faced, an endgame coup provides coalition members one of their limited credible opportunities to preserve the regime, if not the incumbent, that privileges them. Thus, when the risks of both a coup and a mass uprising are high, coalition members lean toward pursuing a coup d'état and, as we illustrate in Chapter 6, when leaders anticipate such circumstances (as they often do), they may have effective counter-measures that prevent both a coup and a revolt from occurring although at the expense of a need to significantly alter the status quo institutions of the regime.

5.7.2 Coups Due to Underpayment: Portugal, 1974

Marcelo Caetano became Portugal's Prime Minister in 1968 after his long-term predecessor, António de Oliveira Salazar, who had ruled since 1932, retired following a serious stroke. In addition to being a relatively new leader, Caetano faced serious economic problems, many of which can be traced to colonial conflicts in Portugal's overseas territories, particularly those in Africa. Caetano was deposed in April 1974 by a military coup that came to be known as the Carnation Revolution after a worker greeted soldiers by handing out carnations. This successful coup, and another attempted coup in 1975, led to Portugal's democratization.

[14] https://www.reuters.com/world/africa/gabonese-military-officers-announce-they-have-seized-power-2023-0

[15] https://www.reuters.com/article/us-algeria-protests/algerian-president-bouteflika-resigns-state-news-a
il=0

The reasons for the willingness of portions of the army to defect and launch a coup become clear when we examine Caetano's policies relative to expectations. Figure 5.11 shows the policy residuals for Portugal from 1968 to 1976. Throughout this period the coalition received fewer rewards that they should have felt entitled to, with private goods, in particular, being under-provided. The trajectory for private goods, as seen in the figure, indicates that not only were these essential coalition benefits under-provided, but they were declining even more relative to expectations when the coalition defected in 1974 and deposed Caetano.

The coup d'état against Caetano's leadership resulted in radical reversals in Portugal's policies. The government surrendered many of its overseas possessions, rapidly increased the provision of public goods and freedom of assembly, and introduced a still greater reduction in private goods that both logically and on the ground presaged an expansion of the winning coalition. Although a coup attempted in 1975 tried to reverse the liberalization trends set in motion in 1974, Portugal transitioned to a full-fledged democracy over the succeeding years. Figure 5.12 shows the institutional changes. As we see, Portugal's middling winning coalition size of about 0.45 in 1972 rose to about 0.60 in 1974 and then continued its upward trajectory. By 1976 Portugal's policies begin to converge towards expectations given its newly greatly expanded coalition size. The new policies were close to expectations and were far more liberal than those expected under Caetano.

Figure 5.11: Policy Provisions and Coups in Portugal

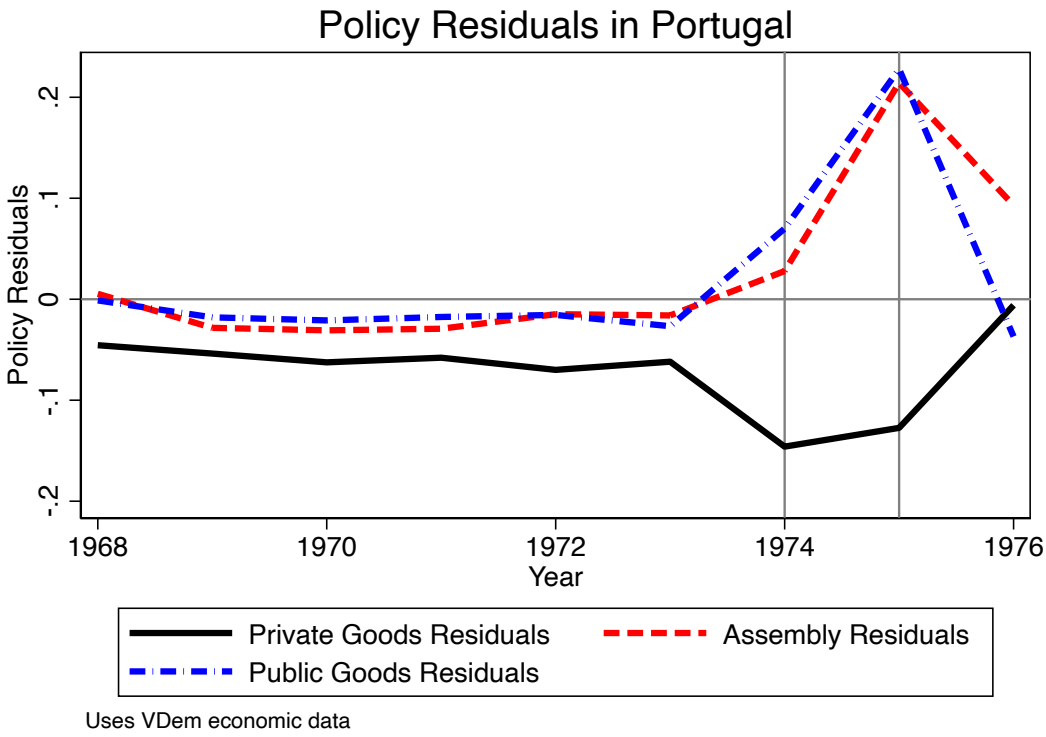
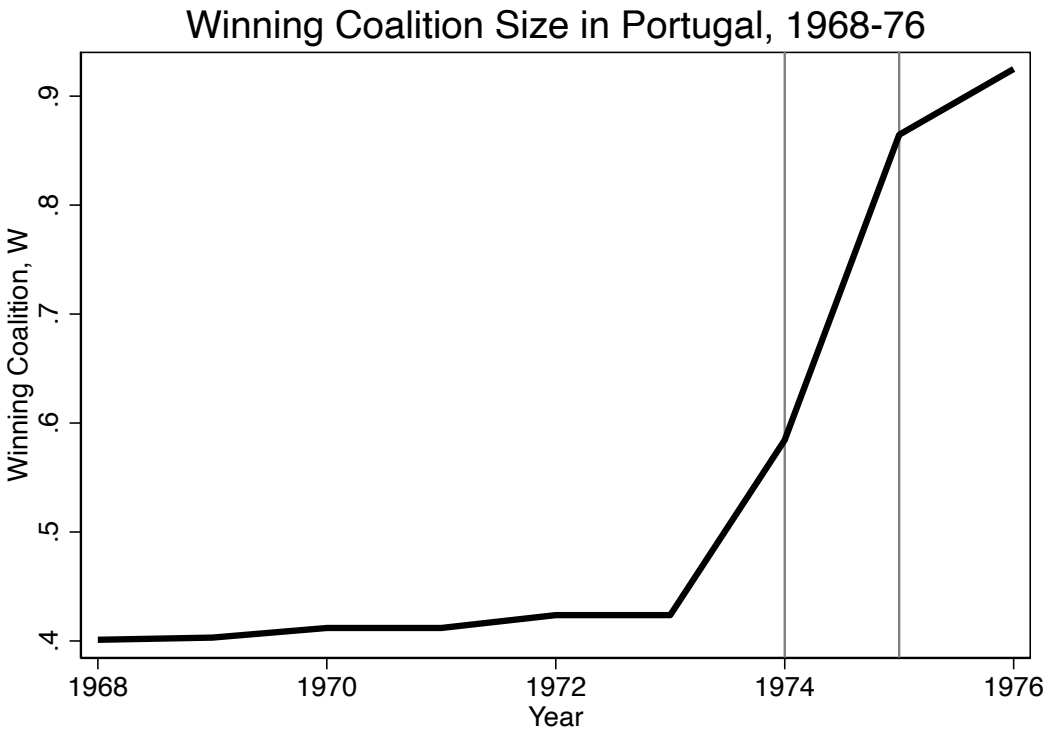


Figure 5.12: Winning Coalition Size in Portugal, 1968-76



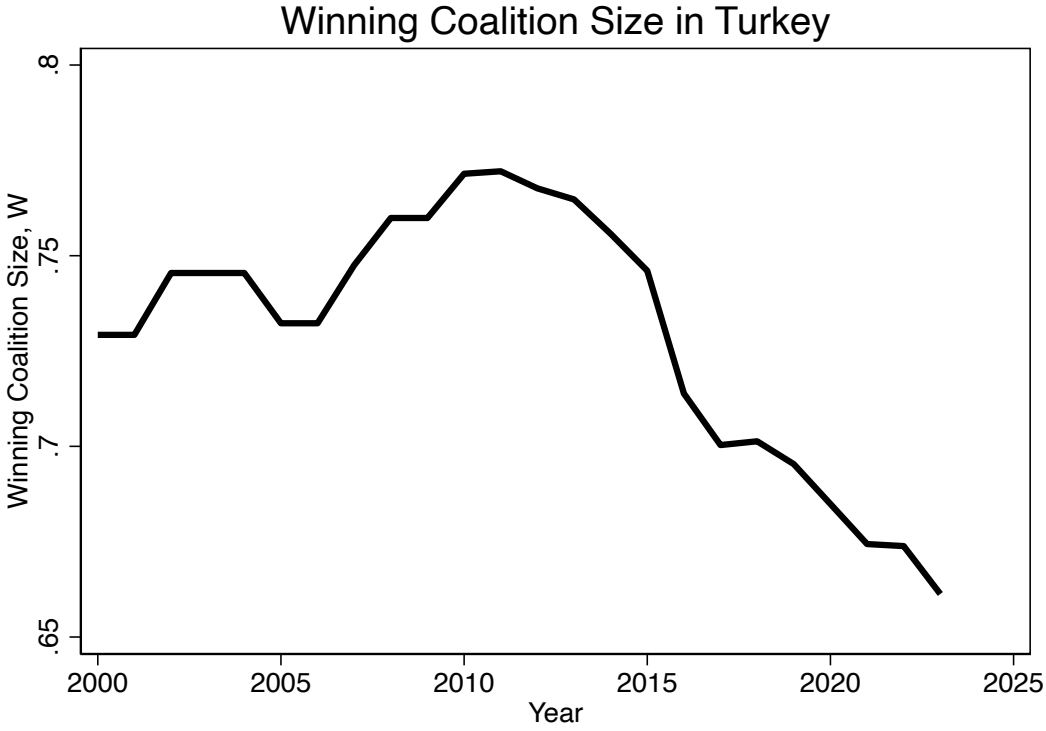
5.7.3 The Over-Provision of Private Goods: Turkey's Coup in 2016

Recep Tayyip Erdoğan became Turkey's prime minister in 2003, just 4 years after he was released from prison. He had been imprisoned because of his advocacy of Islamist policies and his support for former Prime Minister Necmettin Erbakan. Erbakan had resigned under military pressure in 1997 for allegedly violating Turkey's constitutional separation of religion and the state. Erdoğan became Turkey's president in 2014, the position which he holds as of this writing in early 2024. During his presidency, Erdoğan has resumed many of the Islamist policies that he eschewed between 2003 and 2014.

As is evident in Figure 5.13, Erdoğan's years as Prime Minister were marked by a modest, but substantively meaningful increase in the Turkish government's coalition size. The improved accountability of the government was accompanied by improved economic conditions and improved prospects of entry into the European Union, a significant objective of the Turkish government at the time. Equally clearly, Figure 5.13 indicates that around Erdoğan's election as President and shift in policy orientation, the country's coalition size began a notable decline. That decline was

accompanied by important shifts in the focus of the government. Our interest here is in the decline in coalition size, the provision of private goods, and how the two relate to the risks of a coup d'état in Turkey and, indeed, the failed attempt at one in 2016.

Figure 5.13: Was There a Reason to Fear Purges Under Turkey's Pent Erdogan?



Turkey's military has a long history of interference in government affairs, including being behind coups in 1960, 1971, and 1980, as well as the forced resignation of Erbakan in 1997.[16] Mindful of these interventions, Erdoğan began to diminish military authority starting at least by 2007. In the years between 2007 and his election as president, over 500 people were arrested because of their political affiliations, including many military figures.[17] These arrests and other actions were designed at least in part to weaken the military's influence over government. Indeed, as noted by Dov Friedman, the secular Turkish armed forces were being systematically neutralized as an

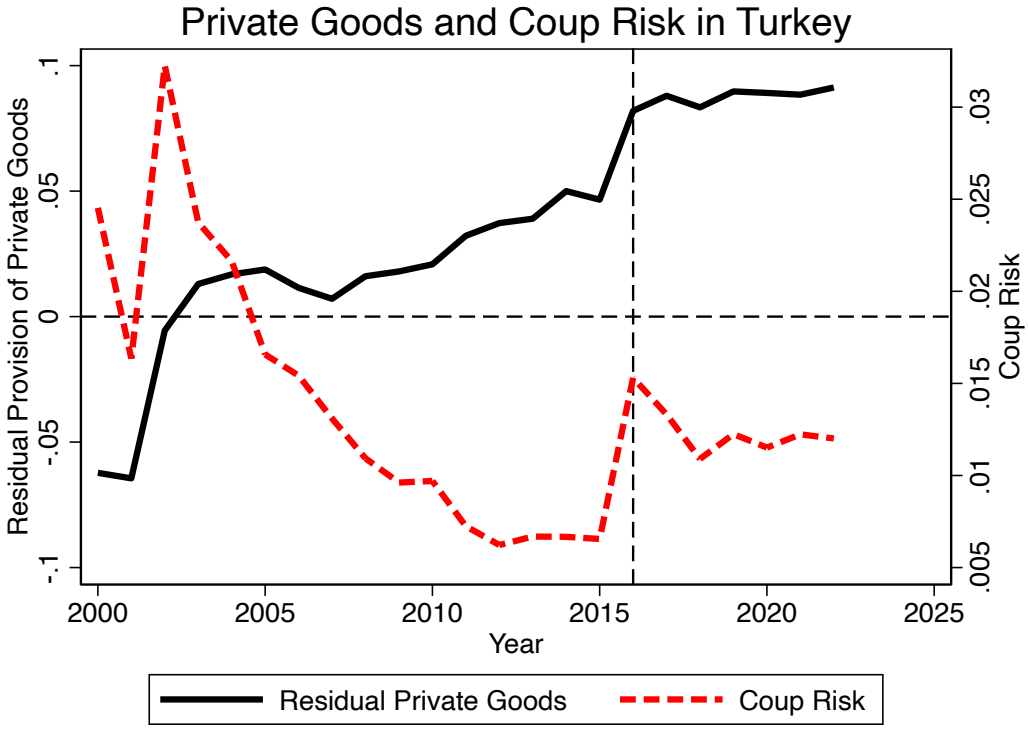
[16] https://www.aljazeera.com/news/2016/7/16/timeline-a-history-of-turkish-coups

[17] https://www.middleeasteye.net/big-story/ergenekon-trials-turkey-gulen and https://www.bbc.com/news/world-europe-23581891

influential part of Turkey's political life.[18]

Erdoğan, clearly tuned in to the challenges the military represented to his government, seems to have sought simultaneously to diminish military influence while paying his coalition, presumably including some military leaders, more handsomely than necessary. As we see in Figure 5.14, Erdoğan's rise to the prime ministership was associated with a notable increase in the provision of private goods relative to expectations. Although the coalition received too few such benefits before he became prime minister, once Erdoğan was ensconced in office, the figure shows us the emergence of two important patterns. Not only were private goods paid in excess of the incumbency constraint, and increasingly so over time, but the risk of a coup d'état was systematically falling until 2015 when it reversed direction. And as we now know, 2016 saw a failed coup attempt by the military.

Figure 5.14: Attempted Coup Against Turkey's President Erdoğan in 2016: Risks and the Over-Provision of Private Goods



[18] https://warontherocks.com/2016/07/the-causes-of-the-coup-attempt-in-turkey-a-history-of-the-usual-suspects/

That the over-payment of private goods became a government fixture and continued to increase through Erdoğan's election to the presidency and right up to the present time provides an important signal of impending risks during this period. Selectorate theory alerts us that when private goods are over-provided and continue to increase in over-provision then coalition members are likely to fear purges. In fact, Erdoğan was systematically purging the secular military leadership, presumably replacing them with military officers and others expected to be more loyal to him and his political agenda.[19] The situation was ripe for either a coup to end the purges or continued purges to end the military's potential to depose the government.

Indeed, by 2016 many in the military who were thought to be backers of Gulen, a former ally and current adversary of Erdoğan, feared that the government was investigating them with the intent of removing them as a potential threat to the regime.[20] This group included about 600 military officers[21] who feared that they would soon be purged.[22] Their fear was entirely consistent with the over-provision of private rewards that we see in Figure 5.14. While they apparently plotted a coup, the government's intelligence services were monitoring their activities and were well informed about the threat of a coup. With the threat on the government's radar screen, the 2016 coup attempt failed. The upshot of the failed coup plot is that President Erdoğan enjoys more secure control over Turkey's government than he had before.

While, of course, detailed historical accounts of events enrich our understanding of the unfolding of coups or other threats to the government in Turkey (or anywhere else), for the purposes here the central factor of interest is that an examination of shifting coalition size and the over-provision of private goods proves to be a useful early-warning indicator that can be used to signal when it is relevant to probe unfolding events closely. That, as we illustrate further in Chapter 8, is an important way in which the theoretical and statistical results can be used to inform case analyses.

5.8 Summary

This chapter represents the critical transition from theorizing about the anticipation of instability and measuring and testing the effects of that anticipation. We established both in the aggregate and piece by piece that public goods, corruption opportunities, and coordination goods are allocated in accordance with selectorate expectations under normal, everyday circumstances. Coalition size proves to be a dominant shaper of policy provisions but its effects are materially altered in the manners expected theoretically by levels of productivity, leader seniority, and leader health. These factors, scaled to the size of a country's population and economic circumstances, together with

[19] https://www.politico.com/magazine/story/2016/07/what-caused-the-turkish-coup-attempt-214057/

[20] https://www.aljazeera.com/news/2016/7/18/turkey-coup-plotters-acted-early-in-fear-of-arrests

[21] https://www.nytimes.com/2016/07/23/world/middleeast/failed-turkish-coup-accelerated-a-purge-years-in-t
html

[22] https://www.mei.edu/publications/unpacking-turkeys-failed-coup-causes-and-consequences

fixed effects for idiosyncratic country and temporal effects, explain more than 90% of the variance in policy provision.

With baseline policy provisions well predicted and explained, we use deviations from the baseline to identify conditions that place incumbency at risk. Under- or over-provision of benefits violates the incumbency constraint and incentivizes anti-government action by coalition members or the masses. The incorrect allocation of benefits not only increases the risk of instability but also signals different types of threats. Under-provision, especially of public goods (Res(Public) < 0), increases the risk of revolution which, in turn, increases the probability of a pre-emptive coup d'état. Under-provision of private goods (Res(Private) < 0) may trigger a coup d'état that is motivated by the coalition's desire to replace the incumbent with someone who will compensate coalition members at the expected level. Over-provision of coordination goods (Res(Assembly > 0), especially in smaller coalition regimes, was seen to exacerbate the risk of revolution. Over-provision of private goods (Res(Private) > 0), especially when not decreasing, can precipitate a coup d'état that is motivated by the fear that the incumbent is planning to purge members of the winning coalition. Thus, the specific measures of deviations from expected goods provision for each type of benefit offers detailed, theoretically-determined indicators of the risk of mass uprising or of coup d'état.

Finally, sometimes we will be interested in the overall risks of destabilizing events. To develop such more general indicators we applied the theory's key variables, including each of the estimated deviations from the incumbency constraint, to identify conditions that heighten the overall risk of a revolution, coup, or irregular leader change irrespective of the mis-allocation details. The predicted values for those risks, along with specific deviations from the incumbency constraint, were the main aim of this chapter. These predicted values ($\widehat{Rev}$, $\widehat{Coup}$, and $\widehat{LC_{irreg}}$) are our estimation of each leader's belief that she faces a credible threat of revolution, coup d'état and potential ouster from power whether she faces such an event in fact or not. These predicted values, in turn, form a central element in the analysis in Chapter 6 of the actions leaders take when they believe their hold on power is at risk. It is to the question of ameliorating actions that we now turn.

Chapter 6

Responding to Threats

When leaders believe they face threats to their power they act to shore up their position. Each leader's *belief* about the dangers she *anticipates* facing directs her choices about changes in tactics, policies, and in the configuration of her governing institutions. Leaders adopt such changes first to improve their chance of remaining in power and second to improve the prospect they have to maximize their discretionary control over revenue. That means that such changes generally take place even though the keenest of outside observers may not have detected any observable challenge to the incumbent's rule. No attempt at a coup has taken place; no efforts at open rebellion have arisen; no secret cliques of dissidents have been uncovered; and yet the regime's use of such tactics as the torture or killing of presumptive opponents (as in Stalin's 'enemy of the people' campaign), or its provision of new benefits (as in Raúl Castro's reforms and then the elimination of those reforms), or even shifts in its very institutions of governance (as in Ghana's democratization in the 1990s) have taken place. Leaders who wait for someone to take their crown, their scepter, their throne, and their head do not give themselves a good chance to survive in office. Those who anticipate dangers before they happen, nipping any real or imagined 'evil intended' in the bud, are most likely to survive to rule another day.

Chapter 5 introduced $\widehat{Rev}$ and $\widehat{Coup}$ to provide empirical estimates of each leader's belief each year about the magnitude of the risk she faces that a revolution or a coup d'état is being plotted against the government in the current or subsequent year. Our estimates of these beliefs are based on the institutional structure of the state, each leader's tenure and health, the state's economic conditions, and how the leader's policy provisions match up against what supporters should prudently expect to receive. If we, as analysts with greatly limited resources to measure institutions, policy allocations, and leader characteristics can approximate the risks of destabilizing threats, then we should be certain that leaders can do so at least as well as we can. Indeed, since their continuation in office and, in many cases, their very lives depend upon it, leaders are likely to use their state's intelligence and security apparatus to form more nuanced information about

the prospects of threats than our indicators can possibly capture. Armed with their more precise estimates, leaders then presumably select from the menu of responses available to them to mitigate the risks they believe they face. Hence, we turn now to examining whether leaders follow the path of actions implied by the logic behind the selectorate theory.

Whenever a leader detects a meaningful risk that she will be deposed, whether in a coup, a revolution, or by other means, she must spring into action. Three broad responses are available to counter any threat to her political survival, whether real or imagined. She can mobilize support to crush those behind the threat; she can modify policies to buy off the threat, negating its proximate cause; or she can alter the government's institutions to negate the underlying structural conditions that induced the demand to replace the government. Sometimes a ruler can easily see which means of alleviating the threat is most likely to succeed. Other times, choosing a course of action is a tough call because the incumbent faces mixed signals. She may, for instance, see a significant risk both of a coup and of a mass uprising but these different threats may call for incompatible responses. In such cases, lacking clarity about what action is most likely to succeed, the leader is forced to gamble on what she hopes is the best response and, of course, sometimes her gamble will prove incorrect.

Suppression is probably the first line of defense that comes to mind for any smaller coalition ruler while policy change may be the initial response by those who preside over a larger winning coalition. Suppressing threats, nipping them in the proverbial bud, calls for the mobilization of winning coalition members and, possibly, the larger support coalition as well. Policy change may involve shifting the balance in the provision of public goods, private goods and coordination goods or, sometimes in a larger coalition environment, shifting budget commitments within goods categories rather than across them. Changing policy may be less attractive than suppressing opposition because policy changes have significant effects on the stability of the existing institutions of government. Coalition size, for instance, is tied to resource allocations across public and private goods and the distribution of those goods is an equilibrium characteristic of any government's institutions. Hence, a change in resource allocations between public and private goods may necessitate modifications to the size of the winning coalition and possibly the selectorate as well.[1] The exception to these claims within the theory's logic is directly tied to how long the incumbent has been in office. Newcomers who do not shift policy toward more public goods for a short while are, logic tells us, less likely to survive than those who do. Hence, when we turn to policy change, we think it will be useful to establish that new leaders understand the need to alter policies compared to what they had been under their longer-term predecessor. But first we must settle on the extent to which suppression is tried as a way to address threats to political survival.

Suppression, where it can be implemented, involves quite different choices depending on the nature of the real or perceived threat. Probably, when a coup is believed to be looming, then

[1]For a case history of the use of elite compensation to secure their support for changes to the state's structure see, for instance, Chen, Wang and Zhang (2021)

purging those coalition members who are suspected of plotting against the regime is the first line of defense. When a mass revolt is thought to be on the horizon, mobilizing the winning coalition to help defeat any nascent revolutionary threat may be cheaper and easier than changing policies or institutions. But inducing the coalition to mobilize against those who are believed to be mounting a threat is not free and, hence, not easy (Casper and Tyson, 2014).

If the coalition is mobilized to neutralize or eliminate those creating the threat, its effort alone does not resolve the underlying problems that prompted the risk of rebellion. Suppression may be an effective means of treating the symptoms of impending unrest but it may not be a cure. Likewise, treating the masses better by reducing or eliminating governmental suppression may curry favor with some but it may embolden others within the masses to engage in opposition that threatens the government. The government's suppressive actions, either way, may result in new, subsequent would-be organizers of rebellion. They may have to be dealt with too so that even when a threat is effectively suppressed at the moment, the pressure for policy or institution change may not have been eliminated (Bueno de Mesquita et al., 2024). With these reflections in mind, we probe what leaders can do to suppress the threat of rebellion and the closely associated problems of diminishing the risk of coup d'état. Then we explore the motives and expected consequences behind policy change and institution change.

6.1 Suppression: A Tool for Small Coalition Rulers

Mobilizing the winning coalition, its supporters, and resources to suppress an uprising is costly for coalition members, possibly for the support coalition behind them, and for the incumbent leadership as well. Coalition members are privileged to be the recipients of private benefits, some of which may trickle down to others in society. When there is no credible threat of a looming mass revolt against the government, these private benefits can be enjoyed with little or no extra effort to help sustain the government and its incumbent beyond the normal demands of loyalty against the ever-present political foe. But when the probability of an uprising is thought to be large enough to necessitate action, then the coalition may need to be mobilized to crush the nascent threat before it turns into a reality. As we saw in Chapter 3, when revolution is likely, the leader pays her supporters more so that they are willing to engage in suppression.

Crushing a rebellion, especially one that has not yet happened, is costly both materially and psychologically (this is the cost η in Section 3.1). In order to put down a prospective uprising the coalition's members must be prepared to participate in such extremely unpleasant acts as engaging in violence against those thought to be behind an as-yet unrealized rebellion. That means supporting government efforts to suppress those suspected of organizing or even just thought to be sympathetic to a prospective revolt.

To see why some coalition members engage in the heinous acts required to suppress mass resistance while others do not, we must focus on the differences in rewards as the size of a polity's

coalition changes. Remember that coalition members (and their supporters) remain loyal to the government only if the flow of rewards to them is at least as good as the benefits they foresee if they support the rebels. If the benefits from the rebels are anticipated to be greater then the coalition's members do nothing to protect the incumbent regime. Naturally, the cost incurred in suppressing opposition reduces the net expected value of coalition membership since this cost must be subtracted from the unique benefit of coalition membership; that is, the flow of private goods. As we know, there are relatively few private goods for coalition members when the coalition is very large. Hence, even a pretty small additional cost incurred by suppressing resistance might exceed the private goods benefit received by members of a large coalition. And, since the incumbent in a large coalition polity has relatively little discretionary money, the leader's rainy day fund may be insufficient to make up for the coalition's material and, especially, psychological costs from suppressing rebellion. Thus, suppression – torture and extra-legal killing – is unlikely to be supportable in a large coalition, more democratic, polity.

Conversely, when private goods are substantial, as is true in small coalition regimes, then the cost of suppression is more likely to be worth enduring in order to preserve the regime and, with it, the large expected flow of private goods enjoyed by the coalition's members. Thus, it is more likely that regimes sustained by a smaller winning coalition (autocracies, monarchies, and military juntas, for example) torture and kill their fellow citizens to avoid rebellion and sustain their own flow of private rewards at a much higher rate than large coalition governments.

The magnitude of the costs incurred in suppressing opposition is, as well, a matter of great concern to the incumbent ruler (Bueno de Mesquita et al., 2024; Nandong, 2023). The ruler has to persuade coalition members – and perhaps their backers – that there is, in fact, a credible threat to their future rewards in the form of a nascent mass revolt (Luo and Rozenas, 2023). In working to persuade the coalition to endure the costs associated with suppressing the prospective revolt, the incumbent will have to be attentive to whether that cost is so large as to push the coalition's benefits below the incumbency constraint. As we know, if the coalition's rewards fall below the incumbency constraint (that is, below the swoosh curve) then regime instability is exacerbated. For the incumbent to minimize the risk that coalition members will back the rebellion instead of the ruler, she may need to draw on her rainy day fund to alleviate the threat of revolt by increasing, at least temporarily, the benefits going to coalition members so as to offset their cost for crushing the threat of rebellion. With the rainy day fund being larger in smaller coalition systems, all else being equal, that means it is also easier for small coalition incumbents to pay backers enough so that they will help to suppress opposition, thereby improving the ruler's prospects of political survival along with their own. In the Appendix (Table A6.1) we show that increased torture is strongly and positively associated with an increase in the subsequent provision of private goods over the next two years, with the effect being stronger in small coalition settings than in large coalition environments. This pattern holds whether we control for our full set of standard variables; whether we add in as well controls for the residual quantity of private goods; whether we include or exclude country and

year fixed effects; and whether we filter on whether or not the leader remained in power.

If the reasoning we have laid out is correct, then the preparedness and the ability to suppress revolutionary threats is expected to be much greater in smaller coalition regimes than is true in larger coalition governments. And that expectation is further reinforced if the small coalition is accompanied by a large selectorate; that is, a large pool of replacement members for recalcitrant, hesitant coalition members. Thus, as implied by the strength of the loyalty norm (as $\frac{W}{S}$ increases, loyalty to the incumbent decreases), the extent to which governments suppress opposition among the masses is expected to be endogenous to institutions.[2]

6.1.1 Testing How Suppression is Used

When private goods are substantial and the leader's discretionary revenue $(R-m^*)$ is large as well, suppression is expected to be more prevalent. These conditions, as we have established theoretically, are tied closely to small coalition size and large selectorate size. To test the theory's expectations we examine two variables as indicators of efforts to suppress opposition: the use by the state of political killing and of torture. The utilization of each of these means of suppression is expected to depend on the variables that selectorate logic tells us should be critical: especially W, the estimated risk of revolution ($\widehat{Rev}$), the incumbent's tenure in office, health, and economic performance.

Table 6.1 displays the results of four models in which the extent of political killing and torture are the dependent variables.[3] Table 6.2 repeats the tests from Table 6.1 but now adds the effects of the key variables that we used to predict the risk of a mass uprising; that is, the residual allocation of public goods, private goods, and freedom of assembly. Each variable is an imperfect but meaningful indicator of government efforts to suppress opposition.

Political killing may be too strong an indicator of suppression. It ignores efforts to suppress that fall below execution, such as incarceration, exile, or house arrest. Torture, likewise, has its deficiencies. In particular, it must be interpreted with some care. While torture is surely used to suppress threats of rebellion and to extract information about other rebels, it is also used for other purposes, such as extortion and enforcement of criminal activity such as loan-sharking. These other uses, however, are probably fairly constant in magnitude across time within a given coalition structure or they vary randomly with respect to the factors of interest here. In contrast, torture that is related to suppressing threats to political stability probably varies systematically with differences in the perceived risk of rebellion and other anti-government activity. Scholars such as Guriev and Treisman (2022) suggest that modern dictators are more likely to rely on 'spin', meaning information

[2]For a non-strategic account of repression grounded in misaligned bureaucratic incentives see Slough and Fariss (2021).

[3]For compatibility with other model specifications we have not include S_R in the analyses. If S_R is included, then we find the predicted effect that large selectorate size increases suppression. However, the result is of marginal statistical significance, perhaps unsurprisingly because there is little within-country variation in selectorate size within our sample.

manipulation, rather than outright suppression. With these caveats in mind, the models in the two tables examine the theoretically implied explanatory variables with temporal controls and country-specific fixed effects. Standard errors are robust, having been clustered on the country's code, making the tests statistically very demanding.

The first two models in Table 6.1 draw attention to the impact on political killings and on torture that the predicted risk of revolution has. When the anticipation of a revolt is large, so too is the amount of political killing and torture, with the substantive and statistical significance levels being extremely high. The effect remains significant in Models 3 and 4 in which we have added the lagged dependent variable and whether a revolt actually occurred or not. Of course, the lagged use of killing and torture are both likely to be strongly influenced by the prior value of $\widehat{Rev}$ so that a portion of $\widehat{Rev}$'s effect is absorbed by lagged killing in Model 3 and lagged torture in Model 4. Still, the predicted risk of revolt remains significant at $p \leq 0.001$ in the case of killing and when it comes to the use of torture. In contrast, the actuality of a revolt only insignificantly increases torture and, not surprisingly, it significantly increases the use of extra-legal executions by the government. In this context it seems that torture is more about suppressing the threat of rebellion than it is a means for defeating an actual rebellion whereas the state's use of execution seems designed to thwart rebellion and to eliminate actual rebels.

The four models in Table 6.2, by evaluating the impact of the residual provision of benefits to the coalition, expose more nuanced information about the use of extra-legal killing and torture to suppress mass threats. The first noteworthy element of the residual provision of goods is that 11 of the 12 coefficients indicate a highly significant impact on suppression. Only the residual provision of private goods does not significantly influence the use of political killings in the first model. In this model, however, like in the other three models, where residual private goods are highly significant, excess private goods provision translates into greater state participation in extra-legal executions and torture. That is, the greater the excess unique benefits that go only to coalition members the more prepared the regime – presumably including the coalition's membership – is to bear the costs involved in the violent suppression of prospective mass uprisings. In contrast, excess provision of public goods, especially freedom of assembly, apparently makes political executions and torture politically problematic. Those policies that redound to the benefit of the masses and enhance their capabilities seem to help reduce the regime's use of suppressive measures against those suspected of being rebels.

As the theory leads us to anticipate, larger coalition governments are less likely to use torture or killing than are small coalition governments whereas leaders long in office are particularly prepared to suppress the masses. The more secure a leader is in the loyalty of coalition members, the more incumbents are prepared to ask coalition members to help suppress mass discontent. We also see here that the preparedness to engage in killing and torture is generally weakly true for sickly leaders.

The key variables in both tables explain a considerable amount of the variation in the willingness by the government to order suppression and for the coalition members to carry it out. The variables

Table 6.1: Institutions, Revolutionary Threats and Suppression via Political Killings and Torture (OLS with nation and year fixed effects)

	(1) Political Killing	(2) Torture	(3) Political Killing	(4) Torture
$\widehat{Rev}$	0.675***	0.508***	0.174***	0.134***
	(0.0900)	(0.0655)	(0.0323)	(0.0366)
Revolution			0.0585**	0.0291
			(0.0216)	(0.0187)
Political Killing$_{t-1}$			0.843***	
			(0.0137)	
Torture$_{t-1}$				0.873***
				(0.0113)
W$_{t-1}$	-3.102*	-2.320*	-1.230***	-1.154***
	(1.260)	(1.106)	(0.300)	(0.334)
W$^2_{t-1}$	-0.377	-1.572	0.902**	0.872**
	(1.154)	(0.998)	(0.275)	(0.318)
Log(Tenure)	0.254***	0.258***	0.0859***	0.0730***
	(0.0459)	(0.0319)	(0.0138)	(0.0155)
Old or Sick	0.335***	0.293***	0.0808***	0.0536**
	(0.0602)	(0.0456)	(0.0181)	(0.0193)
Log(GDPpc$_{t-1}$)	0.292**	0.126	0.102***	0.0482*
	(0.0907)	(0.104)	(0.0253)	(0.0228)
Growth$_{t-1}$	0.00888***	0.00814***	0.00406***	0.00344***
	(0.00239)	(0.00171)	(0.00101)	(0.000994)
Log(Population$_{t-1}$)	0.0846	-0.156	-0.0269	-0.0606$^+$
	(0.171)	(0.144)	(0.0371)	(0.0328)
Observations	6971	6971	6764	6764
Number Nations	164	164	164	164
Years	1972-2022	1972-2022	1972-2021	1972-2021
Nation FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Fit: R2	0.891	0.903	0.968	0.973
Fit: R2 within	0.432	0.488	0.833	0.858
Bootstrap N	6957	6957	6747	6747
Bootstrap Fit	0.846	0.859	0.964	0.969

Standard errors in parentheses

$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6.2: Institutions, Policy Provisions and Suppression via Political Killings and Torture (OLS with nation and year fixed effects)

	(1) Political Killing	(2) Torture	(3) Political Killing	(4) Torture
Res(Private)	0.887	2.030***	0.651***	1.003***
	(0.630)	(0.487)	(0.183)	(0.163)
Res(Public)	-2.448***	-1.169**	-0.610***	-0.389**
	(0.486)	(0.434)	(0.151)	(0.139)
Res(Assembly)	-3.047***	-2.911***	-1.056***	-0.998***
	(0.339)	(0.312)	(0.124)	(0.120)
Political Killing$_{t-1}$			0.798***	
			(0.0163)	
Torture$_{t-1}$				0.811***
				(0.0154)
W$_{t-1}$	2.083^{+}	1.680^{+}	0.193	0.0467
	(1.083)	(0.987)	(0.285)	(0.286)
W$^2_{t-1}$	-5.656***	-5.622***	-0.756**	-0.623*
	(0.941)	(0.905)	(0.259)	(0.290)
Log(Tenure)	0.0357	0.0956***	0.0267**	0.0324***
	(0.0269)	(0.0217)	(0.00859)	(0.00798)
Old or Sick	0.0438	0.0699*	0.00786	0.00118
	(0.0378)	(0.0326)	(0.0131)	(0.0124)
Log(GDPpc$_{t-1}$)	0.0210	-0.0657	0.0292	-0.00505
	(0.0819)	(0.101)	(0.0196)	(0.0244)
Growth$_{t-1}$	-0.00551**	-0.00301*	-0.000387	-0.000178
	(0.00166)	(0.00133)	(0.000870)	(0.000800)
Log(Population$_{t-1}$)	0.240	-0.0338	0.0199	-0.0336
	(0.171)	(0.146)	(0.0447)	(0.0404)
Observations	7140	7140	7140	7140
Number Nations	164	164	164	164
Years	1971-2022	1971-2022	1971-2022	1971-2022
Nation FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Fit: R2	0.909	0.922	0.970	0.976
Fit: R2 within	0.530	0.595	0.848	0.873
Bootstrap N	7124	7124	7124	7124
Bootstrap Fit	0.871	0.883	0.966	0.971

Standard errors in parentheses

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

tell us that the more nervous an incumbent is that she faces a threat of mass uprising and the more her hold on power is in doubt due to chronic sickness or the more experienced the incumbent is and the more reliable the coalition, the more we should expect that executions and torture will be employed to suppress rebellion. The results of the bootstrapped analyses echo the strength of the general results, suggesting that the models may be helpful in anticipating future uses of torture and extra-legal killing. We pause now to offer two case studies that illustrate some of the logic of suppression in action, one in a democracy and one in an autocracy.

6.1.2 Torture in a Large (USA) and a Small Coalition (USSR) Polity

Before moving on from efforts to suppress opposition in the masses to purges against disloyal coalition members, we believe it will be helpful and informative to examine two cases of the use of torture as a means to stymie opponents. The two cases we examine involve the use of 'enhanced interrogation techniques' – that is, torture – during George W. Bush's presidency (albeit overwhelmingly against foreign adversaries rather than domestic opponents, making the case a bit of a stretch given the theory being probed here) and the use of execution and imprisonment without due cause during Stalin's 'enemies of the people' campaign. We choose these two cases because the former seemingly raises questions about theoretical expectations regarding the use of torture in a large coalition government while the latter fits in well with our expectations. We will see that the responses to each were consistent with the theory. While the evidence shows that Bush's gamble on authorizing torture may have backfired politically for him and his party, it also shows that Stalin's choice was reinforced and even strengthened by members of his winning coalition and his support coalition.

Post 9/11 and the Use of Torture by the Bush Administration

The people of the United States suffered a severe attack on the homeland by foreign adversaries on September 11, 2001. With thousands of Americans killed, the only precedent was Japan's attack on Pearl Harbor on December 7, 1941. That attack led on the next day to a declaration of war and to the subsequent incarceration and violation of the rights of more than 125,000 Japanese-Americans. The aftermath of 9/11 looked much the same. The United States went to war in Afghanistan to depose the government in that country that was protecting the al Qaeda leadership that planned and implemented the 9/11 attack. And Congress passed the Patriot Act six weeks after the 9/11 attack, with the Act's name the acronym for its stated purpose: Providing Appropriate Tools Required to Intercept and Obstruct Terrorism.

The Patriot Act granted new powers to the federal government, including, importantly, ensuring that anyone identified as a domestic terrorist was subject to the same punishments as international terrorists (107th Congress, Oct. 26 2001). The most pertinent portion of the law (Section 802) did not, of course, explicitly allow for torture as doing so would have violated the Geneva Convention to

which the United States is a signatory. However, Section 802 meant that domestic terrorists could receive the same treatment as international terrorists, which, when coupled with other policies adopted by the Bush administration at the time, effectively meant they could be subject to torture.

In addition to the new legislation, Bush authorized the creation of a network of 'black sites' outside the USA to detain anyone believed to pose a serious threat to the United States.[4] By 2002, Bush administration lawyers began issuing classified memos, now known as Torture Memos, that provided the legal justification for the contention that enhanced interrogation techniques during wartime do not constitute torture. These memos and other aspects of the torture program were unquestionably in the public domain following CBS's release of photos taken at Iraq's Abu Ghraib Prison in 2004 (Miller, Gronke and Rejali, 2014).[5]

What was the response of the American public to the revelation that torture was being used against prisoners held at 'black sites' including the U.S. facility at Guantanamo Bay, Cuba? In part to address this question Gronke et al. (2010) compiled the numerous public opinion surveys on this and closely related questions that were conducted during the Bush presidency (and into the early Obama presidency during which time the practice was denounced and rescinded).

We should be mindful that torture was primarily directed against foreign nationals. This meant that U.S. citizens had virtually no chance of being victims of domestic torture. Few U.S. citizens would have opposed torture out of fear that they would be tortured. Rather, any opposition was probably grounded in moral principles. Torture was virtually continuously opposed by 55-60% of Americans from *before* the 9/11 attack until close to the start of the Obama presidency when opposition and support each converged to about a 50:50 split though always with more opposed than in favor (Gronke et al., 2010). A later study, more concerned with partisan divisions (Miller, Gronke and Rejali, 2014), indicates a close to 50:50 split despite there being little to no risk for U.S. citizens. In fact, the evidence at the time, as demonstrated by Gronke et al. (2010), persistently shows significant opposition to torture for most of Bush's time in office.

Furthermore, many polls showed that the opposition to torture rose noticeably as public awareness of its use grew (Gronke et al., 2010, Table 1). Indeed, while Bush got high marks for his handling of terrorism during the 2004 campaign, he did not promote the use of torture as a major success. This might seem surprising given his need to offset political opposition in 2004 to his conduct of the Iraq War of 2003. Certainly, Bush did not go out of his way to address his administration's use of waterboarding and other forms of torture during the presidential campaign. He presumably believed in what he had authorized as a means to extract information but he kept it in the background as much as he could.

As time passed, torture did not grow more effective as a campaign item for the Republican Party. Certainly it was not a major issue in 2008. This is not surprising given the near-depression

[4] `https://www.cfr.org/timeline/how-911-reshaped-foreign-policy`

[5] See CNN Editorial Research. (2023, March 10). Iraq prison abuse scandal Fast Facts. `https://www.cnn.com/2013/10/30/world/meast/iraq-prison-abuse-scandal-fast-facts/index.html`

financial crisis of 2007-2008. Nevertheless, one year before the election, in October, 2007, Douglas Schoen noted that, ". . . recent data sheds light on an important question facing the U.S. as we approach the 2008 election: who will the issue of torture help in the upcoming Presidential election? At this point, it is hard to answer the question definitively. The evidence available points to the Democrats but suggests the issue will help them very modestly."[6] While the data from the Rasmussen Report that Schoen highlighted were not definitive, the basic observation and tilt to the data was that torture was not a plus for the Republicans and was likely to contribute modestly to their loss of electoral support. Thus, it seems that Bush gambled on using torture to diminish the threat to the American homeland. His effort seems not to have been effective in enhancing his party's prospects of retaining the presidency in 2008.

The 'Enemy of the People' Campaign

Bush's use of torture faded to the background as a political issue in light of other, more pressing concerns. The case of suppression in Russia tells a story of its greater political 'success.' To illustrate the use of murder and torture as a means to sustain oneself in power based solely on 'the expectations of evil intended,' when overt evidence of an imminent uprising is essentially absent, we consider Stalin's 'enemy of the people' campaign.

There is little doubt that by the mid-1930s Stalin believed that trouble was brewing among Kulaks and other 'anti-Revolutionary' segments of Soviet society. And it is certain that he believed there was a need to be particularly attentive to the loyalty of those in his coalition who might, for instance, have been secret Trotskyites. For these and other reasons, he may well have felt a need both to purge insiders and to quash any prospective revolutionaries, perhaps well in excess of the true level of disloyalty (Jansen and Petrov, 2002), so as to improve his survival prospects. It was against that backdrop of perceived threats that Stalin saw to the implementation of the July 30, 1937 secret NKVD Order 00447.

NKVD Order 00447 stipulated that beyond high-level enemies of the people (for whom purges were accompanied by show-trials and execution), a quota system was to be established by which a pre-determined percentage of 'undesirable' people were to be arrested, found guilty as undesirables, and shot while another pre-determined percentage were to be sent to gulags for ten years at hard labor. In an effort to curry favor with Stalin and demonstrate their loyalty, local officials, charged with implementing his order, pressed to have the quota of those to be shot raised and it was. Guilt or innocence was not a major concern: demonstrating loyalty was (Montagnes and Wolton, 2019)! It seems that Stalin's fearful commissars had calculated that, whether they were more likely to eliminate 'enemies of the people' or not, they were more likely to save themselves by expanding purges, arrests, and executions to cover a broader swath of the population (Naimark, 2010).[7] This

[6] https://www.rasmussenreports.com/public_content/political_commentary/commentary_by_douglas_schoen/torture_as_an_election_issue/(language)/eng-U.S.

[7] https://www.sciencespo.fr/mass-violence-war-massacre-resistance/en/document/

may well have been prudent for local commissars to do given that Russia's winning coalition at the time was very small ($W = 0.19$) and Stalin's opportunity to replace any 'disloyal' members was substantial ($S_{Real} = 0.72$). Whether or how this extreme program of torture and murder influenced Stain's political survival is unknowable beyond the fact that he remained in power for a very long time and he seemed to have neutralized thoughts of plotting against him.

In the end, Stalin's program not only eliminated members of his inner circle but also led to the execution of about 387,000 of the approximately 767,000 condemned ordinary Russian citizens during the span of 15 months. The campaign against Stalin's supposed enemies began after he had been in office for nearly 15 years. He remained in power until his death 16 years later despite – or perhaps thanks to – his willingness to engage in extreme brutality. In virtually every case, the only evidence against the accused was obtained through sustained, extreme torture. In reality, many of Stalin's victims were committed loyalists to him and to the revolution. That this was so was made eloquently and powerfully clear by the Soviet Union's Chairman, Nikita Khrushchev, in his 1956 'secret speech':

> Stalin originated the concept 'enemy of the people.' This term automatically made it unnecessary that the ideological errors of a man or men engaged in a controversy be proven. It made possible the use of the cruelest repression, violating all norms of revolutionary legality, against anyone who in any way disagreed with Stalin, against those who were only suspected of hostile intent, against those who had bad reputations. The concept 'enemy of the people' actually eliminated the possibility of any kind of ideological fight or the making of one's views known on this or that issue, even [issues] of a practical nature. On the whole, the only proof of guilt actually used, against all norms of current legal science, was the 'confession' of the accused himself. As subsequent probing has proven, 'confessions' were acquired through physical pressures against the accused. This led to glaring violations of revolutionary legality and to the fact that many entirely innocent individuals – [persons] who in the past had defended the Party line – became victims.[8]

Torture and murder were the modus operandi used by Stalin to eliminate anyone 'suspected of hostile intent.' Did such heinous actions lead to his ouster, as V. I. Lenin had recommended in 1922? No, as we know, he went on to head the Soviet Union until his death in 1953 and even today is thought of as a great hero of World War II and as a great leader by many in Russia and elsewhere.

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nkvd-mass-secret-operation-n-00447-august-1937-november-1938.html

[8] https://novaonline.nvcc.edu/eli/evans/his242/Documents/Speech.pdf

6.2 Purges: Suppressing Threats Within the Coalition

The danger that a revolt is on the horizon is, of course, not the only risk that incumbent leaders face. As we illustrated in Chapter 5, coup threats within the winning coalition can arise under three broad circumstances: (1) the coalition members decide to pre-empt a mass uprising; (2) the coalition members perceive that they are under-compensated; or (3) the coalition members fear that they will be purged (as, for instance, is signalled by their being over-paid, with their over-payment not accompanied by decreases in private goods payments over time). This means, unfortunately, that it is difficult to sort out the actual cause of a coup or perception of a high risk of coup, although the data and theory we have help us to do so partially. A major difficulty is that when the threat of mass uprising is high, coalition members have to decide whether to remain loyal to the incumbent, back the would-be revolutionaries, or pre-empt a rebellion by launching a coup. A major cause of coup d'état or fear of it is the same as the cause of or fear of revolt.

A leader must take potential threats from within her coalition seriously. As an empirical matter, leaders are far more likely to be unseated by their 'supporters' than they are by the people. For instance, of the 407 nation-year observations in which a coup occurs, there are 186 instances of irregular leader removal. Revolutions account for far fewer cases of irregular leader removal. There are only 34 nation-year observations in which irregular leader removal occurs when there is a revolution but no coup. In terms of observations at the leader level (explored in the next chapter), our extension of the Archigos data has 355 instances of leaders who were irregularly deposed by the coalition and only 82 instances of leaders who were deposed by the masses through irregular means like revolution or civil war. Given these numbers, leaders should be particularly attentive to threats from within the coalition. How best to counter those threats depends on their origins.

The previous chapter identified three origins for coup threats. The coalition members may depose their leader to dissipate a revolutionary threat and therefore retain their privileged positions. Coups also occur when leaders fail to adequately reward their supporters. Finally, coalition members may pre-emptively initiate a coup when they believe they are likely to be shuffled out of the coalition.

The leader's response to risks within the coalition depends on the nature of the threat. A leader has three main responses to mitigate a feared threat. She can modify policies to accommodate dissatisfaction; she can alter institutions to realign expectations; or she can reshuffle the coalition, purging members believed to be disloyal. Subsequent sections explore policy change and institution change. Here we examine the use of purges in response to the varying sources of coup threat, including the threat of a revolution.

If leaders reshuffle the coalition in response to the belief that they face real threats to their hold on power, then we should see greater turnover in coalition membership as risks grow. Unfortunately, as we noted in Chapter 4, we do not have a list of coalition members and their turnover. However, turnover in cabinet members is a useful proxy for coalition turnover. We return, therefore, to the cabinet data introduced earlier (Nyrup, 2020).

We anticipate that as the risk of revolution or coup rises so too does the occurrence of coalition reshuffles. After all, the presence of any credible coup threat directly suggests a counter-move by the incumbent: remove and replace anyone in the coalition who is suspected of weak loyalty. Revolutionary threats, as the theory emphasizes, may themselves be countered by coalition members. The coalition's members may back the incumbent; pre-empt the revolt through a coup; or throw their support behind the revolutionaries. In the latter two cases, the belief that a mass uprising is on the horizon is tantamount to the belief that at least some coalition members will act disloyally and so must be replaced.

Table 6.3 provides two models that evaluate how the anticipation of and the subsequent realization of instability influence turnover in coalition membership; that is, cabinet reshuffles. Models 1 and 2 look at the belief that a coup or mass uprising is in the offing ($\widehat{Coup}$ and $\widehat{Rev}$) as well as the effects of actual coups and revolutions. Model 1 includes all nation-year observations and a variable to indicate when leader change occurs. Cabinet turnover is greatest when leader turnover occurs. As an alternative specification, Model 2 excludes observations in which leader turnover occurs.

As we saw earlier in Table 5.4, leader turnover, illness, and being new to office all increase the rate of cabinet turnover. The significant and positive coefficient estimates on the $\widehat{Rev}$ variable indicate that when leaders anticipate revolution, they are liable to turn over their cabinet, presumably replacing those members of questionable fidelity with those they deem more loyal. Model 1 suggests that the occurrence of revolution also increases cabinet turnover, but it appears that the risk of revolution is the larger driver in a leader's decision to shuffle supporters. In that regard, it is interesting that the actual occurrence of revolution is insignificantly associated with cabinet turnover in Model 2; that is, in those cases where the pre-revolution incumbent survives the event.

The variable $\widehat{Coup}$ does not affect turnover rates in a uni-direction manner as emphasized by the theory, and illustrated by the three case studies in the previous chapter. There are multiple conditions under which coups occur. Leaders who are at risk of a coup because they underpay their coalition are unlikely to further jeopardize their tenure by reshuffling supporters if their coalition's size is to the left of the swoosh-curve minimum but they are likely to purge coalition members if W's size is to the right of the minimum. Further, a coup risk could be high because the coalition anticipates a reshuffle by the incumbent and preempts it. Hence, high coup risks are associated with either an elevated or suppressed rate of coalition turnover depending on the precise conditions. A heteroskedastic regression in which the variance in the error term is modeled as a function of coup risk and winning coalition size shows that high coup risks are associated with high volatility in cabinet turnover as seen in Table A6.14 and as reflected in the insignificant coefficient estimate for $\widehat{Coup}$ in Table 6.3 .

Whether some of the coalition's members are prepared to throw their support behind a mass uprising, as happened in Iran in 1979, or withhold their backing from the regime, as occurred in Egypt in 2011, or are plotting to initiate a coup, as occurred in Burma in 1988, the incumbent's best chance at suppressing such defections from within the winning coalition may be to purge those

Table 6.3: Institutions, Regime Risks, and Cabinet Turnover (Model 2 excludes observations with leader change)

	(1) Turnover	(2) Turnover
$\widehat{Rev}$	0.0432*	0.0516**
	(0.0175)	(0.0176)
$\widehat{Coup}$	0.00577	0.0229
	(0.0156)	(0.0211)
Coup	0.0283	0.0818*
	(0.0305)	(0.0346)
Revolution	0.0248*	0.0185
	(0.0125)	(0.0126)
W_{t-1}	0.202	0.0416
	(0.250)	(0.312)
W^2_{t-1}	-0.0330	0.222
	(0.242)	(0.321)
Log(Tenure)	-0.0331^{+}	-0.00734
	(0.0194)	(0.0192)
W_{t-1} *Log(tenure)	-0.0659^{+}	-0.111**
	(0.0348)	(0.0334)
Old or Sick	0.0458**	0.0552***
	(0.0145)	(0.0133)
$Growth_{t-1}$	-0.00135^{+}	-0.00138^{+}
	(0.000734)	(0.000707)
$Log(Population_{t-1})$	0.0347	0.0271
	(0.0261)	(0.0289)
$Log(GDPpc_{t-1})$	0.0214	0.0231
	(0.0156)	(0.0160)
Leader Change	0.231***	
	(0.0206)	
Observations	5890	4900
Number Nations	158	157
Years	1972-2018	1972-2018
Nation FE	Y	Y
Year FE	Y	Y
Fit: R2	0.278	0.248
Fit: R2 within	0.125	0.074
Bootstrap N	5886	4896
Bootstrap Fit	0.233	0.181

Standard errors in parentheses

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

thought to be disloyal. Yet, the very contemplation of a purge may have an adverse consequence for the incumbent. The fact that the leader might be thinking of replacing supporters may itself stimulate a coup, as we saw in the case of Turkey in 2016.

Being purged means, at a minimum, losing access to the special benefits of coalition membership and, of course, it may mean more, up to and including execution. Russia's President Vladimir Putin, for instance, purged numerous members of his inner circle in 2022, including key intelligence agents and military officers, as he learned that his invasion of Ukraine was going badly.[9]. In this way he may have shifted blame to them and, presumably, he removed from his winning coalition those in whom he had least confidence. North Korea's Kim Jong-un, likewise, purged many members of his inner circle, including his powerful Uncle, Jang Song-thaek, and more than one hundred senior military officers and, apparently, even his half brother. Many purgees were executed to insure that they would never again threaten the hold on power.

When threats arise leaders act to diminish the likelihood that such threats end up costing them their tenure in office, and perhaps their life as well. Suppression of the masses and reshuffling provide the immediate means to diminish threats, but they are probably better thought of as treating the symptoms rather than addressing the underlying causes of threats to a regime's continuation. The people rise up because they are dissatisfied and think they might get policies more to their liking through rebellion. The coalition opposes the incumbent if they share the belief that they will be better off by doing so. In response to these dangers, the leader can reduce the underlying threats by changing policy, and it is to this approach that we now turn.

6.3 Change Policy to Overcome Threats

Suppression of opponents and purges of erstwhile backers are important immediate treatments that leaders use to address the symptoms of rising instability. But fixing the symptoms is not the same as managing a cure. So, having treated dangerous symptoms, leaders may then pick policy adjustments to solve their political problems. They may be over- or under-providing particular types of policy goods, whether out of uncertainty about what exactly is the right amount, out of general incompetence, or out of greed. Whatever the reason for providing the wrong policies or the wrong policy mix, the leader may have come to believe that adjustments are needed to neutralize nascent threats.

We note that within the selectorate perspective, leaders do not pick policies specifically to enhance the welfare of their citizens. To be sure, policy adjustments may do just that but the purpose of adjustments is to alleviate worries about risks to the leader's well-being, not to improve the welfare of the citizens. When incumbents face risks to their continuation in power, they switch policies as a way to secure their political survival. Hence, we examine how leaders respond to real

[9] "The Purges in Putin's Shrinking Inner Circle," *The New Yorker*, March 22, 2022

or anticipated threats. We examine the policies that benefit an established, long-serving leader and show that those policies are not the same as the ones that benefit a newly anointed ruler.

6.3.1 Testing Policy Adjustments

As we saw in Chapter 5, policies that are out of alignment with expectations create risks of destabilizing events. By bringing policies in line with expectations, leaders can reduce the prospects of facing threats to their hold on power. Our first cut at looking at how policy responds to shifting threats is to focus on how perceived threats and actual events, combined with incorrect provision of policies at t, shape subsequent changes in the policies that are provided in the immediate future ($\Delta Private = Private_{t+2} - Private_{t-1}$ and analogous definitions for other policies).

Table 6.4 offers six models that assess policy responses to threats to the leader's continuation in office.[10] The patterns are readily seen and reinforce selectorate theory expectations. All six models show that on average leaders correct deviations from the incumbency constraint. For instance, in Models 1 and 4 the coefficient estimates on $Res(Private)_{t-1}$ are negative and highly significant. If the leader was over-providing private goods, then she reduces corruption. In contrast, she likely increases private goods if she was under-providing private goods in the previous year. We see the same pattern for public goods and assembly. The leader moves to correct under or over-provisions, returning to the incumbency constraint.

Leaders who anticipate facing a revolutionary threat decrease their provision of private goods. In contrast, when a leader believes she is facing a coup threat rather than a mass uprising, then the policy response is to increase the provision of private goods to neutralize the coalition's incentive to act against the incumbent's interests. Both Models 1 and 4 demonstrate that private goods allocations are changed quite precisely to have the desired survival-oriented impact on the threat that dominates: revolutionaries want to end corruption; coalition members want to promote corruption; and each gets the response required to offset the relevant threat.

Leader change as well follows the expectations of selectorate logic. With the old ruler out of power and a new leader in office, we see a significant boost in public goods and freedom and a significant decline in private goods provision. Newly anointed leaders, as we emphasized in Chapter 3, must do more on the public goods front and they do!

Interestingly, the actual occurrence of a revolution has no meaningful impact on policy allocations. Revolutionaries, as we saw in Chapter 3, have strong incentives to declare that they plan to build a democratic polity designed to benefit the masses and cut back on corruption, but once ensconced as a leader, the revolutionary's incentives are likely to change. The net effect, revolutionary leaders cannot be counted on to do what they promised to do. When out of office they do what selectorate logic indicates they ought to do: promise reform. Once in office, what they do

[10]Table A6.2, in the appendix, presents analogous analyses of changes in policy between years $t-1$ and $t+1$. Those analyses include our standard set of control variables and show a similar pattern of results.

Table 6.4: Change in Policy as a Reponse to Revolution and Coup Threats: Δ Private=Private$_{t+2}$ - Private$_{t-1}$

	(1) Δ Private	(2) Δ Public	(3) Δ Assembly	(4) Δ Private	(5) Δ Public	(6) Δ Assembly
$\widehat{Rev}$	-0.0126*	-0.00401	-0.00803	-0.0116*	-0.00417	-0.00953
	(0.00489)	(0.00443)	(0.00985)	(0.00491)	(0.00438)	(0.00982)
$\widehat{Coup}$	0.0132**	0.00410	0.00879	0.0117**	0.00411	0.0111
	(0.00403)	(0.00489)	(0.00902)	(0.00418)	(0.00490)	(0.00934)
res(Private)$_{t-1}$	-0.267***	-0.0234	-0.102*	-0.265***	-0.0239	-0.102*
	(0.0316)	(0.0224)	(0.0440)	(0.0315)	(0.0225)	(0.0444)
res(Public)$_{t-1}$	-0.0211	-0.214***	0.0886	-0.0249	-0.212***	0.0906^{+}
	(0.0252)	(0.0236)	(0.0538)	(0.0252)	(0.0236)	(0.0537)
res(Assembly)$_{t-1}$	-0.0399*	0.0136	-0.356***	-0.0368*	0.0135	-0.360***
	(0.0169)	(0.0145)	(0.0345)	(0.0171)	(0.0145)	(0.0333)
Leader Change	-0.0626***	0.0466***	0.109***	-0.0723***	0.0472***	0.123***
	(0.0145)	(0.0103)	(0.0221)	(0.0155)	(0.0104)	(0.0230)
W$_{t-1}$ *Leader Change	0.0800***	-0.0548***	-0.137***	0.0900***	-0.0553***	-0.152***
	(0.0183)	(0.0127)	(0.0275)	(0.0196)	(0.0129)	(0.0289)
Revolution				-0.00324	-0.000304	-0.00160
				(0.00365)	(0.00277)	(0.00569)
Coup				0.0265***	-0.00140	-0.0356**
				(0.00774)	(0.00464)	(0.0130)
Observations	6815	6813	6812	6713	6711	6710
Number Nations	164	164	164	162	162	162
Years	1972-2021	1972-2021	1972-2021	1972-2021	1972-2021	1972-2021
Nation FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Fit: R2	0.153	0.203	0.208	0.164	0.208	0.221
Fit: R2 within	0.094	0.097	0.117	0.104	0.096	0.128
Bootstrap N	6803	6801	6800	6696	6694	6693
Bootstrap Fit	0.113	0.098	0.098	0.027	0.064	0.051

Standard errors in parentheses

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

depends on the size of the coalition they rely on and if they have their druthers that coalition will be small.

Both the threat of a coup and the actual occurrence of a coup, as anticipated by theory, have no meaningful impact on the provision of public goods (see Lemma 3, Chapter 3) but both the fear of and the realization of a coup increases private goods and the occurrence of a coup decreases freedoms.

6.3.2 Change Leaders, Change Policy

We have established that leaders face different threats and different policy requirements in part as a function of where they are in the political life-cycle. We saw evidence in Table 6.4, for instance, that leader replacement is generally followed by a boost in public goods and a decrease in private goods in all but the largest coalition systems. Now we probe more deeply the policy changes that are associated with leader change.

We use a difference-in-difference design to show that new leaders provide more public goods and more freedom than experienced leaders. Our tests, however, are far from perfect. One significant limitation with examining the difference in policy across leaders is that poor policies might themselves have hastened a leader's removal, making the observed change a function of the prior ruler's failings rather than a consequence of leader life-cycle effects. Although we cannot perfectly correct for such selection effects, we can get pretty far in correcting for the prior leader's potential policy incompetence by focusing attention on an exogenous cause of leader replacement; namely, terminal illness as a quasi-experimental, seemingly random intervention.

Selectorate logic indicates that every new leader and every terminally ill leader needs to try hard to survive even if no overt threat to their political survival has been detected. New leaders know they are at a heightened risk of deposition, coup, and revolution relative to later in their leadership life-cycle. Leaders suffering from a serious chronic illness know that their coalition's loyalty will decline once their illness becomes known. Hence, they too are likely to take steps to purchase support through a greater effort on behalf of their coalition and perhaps even from their subjects in general. We investigate these expectations with difference-in-difference tests designed to capture changes in policy performance following immediately after the regular transition from one leader to another. We focus on regular leader change rather than irregular change to highlight that the mechanism driving policy shifts is not related to the previous incumbent having been overthrown rather than having died peacefully in office, retired, or otherwise having undergone normal leadership change through electoral defeat, term limits, and so forth. Although we focus on regular leader change, we note that the statistical results are equivalent whether we include or exclude irregular removal from office in our difference-in-difference tests.[11]

[11] In the appendix, Table A6.3 includes both irregular and regular leader change and finds similar patterns (although the economic effect is significant only at the 10% level in a one tailed test). Table A6.4 examines policy changes between the years $t-2$ and $t+2$ and, over this extended time frame, finds similar patterns

Table 6.5 examines $\Delta y = y_{t+1} - y_{t-1}$, where y, in turn, is economic growth, the provision of public goods, private goods, assembly, or coalition welfare. The table contrasts the cases where the leader changes in year t with cases in which no leader change occurs in year t. The idea behind the test is to compare how the policy output changes with new leadership versus continued leadership. For this reason we limit the analysis to observations where there was no leader change in year $t-1$.

Table 6.5: Change in Growth Rate and Policy Provision When Leader Change Occurs: $\Delta y = y_{t+1} - y_{t-1}$

Variable	No Leader Change	Leader Change	Difference	t-statistic
Δ Growth	-0.178	0.363	0.541	1.878
	(5,700)	(852)		p=0.0604
Δ Public Goods	0.002	0.009	0.007	7.254
	(6,724)	(957)		p=0.0000
Δ Private Goods	-0.000	-0.007	-0.006	4.981
	(6,781)	(964)		p=0.0000
Δ Assembly	0.001	0.017	0.015	7.468
	(6,726)	(950)		p=0.0000
Δ CW	0.003	0.011	0.008	5.647
	(5,548)	(832)		p=0.0000

This table is constructed looking at only regular leader change with cases of irregular leader change and cases of leader change in the previous year eliminated from the analysis.

As is evident from Table 6.5, leadership change is accompanied by policy change. As Table 6.5 demonstrates, if a leader continues in office, economic growth tends to decline but if, over the same time interval, a leader is replaced by a new incumbent then economic growth accelerates. The difference in growth rates is substantively and statistically significant at the 6% level, just above conventional standards, and is consistent with the life-cycle effects. The table also demonstrates that leader change is immediately followed by an increase in the provision of public goods, freedoms, and coalition welfare and in a diminution in corruption opportunities (although remember there are offsetting effects with respect to private goods: new leaders work harder producing overall more rewards while shifting focus away from private goods towards public goods). These results hold if we reduce the set of cases to only those in which there was close to no change in coalition size or to absolutely no change in coalition size to be sure that it is the change in leader, and not the change in institutions, that drives the difference in policy when a new leader comes to power.

We replicate the essentials of Table 6.5 but now switch our focus to the difference in how hard leaders try to satisfy their coalition and their selectorate when they have good reason to believe that they are getting close to death, the other main circumstance under which leaders may be incentivized to alter policy even if they have not detected overt social activity threatening their

to those in Table 6.5.

hold on power.

Our tests regarding chronically ill leaders illuminate a nuanced view of leader change. In a widely cited paper, Jones and Olken (2005), like us, examine growth rates across leaders. Their theoretical perspective is that different leaders generate different average growth rates. They recognize, as do we, that simply comparing growth rates across leaders is difficult because low growth rates are likely to incentivize others to remove their leader. To overcome this obstacle, Jones and Olken look at the set of leaders who die in office as a result of ill health or an accident, since presumably a low growth rate did not result in their medical or accident-related death.[12] While their approach is innovative, it is problematic in terms of the selectorate life-cycle results.

A leader's incumbency advantage grows with tenure because the leader can promise coalition members access to private rewards in the future. Given the value of such a long-run flow of rewards, the leader can afford to offer less in the short run and still maintain coalition loyalty. However, when a leader is known to be terminally ill, the leader's ability to offer a flow of future rewards unravels. A leader who is terminally ill (or thought to be so) needs to spend more on her coalition. In contrast, if a leader dies of an acute illness or as the result of an accident, then there was little prior expectation that the coalition would soon be reshuffled. Such leaders should have been providing policy consistent with the phase they were in within the political life-cycle. Contrasting these results, we anticipate a larger increase in coalition wealth (and also economic growth) following the death of a leader by acute causes than the size of the increase following leader death by chronic causes.

To conduct tests on the effect that cause of death has on growth and on coalition welfare, we use data from Smith (2022) and Bueno de Mesquita and Smith (2018) and focus on leaders who can be classified clearly into acute causes of death (including accidents) and chronic causes of death.[13] Although the sample of such leaders is small, we expect the chronically ill leaders to be working hard on behalf of their coalition prior to their death while the acutely ill leaders, having died suddenly and unexpectedly, should have been enjoying more discretionary rewards and not working as hard on behalf of their supporters. Given the small number of cases, Table 6.6 provides simple comparisons of the growth rate in the year prior to leader change, growth rate in the year after leader change, and the difference, Δ, between these growth rates for leaders who died from chronic causes while in office, acute causes of death in office, and all other instances of leader change. The lower part of the table repeats these figures for overall Coalition Welfare.

The presence of a political life-cycle suggests that the change in growth rates between rulers may not be because one leader averages a different growth rate than another as hypothesized by Jones and Olken (2005). The evidence in Table 6.6 is consistent with the selectorate implications;

[12] Jones and Olken (2009) exploits the apparent randomness as to whether or not assassination attempts succeed and find that if the assassin's bullet (or bomb) kills the leader that the polity is also more likely to democratize than if the bullet missed, or merely injured, the leader. See also Iqbal and Zorn (2008).

[13] We eliminate leaders who were killed in political events, such as coups and assassinations, and other deaths in which the cause of death is ambiguous.

Table 6.6: The Cause of Leader Death and Changes in Economic Growth and Coalition Welfare

	Economic Growth			
Cause	Before LC $(t-1)$	After LC $(t+1)$	Δ	Observations
Other Leader Change	1.63	1.98	0.34	1,291
Chronic Illness Death	2.29	1.34	-0.96	44
Acute Event Death	0.50	2.56	2.07	8

	Coalition Welfare			
Cause	Before LC $(t-1)$	After LC $(t+1)$	Δ	Observations
Other Leader Change	0.63	0.64	0.01	1,277
Chronic Illness Death	0.53	0.55	0.02	43
Acute Event Death	0.52	0.55	0.04	8

namely that new leaders work harder for their coalition and in general have more liberal policies than well entrenched leaders. For instance, the t-test for growth comparing those who died of chronic illness versus acute illness shows a difference at $p = 0.065$. If we extend the test to two years before and after the change, as anticipated, it weakens to $p = 0.10$ and if we extend it to three years, again as expected, it weakens further to $p = 0.221$, suggesting that illness is generally not known until the leader is close to death. In addition to Jones and Olken's important observation that changes in growth rates differ because of differences in leader talent, our results indicate that a leader's position within the political life-cycle and their health also affect growth.

The findings for coalition welfare between those who died of chronic causes compared to those who died of acute illness further reinforce the logic of political life-cycle effects. As a new ruler becomes an entrenched ruler, early-term higher growth and early-term higher coalition welfare may give way to slowed growth and diminished welfare. Further, sickly leaders are likely to have to work harder than healthy leaders to maintain coalition loyalty. Hence, chronically ill leaders and new leaders are both likely to be working hard to maintain growth, while leaders who die suddenly of acute causes are less likely to have been trying hard to promote growth in the economy.

As the analyses demonstrate, policy changes are responsive to the source of threat. Unlike suppression, policy shifts logically necessitate deeper institutional changes unless the policy adjustments are fleeting. That means that when we observe sustained policy shifts we should also expect to observe changes in institutions. We now investigate whether that expectation is supported by the evidence.

6.4 Changing Institutions

Policy change is prompted by a concern to ameliorate threats to the incumbent's political survival. If modifications in the provision of public goods, private goods, and coordination goods are successful then a leader's immediate concern about threats is reduced. But with the alleviation of the threat of a destabilizing event comes the fact that the new policy allocations might no longer be the equilibrium quantities dictated by the logic behind political survival. That means that either the institutions must be modified to be in alignment with the policies of the regime or the incumbent can gamble further, risking, for instance, a coalition-initiated coup if the coalition's rewards under the new provision fail to match the coalition's expectations given the extant institutions. And, as the theory's implications about life-cycle effects tell us, such a gamble is smaller the longer the incumbent has been in office. That means that more experienced rulers are expected to make smaller changes in institutions than newer incumbents or than replacement leaders if the experienced leader makes changes in institutions at all.

In Chapter 3 we saw that in theory if leaders get an opportunity to alter institutions but do not take it then they risk ceding the 'first-strike' advantage to a coup-plotter and so, being prudent, rather than wait, they act to pre-empt a prospective threat. Thus, whether out of fear of the masses or fear of a coalition-launched coup, policy shifts or perceived threats are expected to induce changes in the regime's institutions with such changes dependent, as we have noted, on how long the incumbent has been in office. Survival, the topic of the next chapter, is expected to become easier to achieve after changes in the sizes of the coalition and real selectorate when such change is called for. That is why we now probe when and how institutions are expected to change given threats to the incumbent's political well-being.

6.4.1 Determinants of Changes to Institutions

We investigate institution change as a two-step process. Credible revolutionary threats or coup threats are relatively infrequent. So, most of the time neither we as analysts nor leaders as survival-oriented actors should anticipate observing or making consequential changes in the size of a government's winning coalition or its real selectorate. But if conditions are right to create the motivations for institution change then such changes should be expected. To capture the conditions for change, we first predict whether any change in coalition size or selectorate size is *expected* over the coming two years. Then we use the predicted likelihood of such change to help inform the circumstances under which we expect that leaders anticipate a need for an increase or decrease in the size of their coalition or their real selectorate.

We define the dependent variable $|\Delta W|$ as 1 if $|W_{t+2} - W_{t-1}| > 0.01$ and as zero otherwise. We define any change in the real selectorate's size, $|\Delta S|$, equivalently. Table 6.7 displays four logit models that predict whether W or S changed between $t-1$ and $t+2$ as a function of anticipated threats against the government. The first model for each dependent variable (Models 1 and 3)

focuses attention on the extent to which the expected risk of a coup or revolution influences institution change. Models 2 and 4 add the actual occurrence of a coup or revolution to the mix to determine the marginal effect of expected threats compared to realized threats on the likelihood of institution change.

The two models used to analyze $|\Delta W|$ (Models 1 and 2) in Table 6.7 demonstrate that the higher the anticipated risk of revolution, the higher the odds that the regime's coalition size will change within two years. Models 3 and 4 likewise show that the anticipation of a revolutionary threat presages changes in S_R, while a high coup risk does not enhance the likelihood of changes in institutions. The addition of an actual coup or mass uprising, as in Models 2 and 4, further significantly strengthen the odds that institution change is about to be afoot over the next couple of years. While resource rents dampen the chances of institution change, high productivity – indicated by per capita income – increases the probability of institution change and old age or sickness heightens the odds that the selectorate size will shift. Most of the other variables – whose relevant effects were absorbed in the predicted risks of coups and revolutions – have little marginal impact. The action in altering the chances that the coalition and selectorate sizes will change resides overwhelmingly in the *anticipation* of a significant threat to the incumbent's political survival although the effect is somewhat masked in Table 6.7 because there are multiple causes of coups.

Table 6.8 replicates Models 1-4 from Table 6.7 but replaces the predicted risks with the policy-provision factors that create the expected risks of instability; that is, the residual allocation of policies that reflect deviations from the incumbency constraint.[14] We use the models in Table 6.8 rather than those in Table 6.7 to predict the likelihood of institution change because the residual provision of goods provides a more nuanced differentiation of the risk of events than do $\widehat{Rev}$ and $\widehat{Coup}$. It is important to remember that coups originate under a variety of different circumstances. For instance, coups are likely when revolution threatens and when the coalition is under-paid. Yet, the threat of coup is also high when the coalition is over-paid, and under such circumstances the likelihood of institution change is relatively low. By switching from $\widehat{Rev}$ and $\widehat{Coup}$ to the individual policy residual values, Table 6.8 facilitates the identification of the specific source of each type of threat to the regime. Hence, the predicted values generated by Model 1 in Table 6.8 are our predictions for whether there is any change in the size of the winning coalition while the values predicted by Model 3 are used to assess the probability of a change in the real selectorate size. We note that the out-of-sample bootstrapped results provide a significant fit with the observed actual likelihood of changes in institutions.

The analyses demonstrate that changes in W and S are especially likely when policy allocations are out of whack with expectations, although the magnitude of any such changes diminishes as the incumbent's tenure increases. In particular, the over-provision of coordination goods greatly

[14]The appendix includes ordinary least square regressions with fixed effects for country and year, as well as logit analyses with fixed effects to test the robustness of the results.

Table 6.7: Political Threats and Institutional Change

	(1) $\lvert\Delta W\rvert > .01$	(2) $\lvert\Delta W\rvert > .01$	(3) $\lvert\Delta S\rvert > .01$	(4) $\lvert\Delta S\rvert > .01$
main				
$\widehat{Rev}$	0.648**	0.594**	0.750**	0.699**
	(0.228)	(0.207)	(0.238)	(0.214)
$\widehat{Coup}$	0.0745	-0.00411	0.0225	-0.0606
	(0.302)	(0.246)	(0.288)	(0.234)
Revolution		0.331*		0.274+
		(0.132)		(0.140)
Coup		0.754***		0.712***
		(0.181)		(0.185)
W_{t-1}	2.513	3.510	-1.473	-0.598
	(2.822)	(2.499)	(2.753)	(2.460)
W^2_{t-1}	-2.542	-3.588	0.539	-0.359
	(2.961)	(2.585)	(2.864)	(2.524)
Log(Tenure)	0.0251	-0.00382	0.0774	0.0661
	(0.115)	(0.106)	(0.107)	(0.0991)
Old or Sick	0.191	0.196	0.449**	0.423**
	(0.154)	(0.150)	(0.149)	(0.145)
Growth_{t-1}	-0.00103	-0.00114	-0.00366	-0.00370
	(0.00632)	(0.00608)	(0.00741)	(0.00720)
$\text{Log(Population}_{t-1})$	-0.132	-0.137+	-0.148+	-0.139+
	(0.0827)	(0.0741)	(0.0858)	(0.0759)
$\text{Log(GDPpc}_{t-1})$	0.123	0.0834	0.249*	0.214*
	(0.129)	(0.116)	(0.108)	(0.0979)
$\text{Resource Rents}_{t-1}$	-0.0201*	-0.0207**	-0.0174*	-0.0165*
	(0.00827)	(0.00778)	(0.00833)	(0.00754)
Observations	6816	6714	6816	6714
Method	logit	logit	logit	logit
Number Nations	164	162	164	162
Years	1972-2021	1972-2021	1972-2021	1972-2021
Nation FE	N	N	N	N
Time Trend	Y	Y	Y	Y
ROC	0.732	0.740	0.707	0.714
Bootstrap N	6816	6714	6816	6714
Bootstrap Fit	0.594	0.601	0.558	0.567

Standard errors in parentheses
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6.8: Policy Provisions and Institutional Change

	(1) $\|\Delta W\| > .01$	(2) $\|\Delta W\| > .01$	(3) $\|\Delta S\| > .01$	(4) $\|\Delta S\| > .01$
main				
Revolution		0.337**		0.289*
		(0.128)		(0.143)
Coup		0.673***		0.643***
		(0.185)		(0.188)
W_{t-1}	7.502***	7.327***	3.805**	3.490*
	(1.213)	(1.205)	(1.451)	(1.455)
W^2_{t-1}	-7.312***	-7.135***	-4.537***	-4.177**
	(1.074)	(1.073)	(1.313)	(1.328)
Res(Public)	-0.0213	0.0643	0.255	0.371
	(0.878)	(0.864)	(0.985)	(1.022)
Res(Public)^2	-3.206	-2.608	-5.462	-5.369
	(10.70)	(9.863)	(9.860)	(9.444)
Res(Assembly)	1.938**	1.923**	0.333	0.386
	(0.614)	(0.625)	(0.652)	(0.674)
Res(Assembly)^2	20.59***	18.95**	11.54***	10.45**
	(6.165)	(5.845)	(3.346)	(3.189)
Res(Private)	0.223	0.233	-0.504	-0.692
	(1.069)	(1.049)	(1.203)	(1.199)
Res(Private)^2	28.87***	27.32***	19.39**	19.00**
	(8.268)	(7.360)	(6.212)	(6.076)
ΔRes(Private)	-4.236*	-4.166*	-2.612+	-2.830+
	(1.734)	(1.780)	(1.463)	(1.475)
Δ Res(Private)^2	141.1***	129.0***	83.04***	75.27***
	(31.83)	(31.59)	(15.26)	(14.40)
Δ Res(Private)*Res(Private)	58.08*	49.02+	35.65+	26.21
	(29.29)	(29.60)	(20.95)	(19.75)
Δ Res(Private)*Res(Private)^2	-180.0	-188.2	-179.3	-136.6
	(231.6)	(231.3)	(155.9)	(158.0)
ΔRes(Private)^2*Res(Private)	-1065.4*	-1169.5*	116.6	92.21
	(530.4)	(509.9)	(194.4)	(193.3)
Δ Res(Private)^2*Res(Private)^2	2974.8	3791.7	-1597.6***	-1301.3**
	(2822.6)	(2875.4)	(464.2)	(424.2)
Log(Tenure)	-0.141*	-0.129*	-0.114+	-0.0813
	(0.0603)	(0.0611)	(0.0672)	(0.0680)
Old or Sick	-0.102	-0.0650	0.124	0.121
	(0.108)	(0.110)	(0.111)	(0.114)
Growth_{t-1}	-0.00989+	-0.00790	-0.0164*	-0.0142*
	(0.00514)	(0.00493)	(0.00647)	(0.00628)
$\text{Log(GDPpc}_{t-1})$	-0.154***	-0.133**	-0.0489	-0.0229
	(0.0429)	(0.0423)	(0.0478)	(0.0476)
$\text{Log(Population}_{t-1})$	0.0260	0.0138	0.0462	0.0496
	(0.0341)	(0.0351)	(0.0380)	(0.0394)
$\text{Resource Rents}_{t-1}$	-0.00867	-0.00960+	-0.00390	-0.00304
	(0.00544)	(0.00564)	(0.00585)	(0.00576)
Method	logit	logit	logit	logit
Observations	6816	6714	6816	6714
Number Nations	164	162	164	162
Years	1972-2021	1972-2021	1972-2021	1972-2021
Nation FE	N	N	N	N
Time Trend	Y	Y	Y	Y
ROC	0.754	0.761	0.725	0.730
Bootstrap N	6816	6702	6816	6702
Bootstrap Fit	0.624	0.643	0.579	0.598

Standard errors in parentheses
$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

increases the probability that the coalition's size and the selectorate's size will be adjusted. Likewise the incorrect amount of private goods leads to a higher probability that W will change although adjustments to private goods that bring them more in line with expectations significantly dampen the decision to alter the coalition's size. Likewise, we see that the provision of private goods affects the probability of change in $|\Delta S|$.

With the broad results outlined, we now delve more closely into determinants of coalition change. Table 6.9 shows the consequences of over, under, or expected policy provisions on the likelihood of any institution change occurring.[15] Under-provision of private goods is defined as a Res(Private) value that is more that one standard deviation below the mean of Res(Private). Likewise, over-provision is a policy residual at least a standard deviation above expectations, and expected provision implies the policy residual deviates from expectation by less than a standard deviation. Each column of the table corresponds to an increasingly demanding quantity of change in coalition size. Thus, the first column corresponds to any absolute change in coalition size at least as large as 0.01: $|\Delta W| = |W_{t+2} - W_{t-1}| \geq .01$. Column 2 assesses changes in W at least as large as 0.05 and column 3 addresses how the row conditions influence the chance that W's absolute change is at least as large as 0.10. Because we focus on the absolute change in coalition size, our variable of interest is coded 1 if coalition size increases or decreases by more than the amount designated in the column heading; and is coded 0 otherwise.

The table's results are clear. When the benefits are provided close to the expected level then there is substantially less chance of a change in coalition size than when benefits are over- or under-provided. These results highlight how important the correct allocation; that is, the incumbency constraint allocation, of policies is for stable political institutions. The significance of incorrect policy allocations can be further probed by focusing our attention on the distribution of changes in coalition size as a function of policy choices combined with the ex ante size of the coalition at the time the allocation choice is made.

Table 6.9 offers a more digestible view of key results regarding institution change than is readily gleaned from Table 6.8 but, in doing so, it glosses over some important subtleties in the fuller analysis. Given that the estimated values for the probability of institution change form the basis for our predictions of whether institutions are expected to have changed it is useful to unpack the nuanced analysis further. Therefore, we examine additional effects graphically.

Figure 6.1 unpacks the logit analysis by showing four panels. Panel (a) looks at the association between public goods provision and $|\Delta W|$, assessing the absolute change in coalition size between $t-1$ and $t+2$. Panels (b), (c), and (d) look respectively at assembly, private goods when they are declining, and private goods when they are increasing. In each panel, the solid black curve denotes the probability of a change in coalition size when the policies were provided at the expected

[15]Table A6.5 in the appendix considers policy deviations in year $t-1$ rather than t and finds a similar pattern. The ability to distinguish the likelihood of future institution change using these lagged data suggests the ability of deviations in policy provisions to forecast the institutional change.

Table 6.9: How Under, Over or Expected Provisions of Policy Affect the Likelihood Change in Winning Coalition Size

Policy Provision		$\|\Delta W\| > 0.01$	$\|\Delta W\| > 0.05$	$\|\Delta W\| > 0.10$	Observations
CW	Under Provision	51.6%	22.1%	13.9%	868
	Expected Provision	41.8%	13.8%	7.8%	5,188
	Over Provision	56.2%	24.0%	15.6%	928
Private Goods	Under Provision	61.5%	31.8%	25.1%	758
	Expected Provision	41.2%	12.7%	6.4%	5,521
	Over Provision	56.3%	27.0%	17.7%	716
Public Goods	Under Provision	52.1%	21.8%	13.1%	747
	Expected Provision	42.5%	13.9%	7.8%	5,431
	Over Provision	54.8%	26.7%	18.2%	808
Assembly	Under Provision	52.2%	23.0%	15.1%	923
	Expected Provision	40.9%	12.8%	7.0%	5,221
	Over Provision	61.8%	29.9%	19.4%	850

The table shows the percentage of nation-year observation that experience change in winning coalition size between year t-1 and t+2.
Under-provision indicates the policy is at least one standard deviation less than the expected level of policy provision. Over-provision indicates policy more than a standard deviation larger than the expected level of policy provision.

level. The dashed curve looks at the probability of coalition change when the policies were under-provided and the dot-dashed line denotes the probability that W changed when the policies were over-provided.

The central pattern across all four panels of the figure is that coalition size is most likely to change, as theory tells us should be true, in regimes close to the middle on coalition size. Every panel shows an inverted U-shaped function as a defining characteristic of the probability that W's size will shift over the coming two years. The pattern is noteworthy for two reasons. First, it is what selectorate logic anticipates should be the case. Regimes at the extremes on coalition size are relatively invulnerable to credible threats of coups or revolutions and so their leaders are unlikely to feel great pressure to alter institutions. Second, the inverted U-shaped curves are contrary to the effects one might expect given regression to the mean. If regression to the mean were driving institution change then very small and very large coalition governments would have higher probabilities of making adjustments, converging toward the mean for W. That this does not happen further strengthens confidence in the theory-driven explanation that anticipates an inverted U-shaped function.

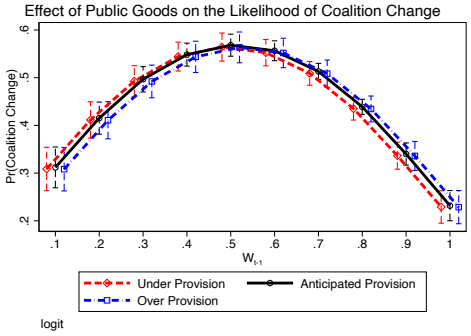
Shifting our attention to panel (a) we see that whether public goods are under- or over-provided proves to have little bearing on the probability that the coalition's size changes over the next few years. This absence of effect, however, does not repeat when it comes to freedom of assembly, a decrease in private goods provision, or an increase in private goods provision. As we see in panel (b),

too much freedom of assembly – too many coordination goods – greatly increases the chances that the coalition's size will require adjustment. For smaller coalition regimes, the under-provision of freedoms as well increases the odds, although modestly, that coalition size will change relative to the baseline pressures for change when assembly is provided at the level indicated by the incumbency constraint.

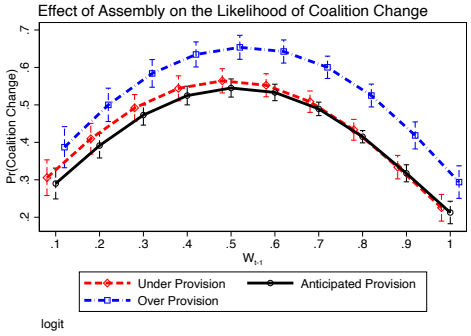
Panels (c) and (d) examine the impact of private goods provision on the likelihood of institution change. Panel (c) considers the case where the provision of private goods is declining. As the figure makes abundantly clear, when private goods are declining and the provision is below expectations institution change is highly likely. These are exactly the conditions likely to precipitate a coup due to the coalition being under-paid. In contrast, a leader who diminishes the over-provision of private goods, thereby reducing the risk of a coup, is less likely to need to change institutions. Panel (d) shows the effect on $|\Delta W|$ of the provision of private goods when that provision is increasing. The main effect of interest is seen by comparing panel (c) with (d). Given equivalent private goods provision, decreasing their provision, as in panel (c), generally implies a higher likelihood of institution change than arises if private goods provision is increasing, as in panel (d). It is evident from Figure 6.1 that the stability, or rather the instability of coalition size is seen to be strongly associated with W's initial size and with whether assembly and private goods provision are aligned with expectations or not.

Figure 6.1: Policy Provisions and the Likelihood of Any Change in Coalition Size: $|\Delta W| = |W_{t+2} - W_{t-1}| > .01$

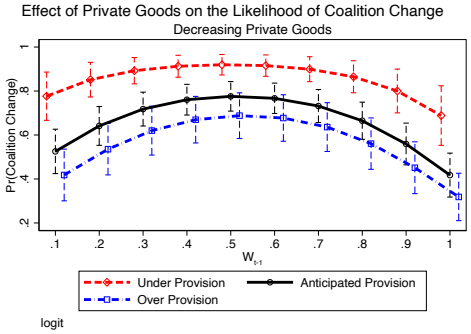
(a) Impact of Public Goods on $|\Delta W| > .01$



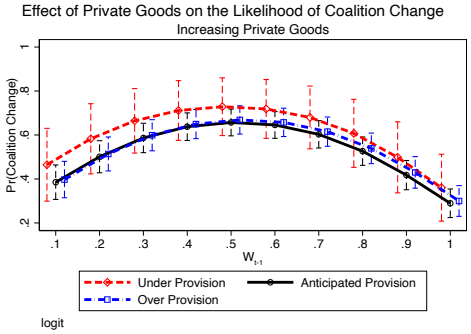
(b) Impact of Assembly on $|\Delta W| > .01$



(c) Impact of Private Goods Provision When Private Goods are Declining



(d) Impact of Private Goods Provision When Private Goods are Increasing



Our theoretical approach is focused on the anticipatory responses of leaders. However, one might be legitimately concerned that the results in Table 6.8 and Figure 6.1 are driven by the revolutions and coups that depose leaders rather than by leaders acting to avert such destabilizing events. To allay such concerns, Table A6.10, shown in the Appendix, replicates the analyses and either excludes all observations that involve leader change in year t or $t+1$ or excludes all observations that involve irregular leader change in year t or $t+1$. These robustness tests produce remarkably similar results and show similar abilities to predict change.

We conclude our assessment of step 1's investigation into institution change by evaluating the question that motivates this portion of our analysis: How well do our models do at sorting out the probability that a regime's coalition or selectorate size will be altered in the coming two years? Tables 6.10 and 6.11 dichotomize our predicted values to equal 1 if the probability of change is predicted to be at or above 0.5, coding them as 0 otherwise, and compares the distribution of predicted change or no change to what actually happened; that is, whether W or S_R changed over

Table 6.10: Ability to Predict When Winning Coalition Size Changes: Based on Model 1 of Table 6.8

		Change in W, $\|\Delta W\| > .01$		
		No	Yes	Total
Predicted Change in W	No	2,943	1,351	4294
	Yes	802	1,720	2,522
	Total Obs	3,745	3,071	6,816

$\chi^2 = 866.20$

Table 6.11: Ability to Predict When Real Selectorate Size Changes: Based on Model 3 of Table 6.8

		Change in S, $\|\Delta S\| > .01$		
		No	Yes	Total
Predicted Change in S	No	4,993	1,331	6,324
	Yes	184	308	492
	Total Obs	5,177	1,639	6,816

$\chi^2 = 431.59$

the subsequent two years.

The strength of association in each table is exceptionally strong as reflected by the χ^2 values of 866.20 and 431.59 respectively. Table 6.10 correctly predicts no change in coalition size 69% of the time and correctly predicts change in 68% of the cases where change is anticipated. Although change is much less frequent when it comes to the selectorate's size, still Table 6.11 is correct in 79% of the cases for which the model predicts no change and correctly predicts change when change occurred in 63% of the cases. The model's predictions are meaningful improvements over predictions based on the ex-post observed modal category – no change – in each case. The results tells us that in the absence of any additional information, predicting the modal category of no change in W results in falsely classifying about 45% of observations. Using the model's predictions, however, we reduce the error rate to 32% of observations incorrectly classified. If we use a fixed effects logit, then we can reduce this even further, to 25% misclassified cases.

The adjustment of institutions in response to deviations from the expected provision of policies, sometimes accompanied by increased political suppression and concerns about revolts or coups d'état, are not merely momentary fixes to any anticipated threat to a regime's survival. Because policy allocations are equilibrium consequences of coalition size and of a leader's length of time in office, once policies are modified it becomes necessary, as we have seen, to alter coalition size if the leadership is to survive. Policy changes and their institutional consequences are costly. If the incumbent increases private goods provision, for instance, then this should trigger a new institutional equilibrium in which the coalition is made smaller just as the analysis of purges suggests. Conversely, if public goods and coordination goods are increased to ward off a threat, then the

future size of the winning coalition must be expanded so that it remains aligned with long-term expenditures. Thus, policy change often necessitates changes in institutions and the direction of such changes ought also to be predictable. We, therefore, turn our attention to an assessment of the second step in explaining institution change, the direction of change.

6.4.2 Direction of Change in Institutions

We have seen that when policy provisions deviate from expectations that instability is likely if no corrective steps are taken and so, in anticipation of a threat to survival, leaders are likely to change institutions. The central interest at this juncture, therefore, is to identify when the risks of instability induce leaders to democratize their government by increasing W or to autocratize by decreasing W. Thus, having completed the first step in our analysis of institution change – predicting the conditions under which institutions are expected to be altered – we now complete the second step by predicting the direction and magnitude of change given the probabilistic expectation of change.

Table 6.12 uses three increasingly demanding models to predict the direction (and magnitude) of change in coalition size. The first model ignores the first step in our analysis and so predicts the direction of change in W without regard to our theoretically-driven prediction of whether we as analysts and, presumably, leaders as survival-oriented actors, had a reason to anticipate that making a change in W would be prudent. In the second model in the table we take advantage of ex post knowledge that in fact the size of the coalition changed over the coming two years. While this is ex post knowledge for us, the leader will have known if she chose to alter the coalition's size but, of course, she will not have known beforehand how it subsequently changed if she was replaced by a new leader. The third model in Table 6.12 makes use only of ex ante knowledge. It takes our predictions from the first step and classifies institution change as predicted to occur if the estimated probability that $|W_{t+2} - W_{t-1}| > 0.01$ is at least as large as 0.5.

Table 6.12 provides several insights that highlight the benefits of our two-step process for estimating institution change. While, of course, we restrict the number of observations as we move from the first model which ignores our two-step analysis, to the second model (that exploits ex post information about whether there were any changes in W) and on to the third model (in which we use the predicted values from our first-step to complete the second-step in predicting changes in the direction of W), we gain a great deal in explanatory power. The first model explains about 39% of the variance in subsequent changes in coalition size. The second model greatly improves the goodness of fit with an R^2 of 0.58. The third model, that fully exploits the strengths of the two-step approach, explains about 56% of the variance with information that any analyst or leader could know beforehand.

Continuing our dive into Table 6.12 we note a persistent pattern of considerable significance when it comes to working out the theory's empirical predictions about the direction (and magnitude)

Table 6.12: Political Threats, Policy Provision and the Direction of Institutional Change between years t-1 and t+2 ($\Delta W = W_{t+2} - W_{t-1}$) (Model 2 restricts sample to observations in which there is some change in W and Model 3 examines a sample where W is predicted to change)

	(1) All Observation	(2) Change in W	(3) Predicted Change in W
W_{t-1}	-0.210**	-0.459***	-0.379*
	(0.0700)	(0.113)	(0.150)
W^2_{t-1}	-0.0808	-0.0761	-0.0502
	(0.0670)	(0.0965)	(0.137)
Res(Public)	0.0157	0.0775	0.0318
	(0.0468)	(0.0670)	(0.0836)
ΔRes(Public)	0.0781	0.0137	0.0443
	(0.0542)	(0.0619)	(0.0686)
Res(Assembly)	0.127***	0.135***	0.122**
	(0.0299)	(0.0402)	(0.0436)
ΔRes(Assembly)	0.0556*	0.0438	0.0544
	(0.0271)	(0.0347)	(0.0341)
Res(Private)	-0.173***	-0.253***	-0.179**
	(0.0397)	(0.0558)	(0.0611)
ΔRes(Private)	-0.484***	-0.389***	-0.418***
	(0.0459)	(0.0569)	(0.0556)
Log(Tenure)	-0.00334	-0.000983	0.000748
	(0.00238)	(0.00359)	(0.00373)
Old or Sick	-0.00216	-0.00597	0.00526
	(0.00351)	(0.00629)	(0.00856)
$\text{Log(GDPpc}_{t-1}\text{)}$	-0.00326	-0.00417	0.00690
	(0.00631)	(0.0121)	(0.0168)
Growth_{t-1}	0.0000563	0.000495	0.000257
	(0.000169)	(0.000306)	(0.000417)
$\text{Log(Population}_{t-1}\text{)}$	0.0348**	0.0410+	0.0267
	(0.0129)	(0.0245)	(0.0332)
$\text{Resource Rents}_{t-1}$	0.000216	-0.000243	-0.000226
	(0.000298)	(0.000469)	(0.000391)
Observations	6815	3070	2515
Number Nations	164	162	156
Years	1972-2021	1972-2021	1972-2021
Nation FE	Y	Y	Y
Time Trend	Y	Y	Y
R2	0.389	0.582	0.558
R2within	0.318	0.472	0.414
Bootstrap N	6803	3013	3013
Bootstrap Fit	0.189	0.329	0.329

Standard errors in parentheses

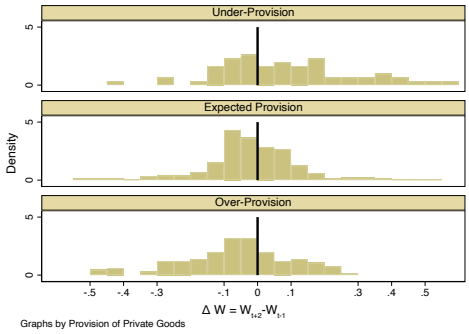
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

of changes in coalition size. Figures 6.2 and 6.3 highlight how the under-, over- or expected provision of policies affect the direction of institution change. The figures show histograms that display the size of change in winning coalition size, $\Delta W = W_{t+2} - W_{t-1}$, conditional on the analysis having yielded a value for $|\Delta W| > .03$. This size restriction is made to ease interpretation of the results exposed by the figure. As we should anticipate, there are so many instances of zero or negligible changes in W that if we did not exclude these cases the height for the column of zero or nearly-zero values for ΔW would dwarf the other columns in the figure, making the patterns harder to discern.[16]

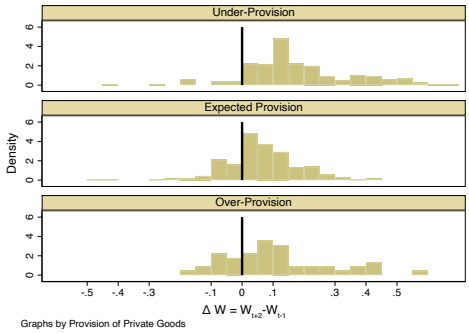
Figure 6.2 separates the case of increasing private goods and decreasing private goods (which are defined as $\Delta Res(Private) > .01$ and $\Delta Res(Private) < -.01$). The patterns of institution change shown in Figures 6.2 and 6.3, for private goods, public goods, and freedom of assembly, are driven by leaders taking actions to help them survive rather than showing institution changes that are the result of leader deposition. Figures A6.4 and A6.5, found in the Appendix, replicate these figures using only observations in which the leader is not removed in either year t or $t+1$. Those figures show similar patterns.

Figure 6.2: Change in Coalition Size and the Under, Over or Expected Provision of Private Goods

(a) Increasing Private Goods



(b) Decreasing Private Goods

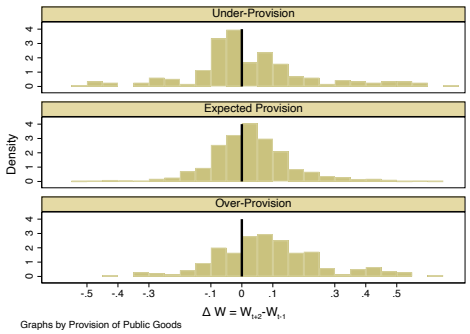


We see several policy effects that influence the shift in coalition size. In general, while smaller coalition regimes tend to increase their coalition's size and larger coalition governments tend to decrease theirs if any change occurs (in keeping with regression to the mean), the key drivers behind significant shifts in coalition size are related to the provision of private goods and coordination goods relative to expectations. If there are excess freedoms relative to expectations then the coalition tends to become larger. If instead there are fewer coordination goods, one can reliably anticipate that the coalition is likely to contract. Levels and changes in private goods also signal the trajectory of political institutions.

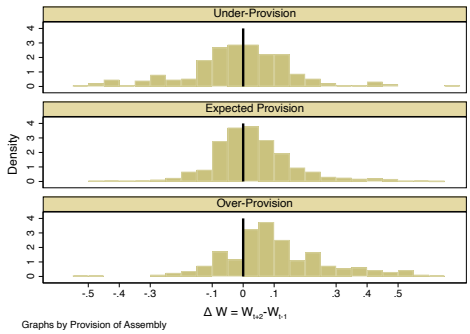
[16]Recall that in Chapter 3 we assume that the probability of institution change is near 0 ($\mu \to 0$).

Figure 6.3: Change in Coalition Size and the Under, Over or Expected Provision of Public Goods and Assembly

(a) Public Goods



(b) Assembly



If there are excess private goods, then the coalition is prone to diminish in size. Purges follow excess private goods provision. However, if the excess provision of private goods is being corrected; that is, if the over-provision is offset by a decrease in private goods, then the coalition's members can expect that the urge to purge diminishes. Decreasing the over-payment imposes pressure to enlarge the coalition while increasing the over-payment further reinforces the risk of a purge, as predicted by the theory. And, of course, if too few private goods are provided, then the coalition generally enlarges. Decreased corruption is an excellent predictor of democratization.

With considerable evidence about the direction of institution change in hand we now return to Model 1 from Table 6.8. That model provides a predicted probability that coalition size will change for each country-year observation. Rather than the arbitrary cut-point of 0.5 (analysed in Model 3 of Table 6.12), we now use those continuous probability predictions to help inform our analysis of step 2. To do so we conduct 100 simulations analogous to Model 3 in Table 6.12.

In constructing the data sets for each of our 100 simulations, each original observation is included in the simulation sample with the probability of change estimated for that observation in Model 1 of step 1. So, a case predicted to have a 0.90 probability of experiencing a change in coalition size has a 90% chance of being included in any simulation sample. A case with only a 0.25 probability of experiencing a change in W has a 25% chance of inclusion in any given simulation sample and so forth. Finally, using the specification shown in Table 6.12, we estimate the predicted direction and magnitude of change in W across the sample, repeating this process 100 times.

Figure 6.4 graphs the predicted and actual changes in W from these 100 simulations. As the graph shows, the two-step approach does a good job at discriminating the direction of change. Using analogous methods, Figure 6.5 depicts the relationship between actual and predicted changes in the size of the real selectorate. To further illustrate the ability to predict the direction of change in coalition size, Table 6.13 looks at actual and predicted changes of magnitude greater than 0.05

within these simulations having averaged the number of observations per cell rather than reporting all 100 simulations.

Figure 6.4: Repeated Simulation of Predicted Change in Coalition Size: $\Delta W = W_{t+2} - W_{t-1}$ (Observations selected into the sample based on the predictions of Model 1 of Table 6.8 and the directional predictions use the specification in Model 3 of Table 6.12)

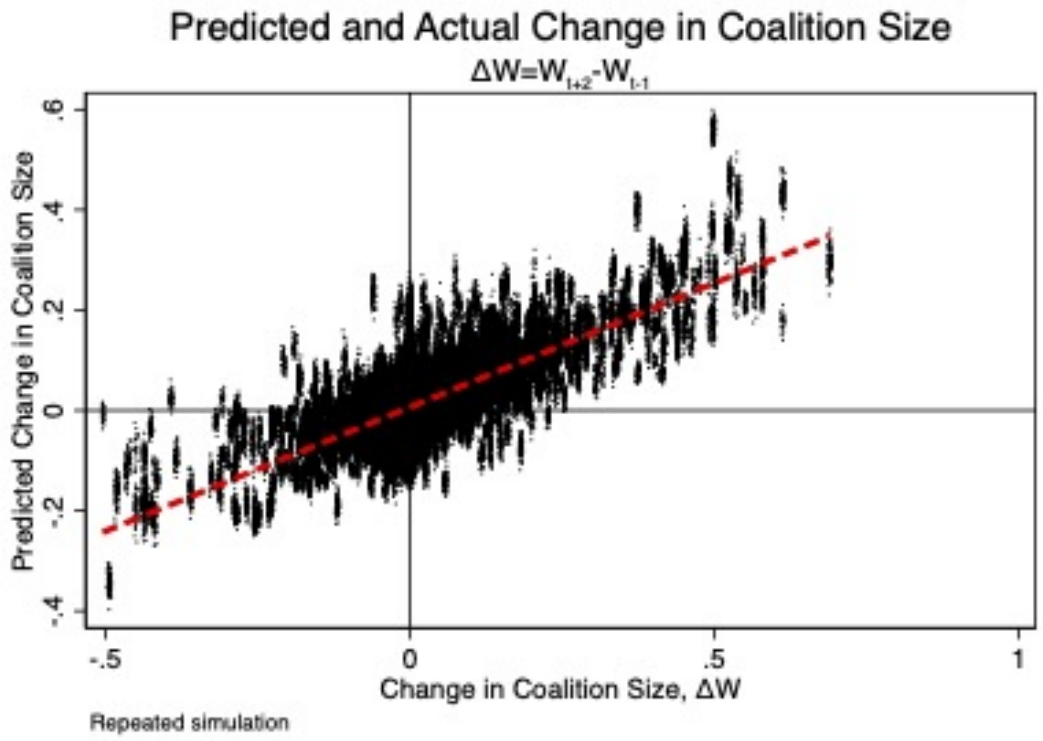


Figure 6.5: Repeated Simulation of Predicted Change in Real Selectorate Size: $\Delta S = S_{t+2} - S_{t-1}$ (Observations selected into the sample based on the predictions of Model 3 of Table 6.8 and the directional predictions use the specification in Model 3 of Table 6.12)

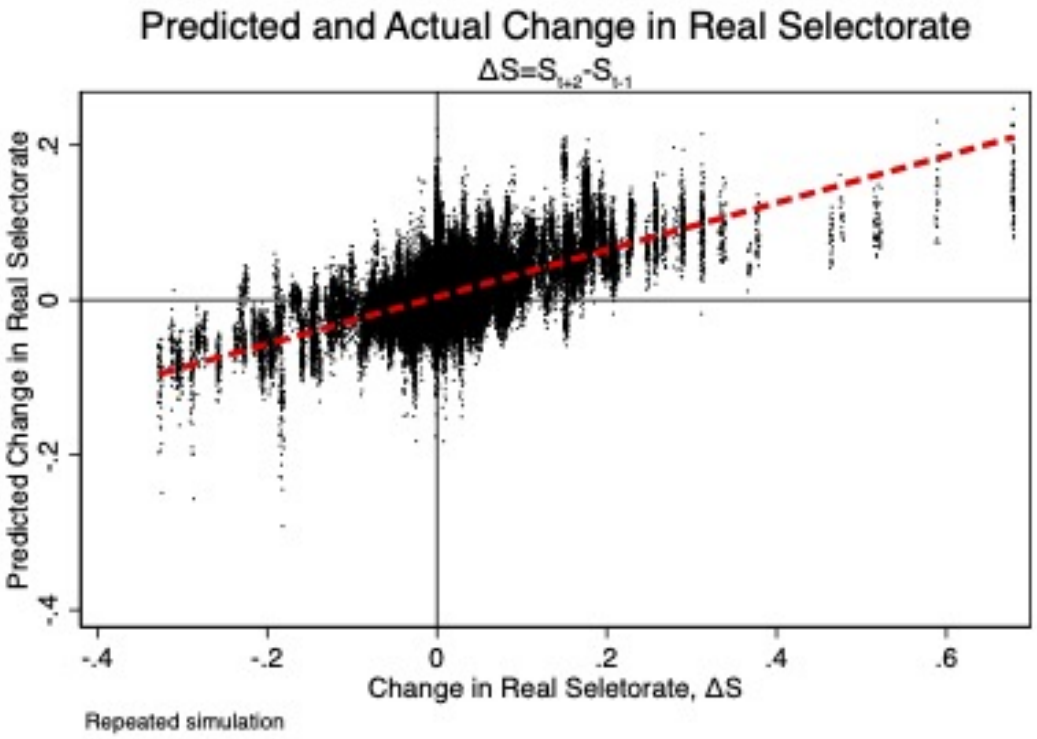


Table 6.13 suggests that the simulations aggregated according to the probability with which step 1 anticipates a change in coalition size does an impressive job of sorting out who moves to increase governmental accountability, who moves to decrease it, and who makes no meaningful shift. Approximately 77% of the predicted values are correct. If we treat the Ns reported in each cell as correct, remembering that they are the average N per cell across 100 simulation samples, then χ^2 is greater than 1,075.

Despite the excellent fit in Table 6.13, we have concerns with the table's interpretation. One concern with our anticipatory approach is whether institution changes are driven by leaders' anticipatory responses or whether all the institution changes are driven by events and their consequences for leader change. To assess this concern, Tables 6.14 and 6.15 separate the observations involving leader change in either year t or $t+1$ from those observation with no leader change.

Two differences stand out to us in Tables 6.14 and 6.15. First, when leaders have avoided being replaced and no institution change is predicted, there are virtually no cases in which institution

Table 6.13: Predicted versus Actual Change in Winning Coalition Size (based on 100 simulations using Model 3 of Table 6.12)

		Change in W			
		Decline	Similar	Increase	Total
Predicted ΔW	Decline	98 (34.83%)	176 (62.53%)	7 (2.64%)	281
	Similar	144 (6.37%)	1,988 (87.89%)	130 (5.74%)	2,262
	Increase	13 (2.37%)	249 (46.43%)	275 (51.20%)	537
Total		254	2,413	412	3,080

Predictions based on Model 3 of Table 6.12. Increase in W defined as $\Delta W > 0.05$ and decline implies $\Delta W < -0.05$. The numbers of observations represent averages within the 100 simulations.

Table 6.14: Predicted versus Actual Change in Winning Coalition Size With Leader Turnover in Year t or t+1 (based on 100 simulations using Model 3 of Table 6.12)

		Change in W			
		Decline	Similar	Increase	Total
Predicted ΔW	Decline	48 (50.22%)	43 (44.74%)	5 (5.04%)	95
	Similar	59 (9.37%)	512 (81.12%)	60 (9.51%)	631
	Increase	5 (2.49%)	50 (26.49%)	133 (71.03%)	188
Total		112	604	198	914

Predictions based on Model 3 of Table 6.12. Increase in W defined as $\Delta W > 0.05$ and decline implies $\Delta W < -0.05$. The numbers of observations represent averages within the 100 simulations.

Table 6.15: Predicted versus Actual Change in Winning Coalition Size Absent Leader Change in Year t or t+1

		Change in W			
		Decline	Similar	Increase	Total
Predicted ΔW	Decline	50 (26.94%)	133 (71.66%)	3 (1.41%)	186
	Similar	85 (5.20%)	1,476 (90.51%)	70 (4.28%)	1,630
	Increase	8 (2.30%)	200 (57.15%)	142 (40.55%)	349
Total		143	1,808	214	2,165

Predictions based on Model 3 of Table 6.12. Increase in W defined as $\Delta W > 0.05$ and decline implies $\Delta W < -0.05$. The numbers of observations represent averages within the 100 simulations.

change actually occurs. When institution change is defined as $|\Delta W| > 0.05$, 91% of the observations predicted not to change indeed experience no change. Second, both increases and decreases in W that exceed 0.05 are substantially more accurately predicted when there is leader change than when the ruler avoids being replaced. Both of these important differences reflect the nuanced, expected effects of the theory's life-cycle implications that we discussed in Chapter 3.

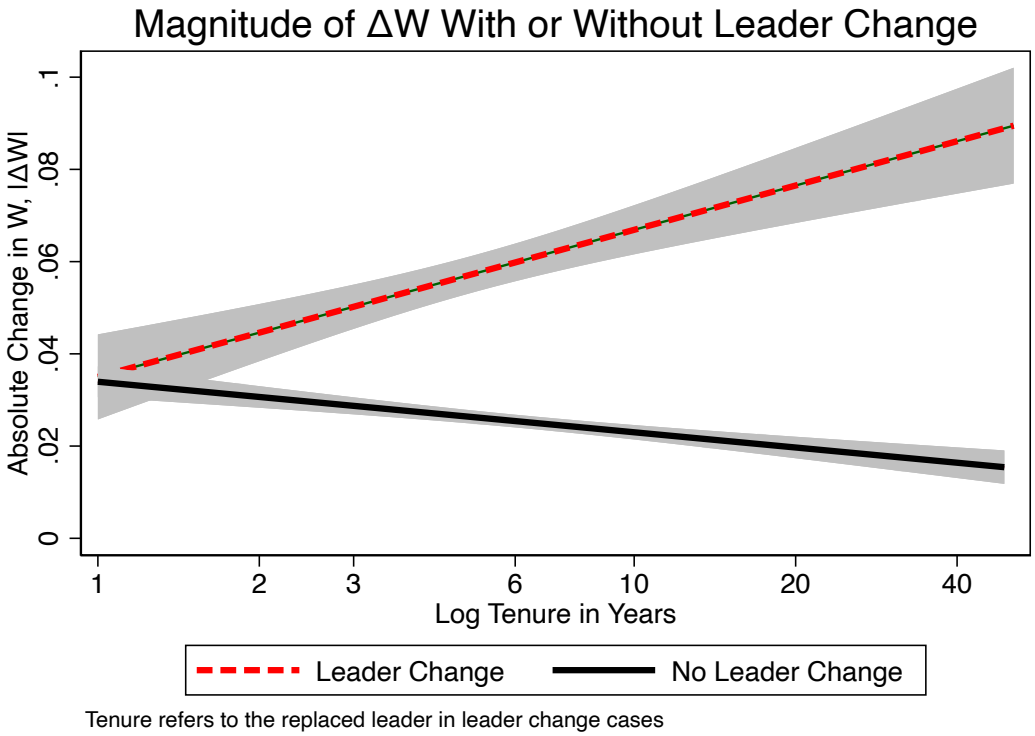
The theory tells us that leaders can provide less compensation and still maintain coalition loyalty the longer they have been in office. This result follows because coalition members have higher uncertainty about remaining in the coalition when the incumbent is newer in office compared to when she is a more seasoned leader. Thus, the expected net present value for coalition members rises as the ruler's tenure increases, meaning that new leaders must do more than experienced leaders in order to secure the coalition's loyalty. We proposed a conjecture in Chapter 3 based on the differences in compensation and confidence about remaining in the coalition as time in office increases. Specifically, we proposed that an important implication of the life-cycle effect is that compared to newly installed rulers, leaders who survive in office for a long time are less likely to change institutions and any changes they make are likely to be smaller. The negative coefficient estimates for Log(Tenure) in Table 6.8 support the prediction that institution change becomes less likely as tenure increases.

Given the loyalty of their coalition, long term incumbents can postpone adjustments that society clamors for. A new leader finds it harder to ignore these pent up pressures for change. As the theory informs us, new leaders tend to act as if they are reformers because they face a public goods bias. Experienced leaders, with their coalition feeling secure in its access to benefits, no longer face the same survival pressures as newcomers and so are less likely to reform. We saw evidence of this in Tables 6.14 and 6.15. The implication of tenure for institution change is the emergence of a wedge that is empirically graphed in Figures 6.6 and 6.7.

The figures plot the average magnitude of change in political institutions for new leaders and incumbents based on the tenure of the potentially replaced incumbent. The downward sloping line in each figure shows the best-fitting line and the 95% confidence interval for surviving leaders. As an incumbent's tenure increases she makes smaller changes. The upward sloping dashed line in each figure shows the best-fit and 95% confidence interval for the magnitude of institution change implemented by a newly installed leader as a function of her predecessor's tenure in office. When the previous leader had served only briefly, then the magnitude of change is similar for the old and new leader. However, had the replaced ruler been a long-term incumbent then the leader new in office is likely to make much larger changes to institutions. The emergence of a wedge alerts us to a secondary consequence implicit in the life-cycle effects. As a leader's hold on power becomes more secure, institution changes gradually erode.[17] New leaders reform and if they last long enough then they work to undo their reforms.

[17]As a simple illustration we compare the correlation between institution change within countries over time. Using the definitions, $\Delta W_t = W_{t+2} - W_{t-1}$, $\Delta W_{t+2} = W_{t+4} - W_{t+1}$, and so on, the pairwise correlation between ΔW_t and ΔW_{t+2} is 0.30 (0.0000), with the significance level shown in parentheses. This positive correlation indicates that the direction of change in coalition size in 2 years time is, on average, similar to the direction of change today. However, looking further into the future, we see the pairwise correlation between ΔW_t and ΔW_{t+4} is -0.08 (0.0000), the pairwise correlation between ΔW_t and ΔW_{t+6} is -0.07 (0.0000), and the pairwise correlation between ΔW_t and ΔW_{t+8} is -0.04 (0.000). Over the medium term, leaders tend to reverse the direction of institution change. There is an analogous pattern for temporal correlation in changes in the real selectorate. The pairwise correlation between ΔS_t and ΔS_{t+2} is .27 (0.0000), the pairwise correlation between ΔS_t and ΔS_{t+4} is -0.06 (0.0000), the pairwise correlation between ΔS_t and ΔS_{t+6} is -0.03 (0.0001), and the pairwise correlation between ΔS_t and ΔS_{t+8} is -0.02 (0.001).

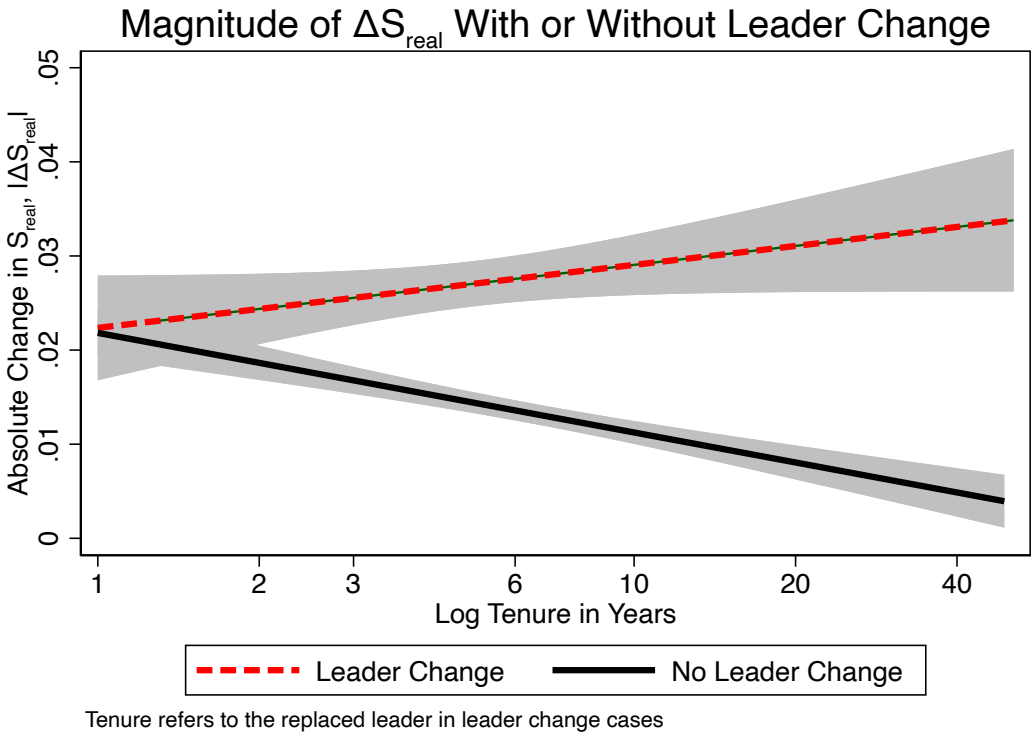
Figure 6.6: Magnitude of Change in Coalition Size With and Without Leader Change



The evidence we have seen makes clear that the theoretically-specified models provide a useful ex ante basis for anticipating the democratization or autocratization of governments two years into the future. The results strongly emphasize changes that are anticipatory rather than the product of successful coups or revolutions. Thus, the cases in which there was no leader change include thousands of observations in which the incumbent made anticipatory adjustments that may have helped her survive in power in the face of perceived threats. These systematic adjustments may look like no more than random changes if the anticipation of threats (in the absence of realized coups or revolts) is not taken into account. The theory has guided us to look for the destabilizing events that did not happen and we have seen that doing so provides useful insights into how government policies and institutions are likely to be modified in anticipation of 'evil intended,' helping the king to keep his scepter, his throne, his crown, and his head.

We will return in Chapter 8 to the strength of the predictive methods we have laid out to help understand some of the important developments around the world in the past few decades and at present. We close this chapter by drawing additional attention to perceived threats that did not manifest themselves; that is, to case of dogs that didn't bark.

Figure 6.7: Magnitude of Change in Real Selectorate Size With and Without Leader Change



6.5 Two Cases of Dogs That Didn't Bark

We closed Chapter 5 with three illustrative case studies. Those cases were chosen because they highlight the different factors that the extended selectorate theory points to as raising the risks of a coup d'état. Although, of course, it is valuable to explain coups – or revolutions – in terms of their theory-driven motivations, our central focus is not on the occurrence or consequences of coups and revolts but rather on their non-occurrence thanks to effective anticipatory counter-measures. It is exactly on such counter-measures that we now focus by illustrating when leaders increase or decrease their government's accountability in response to indications that if they do not act then they will face a high risk of deposition. We turn, therefore, to the contraction of Pakistan's winning coalition in 1978 and the expansion of South Korea's coalition in the 1980's.

6.5.1 Pakistan

Pakistan's earliest years set the stage for the difficult times that have followed since it achieved independence in August, 1947. Its first leader, Muhammad Ali Jinnah, a visionary who was highly regarded and admired, died of lung cancer one year after independence. He was succeeded by another well-regarded figure, Prime Minister Liaquat Ali Khan. Ali Khan made significant efforts to establish a market-oriented economy, a national military loyal to Pakistan rather than itself, and an educational system that would give Pakistan an opportunity to become a thriving, modern nation. But he also emphasized a risky blending of political and religious authority that historically has worked against a state's transformation into a thriving, modern nation such as he hoped to create. More critically, he found himself facing stiff opposition by socialists in West Pakistan and communists in East Pakistan (now Bangladesh). Indeed, he faced and defeated an attempted coup d'état by the military and by socialists in 1951 only to then succumb to an Afghan assassin's bullets later in that same year.

The death of Ali Khan turned Pakistan away from its democratic potential in 1951 and toward military dictatorship under General Ayub Khan. Its unlucky, tragic beginnings, it seems, set the stage for the difficulties that lay ahead, difficulties that included several spells of military government, quasi-elected governments, rampant corruption, and internal divisions. We pick up the account of Pakistan's political challenges in 1977.

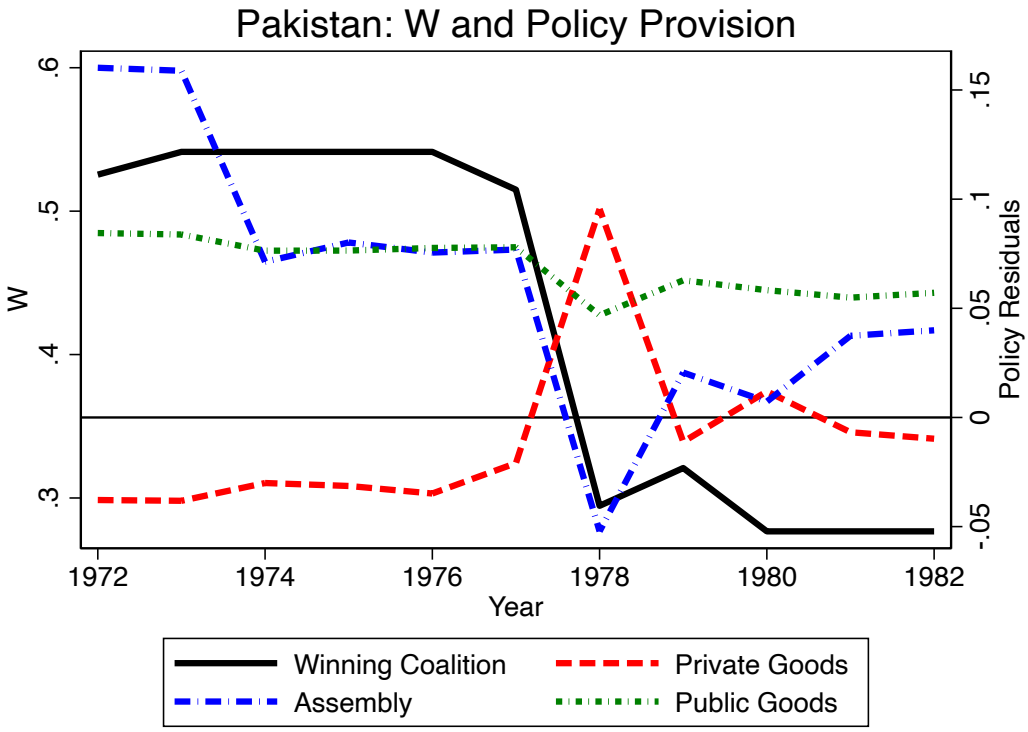
Zulfikar Ali Bhutto, who led Pakistan during its war with Bangladesh in 1971, was the country's president from 1971-1973 and then its prime minister from 1973 until he was deposed in a military coup in 1977 following what many claimed was his return to power in a rigged election. Bhutto was executed in 1979. When he fell from power on July 5, 1977 he was replaced by the Army's Chief of Staff, General Zia ul-Haq, who remained in power until his death in an airplane crash in 1988.

As is evident in Figure 6.8, Pakistan's winning coalition size (the solid black line) fell modestly between 1976 and 1977 and then plummeted between 1977 and 1978, remaining much diminished until about 1990 when it again rose to and exceeded the level it had attained in the early 1970s. It is the sharp drop in coalition size that we are interested in explaining.

Figure 6.8 provides us with a strong foundation from which to infer that if Zia (as he is known) was an astute observer he would have been nervous that a coup or revolution against his government was in the offing during his rise to power in 1977 and his efforts at consolidation of power in 1978. As we see, the provision of private goods spiked up from a nearly exactly right allocation in 1977 by Bhutto to a substantial over-provision in 1978. The theory tells us that too many private goods, especially when the amount is rising, is a signal to coalition members of an impending purge that could be countered by a pre-emptive coup.

In fact, the fear of purges was certainly warranted. Although as Chief of the Army Staff, appointed to that position by Bhutto, General Zia ul-Haq was very likely to be a part of Bhutto's winning coalition, all the members of that coalition must have understood that their positions of privilege were at risk in 1977-1978 under Zia as a new incumbent. As we know, incumbents shake

Figure 6.8: Pakistan 1972-82: Winning Coalition Size and Policy Residuals



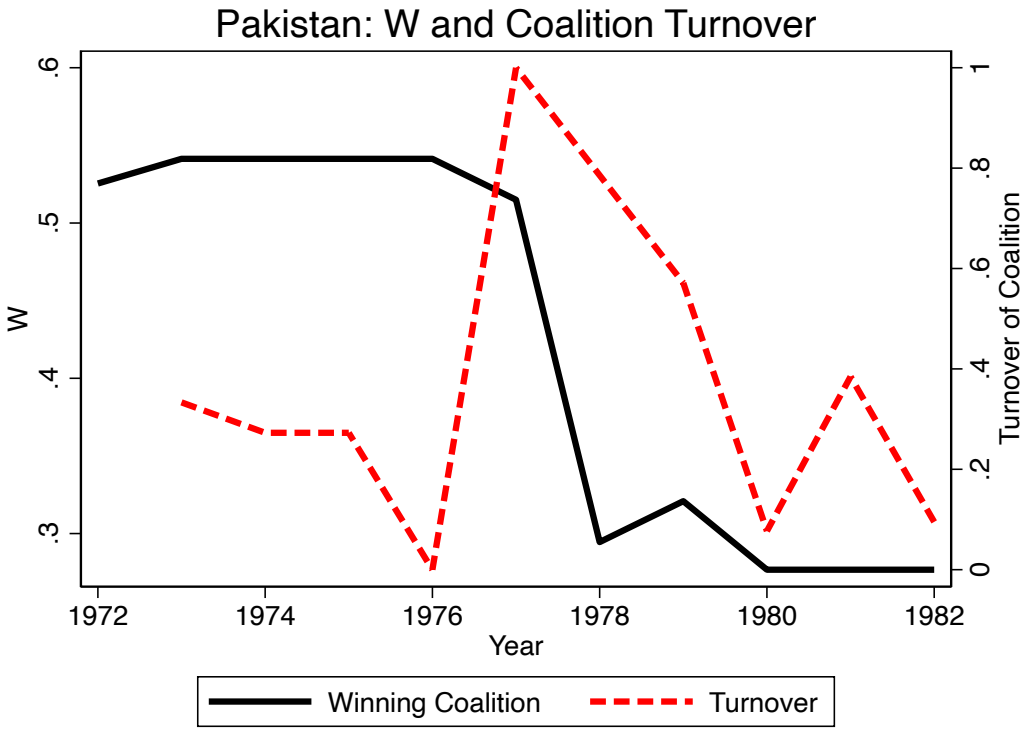
up the coalition they inherit in an effort to build-up affinities and foster loyalty to them. Figure 6.9 makes abundantly clear that, in fact, as the coalition's size dropped between 1976 and 1978, cabinet turnover accelerated, slowing down after 1978.

Of course, plummeting freedom of assembly, excess private goods, heightened turnover, and a newly-installed leader all meant that coalition loyalties and mass support were likely to be at low points. The risk of a coup or a mass uprising must have been elevated and, as we see in Figure 6.10 both $\widehat{Coup}$ and $\widehat{Rev}$ increased substantially between 1977 and 1978.

Recognizing the signs of a high risk of a coup or revolt against his newly-installed regime, Zia took steps he thought appropriate to thwart the threat. He purged before a counter-coup could be organized, shrinking his winning coalition for as long as he remained in power. And when he saw hints of action against his regime he took swift, decisive action to quell the risk.

The signs of a threat arose beginning in late December, 1977 and were brought to a brutal close on January 2, 1978, just six months after General Zia overthrew Bhutto and seized power for himself. The precipitating event was a peaceful workers strike against the Multan Colony Textile Mills. Colony Textile Mills was a large business, operated by a rich and powerful family that

Figure 6.9: Pakistan 1972-82: Winning Coalition Size and Turnover of Cabinet Members

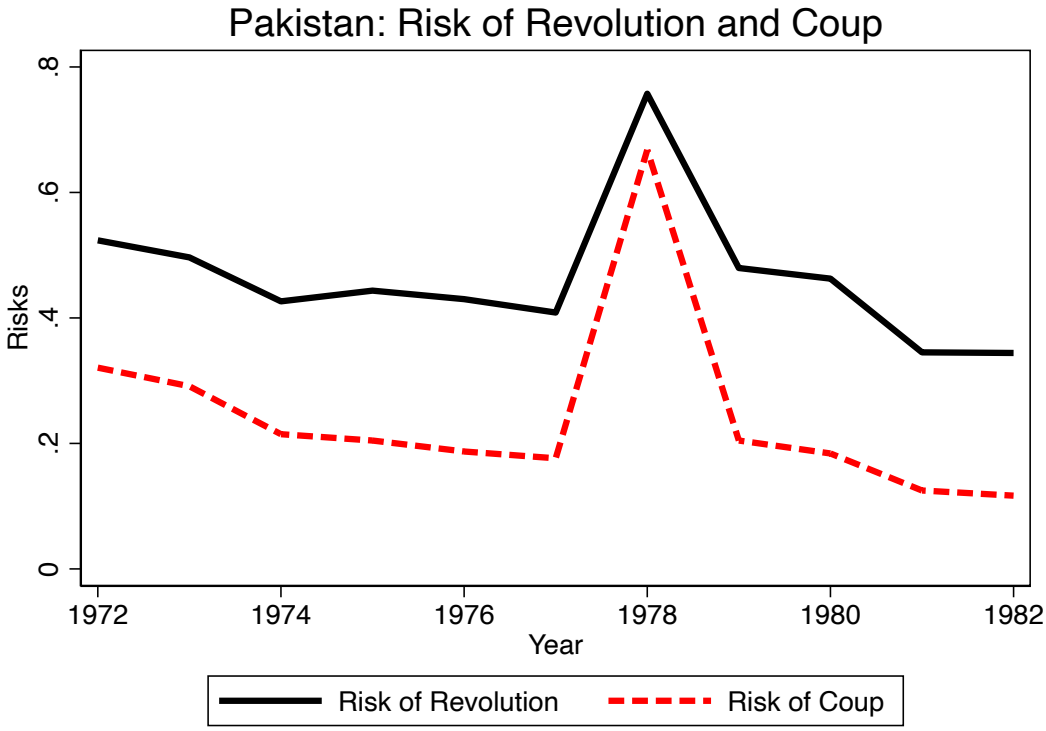


employed about 5,000 workers at the mill. The workers claimed that the profitable business owed them back bonuses under the Pakistani government's 1972 Labour Policy.

The mill-owner's daughter's wedding was planned for January 2nd and Zia was invited to be a guest. Fearing that the wedding might be attacked, he ordered the state's paramilitary force to shoot strikers and crush the potential rebellion (Jaffrelot, 2015). As one observer reported, "[A]ll hell broke loose! The paramilitaries started firing directly at the workers who were gathering for a peaceful gate meeting. In a scene of indescribable horror workers screamed and stampeded over the bloodstained corpses of their workmates, crushing many others as they desperately tried to evade the carnage. Blood was everywhere, streaming from the bodies of the workers whose only crime was to ask for their basic rights. The firing continued uninterrupted for three hours. By six-o'clock in the evening, when darkness had set in, the state forces had 'conquered' the textile mill workers. In the factory compound and lawns the state forces had prevented the bodies of the injured from being taken to hospital. . . . Dozens had died on the spot. Several injured had died due to excessive loss of blood because they were prevented from being rushed for medical treatment" (Khan, 2009, p. 310-311).

And so it was that the dogs of coup and revolution failed to bark, crushed by the power of the state and the urge by General Zia ul-Haq to survive politically.

Figure 6.10: Pakistan 1972-82: Risks of Revolution and Coup



6.5.2 The Republic of Korea's Transition to Democracy

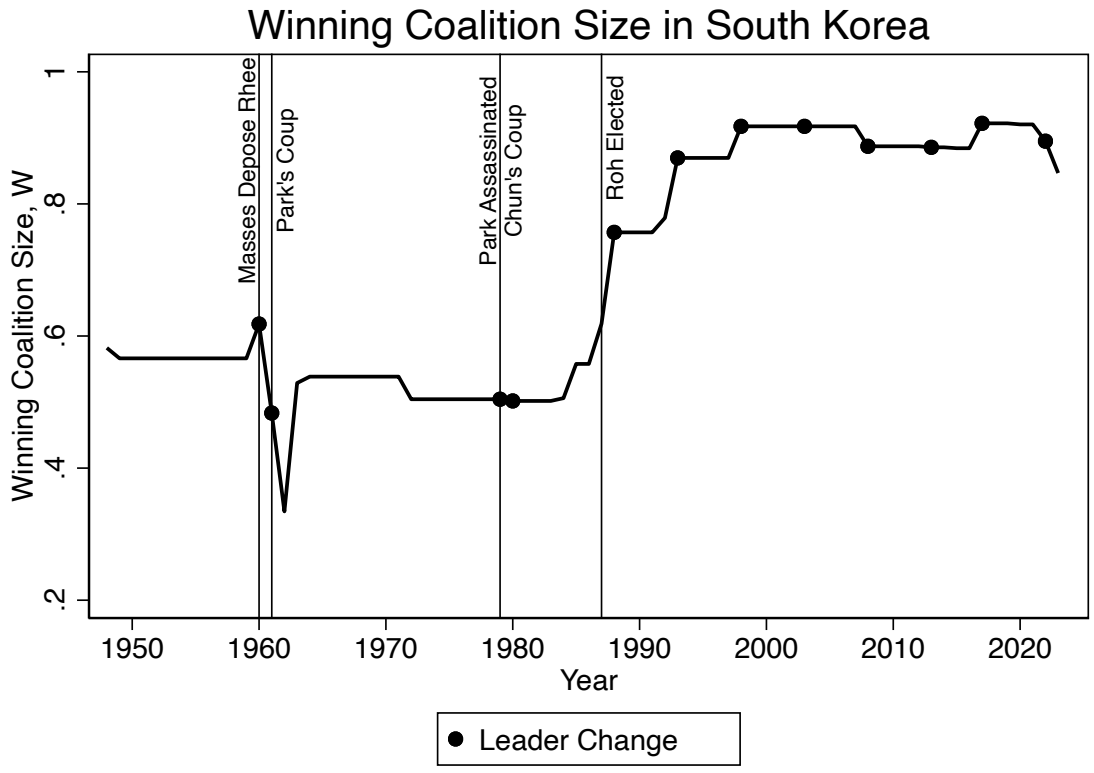
Today South Korea is a rich, vibrant democracy with an average per capita income of around $35,000, a little less than Japan, nearly three times that of China, and perhaps 27 times that of North Korea. In 2023 the Republic of Korea, to use its official name, had a winning coalition size of 0.847, down from a peak of $W = 0.922$ between 2017 and 2019. Despite this slight decline, South Korean institutions are on par with those of West European democracies. In comparison, in 2023 North Korea's winning coalition size was $W = 0.170$, at around the 4th percentile for that year, and its GDP is probably around $1,300 per capita. Life is pretty good for most people in South Korea. In North Korea, Kim Jung-Un's cronies are affluent, but virtually everyone else is poor, hungry, under-educated and isolated.

The comparison between South and North Korea is all the more stark because following the

end of World War II both nations were at similar starting points. Japan occupied the whole of the Korean Peninsula from 1910 to 1945, so both the North and South had identical backgrounds. At the end of World War II, Russia occupied the North of the Peninsula, the part that became the Democratic People's Republic of Korea, and the United States occupied the South of the Peninsula, the area that became the Republic of Korea. Following three years of war after the 1950 invasion of South Korea by North Korea, an armistice was agreed to that effectively reestablished the pre-conflict border. At that time, and for several years after, if either part of the peninsula was thought to have better prospects it probably would have been the North since North Korea is better endowed with natural resources than the South.

Our interest here is in the factors that led the South to become a fully functioning democracy in the late 1980's while North Korea has remained an autocratic dictatorship under the leadership of the Kim family; Kim Il-sung until 1997, Kim Yong-il from 1997 to 2011, and Kim Jong-un since 2011.

Figure 6.11: The Evolution of Winning Coalition Size in South Korea



We start our account of South Korea's path to democracy with Figure 6.11 which shows the evolution of South Korea's winning coalition's size. The vertical lines on the figure highlight several key events. The first President of South Korea was Syngman Rhee, who ruled until April 1960 when he was deposed through mass protest. Rhee's regime was extremely corrupt and repressive, with tens of thousands of opponents jailed. Throughout this time, South Korea's winning coalition remained below 0.6. Against this background of corruption and repression, Rhee repeatedly won re-election. However, things unraveled for Rhee when he tried to have Lee Ki-poong, his adopted son, elected as Vice President. Opposition claims that the election was rigged sparked widespread popular protest. Following the shooting of demonstrators, student-led protests escalated. With his security forces unwilling to suppress these escalating protests, the U.S. evacuated Rhee from the Presidential Blue House and sent him into exile in Hawaii.

Following Rhee's departure, Yun Posun was elected president, although under the parliamentary system of the Second Republic it was Prime Minister Chang Myon who really held power. With a newly installed leader, with private goods being over-provided and with that provision on the increase, coupled with ongoing purges of the military, conditions were ripe for an 'over-provision' style coup. This is exactly what happened. The Second Republic lasted less than two years before Park Chung Hee came to power as a military ruler. He was subsequently (indirectly) elected as president under the Third and Fourth (Yushin) Republic Constitutions. While stifling electoral competition, Park initiated much of the economic development known as the Miracle on the Han River.

No leader dislikes the extra revenue from economic growth; yet, in the long term, improvements associated with increased productivity make it difficult to contract the winning coalition. As examined in Chapter 2, large gains in productivity, such as those achieved in South Korean society, increase the desirability of democratization and make contractions in W less appealing to coalition members, creating strong societal and institutional tensions. These factors were strongly at play in South Korea as Park oversaw economic expansion.

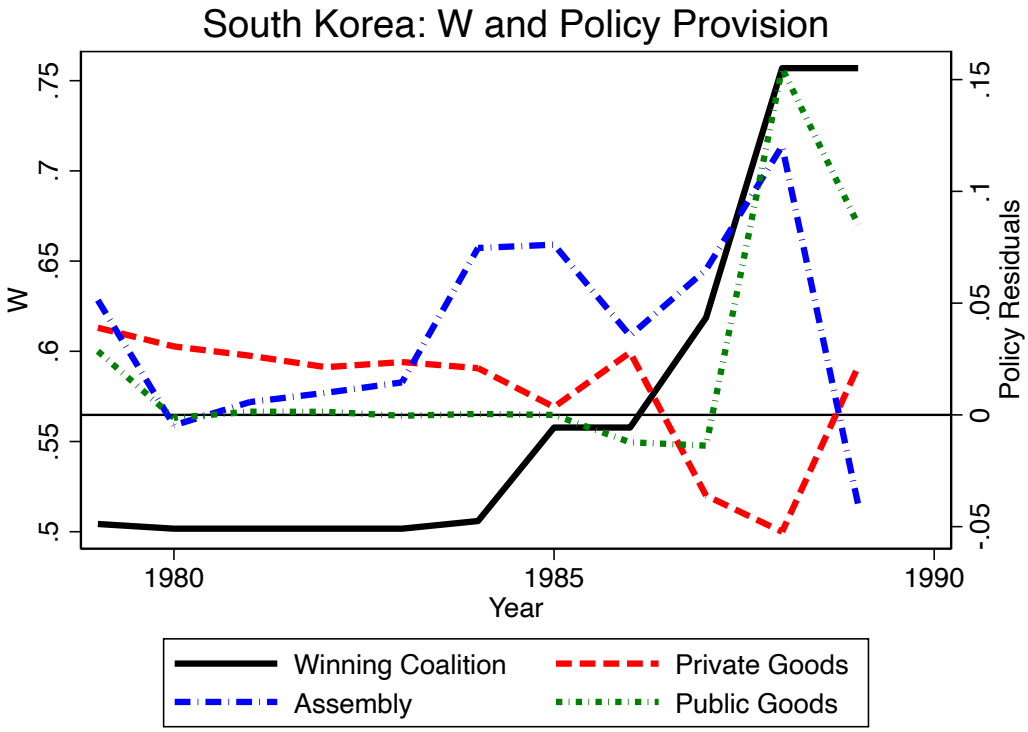
On October 26, 1979, under circumstances that remain unclear, Kim Jae-gyu, a friend and Director of the Korean Central Intelligence Agency, shot and killed Park. Under the Yushin Constitution, Prime Minister Choi Kyu-hah became acting president. Shortly after, in December 1979, Chun Doo-hwan organized a coup and progressively obtained more power.[18] By May 1980, Chun was the de facto leader of South Korea.

Chun's rise to power provoked mass protest. His chosen response was suppression. In May 1980 he declared martial law and used lethal violence against protesters. Tens of thousands of people were arrested and sent to re-education camps. In October 1980, he abolished all political parties before amending the constitution and creating his own political party, the Democratic Justice Party. Figure 6.12 shows why Chun's supporters were willing to engage in suppression. While in 1980 public goods and assembly were provide at almost exactly expected levels, private goods

[18]Interestingly, the coup data we utilize, Powell and Thyne (2011), do not code this event as a coup.

provisions exceeded expectations. Suppressing the people is unpleasant work and so Chun ensured his backers were well compensated. Yet Chun's policy provisions shifted over time. While public goods remained close to expectations, Figure 6.12 shows that freedoms were over provided and by 1987 private goods were under-provided.

Figure 6.12: South Korea 1979-89: Winning Coalition Size and Policy Residuals



As the level of assembly exceeded expectations in the mid 1980's, labor and student groups started to demand direct elections and opposed any moves to amend the constitution to allow Chun to run for another term. On June 10, 1987 Chun announced that his chosen successor, Roh Tae-woo, would be the Democratic Justice Party's candidate at the 1987 presidential election. He also deferred constitutional reforms until after the 1988 Seoul Olympic Games. While earlier protests had been predominantly composed of students and labor movements, these announcements resulted in widespread protest with perhaps as many as 1.5 million participants. With Chun no longer paying his supporters enough private goods and the excess of political freedoms making it relatively easy for citizens to take to the streets, suppression was unlikely to succeed. Instead, on June 29, 1987 Roh announced the regime's acquiescence to the protesters' demands. Political prisoners were released and constitutional reforms were approved on October 12. However, with

the opposition ranks divided, they could not agree on a single candidate as the election drew near, weakening their electoral position. The opposition's prospects were further worsened – and the prospects of the hard-line military were bolstered – when a Korean Air flight exploded, with the disaster blamed on North Korean infiltration. Roh won the December election with 36.6% of the vote.

With the winning coalition size increased by the 6th Republic's competitive direct elections and South Korea being an increasingly high productivity society, very few people beyond the leader stood to gain from a shift back to more autocratic institutions and, as Figure 6.11 shows, the winning coalition continued to expand throughout the 1990's. Chun and Roh both faced high risks of revolution and coup. During the time that freedoms were held in check and Chun was slightly overpaying his coalition, the method to ameliorate the threats of the early 1980's was suppression. However, with more-than-expected provision of coordination goods (Assembly) and with the coalition receiving too few private goods, Chun and Roh's best chance to avert irregular deposition by 1987 was to expand the winning coalition. Anticipation and amelioration of threats rather than the realization of threats in the mid and late 1980's led to democratization and stopped the dog from having to bark.

6.6 Summary: Change and Survival

How best to survive in office is the ultimate challenge faced by any leader. We have established a theoretically-informed way to predict the ex ante threat of a coup or a mass uprising that would put a leader's hold on power at risk. We have seen that the expectation of such risks is more informative about counter-maneuvers by leaders than is knowledge of the actual realization of a coup or a revolution. When mass uprisings are thought to be on the horizon, we saw that leaders engage in torture and extra-legal killing as a means to suppress the threat. When, however, the dominant threat to the regime is believed to come from within the membership of the winning coalition, then we saw that purges are likely to follow.

Torture and purges are a first step on the road to political survival for leaders who believe they are at risk but, as we have noted, these are only the first steps. Leaders modify their resource allocations in response to threats, making the appropriate adjustments to offset the threats they face. When they anticipate threats both from the masses and from their coalition, then they face a difficult challenge since the policy adjustments that buy off one threat may well exacerbate the other. Regardless of which threat is anticipated to loom largest, policy adjustments necessitate institutional adjustments as well. As the selectorate theory indicates, the allocation of resources between public goods, including coordination goods, and private goods is significantly driven by the institutional configuration of the regime. If public goods expand then coalition size generally needs to expand to be in equilibrium with the allocation of resources. Conversely, if private goods are increased then the coalition's size generally needs to decrease to restore the equilibrium between how

revenue is spent and how accountable the government is. The evidence adduced here demonstrates that the expected alterations in institutions over a two year window in fact follow from deviations in expected resource allocations given the size of the coalition at present. And the results show us that, as anticipated by the theory, more experienced leaders make much smaller adjustments to the size of their coalition and real selectorate than newer leaders when any adjustment is called for. The life-cycle of leaders combined with the incumbency constraint and deviations from it, aggregate to produce reliable expectations about when governments become more democratic or more autocratic.

All of the results reported thus far point to the adjustments in suppression, policy change, and institution change that are expected to foster regime and leadership survival. Political survival is, after all, the central motivation behind all of these actions according to selectorate reasoning. Thus we must now establish that the predicted stimuli to change and the predicted responses to threats to a regime's stability in fact protect, promote, and enhance leader survival. And so we now turn to the question of how the adjustments we have investigated influence subsequent political survival.

Chapter 7

Survival

A leader's first and most important priority is to stay in power. Without power, nothing can be done. Those who are out of power cannot implement policies; they cannot salt the state's wealth away in secret bank accounts; they cannot direct government revenue to their civic-minded, pet projects; they cannot promote their friends; and they cannot suppress their enemies. In place of the power they enjoyed, deposed leaders may well face mortal dangers. Only by clinging to office can these dangers be averted. To avoid these dangers, leaders sometimes must take critical steps that alter their approach to governance. As we saw in Chapter 6, they sometimes modify policies or alter the institutions that regulate their government and shape their incentives as rulers. We have established that they take these steps in manners that are consistent with the propositions derived from selectorate theory. But one critical task remains before we can feel confident that the theory's predictions provide a reliable explanation of leader actions. Hence, in this chapter we seek to discover whether the hypothesized corrective actions predicted by the theory to influence the prospects of political survival in fact influence survival as predicted.

It is a tall order to evaluate predictions about political survival. Doing so requires intense counterfactual reasoning. It is hard to know about the consequences of revolutions or coups that never happened. It is hard to know the reasons that a leader was not overthrown. We cannot ever really know what led to political survival. What we can discern are the factors that influenced the observed instances when leaders failed to survive. In fact, if leaders were perfect at avoiding deposition – as simpler expositions of the selectorate theory assume – then we would never be able to discern what made them succeed. It is failures to survive and the difference in circumstances between when those failures occur and when leaders continue in office that give clues to what helps rulers and what hurts their prospects of political survival. While success, according to selectorate theory, and according to some other models concerned with authoritarian governance (Gehlbach, Sonin and Svolik, 2016; Geddes, Wright and Frantz, 2018; Svolik, 2012), is about the choices and actions of leaders, to know how those actions and choices worked we need to look at the instances

when they were not taken to see if their absence heightened the probability that the leader failed to survive.

7.1 Survival and Counterfactual Challenges

Failures to survive can result when circumstances compel a leader to gamble on what action to take. The complexity of choices leaders must make is compounded by the fact that choices are also being made by coalition members, by members of the selectorate, and perhaps by some among the disenfranchised, each of whom may perceive growing threats to their own well-being or see opportunities to improve their future circumstances by taking action against their government. We theorized about these complex, interacting choices in Chapter 3 and evaluated their implications for coups and institution changes within the global game framework we proposed. As we noted in Chapter 3 and emphasize here, from the leader's perspective, the choices made by others may conflict with one another, leaving even a leader who is sure of what is happening unsure of whether it is better to neutralize the coalition's threat of a coup or to counter the threat of revolution within the masses. The counter-moves against these threats may not only be different; they may be incompatible. These incompatibilities mean that the analysis of leader survival in the face of real or expected threats requires counterfactual analyses of what might have happened had the leader, the coalition, and/or the masses made different choices. Although such counterfactual reasoning is essential here, it is, unfortunately, not the way that the risks and realizations of coups and revolutions have generally been studied in the past.

When studying instability, most researchers focus on trying to understand events that happen. They are often concerned with the occurrence of events like coups or revolutions and the factors that may trap regimes in those destabilizing circumstances (Goldstone, 2016; Moore, 1993; Skocpol, 1979). They rarely, if ever, look at what is happening in the absence of observed threats and yet, from our perspective, these anticipatory actions are the essence of what is required to understand political change. For us, actual coups and revolutions represent anomalies rather than reflecting the consequences of general, survival-oriented principles. They are examples of leader failures. Hence, our attention is drawn more to the things leaders do so that coups and revolts do not happen rather than to explaining the circumstances when they do happen.

The journalist, Ryszard Kapuściński, expressed eloquently the centrality to politics of nipping anticipated, possibly imagined threats in the bud. He described this process as the political world of "silence." As he put it:

> People who write history devote too much attention to so-called events heard round the world, while neglecting the periods of silence. This neglect reveals the absence of that infallible intuition that every mother has when her child falls suddenly silent in its room. A mother knows that this silence signifies something bad. That the silence

> is hiding something. She runs to intervene because she can feel evil hanging in the air. Silence fulfills the same role in history and in politics. Silence is a signal of unhappiness and, often, of crime. It is the same sort of political instrument as the clatter of weapons or a speech at a rally. Silence is necessary to tyrants and occupiers, who take pains to have their actions accompanied by quiet. (Kapuscinski, 2013, p.189-90)

With Kapuściński's admonition firmly in mind, our primary objective is to illuminate how well leaders do at avoiding their loss of power whether overt efforts to depose them have or have not been observed; whether dissent is loud and explicit or silent and feared but not manifested. This focus on threats that did not materialize, while implicit in some other studies of instability, is rarely explicit in that neither theorizing nor empirical analysis generally assesses political change as a systematic process driven by events that did not happen; that is, the proverbial dog that did not bark with which we concluded Chapter 6. Acemoglu et al. (2008) and Svolik (2013), for instance, provide important and insightful models of how the inability to make credible commitments over future benefits contributes to the occurrence of revolutions, military coups, and other destabilizing events. They attend very little, if at all, however, to actions taken in the absence of events but in the presence only of the belief that such events might happen if the leader does not adopt anticipatory counter-measures.

In contrast to the general silence regarding events that do not happen, Acemoglu, Egorov and Sonin (2015),Gieczewski (2021) and Meng, Paine and Powell (2023) address a snowball effect in which the anticipation of adverse outcomes averts some action, but they do not explicitly model or test the substance or consequences for leadership survival of corrective actions in anticipation of destabilizing events. We tested the choice of actions in the face of anticipated threats in Chapter 6. We saw that beliefs about threats and the sources of those beliefs are better predictors of political changes than are the actual realization of coups or mass uprisings. That discovery reinforces both Kapuściński's concern that, "People who write history devote too much attention to so-called events heard round the world" and our focus on the importance of anticipating threats and trying to neutralize them before anything overt happens. Now we evaluate whether the anticipatory choices we have analyzed improve the prospects of political survival.

If our theory is right, failures by leaders to survive coups or mass uprisings, while highly visible, significant historical events, should be relatively rare. Much of the time leaders succeed in thwarting prospective coups or revolutions, meaning that irregular removal from office should be observed much less frequently than attempted coups or revolts designed to deprive a leader of her hold on power. And observed threats, in turn, should be much less frequent than the mostly unobserved, 'silent' instances of averted plots to initiate a coup or revolution. When leaders anticipate threats ($\widehat{Coup}$ and $\widehat{Rev}$) then they mostly take successful steps to avoid the actual realization of coups, mass uprisings, or their own loss of power. These pre-emptive steps mean that we should observe many more cases of changed policies and changed institutions than we observe overt efforts to depose leaders as the explanation for changed approaches to governance. We saw in Chapter 6 that this

is, in fact, what we observe.

We are confident that every leader understands that the biggest challenge to political survival resides in the simple fact that there are many ways they can lose power and the many different ways may call for different actions to neutralize threats. Keeping in mind that removal by any means is the thing most to be avoided, we examine the two domestic categories of ouster that encapsulate the ways leaders lose power without being overthrown by a foreign adversary; namely regular and irregular removal. By regular removal we mean ouster by routine, legal means such as the expiration of one's term in office under term limits, electoral defeat in a democracy, or voluntary retirement. By irregular means we mean deposition as a consequence of a coup, mass uprising (revolution, civil war), or by assassination.

Regular removal can be harder to avoid than irregular ouster even if regular removal is easier to anticipate. Irregular ouster is typically harder to anticipate than regular removal. Its consequences are also often severe, with irregularly deposed leaders being particularly likely to be killed, imprisoned or forced into exile (Croco, 2011; Debs and Goemans, 2010; Escribà-Folch, 2016; Goemans, 2008; Krcmaric, 2020; Radtke, 2020). If a leader fails to deliver enough rewards to her supporters to satisfy the incumbency constraint, then she will succumb to regular deposition unless she can change the rules by which she governs. In small coalition systems leaders typically have significant discretionary resources from which they can provide extra rewards for their supporters, meaning that leaders can often avoid removal. However, in such settings, if supporters fear displacement from the coalition and, therefore, the loss of valuable private benefits, then a coup may arise. In small W systems irregular deposition remains a constant threat.

In contrast, in large W systems regular deposition is typically the most salient threat that leaders face. Such leaders have few discretionary resources with which to cover any shortfall in policy provision. Hence, electoral losses and deposition within the existing rules are constant threats for large coalition, democratic leaders. Yet, such leaders have little to fear from irregular deposition. As both the swoosh curve and our empirical evidence demonstrate, it is exceedingly difficult to muster a sufficiently large number of people to overthrow large coalition governance and it is even harder if the society also enjoys a high level of economic productivity. Democratic leaders are almost never ousted from office irregularly and yet they typically have shorter times in office than non-democrats. They are, by institutional design, vulnerable to regular removal, with limited options that have a credible prospect of succeeding at keeping them in office.

Naturally, the expectation of regular removal, or irregular removal by the masses, or irregular removal by elites involve distinct threats and, therefore, call for different responses. We have seen, for instance, that the use of extra-legal killing and torture are aimed at thwarting irregular removal by a mass uprising while purges are used to thwart irregular removal by elites. Likewise, the evidence shows us that some causes of instability call for improving the public's welfare and freedom while others dictate that such general social benefits should be diminished and replaced with a burgeoning of private goods, like corruption opportunities, distributed to a small set of cronies. Sometimes,

threats are best averted by making one's government more autocratic, meaning that it is optimal to shrink the winning coalition's size. But other times the opposite response to threats is called for. Sorting out what is best to do under different threats is no easy matter but getting it wrong may well be the difference between life and death.

In the analyses that follow we focus on the risks of regular and irregular removal by domestic actors (and not on deposition by foreign powers). Although in our supplementary material we disaggregate between irregular deposition by the masses (successful revolutions) and irregular deposition by the elite through such mechanisms as coups, in the main text we aggregate these processes. Leaders take proactive steps to avoid irregular deposition; as such, successful deposition should be infrequent. In fact, successful depositions by the masses are particularly rare relative to deposition by the coalition (Geddes, Wright and Frantz, 2014; Kendall-Taylor and Frantz, 2014; Svolik, 2012). Within the 9,626 leader-year observations that appear in our baseline analysis, there are only 40 cases of irregular removal by the masses even though about 14% of the observations experienced revolutionary activity. Of course, as the formal model in Chapter 3 highlights, revolution can often work indirectly by increasing the likelihood that the coalition deposes the leader to pre-empt the dangers to them from a successful revolt. Such irregular removals by the coalition are significantly more common than successful revolutions. Our data include 182 cases of irregular removal by the coalition out of 530 observations in which there was a coup attempt. Interestingly, 413 of these 530 attempted coups occur in the same year in which the relevant leader also experienced an attempted revolution.

Far more leaders succumb to coups than revolutions. Yet we should not discount the risk of revolution on account of its lack of direct success. Theory informs us that a critical motivation behind attempted coups is the inner circle's realization that their benefits are at risk both from the leader's inadequacies and from a potential mass uprising. Thus, coup-plotters try both to pre-empt rebellion and remove the leader for their own benefit while rebels within the masses try to oust the leader for their own, quite different, potential benefits. The challenged incumbent is in a quandary since the right response to survive a coup often is opposite to the right response to survive a revolution. Unfortunately, given the paucity of successful revolutions, it is difficult to gain much empirical leverage on how the circumstances that determine when revolutions succeed differ compared to deposition by elites or compared to leaders who survive all threats and successfully retain power.

7.2 Observed Patterns of Leader Survival

All leaders, if given their druthers, presumably prefer to remain in power until their own mortality removes them from office and from life. Dying in bed at a ripe old age while still in power is the ultimate accolade for a successful ruler. However, not all leaders have an equal opportunity to die peacefully in office. Rather, how incumbents lose their job is heavily dependent on the sort of

government they lead. Those who govern in societies with winning coalitions that occupy the upper ends of the distribution face substantially different causes to their loss of power than those who govern with mid-range winning coalitions. It is only those who rely on the smallest coalitions for whom it is true that they have genuinely good prospects of surviving in power until the grim reaper catches up with them. We see how different the risks of deposition are as a function of coalition size in Figure 7.1.

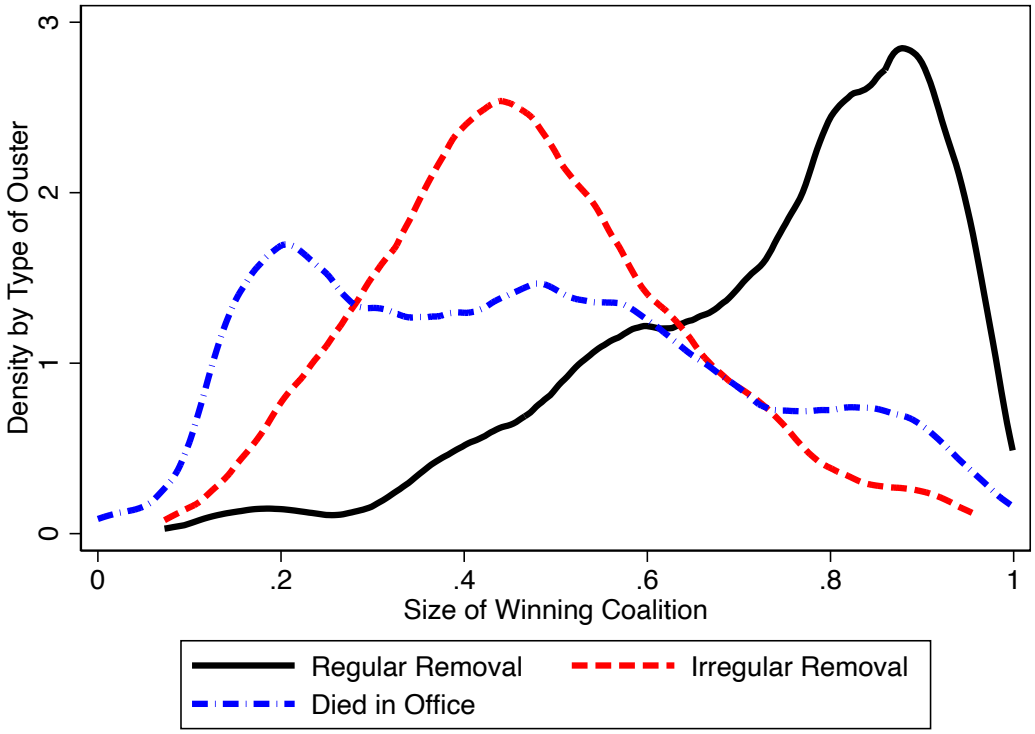
Figure 7.1 shows us that coalition size affects the types of deposition risks that a leader faces. It displays density plots of the institutional arrangements associated with each broad form of political deposition. The solid line corresponds to the distribution of winning coalition size among leaders who were deposed by regular means. The dashed line corresponds to the distribution of winning coalition size for cases of irregular deposition and the dash-dot line corresponds to the distribution of W for events in which leaders died in office. The figure shows distinct patterns. Regular deposition generally occurs in relatively large coalition systems. Within such systems irregular deposition is relatively rare. Irregular deposition is most prevalent in intermediate sized coalitions. Death in office occurs for leaders of all institutional arrangements but it is most prevalent in small coalition systems.

The dashed curve in Figure 7.1 highlights an important implication of the selectorate theory. As we see, the gravest risk of deposition as a consequence of a coup or revolution occurs among those governments with intermediate-sized coalitions.[1] We have already seen that the danger of destabilizing events is maximized in the mid-coalition range and now we see that so too is the reality of losing power by being overthrown or assassinated. Indeed, irregular deposition is the modal reason for losing power *only* for leaders who rely on a mid-sized coalition although, of course, mid-sized coalition leaders are also frequently deposed by regular means. The shape of the curve for irregular removal reminds us that when we examine the risk of losing office by irregular means as a function of coalition size we must be attentive to W and W^2 so as to capture the inverted U-shaped distribution of irregular removal seen in Figure 7.1. We must also be attentive to the anticipated risk of coup or revolution. When a revolt is thought to be likely, then we should expect that leaders succeed in reducing their risk of irregular ouster by using torture and political killing, the very devices we have already seen they are likely to implement under these circumstances. When they fear that a coup is imminent, then their survival in power should be enhanced by using purges, including perhaps the execution of distrusted insiders.

Regular removal is distributed very differently from irregular removal. The likelihood for regular removal is generally increasing in W. Leaders who anticipate little threat of revolt or coup; that is, large coalition incumbents, probably benefit little from using the very devices that we believe help save mid-sized coalition leaders, such as torture, extra-legal killing, and coup-avoiding purges. And at least as importantly, they have very different incentives regarding the conditions under which they change policy allocations or governance institutions as means to enhance their prospects of

[1] See Iqbal and Zorn (2008)

Figure 7.1: Reasons Leaders Lose Office, By Coalition Size



political survival. Hence, one important question we will probe is whether, especially in mid-sized or small coalition settings, the actions intended to reduce irregular deposition help, hinder, or do not alter the risk of regular falls from power. We will see that actions that ameliorate the risk of one type of deposition often exacerbate another, making accurate anticipation of threats and careful selection of responses critical for political survival.

In contrast to large and mid-sized coalition systems, those who rely on the smallest of winning coalitions are relatively unlikely to fall from power by routinized means or by irregular upheavals. Instead, these least accountable leaders are the rulers who are most likely to die in their sleep, losing power in the grip of mortality. To die peacefully in office is presumably every leader's desire but to do so they must first solve the puzzles of how to avoid regular or irregular removal from power. Hence, our focus is on the extent to which the hazards – the risks – of removal are mitigated or exacerbated by the actions leaders take.

7.3 Framing the Analysis: Hazard Rates and Censoring

Because political survival is assumed to be each leader's main objective and the risks leaders face differ as a function of their governmental institutions and their choices, we assess the effectiveness of alternative survival strategies by focusing on hazard analysis. The unit of analysis, therefore, is the leader-year. As described in detail in Chapter 4, our data extend the Archigos (Goemans, Gleditsch and Chiozza, 2009) data through March 31, 2024 (Smith, 2022). The data record the day a leader enters office, the day they leave office (unless they are still in office as of 3/31/2024) and the date the leader dies (if they have died prior to 3/31/2024). Our data also examine the cause of death of leaders who die within 10 years of leaving office following the procedures in Bueno de Mesquita and Smith (2018).

To frame our hazard analyses we classify leader deaths into four categories:

1. **Chronic**: A serious long term illness whose severity would have been hard to hide from close advisors and supporters. Cancer is one obvious example.

2. **Acute**: A serious illness but whose onset is not foreseeable. Infectious diseases fall in this category.

3. **Incident**: An accident such as falling off a horse or dying in a plane crash.

4. **Killed**: Often leaders are killed during or following a political deposition. Former leaders are also liable to be executed for alleged crimes during their term in office. Assassinations also fall in this category.

To examine the different risks that leaders face, we adopt a competing risks approach.

7.3.1 Competing Risks

Censoring is an important concept in hazard analysis. If a leader is still in office according to our data, then we do not know how long she will survive, but we do know that she has survived at least as long as her current tenure. A leader can depart office for numerous reasons and leaving office for any one particular reason censors our ability to know when she would have left office for another reason (Box-Steffensmeier and Jones, 2004; Clayton, 1978; Diermeier and Stevenson, 1999; Gordon, 2002). We conceptualize the time at which a leader will leave office via different mechanisms as the revelation of random variables. Suppose $T_{naturaldeath}$ represents the time at which a leader would die naturally (not killed). Let $T_{regular}$ and $T_{irregular}$ represent the length of time in office until a leader is removed either by regular means, such as elections, term-limits, or retirement, or by irregular means, such as coup or revolution. In practice we only observe the shortest of these times and the other events are censored. For instance, if a leader is voted out of office after 5 years, then we only know that the time to irregular removal was greater than 5 years ($T_{irregular} > 5$) as irregular removal had not yet happened. For leaders still in office we only know that $T_{regular}$ and $T_{irregular}$ are greater than the leader's tenure as of 3/31/2024 as neither had yet happened.

A leader might die in office and such mortality censors our ability to observe when the leader would have been deposed by regular or irregular means: $T_{naturaldeath} < T_{regular}, T_{irregular}$. Many leaders die after leaving office, so in many cases we can observe $T_{naturaldeath}$ even if it is larger than the time until removal. However, should a leader be killed or executed as a result of the deposition, then we treat $T_{naturaldeath}$ as censored. We do not know at what later date the leader would otherwise have died of natural causes.[2]

7.3.2 Hazard Analysis: Weibull

Our investigation of survival prospects in its competing risks framework is done through the use of the Weibull model. The Weibull model includes a shape parameter that assesses how the hazard rate changes as a leader's tenure increases. We model how this shape parameter depends on coalition size. Selectorate theory predicts that the relationship between the hazard rate and tenure differs depending on the institutions under which a leader governs. These differences invalidate, or at least greatly diminish, the usefulness of the commonly preferred Cox proportionate hazard model in our theoretical context. That semi-parametric approach assumes that the hazard that all leaders face is proportional to some underlying hazard and so the change in hazards as tenure increases should be the same for all leaders independent of the type of political system in which they govern. There are formal tests of these assumptions that, consistent with theoretical expectations, our data strongly violate (Box-Steffensmeier and Jones, 2004). There are also ways to modify the analysis to

[2]Such censorship biases against our hypotheses. The theory predicts that terminally ill leaders face an elevated risk of irregular deposition and such depositions often result in the death of a leader. Killings censor our ability to observe the impending natural death that helped precipitate leader removal.

compensate for these violations of underlying assumptions by interacting the independent variables with the log of tenure (Licht, 2011). However, these fixes undermine the semi-parametric nature of the Cox approach that makes it so attractive and complicates the interpretation of the results. Since the theory predicts that coalition size affects how the hazard rate changes with tenure, we model this hypothesis directly using the parametric Weibull hazard framework.

The Weibull hazard model assumes that the hazard rate (that is, the risk of being deposed conditional upon not already having been deposed) is $h(t) = p\, e^{X\beta}\, t^{p-1}$ where X is the standard vector of covariates and β is the vector of coefficients associated statistically with the X variables, thereby determining the impact of each variable on the risk of being removed. The Weibull model includes an ancillary parameter, p, that determines how the hazard rate varies over time. If $p = 1$, then the hazard rate is constant over time. As we will see, large coalition leaders find themselves in circumstances close to $p = 1$. In contrast, if $p < 1$, then survival becomes easier over time, a setting small coalition leaders find themselves in. To incorporate the impact of coalition size on the hazard rate we model the ancillary parameter p as a function of coalition size. The tables that contain hazard analyses are divided into two sections. The top part of each table, labeled $X\beta$, shows the estimates of how covariates affect the hazard rate. The lower sections show estimates of the ancillary parameter, $ln(p)$, as a linear function of political institutions.

7.4 Decomposed Risks: A Starting Place

We begin by turning our attention to the independent impact of key selectorate variables on political survival. The theory highlights the importance of tenure for political survival and so we begin with that key factor. As tenure increases, so does political loyalty as supporters increasingly expect to be kept in the coalition in the future and rewarded with private goods. Since it is the reliability of access to private goods that increases over time, we should expect that the growth in political loyalty is greatest in small coalition systems where private goods are highly prevalent. In large coalition systems private goods are relatively unimportant in terms of rewarding supporters. As a result, large coalition leader do not develop the large incumbency advantage that small coalition leaders gain over time. Large coalition leaders always face a high risk of deposition, while the risk for small coalition leaders declines sharply over time. The data strongly support these predictions, as we now demonstrate.

Figure 7.2 shows a Kaplan-Meier survival analysis for small ($W \leq .4$), medium ($.4 < W \leq .75$) and large ($W > .75$) coalition systems. These non-parametric analyses show the proportion of leaders who have survived in office at different tenures. The cell entries in Table 7.1 slice the survival prospects by time and coalition size. They report the time up until 25%, 50% and 75% of leaders have been deposed as a function of coalition size, providing an alternative view. We see that leaders in all political systems find it difficult to survive in office through their first year. As the data show, regardless of coalition size, 25% of leaders have fallen from power by about the

end of their first year. Incumbents in medium-sized coalition systems find surviving the first year hardest of all regime types. About 25% of them are out of power after approximately seven months (0.62 years). While the initial year is rough for everyone, the ease of survival diverges according to institutions for those who make it through their first year. For instance, after 15 years, virtually all large coalition leader have been replaced, yet more than 25% of small coalition leaders remain in office, and, as the flatness of the dashed line in Figure 7.2 indicates, for small coalition leaders who survive that long, the subsequent replacement risk is low. After 5 years 75% of large coalition leaders have been replaced while it takes over 18 years before 75% of small coalition incumbents leave office one way or another.

Table 7.1: Survival Times of Leaders by Winning Coalition Size

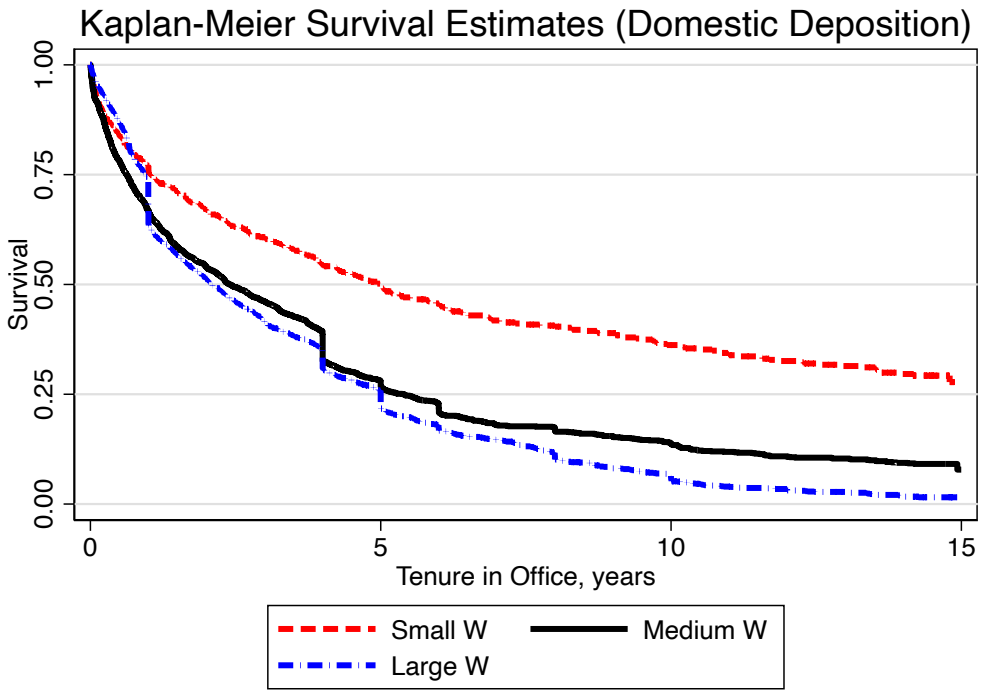
	Survival Time (years)		
Coalition Size	25% Removed	50% Removed	75% Removed
Small W	1.03	5.00	18.46
Medium W	0.62	2.40	5.40
Large W	0.94	2.06	5.00
Overall	0.80	2.46	5.62

The tables reports the average number of years until 25%, 50% and 75% of leaders have been deposed. Small W means $W \leq 0.4$: Medium W means $0.4 < W \leq .75$: Large W means $W > .75$.

Figure 7.3 provides another way to visualize how the impact of tenure on survival differs across institutions. The figure's bars represent the risk of deposition for relatively new leaders (less that three years in office), experienced leaders (3 to 8 years in office), and long term leaders (more than 8 years) for small ($W \leq .4$), medium ($.4 < W \leq .75$) and large ($W > .75$) coalition systems. The vertical axis reports the probability that a leader faces domestic removal from power so that taller bars depict leader-types at higher risk.

The figure draws attention to two patterns. First, we see that large coalition leaders face a higher risk of deposition at all stages of their career than do those who govern with a smaller coalition. At least 20% of large coalition leaders are deposed per year regardless of their length of time in office. Second, unlike large coalition leaders, small and medium coalition leaders have a decreasing risk of deposition as their tenure increases. That is, as the theory informed us, the longer an incumbent remains in power, the less likely the leader is to succumb to any regular means of ouster. If we were to plot the equivalent graph to see the distribution of irregular removals one element would differ from the figure we have plotted. We would again see the operation of life-cycle effects. The longer a leader is in power, the lower the probability of ouster. However, while in Figure 7.3 the probability of deposition increases with coalition size, if we plotted irregular removal we would see that the opposite is true. As the winning coalition gets larger, the probability of irregular removal drops so that when it comes to the risk of irregular removal, we see that the risk

Figure 7.2: Kaplan-Meier Survival Analysis by Coalition Size



drops both with time in office and with coalition size.

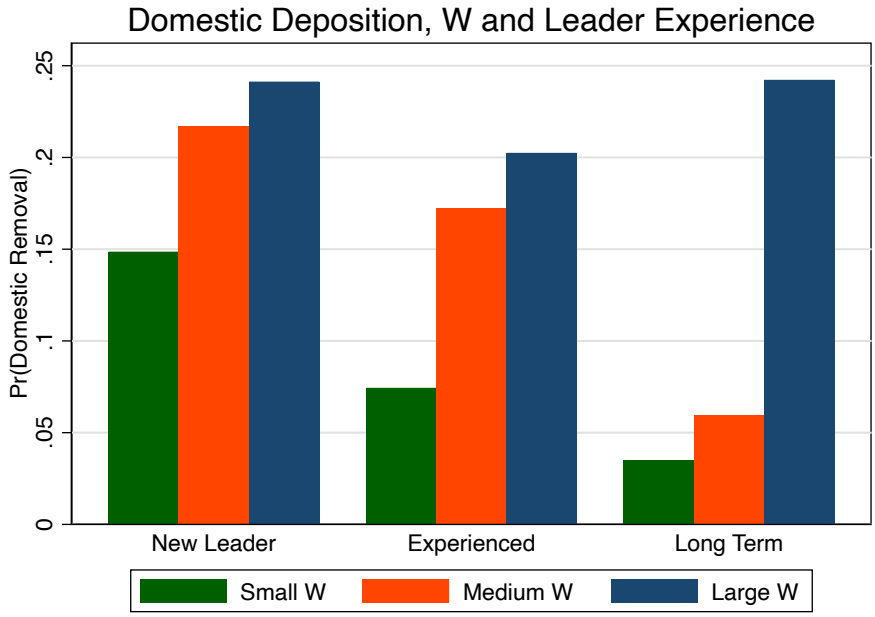
Having seen how the odds of removal vary with coalition size and time in office under regular and irregular removal, we turn our attention in Figure 7.4 to the odds of removal by regular or irregular means when a leader is believed to be suffering from a terminal illness. We identify such leaders as those who had a chronic disease from which they died within 5 years.[3] As we see, illness greatly increases the political risk of deposition by regular means for incumbents in medium and large size coalition systems. As well, chronic illness adds a significant increase to the risk of deposition by irregular means in small and medium-sized coalition systems but, as expected, has little effect on the probability of irregular ouster in large coalitions where such ouster is nearly absent.[4] In general, a chronic illness not only imposes a mortality risk, but it also increases political risks.

We have now looked at the effects of several of selectorate theory's key variables that are hypothesized to influence the prospects of political survival. We have found that each does so in the expected way. However, our preliminary probe of the data treats each of these variables as

[3]The graph focuses only on leaders who are domestically deposed so leaders who die in office are treated as censored.

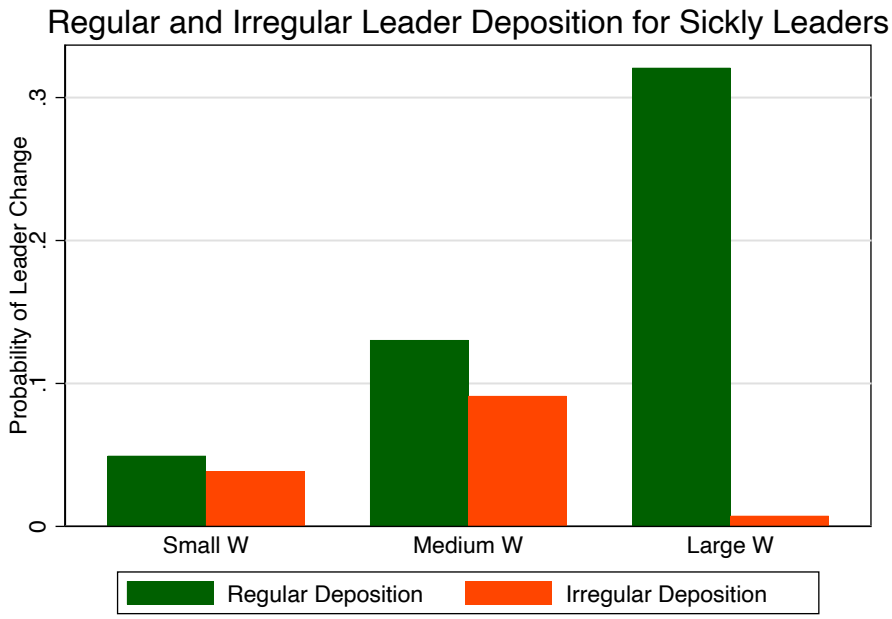
[4]It is important to note that the removals in this category exclude leaders who died while in office.

Figure 7.3: Political Life-Cycle: Leader Tenure, Coalition Welfare and Leader Deposition



acting in isolation. Now we are ready to put these variables together to establish the collective, baseline effects they have on political survival. Doing so will make it easier later to understand the marginal impact on political survival of circumstances outside the baseline, such as the introduction of beliefs about threats and the counter-moves adopted to offset those threats.

Figure 7.4: Chronic Illness, Coalition Size, and Deposition



7.5 Baseline Hazard Models

Table 7.2 shows what we think of as the baseline hazard analyses for regular and irregular deposition. It includes all of the everyday elements that selectorate theory tells us influences key choices. Of course, the leader's tenure is excluded since in hazard analysis the dependent variable is the length of time until the leader loses power.

When it comes to regular removal, the selectorate theory's basic variables are observed for 9,626 leader-years made up of 1,748 individual leaders. Of these leaders, 1,219 were deposed domestically by regular means. The remaining leaders either were still in office as of 3/31/2024, died in office of natural causes, or were deposed by a foreign power.[5] The second column of Weibull results displays the effects of the baseline variables for the same set of leaders but now focuses on the 276 rulers who were removed by irregular means.

Looking at the first model in Table 7.2, that considers all regular, routine cases of domestic deposition, the estimated ancillary parameter is $log(p) = -1.207 + 1.399 * W_{t-1}$. In small coalition systems the risk of deposition declines rapidly with tenure ($p = .46$ when $W = .3$); while in large coalition systems leaders face a fairly constant deposition risk ($p = 1.05$ for $W = .9$). A similar

[5] Although we have leader data through March 2024, we do not have data on all the independent variables so, de facto, the *still in office* criteria is coded as the last year for which we have all data.

Table 7.2: Baseline Determinants of Regular and Irregular Removal (Weibull Model)

	Regular b/se	Irregular b/se
$X\beta$		
W_{t-1}	4.147**	7.778***
	(1.528)	(1.748)
W^2_{t-1}	-3.053*	-9.563***
	(1.237)	(1.599)
S_{t-1}	-1.659***	-1.171
	(0.494)	(0.745)
Log(GDPpc$_{t-1}$)	0.095	-0.223**
	(0.054)	(0.068)
Log(Population$_{t-1}$)	0.045	-0.024
	(0.028)	(0.044)
Growth$_{t-1}$	-0.001	-0.018*
	(0.005)	(0.009)
Old or Sick	0.271***	0.471**
	(0.079)	(0.174)
Const.	-3.191***	-0.862
	(0.809)	(1.142)
Ln(p)		
W_{t-1}	1.399***	0.864**
	(0.158)	(0.309)
Const.	-1.207***	-0.769***
	(0.117)	(0.175)
Observations	9626	9626
Number of Leaders	1748	1748
Failures	1219	276
LogLikelihood	-2423.470	-878.275

$*p < 0.05, **p < 0.01, ***p < 0.001$

pattern is found for irregular removal: $ln(p) = -0.769 + 0.864 * W_{t-1}$. Switching from the effect of the ancillary parameter to the analysis of the standard $X\beta$ parameters, we can assess the impact of coalition size on the risk of deposition that leaders face when they first come to power. For both regular and irregular deposition, the immediate hazard rate when entering office is highest for leaders in intermediate sized coalition systems. This effect was also visible in the Kaplan-Meier graph in Figure 7.2. The survival curve initially declined most steeply for intermediate sized coalitions. However, as tenure increases these intermediate size coalition leaders find it easier to survive than do large coalition leaders.

The empirical patterns for how coalition size affects the relationship between tenure and risk strongly supports the theoretical life-cycle predictions derived in Chapter 3. Upon accession to power, all leaders find retaining power difficult, with intermediate size coalition leaders finding it hardest to cling to power. As tenure increases, leaders find it increasingly easy to survive in power, with the impact of tenure being strongest for small W systems and statistically insignificant for large W systems.

The theory tells us that coalition size is not the only government institution that may alter the leader's prospects of political survival. The size of the selectorate, though theoretically secondary to coalition size, nevertheless should also play an important part. Specifically, when leaders have large numbers of potential substitute supporters available to replace coalition members, then their political survival should be enhanced. In fact, this is correct, as evidenced by the significant negative coefficients on the S_{t-1} covariate for regular removal. Although the direction of effect is the same for irregular removal, in those instances, the size of the real selectorate does not have a significant impact. Following leader deposition under extant rules, the chance of former supporters being included in the next leader's coalition is diminished as selectorate size increases. With a reduced chance of obtaining private goods under new leadership in large (real) selectorate institutions, supporters are more loyal. The coefficient estimates suggest that the leader of a small selectorate system, such as a Junta ($S_{Real} \approx 0.1$), faces deposition risks several times higher than the leader of a comparably sized coalition system with mass enfranchisement ($S_{Real} = 1$). A system designed to have corrupt, rigged, elections (small W and large S_{Real}) is, according to selectorate logic, a leader's most preferred institutional configuration. The evidence supports that conclusion and reminds us of the importance of examining governance along at least two continuous dimensions (W and S_{Real}) rather than by using discrete categories.

While a large selectorate size enhances leader survival with respect to regular removal, the analyses find no significant effect for S in terms of irregular deposition. Irregular deposition typically involves a reformulation of political institutions as well as a replacement of the leader. With institutions likely to be changed, the loyalty inducing impact of a large selectorate is greatly diminished. As seen in the theoretical account in Chapter 3, coup plotters enhance their likelihood of coming to power by eliminating mass enfranchisement so as to help reassure those fellow plotters who bring them to power that they will not be displaced from the coalition.

The theory predicts that political loyalty increases with tenure because leaders can credibly promise a long term flow of private goods to supporters. Yet, this symbiosis between credible commitments and loyalty unravels as soon as supporters believe that their leader is terminally ill. Leaders can not promise to continue the flow of private goods from beyond the grave and so the net present value of being in the coalition is diminished by expectations that a leader is likely to die soon. Each of the models in Table 7.2 includes the variable Old or Sick that is coded as 1 if either the leader is older than life expectancy[6] or if the leader will die of a chronic cause within five years; otherwise the Old or Sick variable is coded as 0.[7] Declining health and decrepitude place leaders in political as well as mortal danger. Old or Sick leaders face a 31% increase in their likelihood of regular removal and a 60% increase in their risk of irregular deposition. These are significant risks not only statistically but substantively as well. Old age and decrepitude are political hazards.

While a polity's economic conditions may be important on other dimensions, Table 7.2 indicates that economic growth has little or no consequential effect on a leader's regular survival prospects. High growth appears to reduce the risk of irregular removal but the magnitude of the effect is modest. For instance, in the model of irregular leader replacement in Table 7.2 a leader would need to have an extraordinary growth rate of 26% to offset the survival risk associated with being old or sickly.

7.6 Hazards: Risks and Responses to Them

The baseline analysis has helped us understand the routine, day-to-day risks that leaders face to their hold on power. As we saw, and as the theory indicates, the institutions under which leaders govern matter significantly for their political survival. So too does their health. As well, we saw that higher productivity diminishes significantly the risk of irregular removal, but it has no meaningful impact on regular removal. Having established these routine expectations, we can now investigate what happens to one's hold on office when the threat of revolution or coup is believed to be elevated.

Table 7.3 expands the analysis in Table 7.2 by adding both our estimates of a leader's beliefs about the risks of destabilizing events ($\widehat{Rev}$ and $\widehat{Coup}$) and the actual occurrence of such events (Revolution and Coup). By including real and anticipated events we can get a statistical view of the strength and impact on survival of the counterfactual 'events that didn't happen' at least in a preliminary way. What do we find and what are some of the key cautions that we should apply to the results?

An elevated risk of revolution meaningfully affects the likelihood of both regular and irregular removal but, as we will explain, in opposite directions. For instance, if the belief in the risk of

[6] As discussed in Chapter 4, we use Swedish life expectancy.

[7] For compatibility with the analyses in earlier chapters we focus on this single health variable. Bueno de Mesquita and Smith (2018) examines more nuanced relationships between political survival and health by examining the time till death.

Table 7.3: The Impact of Instability Risks and Occurrence of Revolutions and Coups on Leader Deposition (Weibull Model)

	Regular b/se	Irregular b/se
$X\beta$		
W_{t-1}	4.372*	-1.495
	(1.705)	(2.174)
W^2_{t-1}	-3.297*	2.060
	(1.395)	(1.958)
S_{t-1}	-1.808**	-1.482*
	(0.576)	(0.651)
$\widehat{Rev}$	0.103*	-0.354**
	(0.046)	(0.126)
Revolution	0.218	1.209***
	(0.115)	(0.319)
$\widehat{Coup}$	-0.104**	0.731***
	(0.032)	(0.117)
Coup	0.053	1.991***
	(0.174)	(0.286)
$\text{Log}(\text{GDPpc}_{t-1})$	0.093	0.162*
	(0.075)	(0.064)
$\text{Log}(\text{Population}_{t-1})$	0.010	0.145*
	(0.030)	(0.059)
Growth_{t-1}	0.001	-0.021*
	(0.006)	(0.010)
Old or Sick	0.281**	0.496**
	(0.086)	(0.167)
Const.	-2.767**	-5.717***
	(0.911)	(1.180)
Ln(p)		
W_{t-1}	1.385***	0.372
	(0.179)	(0.321)
Const.	-1.175***	-0.123
	(0.133)	(0.177)
Observations	7976	7976
Number of Leaders	1469	1469
Failures	1047	201
LogLikelihood	-2006.413	-445.792

$*p < 0.05, **p < 0.01, ***p < 0.001$

revolution increases from 10% to 50%, then the risk of regular removal increases by about 25% but the risk of irregular removal decreases by more than 50%. If a revolution actually occurs, then the risk of removal by irregular means increases by over 300%.[8] The difference in impact between the expectation of a revolution and the occurrence of a revolution is quite dramatic. Either leaders are completely mistaken in fearing that a revolution is coming when none happens or their fear leads them to take substantial corrective steps that culminate in a huge diminution in the leader's risk of deposition compared to what happens when a revolt actually takes place. A prudent ruler should take remedial steps to prevent any anticipated revolution from occurring. The evidence in Table 7.3 shows that leaders act prudently.

When the revolutionary risk is believed to be high, it appears that leaders successfully ameliorate the danger they face from irregular deposition. However, their mitigating steps are not free as they appear to modestly increase the risk of regular removal. This result is consistent with the idea that the changes required to avoid irregular removal may impose costs on supporters that may increase the risk of regular removal. This result highlights an important, recurring insight into the upside and the downside of acting on the anticipation of instability. Solutions to anticipated threats of irregular ouster generally exacerbate the danger of regular removal from office and, conversely, actions designed to minimize threats to regular removal can exacerbate the likelihood of irregular removal. Leaders, especially those in intermediate sized coalition systems, can rarely solve both dangers simultaneously. Hence, we expect that they focus their efforts on the actions that yield the greater marginal impact on their prospects of political survival.

The impact on political survival of the anticipation of a coup, if anything, is even more dramatic than the impact of the expectation of revolution compared to its actualization. Leaders certainly seem to be quite prudent when they worry about the risk of a coup. An elevated risk of coup ($\widehat{Coup}$) is significantly associated with subsequent irregular removal. If, for instance, the risk of coup rose from 10% to 50%, then a leader's risk of irregular deposition would increase approximately five-fold. But if there is an actual coup, then the risk of irregular removal is elevated by an extraordinary 730%, substantially more than the increase given a large value for $\widehat{Coup}$. That is, the risk of irregular removal when a coup is thought to be on the horizon is much lower than when a coup actually occurs. Of course, since the occurrence of a coup is close to a prerequisite for irregular deposition by elites it is not a surprise that coups endanger a leader's hold on power by a substantial amount. Perhaps, however, there is an important lesson to be extracted from the substantial difference in the hazard of irregular removal when $\widehat{Coup}$ is high compared to when a coup actually happens.

Recall that actual coups occur much less frequently than the belief that there is a high risk of a coup. This can be true under two distinct circumstances. Perhaps an incumbent imagines an elevated risk of a coup when, in actuality, there is no such risk. Hence, no coup occurs and any

[8] The risk of regular removal is not significantly impacted by the occurrence of a revolution. Revolutions, after all, are not designed to oust leaders by normal means like elections; they are an irregular alternative to elections.

modifications to policy or institutions that they make to avert an incorrectly-feared coup ought not systematically alter their survival prospects. The fear of a coup and modifications they made to ameliorate the feared threat were unwarranted and may become the source of a future threat to their hold on power. But if, seeing that $\widehat{Coup}$ is large, they correctly fear a coup and they act by adjusting policy allocations or institutions to neutralize the risk, then that probably does result in a substantially better survival rate for themselves, just as we observe. Thus, the diminished hazard rate may indicate the effectiveness of the changes leaders undertake when they believe they are in danger even though we subsequently fail to observe an actual coup d'état. We probe this prospect more carefully in the remainder of this chapter.

We saw in Chapter 6 that leaders who believe they face a serious risk of revolution engage in suppression to remove the threat. We saw that when they fear a coup is coming, then they purge as well as suppress opposition. These actions, as we emphasized in Chapter 6, treat the symptoms of instability but do not remove the incentives within the masses or within the coalition to act against the leader. At best, suppression may postpone action and, at worst from the leader's perspective, it may instead stimulate destabilizing acts (Bueno de Mesquita et al., 2024; Condra and Shapiro, 2012; Kalyvas, 2006; Valentino, 2014). When threats are thought to be credible, leaders need to modify their choices to establish a beneficial, survival-enhancing set of equilibrium conditions. To do so, selectorate logic tells us that they may modify their policy allocations and they may change the institutions within which they govern. Hence, we now examine policy change to see if the alterations that leaders implement actually help them stay in power. We then follow that analysis with an assessment of choices leaders make to maintain or alter their governing institutions – especially the size of the winning coalition – as a means to improve their political survival prospects.

7.7 Changing Policy Provisions and Survival Prospects

Table 7.4 depicts the impact on political survival of (1) policy deviations from the incumbency constraint (the set of 'Res' variables), (2) changes in private goods provision (the Δ Res variables), (3) the interaction effects of such changes along with the initial under- , over-, or expected provision of private goods (Δ Res(Private) variables interacted with Res(Private) variables), and (4) the now-standard set of variables that theory tells us are important for survival analysis: coalition size, real selectorate size, per capita income (productivity), mortality risks (health and age), growth, and population. The table, already very lengthy and complex, excludes the effects of changes in public goods and freedom of assembly as well as their interaction terms. We have, of course, calculated the survival analysis including all of those variables and we will touch on them at the end of this section. The inclusion of the corresponding changes for public goods and assembly adds an enormous amount of complexity to the analysis with only a few statistically significant but generally substantively small effects.

The important effects of policy change on leader survival reside in the provision of private goods.

It is the magnitude of privileges enjoyed by coalition members that sets their choices apart from everyone else's. It is the current and future flow of private goods that helps determine whether they will do what they can to keep the incumbent in power or, instead, will throw their support behind revolutionaries or oust the incumbent themselves through a coup d'état. Ignoring changes in the provision of public goods and freedom of assembly should cost us little precision in analyzing political survival risks and, in fact, we do lose little by ignoring those policy changes. We ignore these changes, mindful that even without the added complexity of these policies, given the number of interaction terms, it is difficult to directly interpret the individual and joint effects of key variables in the two models in Table 7.4.

We believe that while readers can certainly work through the complexities of the table, the implications for political survival will be most readily understood by depicting the core results graphically. Hence, rather than dwell on the complex numerical assessment of the survival implications of key variables, we divide the set of circumstances captured in the table into 9 discrete categories. In Figure 7.5 private goods are categorized as having been provided 'Below,' at the 'Expected' level, or 'Above' the quantity dictated by the theory's incumbency constraint using the quantities $Res(Private) = -0.1$, 0, and 0.1 (approximately, 5th, 50th and 95th percentile). That, of course, is the difference between a Res variable that is meaningfully negative, approximately zero, or meaningfully positive. Within each of these three possibilities, a leader may have chosen to alter policies for the coming year in any one of three ways: 'Decreased,' 'Unchanged,' or 'Increased' level of private goods. We assessed which action was taken using the quantities $\Delta Res(Private) = -0.05$, 0, and 0.05 (approximately 5th, 50th and 95th percentile). We utilize the results from Table 7.4 to calculate the hazard rate in each category. The numerical value shown above each bar in the figure reports the relative hazard rate depicted by the bar. So, for instance, a value of 1 means neither an elevated nor a diminished hazard relative to the base-case of expected and unchanged level of private goods. While a value of 1.9 can be interpreted as a 90% increase in the risk of deposition, a coefficient of 0.6 means a 40% decrease from the base hazard rate of 1. The figure depicts the effect of each of these 9 categories on the risk of deposition by regular means (left green bar) and by irregular means (right orange bar).

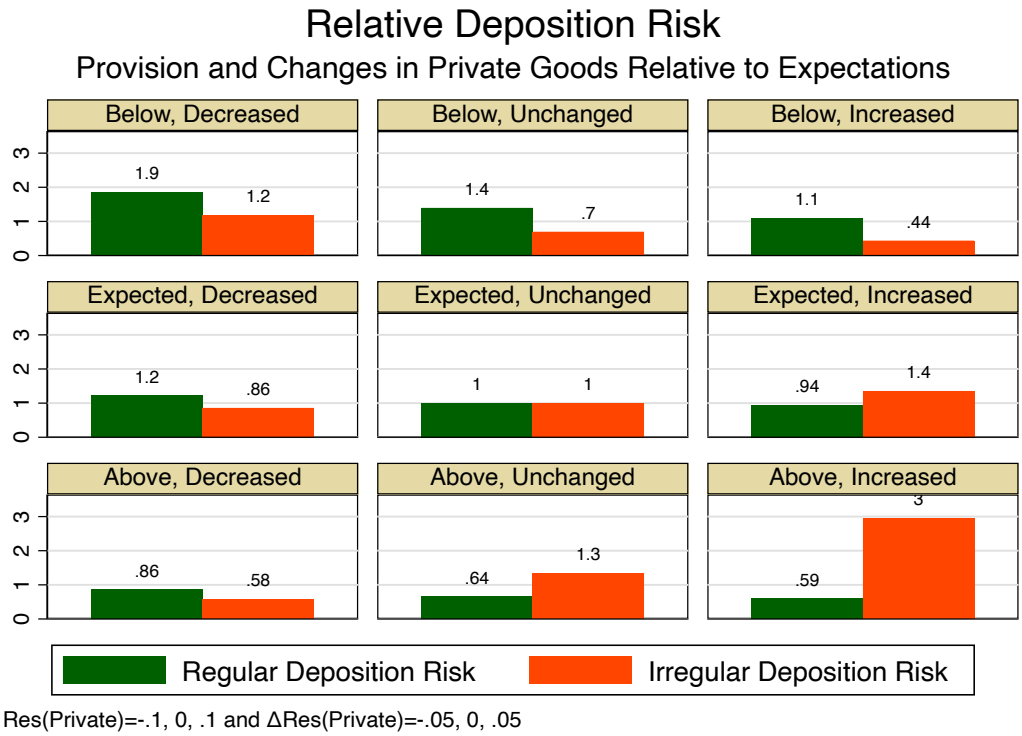
Figure 7.5 tells a visually strong story of risks to survival and corrective steps to avert deposition. We begin by looking at the first row of the figure; that is, the set of cases in which fewer private goods were being provided to the coalition than expected given the empirical estimation (as described in Chapter 5) of the government's incumbency constraint. When too few private goods are provided, as in all cases in the first row of the figure, further diminishing private goods provision increases the risk of regular deposition by 90% and it increases the risk of irregular deposition by 20%. Under-provision coupled with even fewer private goods in the coming year is a dangerous recipe for any survival-oriented leader. Continuing to under-provide private goods without further diminishing their provision, as in the middle graph in the first row, still leaves an incumbent with a 40% increase in regular deposition risk but a 30% decrease from the baseline risk of irregular removal. The gold

Table 7.4: Change and Levels of Policy Provision and Leader Deposition (Weibull Model)

	Regular b/se	Irregular b/se
$X\beta$		
W_{t-1}	4.860*	4.859*
	(1.919)	(2.134)
W^2_{t-1}	-2.852	-6.119***
	(1.503)	(1.854)
S_{t-1}	-2.012***	-1.420*
	(0.605)	(0.722)
Res(Public)	0.458	-0.400
	(0.746)	(1.443)
Res(Public)^2	-6.858	-8.408
	(5.111)	(12.193)
Res(Assembly)	0.624	-1.729
	(0.408)	(1.085)
Res(Assembly)^2	3.096	6.624
	(2.439)	(3.792)
Res(Private)	-3.861***	3.242
	(0.857)	(2.064)
Res(Private)^2	-5.247	-3.678
	(9.688)	(10.116)
ΔRes(Private)	-2.591*	4.553
	(1.282)	(2.789)
Δ Res(Private)^2	27.420**	30.960
	(9.437)	(15.853)
Δ Res(Private)*Res(Private)	7.984	131.004*
	(19.018)	(56.753)
Δ Res(Private)*Res(Private)^2	-191.974*	-136.320
	(82.153)	(133.475)
ΔRes(Private)^2*Res(Private)	160.554*	-97.841
	(68.305)	(164.984)
Δ Res(Private)^2*Res(Private)^2	-378.819	-2881.985**
	(227.628)	(1064.531)
Log($GDPpc_{t-1}$)	0.078	-0.219**
	(0.058)	(0.072)
Log($Population_{t-1}$)	0.047	-0.006
	(0.031)	(0.051)
$Growth_{t-1}$	0.002	-0.027**
	(0.006)	(0.008)
Old or Sick	0.225**	0.539**
	(0.085)	(0.198)
Const.	-3.589***	-1.295
	(1.000)	(1.268)
Ln(p)		
W_{t-1}	1.071***	0.608
	(0.174)	(0.332)
Const.	-0.910***	-0.453*
	(0.132)	(0.196)
Observations	8279	8279
Number of Leaders	1518	1518
Failures	1081	208
LogLikelihood	-2022.272	-604.406

$*p < 0.05, **p < 0.01, ***p < 0.001$

Figure 7.5: Level and Change in Private Goods Provisions (relative to expectations) and Relative Rates of Regular and Irregular Deposition



star for survival among leaders who currently under-provide private goods goes to those who correct their error by increasing the provision of such goods. The risk of regular deposition returns close to the normal baseline expectation if a leader increases private goods when she has been providing too few of them. The risk of irregular deposition with increased provision of private goods when the initial provision was too low is diminished by 56% compared to baseline expectations. For those giving their coalition too few private goods, returning closer to the swoosh curve from below is the path to improved political survival.

The second row of the figure shows us how alternative shifts in private goods allocations influence survival when the initial amount of private goods is as expected; that is, falls on the swoosh curve. The risk of regular removal is exacerbated by 20% if a leader shifts from on the swoosh curve to below it but the risk of irregular removal is modestly below expectations in this case (14% below). Leaders who provide the right amount of private goods and continue to do so have zero deviation from the background everyday risk of ouster whether by regular or irregular means. Being on the swoosh curve is a safe policy to follow in fact as well as according to selectorate theory. Increasing

private goods when starting out providing the right amount slightly diminishes the danger of regular ouster, by 6%, but, dangerously, it elevates the risk of irregular removal by 40% in keeping with theoretical expectations about the fear of being purged.

Finally, shifting to the risk of deposition when a leader seems 'generously' to be giving coalition members more than their expected rewards, we see a further empirical demonstration of a subtle implication drawn from selectorate theory. The institution change global game in Chapter 3 predicts that an increase in private goods when they are already abundantly provided is associated with coups and purges. If a coup plotter is attempting to foment a coup, then the incumbent increases the likelihood that the current elites will back her by offering more private goods. If instead the leader is contemplating a purge, then she will also increase private goods provision to help garner support for her transition to a smaller coalition. The expectation of such a purge often induces current supporters to reconsider their support and launch a pre-emptive coup while they are still in a position of influence.

If too many private goods are provided and a leader adjusts so as to diminish or eliminate the excess provision, then the hazard rates for regular and irregular removal both drop. In the case of regular deposition, the risk falls by 14% while the risk of irregular removal falls by 42%. Over-providing and continuing to do so leaves the risk of regular removal depressed by 36% but, as predicted by the theory, elevates the danger of irregular ouster, in this case by 30%. And when private goods are over-provided and the incumbent increases their provision further we see, again, a diminution in regular removal (39%) and, as the global game highlights, an enormous increase in irregular removal. That risk is 200% higher than the baseline risk (a coefficient of 3 compared to a baseline of 1). Leaders who move above the swoosh curve (as in rows 2 and 3, column 3) greatly increase their risk of irregular deposition.

Rulers face considerable trade-offs when setting policy. As we see in row 3 of Figure 7.5, leaders reduce the risk of removal by regular means by overpaying their coalition with private goods, but such actions increase irregular deposition risks. There is also a temporal dimension to this policy trade-off. If a leader (especially an established leader) reduces coalition size, then she enhances her survival in the future. However, to successfully enact such an institution change she needs to increase private goods provisions in the short term, and these actions are liable to induce a preemptive coup from members of the coalition who fear they might be purged. The evidence supports the subtle expectations derived in Chapter 3.

To sum up, we have seen both in Table 7.4 and in Figure 7.5 that private goods provision strongly influences both regular and irregular risks of deposition. Although many of the individual coefficients are statistically insignificant, joint hypotheses tests indicate a strong statistical relationship between private goods and survival. A leader substantially reduces her risk of deposition by regular means by over-providing private goods and then increasing their provision further. While such generous private goods provisions help keep supporters loyal in terms of political competition within the normal rules of the system, such generosity greatly increases the risk of deposition by

irregular means. Leaders also place themselves at a heightened risk of irregular deposition if they continue to under-provide private goods. Sitting right on the swoosh curve is not only a good way to avoid ouster through coups and revolutions according to the logic of the theory; it is also a great risk reducer when it comes to irregular removal in the real-world experience of political leaders.

Before leaving the subject of policy change, we reflect briefly on the impact of the same sorts of analyses when it comes to public goods and freedom of assembly. The analyses in Table 7.4 show that public goods provision have little impact on leader survival. However, if we disaggregate categories of leader deposition further, we find that over-provision of public goods reduces the risk of irregular deposition by the masses (i.e. successful revolution, Model 5 of Table A7.4). Likewise, deviations from the anticipated levels of freedom of assembly (Res(Assembly)) have little effect on regular deposition. However, providing 'too much' or 'too little' freedom of assembly modestly increases the risk of irregular deposition.[9]

7.8 Survival by Democratizing or Autocratizing

We just saw how changing policy affects regular and irregular deposition rates. The trade-offs we uncovered between these two forms of deposition highlight the difficulties that pretty much any smaller coalition leader must face in trying to survive in office. While large coalition leaders almost never face irregular deposition, smaller coalition rulers lose office with approximately equal frequency through regular and irregular means. And yet, as we observed, leaders, for instance, who overpay their coalition place themselves in jeopardy of irregular removal but they diminish the risk of regular ouster. That places them in a tough spot indeed! But then, of course, they have more tools than shifts in the provisions of public goods, freedom, and, most importantly, private goods. In this section we examine how institution change can help extend a leader's tenure.

Table 7.5 displays the Weibull hazard analysis in which the variables of interest concern the impact that increasing or decreasing coalition size, denoted as ΔW, has on risks to political survival. Table 7.5 examines the effect of changes in coalition size in a manner that parallels the approach to policy change taken in Table 7.4. As was true with policy change, here we focus on short term changes in institutions by the leader, defining $\Delta W = W_{t+1} - W_{t-1}$.

We focus here on immediate corrective steps designed to inoculate the leader from deposition. Because coups and revolutions are expected to represent different threats to survival and to call for different institutional adjustments we also test both the direct effects of changed coalition size and the interaction of ΔW with the anticipated threats to survival; that is, $\widehat{Rev}$ and $\widehat{Coup}$.

As with Table 7.4, Table 7.5 is difficult to interpret as so many of the results depend on the joint

[9] Although the individual coefficient estimates associated with the Res(Assembly) variables and irregular deposition appear statistically insignificant, a joint hypothesis test is highly significant and additional analyses shown in Table A7.4 suggest the over-provision of assembly particularly increases the risk of irregular deposition by the masses.

Table 7.5: Change in Winning Coalition Size and Leader Deposition (Weibull Model,)

	Regular b/se	Irregular b/se
$X\beta$		
W_{t-1}	5.339**	-2.026
	(2.012)	(2.533)
W^2_{t-1}	-2.954	1.568
	(1.636)	(2.326)
S_{t-1}	-1.785**	-1.178
	(0.587)	(0.691)
ΔW	4.269***	-3.049***
	(0.574)	(0.855)
$\widehat{Rev}$	0.045	-0.209
	(0.037)	(0.108)
$\Delta W * \widehat{Rev}$	0.178	1.323
	(0.287)	(1.102)
$\widehat{Coup}$	0.020	0.909***
	(0.072)	(0.115)
$\Delta W * \widehat{Coup}$	-0.108	-1.783***
	(0.146)	(0.309)
$\text{Log}(\text{GDPpc}_{t-1})$	0.090	0.136
	(0.082)	(0.084)
$\text{Log}(\text{Population}_{t-1})$	0.037	0.131*
	(0.031)	(0.058)
Growth_{t-1}	0.003	-0.018*
	(0.006)	(0.009)
Old or Sick	0.240**	0.491*
	(0.085)	(0.199)
Const.	-3.811***	-2.988*
	(0.970)	(1.246)
Ln(p)		
W_{t-1}	1.080***	0.640
	(0.185)	(0.344)
Const.	-0.912***	-0.398*
	(0.140)	(0.193)
Observations	8279	8279
Number of Leaders	1518	1518
Failures	1081	208
LogLikelihood	-2025.797	-600.206

$*p < 0.05, **p < 0.01, ***p < 0.001$

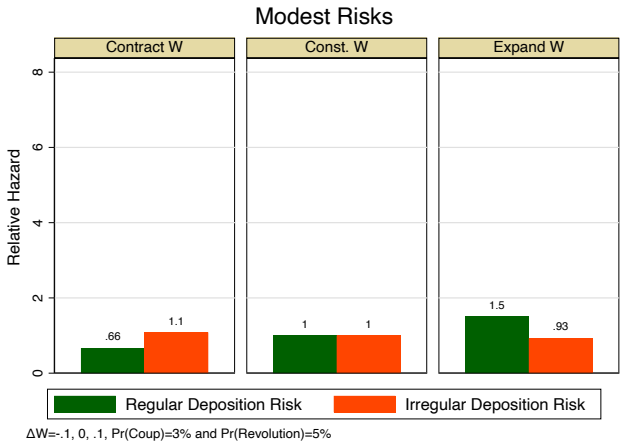
significance across several variables rather than the significance of any one variable. Hence, we use a similar graphing strategy to show the key results for ΔW as we did for changes in private goods provision. Before turning to Figure 7.6, however, we briefly summarize some readily discerned and important results from Table 7.5.

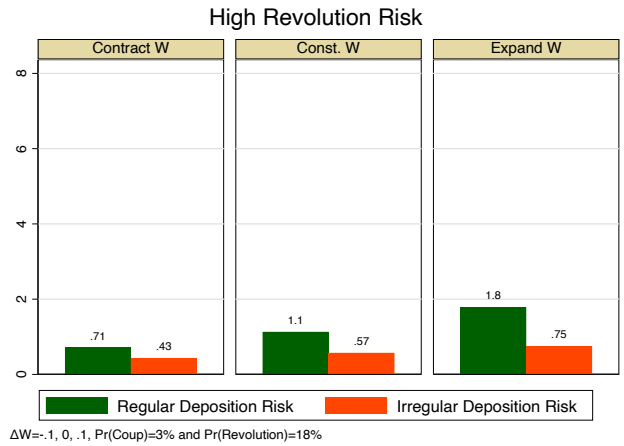
The first result that jumps out from Table 7.5 is the enormous difference that changing coalition size makes for regular and irregular removal from office. As expected, democratization is dangerous for leaders under normal, everyday circumstances. Their survival prospects are greatest when W is small, especially if S_{Real} is large. Making their coalition bigger greatly increases their exposure to regular removal. In fact, the coefficient of 4.269 means that if the leader increases W by, say, 0.1 then the risk of regular removal rises by 53%. It is tough to survive regular challenges to office-holding by becoming more democratic. But when it comes to irregular removal, the same amount of democratization ($\Delta W = 0.1$), at least *in the absence of threats*, looks attractive as the risk of irregular ouster fall by more than 25%. Would-be revolutionaries may be placated and would-be coup plotters must be less worried about being purged if the coalition expands. Latent plots against the incumbent may be diminished by democratizing. But, of course, leaders face diminished discretionary funds if they democratize so this is surely not something they do casually or in the absence of good reasons to fear a threat.

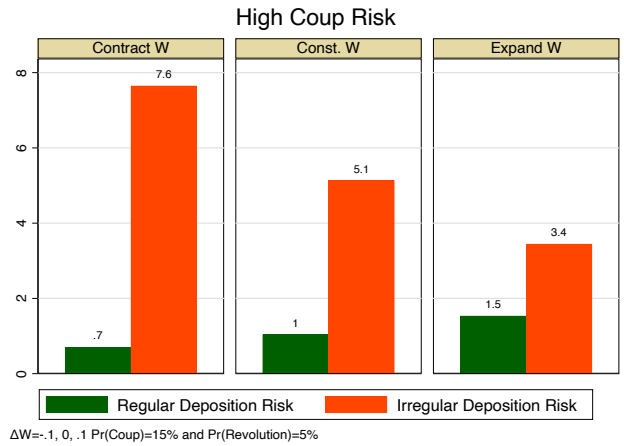
Having assessed the direct effect of ΔW, we now focus on Figure 7.6. The figure displays the risk of regular and irregular leader removal under three distinct, critical circumstances: when a leader faces no more than the average, background risk of a coup or revolution; when the leader believes that she faces a high risk of revolution; and when the leader believes that she is subject to a high risk of coup d'état. The leader's responses to these circumstances are portrayed along three dimensions: the leader contracts W; holds coalition size constant; or the leader expands the coalition, increasing W. The values used to calculate survival risks, given the coefficients in Table 7.5, are displayed for each circumstance below each row of the graphs.

The three rows of graphs all share the same scale on the y-axis; that is, the scale used to plot the relative hazard rate under each of the depicted circumstances. By keeping the y-axis the same in all of the graphs we see how dramatically greater are the risks to political survival when a leader fears that a coup is being plotted than is true under any other circumstance.

Figure 7.6: Change in Coalition Size, Risks of Revolution and Coup and Relative Deposition Rates







We know from Chapter 3 that there are three circumstances under which an incumbent is expected to believe that there is a significant threat of a coup d'état: members of the coalition are dissatisfied with the incumbent's efforts on their behalf; members of the coalition fear that if they do not act to depose the incumbent then the incumbent is going to purge them from the coalition, eliminating their future access to the benefits of being in the coalition; or coalition members recognize or believe that there is a danger of a mass uprising and conclude that they expect to be better off if they pre-empt the mass revolt by initiating a coup.[10] These circumstances help us to understand why responses to coup threats and revolutionary threats look so different.

The magnitude of the deposition risks associated with the strong expectation of a coup are massively larger than the deposition risks given the strong expectation of a revolt (although the occurrence of the latter is much more frequent than the occurrence of a coup). Focusing on irregular removal, we see that a high coup risk accompanied by a contraction in coalition size increases the risk of ouster by 660%. Dangerous as expanding the coalition is when a ruler believes there is a great danger of a coup, still the risk of the leader's irregular removal, while 240% above 'normal', is less than half of the risk of ouster if the coalition were contracted and it is substantially lower compared to the danger of irregular removal if the coalition's size is unaltered. Yet, if the danger comes primarily from a revolutionary risk instead of a coup risk, then the deposition danger is much lower and responds in the opposite direction to the parallel circumstances when there is an elevated belief in the risk of a coup d'état.

Specifically, when there is a strong expectation of a mass uprising then the danger of irregular removal is 25% lower than normal if the coalition is expanded whereas the risk of such deposition is 57% below average if the coalition is contracted instead of being expanded. And, as with the belief that there is a significant danger of a coup, doing nothing to change the coalition's size when there is a revolutionary threat results in an intermediate danger, reduced 43% from average, but higher than if the coalition were reduced in size and lower than if it were expanded.

Thus, when a leader faces only a significant threat from revolution, the optimal response in terms of avoiding irregular removal (such as arises if the revolution occurs and succeeds) is to shrink the coalition, making the regime more autocratic rather than buying off dissatisfaction in the masses by democratizing. When the significant threat is believed to be from within the coalition in the form of a coup plot then the optimal response to avoid irregular ouster from a successful coup is to expand the coalition, thereby possibly reducing the fear among coalition members that they will be purged. Elevated beliefs about coup risks are less common than are elevated beliefs about the risk of revolution, but the consequences of attempted coups are much worse for incumbents than the consequences of attempted mass uprisings. When both risks are believed to be high, the relative magnitude of the risks to political survival tells us why it is that we should expect leaders

[10]Recall from Chapter 3 that these conditions are met in the static game when θ is less than a condition-specific critical value and are met in the global game when Ω, the leader's strength, is sufficiently low and signals about that strength are below their critical threshold.

to be more attentive to offsetting the danger of a coup d'état than the danger of a revolution.

We have just seen that there is an inherent tension in what a survival-oriented leader needs to do when faced both with an elevated threat of revolution and of coup, two dangers that often go hand-in-hand since one reason to make a coup is to avert a revolution. The risk of ouster is vastly higher if a coup threat exists and the leader contracts the coalition – autocratizing – than if, instead, the leader expands the coalition, democratizing. The risk of ouster given a high threat of revolution in both cases is much smaller but, nevertheless, is moving in the opposite direction and the risk of a revolution occurring is much higher than the risk of a coup. To ward off a revolution, leaders are likely, as we saw in Chapter 6, to engage in extra-legal executions and torture and they are likely to shrink their coalition, becoming more autocratic rather than less so. That is their best path to political survival in the face of a credible threat of irregular removal from power by the masses.

The leader's tension in what to do is not limited to the choice of averting irregular removal through a coup or a mass uprising. When a coup threat looms large, democratizing – watering down the private goods benefits that make coalition loyalty attractive – *increases* the risk of regular removal by 50% whereas decreasing the size of the coalition *reduces* the risk of regular removal by 30%. And when it comes to worrying about future regular removal, the response to the threat of a revolt parallels the best response to the threat of a coup. Democratizing is the inferior choice for an incumbent facing a revolutionary threat whether she is more worried about irregular removal or regular removal. In either case, expanding the coalition is her worst choice.

While we, as members of society behind Rawls's veil of ignorance, would like to see more democratization around the world, selectorate logic and the evidence from the survival analysis tell us that incumbents have strong incentives to move away from democracy whenever they can do so successfully. Under average circumstances in which the risk of coup and of revolution is relatively small, leaders can modestly diminish their risk of regular ouster by contracting coalition size, although at the cost of a slight increase in the risk of irregular removal. Democratizing in the absence of the belief that there is a significant threat to stability substantially increases the chance of regular removal while minimally decreasing the danger from irregular ouster. In general, only coup threats provide incumbents with an incentive to gamble on democratization. When leaders anticipate challenges to their hold on power, most of the time they look for ways to diminish their coalition rather than expand it. That is the sad conclusion from selectorate logic and from the evidence provided by the survival analysis we have conducted.

7.9 Summation

The analyses in this chapter have demonstrated several important empirical regularities that help us understand the challenges that we, as citizens, face when it comes to advancing democracy as the best form of government. For starters, we saw that among those leaders who die from natural causes,

the modal coalition size is exceptionally small. Death by natural causes is disproportionately the reality of the most autocratic or monarchic rulers. Relatively speaking, such rulers are not frequently overthrown by coups, revolutions, or by elections. Among leaders who survive the first few years in office, the smallest coalition rulers have the best prospect of losing office by going to sleep and not waking up, the grim reaper having caught up with them before any political rival could manage to do so. That, of course, is the optimal exit from power from any ruler's perspective.

For democratic leaders and for mid-sized coalition rulers, those who govern with rigged elections or other 'moderate' forms of autocracy, death from natural causes, of course, happens but it is not the modal reason they lose power. Democrats are overwhelmingly deposed by routine, constitutional means. Time is not on their side so, as we have seen, they would benefit, all else being equal, if they could shrink their coalition and improve their chances of losing office by dying in their sleep. Rigged-election autocrats and other middling dictators face a mix of reasons for being ousted from power. The risk of irregular deposition is most heavily focused on mid-sized coalition leaders, followed by death-in-office and, as the coalition gets larger, regular removals become commonplace. The lot of those who depend on a mid-sized coalition is a complicated one but it is one with better chances of survival than the chance experienced by large-coalition, democratic rulers.

Of course, rulers generally do not passively accept their impending ouster from office. Instead they look for signs of trouble and when they see such signs then they look for fixes that will sustain their authority. We saw that adjustments to private goods provision; that is, increasing or decreasing the privileges of coalition members, is an important policy pathway to political survival but it is a tough, complex, conflicted pathway.

Over-provision of such private benefits as corruption opportunities is a sure way to reduce the risk of regular removal from office. But providing too many private goods relative to the incumbency constraint increases the leader's risk of irregular deposition by coalition members who fear they are about to be purged. For people who govern with a mid-sized to largish coalition this is quite a quandary. They face high risks from both irregular and regular ouster. For smaller coalition rulers there is a different quandary.

In a small coalition system irregular ouster is a much bigger threat than is regular removal. If a small coalition ruler is over-providing private goods, then she has three ways to return to the incumbency constraint. First, she could cut back on private rewards, keeping more resources for herself. Doing so diminishes the risk of irregular ouster by coup d'état and helps her build up her rainy day fund. Second, she could purge members of the coalition, bringing the over-payment in line with the newly diminished coalition size. This choice increases the incumbent's future discretionary pot of money but at the cost of an elevated coup risk. Third, she might increase the coalition's size, spreading the private rewards over an increased number of supporters. This approach reduces the incumbent's discretionary resources but ameliorates the threat of removal by supporters who fear they might be about to be purged. As we saw in Chapter 6, experienced, small coalition leaders are particularly likely to adopt the first strategy. The second and third approaches are more likely

to be attractive to less experienced or sickly leaders.

As we know, the mix of private and public goods that a leader provides is an equilibrium characteristic of governance among incumbents motivated by political survival. Hence, when they fear that a coup or revolution is on the horizon and they adjust their goods provision to thwart the feared event, then they may also need to change their government's institutional configuration. Here too theory and evidence provide an explanatory picture.

We saw that leaders are pulled in two directions when it comes to their institutional configuration if they believe that they face a significant threat of coup d'état and of revolution. Democratizing is an effective way to diminish their risk of deposition in a coup but autocratizing is the more effective way to survive the anticipated threat of a mass uprising. And under the most common circumstance, when the incumbent believes she faces no more than the typical background risk of coup or revolution, then she can modestly diminish her risk of regular ouster by decreasing the size of her winning coalition but at the cost of a modest increase in the likelihood of irregular ouster.

When a leader anticipates that the main threat to her continuation in power comes from a coup threat, she has an incentive to gamble on democratization. If the coup arises because she cannot pay her supporters enough private goods, then an enlargement of W dissipates the need for heightened corruption. If the coup threat arises because too much corruption leads supporters to fear that a purge is imminent, then enlarging W alleviates those fears. Of course, diminishing the short-term threat of a coup by democratizing increases the difficulty of surviving in the longer term. But, then, tomorrow's survival problems only matter to those who survive today.

As we have emphasized throughout, the interests of coalition members and ordinary citizens can align against the interests of leaders if the coalition size, combined with productivity, pushes the coalition's welfare above and to the right of the minimum value on the swoosh curve. In that circumstance, the leader's interests begin to separate from the interests of the coalition's members whose interests now begin to move together with the welfare of the mass of society. Their interests are then in favor of democratization. Below a critical cut-point, the coalition might be bought off by the incumbent but if productivity and coalition size are both large enough then the push to autocratization is thwarted. Logic and evidence both tells us that is the best circumstance for democratization. It might arise through the course of economic development but as our results show, economic growth generally is not significantly associated with changes in a leader's prospects of political survival and smaller coalition leaders have incentives to hold back improvements in domestic economic productivity. Dangerously, the transformation of autocracy into democracy appears to be greatly benefited by a high risk of coup d'état and the risk of a coup is itself increased by the threat of revolution, including, as we saw in Chapter 3, a failed revolution. The path to democracy is a difficult one but once beyond a critical point it is also a secure one.

Chapter 8

Practical Applications

We have set out an extended selectorate theory and we have tested its implications against a large body of observational data. Additionally, we have used several difference-in-difference tests that probe the theory's expectations in settings that are close to quasi-natural experiments. The logic and statistical assessments have also been accompanied by numerous brief case studies to illustrate the working of the theory in concrete situations. Although illustrative examples should not be confused with systematic evidence, nevertheless they help to demonstrate how closely real-world events follow the detailed logic of the extended selectorate theory.

Selectorate theory predicts many hypotheses and we have endeavored to test many of them. The empirical evidence supports a substantial proportion of the theory's testable predictions including many hypotheses that we believe are uniquely derived in selectorate theory. Still, given the noisiness of measures and the lack of experimental evidence, we are not persuaded of the theory's efficacy by any single test and we do not think the reader should be either. Rather, the evidence that the selectorate theory might be a useful way to think about political instability is found in the breadth of the empirical support even for many of its most nuanced implications. The most demanding test of the theory will come from its ability to predict out-of-sample outcomes; that is, its ability to predict events and, just as importantly, non-events in the future and its ability to predict policy change and institution change as efforts to avoid or alleviate threats to political survival.

As a first-cut at demonstrating the prospect of using the theory as a predictive tool we have used boot-strapping to assess how the theory performs on out-of-sample observations. The good fit of statistical models when applied to the excluded data provides reassurance that the theory has real predictive power. We will have to wait to see whether future events provide additional support or undermine confidence in selectorate theory.[1] In the meantime, given the overwhelming empir-

[1]No single case, of course, constitutes refutation or 'confirmation' for a theory that makes probabilistic predictions. Selectorate theory does just that when, for instance, a leader believes she faces a coup threat and the threat of a mass uprising, each with different optimal responses. Hence, future events, and not any

ical support amassed for the broad implications of the theory as well as many of its more subtle, nuanced propositions, we believe the selectorate approach provides important new insights into the performance of polities, the survival of leaders, and the occurrence and anticipatory prevention of instability. Next, we briefly summarize some of these major findings before demonstrating practical ways in which policymakers and analysts might use selectorate logic and the measurement procedures we have introduced to anticipate and respond to prospective sources of policy or institutional instability and leader change anywhere in the world.

8.1 Some Key Findings

The extended selectorate theory includes several advances that we believe add significantly to our understanding of politics beyond the insights created in the original presentation of the theory more than two decades ago (Bueno de Mesquita et al., 2003; Bueno de Mesquita et al., 2002). For instance, Chapter 3 introduced a dynamic model that uncovers significant changes in what leaders do over their life-cycle in office. We saw that how leaders compensate the members of their winning coalition and the people who reside in their society changes the longer they are in power. Specifically, the longer a leader remains in office, the fewer public goods she provides, the fewer overall benefits given to her coalition, but the greater the proportion of rewards in the form of private benefits. We also learned that despite providing less to her coalition and to her full body of subjects, the longer a leader remains in office the lower the probability that she will face threats to her hold on power through coup d'état or mass uprising. And if she faces such threats (or believes she faces such threats), we learned that she makes smaller institutional adjustments compared to what newer leaders do when faced with equivalent beliefs about threats. Thus, the longer a leader remains in power and stays healthy, the less she provides to others, the more resources that remain for her own discretionary use, and the more secure her hold on power becomes.

We also learned that the price of public goods (variously measured as educational attainment and as per capita income), in conjunction with the size of the incumbent's winning coalition, has important effects on political risks. As a polity's government becomes significantly more democratic; that is, as its winning coalition gets to be very large, it eventually crosses a dividing line beyond which it is theoretically invulnerable to the advent of a successful coup d'état or revolution. But how large the coalition must be for the polity to achieve this invulnerability depends on how cheap or costly it is to provide public goods. The costlier it is; that is, the less human capital or the lower the productivity of the labor force, the larger the coalition must be before it attains such invulnerability. This result, borne out by the evidence, helps explain why lower-income, at least quasi-democratic, societies, such as modern-day India ($W = 0.71$ and productivity in the lowest quartile in 2022) or Niger ($W = 0.73$ and productivity in the lowest percentile in 2022), or even sub-units within democratic societies, experience more anti-government efforts at insurrection, coup

one future event, will be informative of the theory's efficacy.

d'état, civil war, or mass uprisings than their higher-income equivalents. Just such instability, in fact, occurred in Niger in 2023.

The results regarding the interaction of coalition size and the cost of public goods highlight another significant finding. Many economists have examined what is sometimes referred to as the 'poverty trap' in which countries, through economic shocks, indebtedness, or the misfortunes of natural disasters, are unable to break free of extreme poverty (Barrett et al., 2019; Krishna, 2006; Krugman, 1991; Kwak and Smith, 2013; Roessler, 2016). In Chapters 2 and 3 we demonstrated that the conjunction of low productivity and a small coalition improves a leader's personal benefits from office and her prospects of surviving in power, thereby endogenously incentivizing leaders, especially in smaller-coalition settings, to create or maintain policies that induce a poverty trap. Consequently, for instance, smaller coalition regimes are happy to promote primary education and basic health care for workers but do little to encourage secondary education or health care for children and others not in the labor force. That is, they want enough productivity so that workers can enrich the regime but not so much that workers think independently or possibly challenge government policies.

The life-cycle and public goods price analyses, taken together with coalition size, give us a new, more dynamic understanding of how the welfare of coalition members changes as a function of time and economic productivity. Rather than there being a single swoosh curve to capture the welfare of coalition members, the curve shifts upward and downward depending on the length of time a leader has been in office (t). The extended theory also shows us that the shifts in the swoosh curve are not limited to being ratcheted up or down. The coalition size at which a member's welfare is minimized shifts to the right as the price of public goods, p, increases. This result means that producing public goods less efficiently extends the range of coalition sizes for which autocratizing the government is more attractive than democratizing it and this attractiveness is true not only for the incumbent but for members of the coalition too. Furthermore, the slope of the long upward swing in a coalition member's welfare becomes flatter as W increases beyond its minimum if public goods are pricier rather than cheaper. As a consequence, leaders are happy if productivity remains low because it makes survival easier and allows them to take a greater proportion of societal resources for their own discretionary ends. Low productivity benefits only the leader. A higher price for public goods means slower growth in benefits for coalition members as the coalition expands beyond its welfare minimum. Hence, once on the upward side of the swoosh curve, coalition members would be happy to see better economic policies that increase the slope; that is, increase their individual benefits by more as the coalition gets larger. High productivity provides a reason for coalition members to favor democratization over autocratization more vigorously in societies in which the winning coalition size is otherwise the same. Taken together, these dynamic changes in the shape and location of the coalition's welfare curve alters the risks and the expectations of destabilizing events like revolutions or coups. By way of illustration, Hungary's coalition fell from around 0.90 to about the same size as Niger in 2022 (Hungary's W=0.73 in 2022). But Hungary's productivity was in the top quartile

globally in 2022 and it has been at that level for at least the past 20 years. In the 20 years up to 2022, Niger experienced 5 destabilizing events; that is, coups or revolutions. Hungary, despite its democratic backsliding, has experienced no such events over the same time.

Returning to the swoosh curve, the points on the curve depict the location of the incumbency constraint at any given coalition size given both the leader's time in office and the price of public goods. That means that, holding coalition size constant while allowing tenure (t) and the price of public goods provision (p) to vary, the same allocation of public goods or private goods can fall on, below, or above the incumbency constraint depending on the values of W, t, and p, creating a complex, three-dimensional calculation for any leader. The evidence shows that most leaders are quite good at working out policy allocations, in keeping with selectorate theory's expectations. Still, with so many parts potentially moving simultaneously, the opportunity for an incumbent to pick the wrong mix of policies is not inconsequential.

When public goods or coordination goods payments are below the curve (or coordination goods are above the curve and the coalition is small), the risk of rebellion is heightened. When private goods are below the curve such that coalition loyalty is low, then leaders may be vulnerable to a mass uprising that the coalition's member are unlikely to suppress. These conditions also make the leader vulnerable to a coup. If a leader over-provides private goods, and, especially if the provision is increasing, then coalition members fear that a purge is on the way and with the prospect of being pushed out of the coalition, they might try to organize a coup while they still have the ability to do so. Of course, the same over-provision of private goods gives the leader the opportunity to purge the coalition. While in the short term this puts rulers at an increased risk of coup, it helps ensure long term survival if they can successfully contract the coalition. However, as we saw in Chapter 7, in such heightened private goods environments, the leader best ameliorates her risk of irregular deposition by democratization. So, a leader's complex, shifting environment certainly creates opportunities for errors that lead to potentially predictable bouts of instability.

Most of the rest of this chapter explores that potential to predict instability, or stability, as a useful tool for analysts, scholars, and policymakers. In the case applications that follow, we will emphasize key events in recent history, many of which illustrate what happens when leaders make errors and a few of which illustrate how long leaders can survive in power when they make the 'correct' decisions; that is, those that are consistent with selectorate-logic. Before turning to case studies, however, we first provide a general overview of how well our measurement procedures do at anticipating threats and how well leaders do, according to those measures, at ameliorating threats.

8.2 Swoosh Curve Deviations and Global Prediction

During the course of this investigation, we have identified a set of new indicators that proved helpful in explaining the expectation of threats to a leader's political survival. Most of the time, we expect that these threats are mitigated by adjustments such as altered uses of suppression, modifications

in policies, changes in institutions, or replacement of leaders. Now we wish to evaluate the extent to which those indicators might prove helpful in real-time evaluations of changes in institutions or in who the leaders are around the world. We begin by focusing on simple cross-tabulations that show us how predictive of future changes are the mis-allocation of public goods, freedom of assembly, and private goods; that is, we look at the relationships between $\widehat{Coup}$ and $\widehat{Rev}$ and important changes in governance, with both of our estimations of the risk of threats based on residual policy provisions relative to expected provisions.

Initially, we look at global predictive power. Then we zoom in to examine how well our indicators would have done in helping to anticipate democratization in Sierra Leone, following which we then examine such major events as the collapse first of autocracy in Poland and then in the Soviet Union between the late 1980s and the early 1990s. We follow those analyses with an examination of the advent of the Arab Spring in 2011. Each of these analyses illustrates the use of our methods to identify what risks leaders 'ought' to have thought they faced and what responses they 'ought' to have used, comparing them to what they actually did. Here we are over-selecting on cases in which leaders had bad luck, made mistaken choices, or had to gamble on what to do and ended up choosing incorrectly. It is such cases that attract attention because they result in noteworthy changes. Those with good fortune who choose correctly can be expected, boringly, to survive in office until they die in their sleep or until unalterable term-limits move them into retirement.

The task before us is extremely challenging. The theory behind this study argues that leaders *anticipate* the risk of destabilizing events and take actions to offset the risk. In game theory parlance, they put the threats to their hold on power 'off the equilibrium path.' As we have repeatedly noted, we only have data about what actually happened in the world and how that compares to our estimates of the counter-factual world in which threats were perceived and actions were taken to make sure the threats were not realized. The absence of information about the threats that did not arise is further compounded by the fact that we have no way of knowing how often leaders over- or under-estimate the risks they face. Clearly whenever a coup or a revolution occurred they either lacked the ability to prevent the event or they failed to detect the risk. Conversely, when the risk was believed to be high and no event occurred it might be that the leader prevented the threat from materializing or it might be that the leader over-estimated the risk. With all of these difficulties firmly in mind, we proceed to suggest ways that our results can be used.

8.2.1 How Much Does *Anticipation* Influence Survival?

To begin, let us compare the probability of surviving in office when a coup or revolution occurred depending on whether the ex ante belief that there was a high risk of such an event was present or absent. To make this comparison in an easy-to-use way, we define the belief that there was a high risk of a destabilizing event as present whenever $\widehat{Rev}$ or $\widehat{Coup}$ is at or above its median value in our data. If below the median, we define the belief as low risk. We are interested in what the chances

of ouster or survival look like based on variations in the belief about the risk of instability– our ex ante, predictive information – when, in fact, a destabilizing event subsequently arises. Table 8.1 provides the information we require.

Table 8.1: Leader Deposition Given Anticipation and Occurrence of Instability

Probability of Leader Desposition in years t or t+1		Risk of Instability Low	Risk of Instability High	Total
Occurrence Of Instability	No	35.0% (934 of 2,671)	22.6% (723 of 3,197)	28.2% (385 of 5,868)
	Yes	42.6% (23 of 54)	40.7% (326 of 801)	40.8% (385 of 855)
	Total	35.1% (957 of 2,725)	26.2% (1,049 of 3,998)	29.8% (2,006 of 6,723)

Occurrence of instability indicates that either a revolution or coup occurred. High risk of instability indicates that either $\widehat{Rev}$ or $\widehat{Coup}$ is above the median risk. The table provides the percentage of observations in which the leader is deposed. Inside the parentheses are the number of observations of leader change and the total number of observations that meet the risk and instability occurrence contingencies.

Table 8.1 examines the probability that a leader was deposed in year t or $t+1$ depending on whether or not she had reason to believe that she faced a high risk of instability (above the median of either $\widehat{Rev}$ or $\widehat{Coup}$) and whether a destabilizing event occurred. The average probability of leader deposition was 29.8%. The occurrence of a destabilizing event (revolution or coup) increased the rate at which leaders were deposed to 40.8%. In contrast, if no destabilizing events occur (the much more common case), then leaders were deposed only 28.2% of the time. The occurrence of revolutions and coups clearly endanger a leader's hold on power. A primary thesis of this book is that leaders do not calmly sit and wait to be be deposed but, instead, they take actions to prevent their loss of power. The evidence suggests that a leader forewarned is a leader forearmed.

The second column in Table 8.1 indicates that when leaders anticipate a possible revolution or coup then they survive at a higher rate than if they did not anticipate a destabilizing threat (first column). About 60% of the observations in Table 8.1 are classified as an anticipated high risk. While revolutionary risks and coup risks are correlated, they are not perfectly correlated (if they were then only 50% of the observations would be coded as high risk).[2] Although in Chapter 5 we lamented our inability to predict the occurrence of destabilizing events (as leaders work to offset these risks), Table 8.1 suggests that those analyses still provide considerable leverage: 94% of the destabilizing events occur in observations where the risk is high. Only about 6% of coups and revolutions occur when the predicted risk is low. This ex ante ability to identify circumstances in which the risk of instability is high is useful to leaders and policy analysts.

[2]Table 8.1 is constructed using the median risk since this appears as a focal threshold. We obtain similar results if we use other thresholds, such as the 75th percentiles.

Unprepared leaders have the greatest risk of being deposed. The difference in the probability of deposition given that a destabilizing event occurred is small, although favorable to those who believed they faced a high risk. As we see, if an unanticipated instability event occurred (low risk), then leaders are least likely to survive, with a 42.6% risk of deposition. In contrast, if the leader anticipated instability (high risk), then the occurrence of instability results in a deposition rate of 40.7%; still high, but lower than if the destabilizing event was unanticipated. But the important difference in risks arises when no event occurred. The theory tells us that if leaders believe they face a serious risk of deposition they take steps to thwart their fall from power. What do we observe? We see that leaders experience the lowest chance of being deposed when they anticipate they are at high risk from revolution or coup and they manage to dissipate that risk: the deposition rate given high risk and the non-occurrence of an instability event is 22.6%. Conversely, the risk of deposition given the non-occurrence of an instability event when the leader believes she is only facing a low risk is 35.0%. That is, the odds of deposition in the absence of a coup or revolt is about 55% higher when little or no risk is anticipated than when a high risk is anticipated (35.0% vs. 22.6%).

We interpret these results as evidence that leaders are cognizant of the risks they face and actively take measures to dissipate these risks. Of course, whenever a coup or revolution takes place, leaders are at heightened risk of deposition. However, selectorate theory predicts that when leaders believe they are at risk of facing such circumstances, they take preventative actions so that neither a coup nor a mass uprising actually happens. Thus it is, we believe, that the risk of deposition is so much lower when a high risk is foreseen and no event is subsequently observed than in any of the other circumstances in Table 8.1. Seeing a high risk, leaders take actions, for instance, to make sure that their coalition's members back them rather than supporting revolutionaries or rival coup plotters. And those actions eliminate or minimize the conversion of the anticipated threat into a realized threat. Hence, whether an event happens or not, those who do not anticipate a high risk have a 34% higher probability ($\frac{35.1\%}{26.2\%} = 1.34$) of losing power than those who think they face a high risk.

8.2.2 Does Anticipation Influence Institution Change?

In the context of selectorate theory, what leaders 'should' do is whatever helps them survive and maximize their discretionary resources. It is a pet peeve of ours that too many editorials state that leaders 'should' do this or that. Inevitably, these proposed policies would be good for the economy or the welfare of the people. Leaders are not opposed to economic growth and social welfare per se, but all too often such goals are to the detriment of a leader's survival and personal prosperity. So leaders 'should not' be expected to do such things. Instead we must focus on what leaders actually 'should' do; that is, make policy choices to maximize their survival and discretionary resources. By focusing on the actions that are in leaders' interests we will be more successful at anticipating and –just maybe – sometimes influencing what they do.

Perhaps the longest lasting impact of a leader's reign is the institutions she leaves behind. Behind the Rawlsian veil of ignorance everyone 'should' create large coalition systems. But once someone becomes a leader, a political rival, a coup plotter, or a revolutionary, their preferences over institutions are shaped by how institutions affect their prospects for power. For them, societal welfare be damned!

In Chapter 6 we examined the circumstances most likely to lead to institution change and how those circumstances influence the direction of such changes. Chapter 7 extended the analyses to how changes to coalition size alter the prospects of leader survival. Now we want to probe how prior circumstances combined with whether the incumbent is ousted or retains power affects the prospects of a government becoming more democratic or more autocratic.

Revolutionaries and coup plotters seek to change institutions, invariably claiming to be doing so for the good of society. Leaders who believe they are facing a serious threat of a coup or a revolution look for ways to survive the threat. That means that they must sort out whether to alter the size and composition of their winning coalition. As we have emphasized throughout, sometimes leaders succeed in surviving the threats they face and other times they do not. Table 8.2 considers a series of political contingencies and summarizes how each circumstance influences modifications to political institutions. The table divides circumstances into two major groupings: the incumbent has been deposed (upper portion of the table) or the incumbent has survived (lower portion of the table).

The first row in each part of the table, labeled 'Low Risk', asks about institution change when the incumbent believed she faced little threat to her political survival, which for the purposes of this table means the risk of revolution and coup are below the 90th percentile. In the upper half of the table, despite believing that there was little risk, the incumbent was deposed. In the lower half, the 'Low Risk' incumbent survived in office. These two low risk circumstances establish the most common, baseline condition: the incumbent does not anticipate irregular ouster. Whether the leader is removed from power or not, the government's institutions are modified about 42% of the time and the coalition is enlarged somewhat more frequently than it is contracted, with a net effect of very little average change in the size of W. In the baseline, low-risk case it turns out to matter little in terms of institutions and their impact on society whether the incumbent continues in power or is replaced. But the picture is significantly altered once we move to a world in which elevated threats or the reality of revolutions and coups arise. Change in institutions becomes more likely when leaders anticipate high risks of revolution or coup and when such events actually occur.

A high risk of revolution and the occurrence of revolution make institution change more likely relative to the baseline, low risk case. Here we compare three revolution-related circumstances: 1) the occurrence of a successful revolution, 2) a high risk of revolution ($\widehat{Rev}$ above 90th percentile) in which the leader is deposed, but not as a direct result of a revolution (i.e. not irregular removal by the masses), and 3) the leader faces a high risk of revolution and survives in office. These first two contingencies, in which the leader is deposed, are shown in the 2nd and 4th rows of the upper

Table 8.2: Institutional Change Drive by the Occurrence and Threast of Coup and Revolutions ($\Delta W = W_{t+2} - W_{t-1}$)

Leader Deposed				
Political Contingency	Pr(W Changes)	Pr(W Increases)	ΔW : Mean (SD.)	Obs.
Low Risk	42.7%	59.2%	0.026 (0.103)	867
Successful Revolution	82.4%	46.4%	-0.003 (0.178)	34
Successful Coup	83.5%	37.4%	-0.048 (0.224)	109
High Risk of Revolution	84.0%	79.4%	0.122 (0.176)	81
High Risk of Coup	86.8%	78.3%	0.094 (0.162)	53

Leader Survives				
Political Contingency	Pr(W Changes)	Pr(W Increases)	ΔW : Mean (Std. Dev.)	Obs.
Low Risk	42.1%	54.5%	0.016 (0.093)	4,790
High Revolution Risk	56.4%	61.9%	0.039 (0.155)	550
High Coup Risk	55.1%	63.5%	0.038 (0.143)	557
High Coup Risk Excess Private Goods	55.4%	59.7%	0.018 (0.126)	354
High Coup Risk Insufficient Private Goods	54.7%	70.3%	0.072 (0.224)	203

Political Contingencies: High Coup Risk implies $\widehat{Coup}$ is above 90th percentile. High Revolution Risk implies $\widehat{Rev}$ is above 90th percentile. Low Risk implies neither of these contingencies is met. Successful Revolution is coded from Archigos definition of irregular leader deposition by the masses. Successful Coup is coded from Powell and Thyne (2011). Excess Private Goods implies Res(Private)$>$ 0.
Pr(W Changes) is the proportion of observations that results in non-trivial change in W ($|\Delta W| > 0.01$), Pr(W Increases) is the proportion of the changes in W that results in an increase in W and ΔW refers to the mean (and Std Dev.) change in coalition size when changes occurs.

portion of Table 8.2 and the latter contingency appears in the 2nd row of the lower portion. The question now is how much it matters for the polity whether the leader is replaced or survives when revolution is threatened or occurs?

Revolutionaries almost always promise to lift up the downtrodden and make government more accountable to the masses. Indeed, we saw in Chapter 3 that such promises are expected to be made by revolutionaries. Chapter 3 also notes that if revolutionaries succeed in coming to power then their incentives change to those of incumbents; that is, they are more interested in decreasing coalition size with all that implies if they can get away with it. The 'Successful Revolution' row reinforces those theoretical inferences although with only 34 observations its implications must be interpreted cautiously. As the small N alerts us, successful revolutions are rare events. In order for a revolution to succeed, the coalition's members must believe that they will be better off under the revolutionary leader than they would be if they pre-emptively deposed the current incumbent or if they suppressed the revolution. Few situations are likely to satisfy the conditions required for a revolution to succeed.

While there are only a few cases of successful revolution, we see that successful revolutionaries indeed do change coalition size. Of the 34 opportunities to do so, the coalition's size was altered 28 times and average change in coalition size in these cases was nearly zero. Looking a little more closely, we see that of the 28 cases where the coalition changed, the coalition became larger only 13 times. It became smaller 15 times and did not change in the remaining 6 opportunities. Successful revolutionaries promise liberalization but most of the time they deliver as much or more autocracy as did their predecessor.

A more common ($N = 81$), but still infrequent set of 'revolutionary' cases involve an incumbent who believes there is a greatly elevated risk of a revolution and either steps down (perhaps going into exile), is assassinated, or otherwise leaves office without having been defeated by a revolution or by a coup. These cases are significantly different from successful revolutions and from their more common brethren; that is, cases in which the incumbent fears a high threat of revolution but succeeds in remaining in power ($N = 550$). When a revolt was thought to be looming, the leader left office, and no revolution actually occurred, then the new leader was overwhelmingly likely to modify the coalition's size, usually by expanding it. Indeed, 68 of the 81 coalitions that faced this unusual set of circumstances were altered and of those 68, 54 experienced a significant move toward democratization. The coalition's size increased, on average, by a substantial 0.122 among these 81 high risk cases in which the leader was replaced but there was no successful revolt or coup.

The most common revolutionary contingency arises, as theory leads us to expect, when the incumbent believes she is at risk of a mass uprising ($\widehat{Rev}$ over the 90th percentile) and she takes ameliorating actions that result in her surviving in power. Of these 550 instances, the coalition's size was modified just 56.4% of the time, far less often than was true when there was a successful revolution (82.4%) or leader-replacement under the threat of a revolution (84.0%), but still more frequently than change in the low risk case. The belief that a revolution is on the horizon seems to strongly incentivize coalition expansion. As we just saw, that was true for 54 out of 81 opportunities when the threat of mass uprising was high and the incumbent fell from power without a revolt occurring. The coalition expanded in 192 of 550 cases when the leader survived a high risk of revolution. In contrast, it contracted in 118 of those 550 circumstances, remaining unchanged in the rest of the cases. Reluctant as incumbents may be to expand their coalition, the fear of revolution in the absence of a successful revolt can act as an inducement toward 'democratization' as a possible way to buy-off the threat. That optimistic observation notwithstanding, we should also remember that most cases saw contraction or no change in coalition size. Further, when the incumbent's response to a high risk of revolution is a contraction in coalition size, then repressive actions, such as torture and political killings, significantly increase.

As different as are the experiences when a country has a successful revolution compared to a high risk of such an event, the differences are starker when we compare successful coups with instances of high coup risk but no coup, with or without subsequent leader removal. When a country experiences a successful coup its governance institutions are as likely to change as they are if there is

a successful revolution but the nature of the change is quite different. True, in both cases, coalition size decreases in a majority of the more than 80% of cases in which there is change but, given a successful coup, the actual change in coalition size averages -0.05 while in the case of a successful revolution, the mean change is -0.003. Both shifts are small but the net difference is notable. The contraction in coalition size means more private benefits for post-coup coalition members but it is a daring move that is indicative of the difference between a leader who rises through a coup compared to a leader who rises by just about any other means. During the first years in office, coalition members face the greatest risk of being replaced and this risk is further exaggerated by any contraction in W. As predicted in the analysis of the institution change global game, coup plotters who propose a contraction in W simultaneously also contract the real selectorate. Indeed, on average, the real selectorate contracts 0.060 following a successful coup d'état if the coup also resulted in a contraction in the coalition's size.

While successful coups on average contract winning coalition size, instances of high coup threat that do not materialize into a coup lead, on average, to coalition expansion. The final row in the the upper half of Table 8.2 examines the contingencies in which there is a high coup risk ($\widehat{Coup}$ above 90th percentile) and the leader is replaced, but not by irregular means. The final three rows in the lower portion of the table examine the consequences of a high coup risk when the leader survives.

In the 53 instances of leader replacement (but replacement not by coup) in a high coup risk setting, institutions changed 86.8% of the time. That is more frequent even than institution change following a successful coup. In 36 of the 53 instances, coalition size expanded. In only 10 cases did the coalition contract. The average change in coalition size in these combined 46 cases of institution change is 0.094.

The third row in the lower portion of Table 8.2 tells us that of the 557 survivors who believed they faced a high coup risk, 35.0% (195) increased their coalition's size, 112 decreased it, with the remainder unaltered. Still, the 35% that increased their coalition yielded a statistically significantly higher probability of $\Delta W > 0$ than is true if a coup actually succeeded. Successful coups, on average, make polities more autocratic; the anticipation of coups, whether the leader survives or is replaced, on average, makes polities more democratic and among those who anticipate a coup, the vast majority seem to take actions that keep them in power.

In Chapter 3, we theorized about the multiple mechanisms behind coups and in Chapter 5 we uncovered multiple pathways to a coup: First, the coalition might depose the leader to dissipate an imminent revolution. Second, if coalition members anticipate a significant risk of a purge then they often attempt a coup before they are removed from the coalition. Third, if coalition members are not given as many corruption opportunities as they anticipate receiving, then they depose their leader. A high coup risk can occur under any of these settings and the leader's best response varies with the origins of the threat. The first of these contingencies falls within the high revolution risk setting already discussed and so here we focus on differentiating between the latter contingencies.

The theory told us that leaders must be attentive to whether an underlying cause of a high coup risk is the over-payment or under-payment of private goods to coalition members. The final two rows of Table 8.2 help us sort out these contingencies. While the probabilities of altering coalition size are similar (about 55%) whether the coalition's members were receiving too few or too many private goods, the direction of change is quite significantly different. Excess private goods translate into increasing the coalition's size nearly 59.7% of the time whereas too few private goods translate into increasing W 70.3% of the time. Debs (2016) finds that democratization is a likely transition for military regimes and our results show this is especially the case if too few corruption opportunities are being provided. When leaders underpay in private goods, the fix is to democratize, thereby reducing the necessary supply of private goods and moving the currently low supply closer to the enlarged coalition's equilibrium amount. The upshot is that when excess private goods are provided, the coalition, on average, increases by 0.018, a very small amount. When too few private goods are provided and the risk of a coup is thought to be high, the surviving incumbent increases W, on average, by 0.072, four time more.

Table 8.2 has uncovered several important patterns. Newly ensconced leaders who came to power following a major disruptive event; that is, a successful coup or revolution, are significantly more likely to modify government institutions than are leaders who anticipated facing such threats and survived in office, a result emphasized as well in the analyses in Chapter 6. Surviving incumbents change institutions far less often but when they change them, they typically liberalize by more than it seems their replacements would have done. The one exception to this arises in cases in which high threats were anticipated and yet the incumbent failed to take actions that led to her political survival. When a revolution is feared to be on the horizon, does not materialize, but the incumbent is ousted internally anyway, then the coalition tends to expand substantially (0.122). The same pattern holds when a coup is feared, does not succeed, but the leader is removed anyway.

From a policy perspective one important contribution that the estimation methods we have introduced might make is to provide an independent, objective procedure for assessing the risks a leader might face and for identifying the steps the incumbent might take to off-set and survive the threat. To see how this might work, we begin with the experiences of leaders in Sierra Leone, a country that has undergone dramatic changes in the past few decades.

8.3 Beliefs, Actions and Political Fates in Sierra Leone

Why Sierra Leone? Nicholas Kristof, a New York Times opinion columnist, had a piece in the Times on June 3, 2023 that pointed to Sierra Leone as a nearly miraculous example of progress in the world. As he wrote, "We happen to live in a transformational era in which 96 percent of the world's children now survive until adulthood. That arc is visible here in Sierra Leone, a country that remains heartbreakingly poor — yet where the risk of a child dying is less than half what

it was 20 years ago."[3] When we read his article, with both of us utterly ignorant about Sierra Leone, we immediately thought, "Aha, Sierra Leone's winning coalition size must have expanded dramatically." Believing in selectorate logic, we turned to the data and discovered that Sierra Leone today has a winning coalition size of 0.73 and back in 1993 it was just 0.23, suggesting a remarkable societal transformation. And, checking on infant mortality, we found that our latest data (2020) shows for every 1,000 births 108 children died before the age of 5 years. This figure is much, much worse than the less-than-excellent performance of the USA at 6.3 but vastly better than it was in 1993 when 253 of 1,000 children in Sierra Leone failed to survive through their fifth birthday. The improved infant mortality rate was what selectorate theory told us to expect but then we had to ask, why did the country's coalition size improve so much. So, that is the question we now hope to answer by probing changes in Sierra Leone's governance based on selectorate theory logic and the indicators we have developed to test it.

Since its independence in 1962, Sierra Leone has suffered from bouts with coups d'état and civil war, as well as long stretches of stability. Additionally, over the span of six decades it has gone from being a one-party autocracy to being governed by a military junta and then by adopting a competitive, multi-party electoral system. Hence, it offers a useful case for analysis to see what difference it makes whether our indicators suggest that a leader should have believed he was facing a coup or a revolution or stability compared to what he actually ended up confronting. Selectorate logic indicates what adjustments a survival-oriented leader 'should have made' given the threats he 'should have believed' he was about to face. Some of those 'prescribed' changes would have avoided democratization while others might have encouraged it. Our task here is not to take a normative stance but rather to emphasize what selectorate logic tells us were the remedies to threats that Sierra Leone's leaders were expected to choose to survive in power and what happened to them if they chose 'correctly' or 'incorrectly.'

From this point forward, we will mostly drop the references that tie what leaders believed to what they 'should have' believed given our indicators and, instead, write as if they believed exactly what our indicators indicate. The exceptions will occur when doing so may mislead. That way, we can see both how well our estimation process did and how well Sierra Leone's presidents did at handling the challenges that they either should have expected or that they, in fact, confronted.

Our data for Sierra Leone begin in 1971, a critical year in which its first president rose to power. We begin by graphing Sierra Leone's risks of revolution and of coup d'état across the years for which we have data. It is worth noting that Sierra Leone's risks of destabilizing events almost always exceeded the global median and typically by a lot.

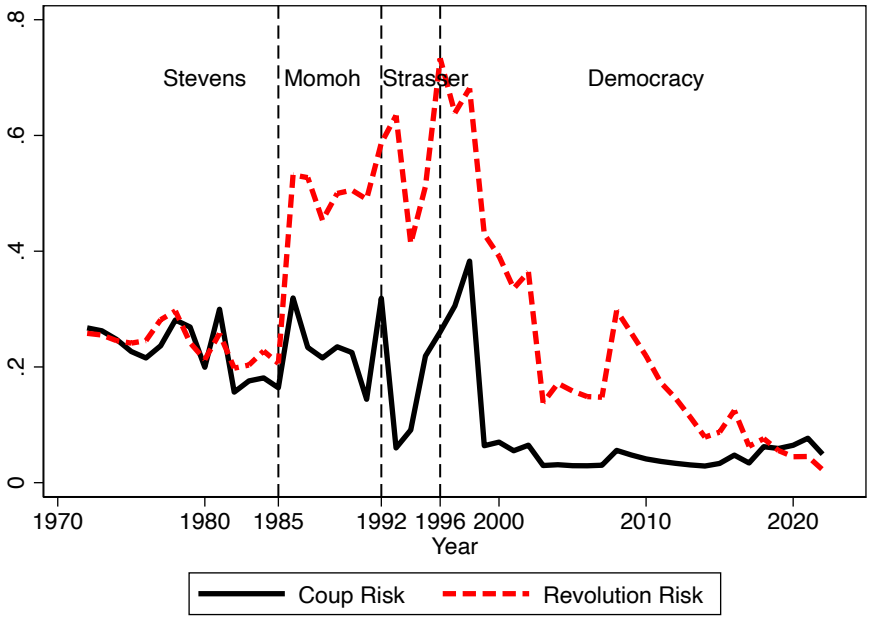
Figure 8.1 shows the annual estimated risk of revolution and of coup d'état according to the procedures we described for calculating the values of $\widehat{Rev}$ and $\widehat{Coup}$ in Chapter 5. The figure's dashed vertical lines denote the years in which leadership changed before the onset of democracy. Siaka Stevens, Sierra Leone's first president, was replaced in 1985 by Joseph Saidu Mohmo. He, in

[3] `https://www.nytimes.com/2023/06/03/opinion/sierra-leone-progress-health-children.html`

turn, ruled until he was ousted in a coup d'état led by Valentine Strasser in 1992. Strasser then fell in a coup led by Julius Maada Bio in 1996. Bio voluntarily stepped aside that same year and promoted free elections. Although flawed and interrupted for nearly a year by a coup led by Major Johnny Paul Koroma in 1997, Sierra Leone has been mostly democratic since then.

We will trace these leadership changes, along with policy and institution change in Sierra Leone, mindful that for most of its independent history its leaders almost always believed that they faced an unusually high risk of threats to their hold on power. Figure 8.1 also makes evident that after the mid-1980s and before 2018 the anticipated risk of revolution was always higher than the anticipated risk of coup d'état. The risk of coup peaked in 1997 and there were indeed coups in 1996 and 1997. Given the general statistical results we have reported, we believe that high threat perceptions can provide an early-warning, case-by-case alert system of coming changes in policies, governing institutions, and, perhaps, even changes in leaders. Hence, we use these risk projections as central elements in our assessment of expected changes in governance in Sierra Leone.

Figure 8.1: Sierra Leone's Risks of Revolution and Coup d'État by Year



8.3.1 What President Siaka Stevens Might Have Expected and Done

Moving chronologically, we begin our account with Sierra Leone's first president, Siaka Stevens. He provides a useful illustration of a leader who confronted no actual revolution or coup d'état but, nevertheless, always believed (by which we mean, remember, 'believed' by our reckoning) that there was a high risk of such an event. Stevens, who had been prime minister from 1967 until 1971, became president in 1971 when Sierra Leone's constitution was ratified. He remained in power until his retirement at age 80 in 1985. By our estimation methods, Stevens was probably believed to be seriously ill at least by 1983. As we have repeatedly emphasized, impending death is the most serious of political problems, especially for relatively small coalition leaders. He died in 1988, three years after his retirement.

During the entire time Stevens was in office, he led a one-party autocratic state. While he faced no actual attempted coups or mass uprisings after 1971, our estimates lead us to infer that Stevens always perceived the risk of a coup and a revolution as being about equal as can be seen in Figure 8.1 for the years up to the end of his presidency in 1985. That meant that he had to gamble on whether to expand the coalition or contract it. As we saw in Chapter 7, expansion is the optimal, although still high risk, survival-oriented response to an elevated coup threat and contraction is the optimal response to the threat of a mass uprising. Choosing what to do when faced with both threats is a tough challenge for any leader. Coups are more likely to succeed than revolutions but revolutions happen much more frequently than coups. Hence, whether the expected utility is higher for responding to one type of threat rather than the other depends on knowing the exact utility function of each leader, an inherently unknowable thing.

Siaka Stevens inherited a winning coalition sized by our reckoning at 0.563 in 1971. This size was typical among one-party states or rigged-election autocracies of the time. Indeed, Sierra Leone's coalition size was nearly identical to such other 1971 governments as those in Mexico, South Korea, Malaysia, and South Vietnam. Examples of current governments (as of 2022) with coalitions in the mid-0.50 range include Russia, Angola, Jordan, and Pakistan. What should we have expected him to do (or what would selectorate logic have advised him to do) if our ex ante projections of the risks he would face in the next two years were correct?

Selectorate logic (and, perhaps, common sense) tells us that someone facing an elevated risk both from the masses and from their coalition probably will engage in the suppression of opponents to deter a revolt and will purge the least trustworthy among their coalition members. While replacing some coalition members, the incumbent might also decrease the coalition's size and increase the provision of private goods. These steps would encourage greater loyalty among those not purged, providing them with greater benefits so that they would be disinclined to join a revolt or launch a coup while simultaneously increasing Stevens's discretionary control over government revenue. That sounds like a winning proposition for the incumbent. Revolutions, as we note in Chapter 3, just about never succeed without support, or at least passivity, from coalition members. So, securing increased coalition loyalty when faced with a possible coup and a possible revolt seems like

a good solution for a threatened incumbent. Stevens could, of course, have increased his coalition, insulating members from the risk of being purged. That, as we saw in Chapter 7, while risky, is the best response to the threat of a coup. But as we also saw in Chapter 7, it is the worst response to the threat of a revolution and so, as we said, Stevens had to roll the dice and he did so rather successfully.

The data for Sierra Leone during Stevens's time in power tells us that while he was not at all reluctant to employ suppressive measures, he chose to maintain a steady level of suppression rather than increasing it. The evidence also indicates that he made no moves to buy off the threat of a mass uprising. He neither increased public goods nor freedom of assembly, two actions that would have diminished the incentives among the masses to revolt against his government. What Stevens did do was increase the provision of private goods; that is, corruption opportunities, while diminishing the size of his winning coalition. These actions would have diminished the hope among revolutionaries that they would secure active support from remaining coalition members and so would have weakened their incentive to rise up against the government.

When Stevens came to power, the provision of private goods on our 0 to 1 scale equalled 0.485. By the late 1970s the value had risen to just under 0.60, reaching its maximum in his time of 0.636 from 1981 until his retirement in 1985. His coalition's size dropped from 0.563 in 1971 to 0.467 in 1978 and continued to decline, down to 0.396 in 1981 where it remained until his retirement. He had diminished his coalition enough so that it was comparable to the coalitions in, for instance, Sudan, Haiti, Kenya, Paraguay and Somalia at the same time. A coalition of that size in today's world is equivalent to what we see in Egypt, Iran, and Guinea-Bissau. Thus, over the fourteen years of his presidency, Stevens reduced Sierra Leone's coalition size sufficiently that, having begun above the global median size in 1971, it fell below the global annual median size for W in 1981 and remained below throughout his term in power.

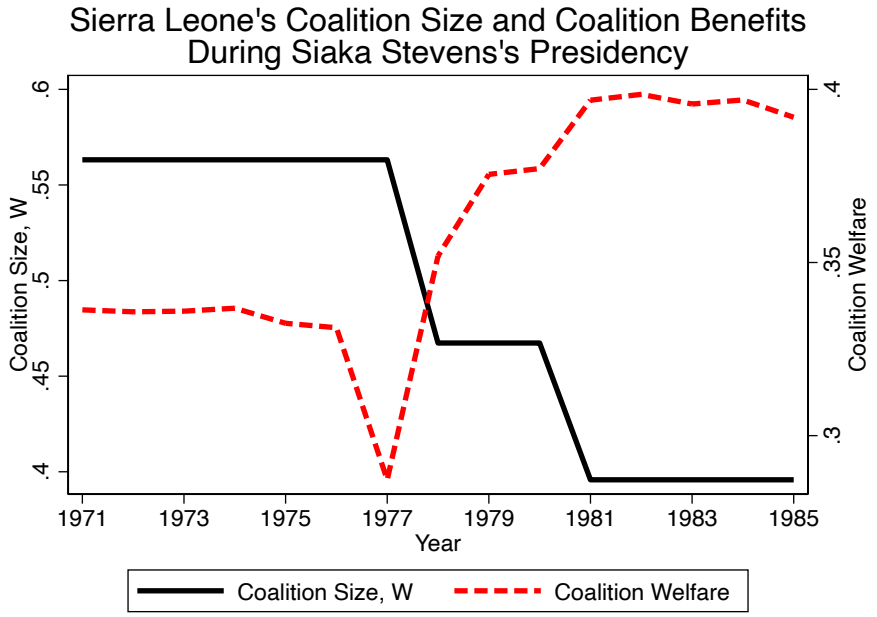
Using our advance-warning indicators of relative risks, we recognized that what President Stevens 'should' have done to secure his hold on power was hard to know because he faced approximately equal risks of coup and revolution. Faced with tough choices, he improved his own welfare by diminishing his coalition and, for those who survived his coalition reduction, he improved their welfare as we see in Figure 8.2.

Stevens's successors faced much clearer choices. For them the threat of revolution was consistently higher than the threat of a coup and, except for around 1997 and post-2018, it was *much* higher as we saw in Figure 8.1. Let's see what selectorate logic would have advised them to do and what they actually did.

8.3.2 President Momoh Fears Revolution but is Deposed in a Coup

Siaka Stevens was succeeded by President Joseph Saidu Momoh. Unlike Stevens, Momoh had to deal both with a strong expectation and with the actual realization of revolution and coup d'état

Figure 8.2: Sierra Leone's Coalition Size and Coalition Benefits During Siaka Stevens's Presidency



attempts during his first two full years in office (1986 and 1987), the most dangerous time for any incumbent. Consistent with the selectorate expectations that many coups are the results of coalition members fearing that they are about to be replaced, the failed 1987 coup resulted in the former Vice President and the former head of Presidential Security, as well as 16 other insiders, being convicted of treason (Brooke, 1987).

Following those threats, Sierra Leone entered a relatively calm period from 1988-1990 although, based on our calculations, the *belief* that there was a high risk of destabilizing events remained in place. As we saw in Figure 8.1, Momoh's situation; that is, the years from 1985 to 1992, was distinctly different from Stevens's. Momoh always faced a substantially higher threat of a revolution than of a coup. In fact, Momoh faced a violent revolutionary movement that began in 1991 and, as selectorate logic indicates, to avoid the adverse potential consequences of a revolt, Momoh's army deposed him in 1992.

By our estimates, Momoh should have been more concerned about a possible mass uprising against him than about a coup every year he held power. Indeed, a mass uprising erupted in 1991 when the Revolutionary United Front (RUF) launched a civil war against the government. What, if anything, had Momoh been doing to thwart the risk of a mass uprising that was so evidently signaled by the elevated value of $\widehat{Rev}$?

President Momoh, after increasing the coalition in 1986 from 0.398 to 0.420, then locked its size in place until 1991. Along with the increased size of W he decreased the size of S_R so that it returned to the level it held in 1989. He reduced the over-payment of private goods and the under-provision of public goods, with the consequence that total coalition welfare fell slightly and public well-being increased modestly.

Momoh's actions in 1990 and 1991 look like his attempt to neutralize the threat of rebellion, a sensible move on its own but short-sighted given that he also was confronted by an elevated (albeit lower) risk of coup d'état that could only be exacerbated by his maneuvers. If what Momoh was attempting was to make revolutionaries indifferent between rising up and living with the status quo, he failed. Likewise, if he was trying to make coup plotters indifferent between rising up or living with the status quo, he failed.

Momoh cut down slightly on corruption between 1990 and 1991 and he modified Sierra Leone's constitution so that the country now allowed multiple political parties rather than his one party. These two steps might have released some of the pressure for rebellion except that they were not accompanied by an increase in the size of the coalition, nor were they followed with greater provision of public goods and freedoms. Instead, he increased the size of the real selectorate from 0.664 to 0.739 while holding W constant after 1986 until 1990. That meant that in 1990 he reduced $\frac{W}{S}$, thereby strengthening the loyalty norm within the winning coalition instead of expanding accountability to buy off dissent within the masses. At the same time, our data show that he slightly under-provided public goods in 1990. The mix of the two resulted in virtually no change in the size of total coalition welfare. His strategy was ill-conceived to the extent that it neither bought off potential rebels nor improved the lot of coalition members. Thus, it was poorly designed to avoid a coup or a mass uprising. But then we should not be too hard on Momoh. Revolutionary threats, as we have learned, beget coup threats and fixing both is well-nigh impossible since they call for quite different, and incompatible, responses.

Momoh made one final try at buying public support against the rebellion by the RUF. He increased W slightly in 1991, raising it to 0.438 just before his overthrow in a military coup d'état at the end of April, 1992, a coup that was accompanied by a sharp decrease in the coalition's size by his successor (Valentine Strasser), down to 0.211 in 1992. The coup was the readily anticipated response to the policies that Momoh had adopted to negate the mass uprising that he faced. Specifically, one consequence of his spending choices during the rebellion was that soldiers received their military pay irregularly and late. Perhaps even worse, they did not receive the weapons and equipment they had been promised to carry on the fight against the RUF. It seems in his effort to combat rebellion, Momoh neglected the support coalition whose backing was essential for preserving the winning coalition's loyalty to him. The upshot was a coup d'état led by Valentine Strasser, then a 25 year old military officer. Strasser immediately replaced the somewhat liberalized autocracy led by Momoh with a military junta whose coalition was reduced to 0.211 and whose real selectorate fell to 0.55.

Momoh had thwarted early efforts to depose him by taking the right steps grounded in his correct concern for the threats that might face him. Later, compelled to make a difficult choice between responding to the threat of rebellion and of coup d'état he may have been between the proverbial rock and the hard place. He took steps to suppress the rebellion, increasing the use of torture and extra-legal killing in 1990 and 1991, but even as the civil war continued, Momoh ended up facing a coup that ousted him from office. Had he had something like our relative indicators of risks he might, perhaps, have acted sooner to nip the RUF's movement in the bud by increasing public goods and freedom, neither of which he did. Through such positive policy responses he might have neutralized the RUF's support for civil war and, had he done so, he might also have averted the fallout from that war that prompted a coup. His successor, Valentine Strasser, like Momoh, facing the civil war effort by the RUF, perceived a much greater danger to his continuation in power from the masses than from within his inner circle at least for his first couple of years in office. And again, like Momoh, that was ultimately going to operate against him as he was deposed by a coup led by General Julius Maada Bio in 1996.

8.3.3 Beyond Momoh: A Path to Partial Democracy

Strasser's efforts to defeat the civil war while maintaining a military junta kept him in office for 4 years. But then he was deposed in a coup led by General Bio who recognized that the country's military government structure was an impediment to defeating the RUF and securing the loyalty of the people. He led the country only for a few months, voluntarily stepping aside in favor of a democratically elected leader. In that way, Bio in 1996 was the rare political figure who seemingly acted contrary to selectorate theory's assumption that leaders seek first and foremost to remain in power. It seems he either sincerely desired to see his country become more democratic or he recognized that a military leader was unlikely to survive in the face of the revolutionary movement in Sierra Leone. In fact, our estimates of the risk of coup and of revolution for 1996 in Sierra Leone were very high and revolution was the larger risk. Bio may simply have opted for stepping aside so that he could seek power another day, as, indeed, he did.[4]

We, of course, cannot know what he was thinking. What we can know and do see is that after 1996, the threat of a mass uprising and of a coup generally fell as a more democratic political structure took hold. Bio attempted to make a comeback, running for President in 2012 but lost and then sought the presidency again in 2018 and won.

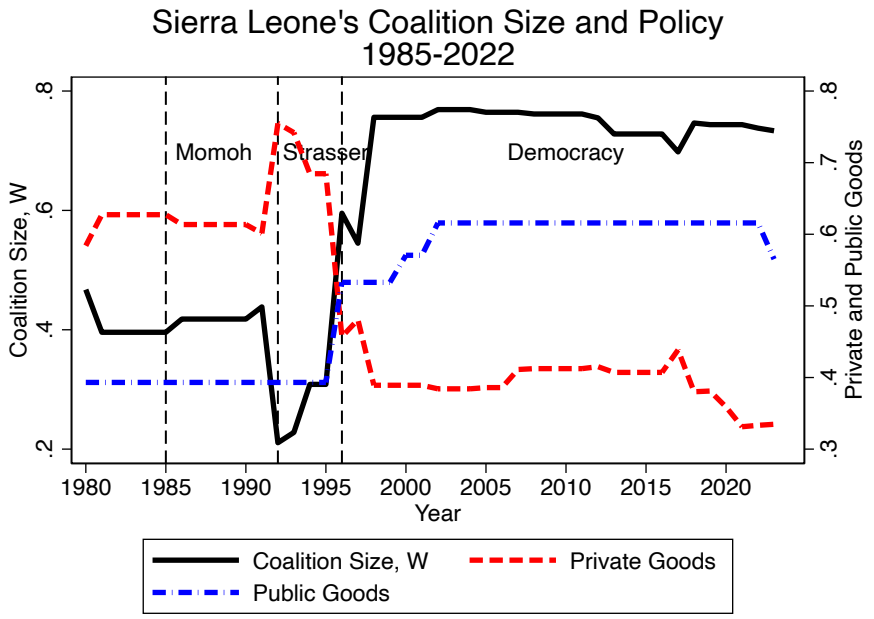
Figure 8.3 shows us the evolution of Sierra Leone's winning coalition and of its provision of public goods and private goods from the start of Joseph Momoh's presidency through 2022. It tells the story of trading away threats of mass uprising and of coup d'état by expanding the winning coalition and improving public goods while cutting back on corruption. The path forward was

[4]In the introduction to the global game in Chapter 3 we note that we could add a branch at the top of the game in which a leader, seeing a bad outcome farther down the tree, resigns at the outset. While we excluded that branch, it seems to describe exactly what Bio chose to do.

steep initially but seems to have flattened out at the level of a middling 'democracy.' Sierra Leone's winning coalition peaked in the early 2000's at 0.769 and today is slightly smaller at 0.733. The change is probably meaningless but what is meaningful is that so far at least it has not continued to expand. Today's Sierra Leone has a winning coalition size echoed by such limited quasi-democratic and quasi-anti-democratic governments as Hungary, the Philippines, El Salvador, and Guatemala. As Figure 8.1 indicates, even today, Sierra Leone faces a modestly elevated risk of revolution and a more elevated risk of coup d'état than is normal. Additionally, as Nicholas Kristof pointed out, Sierra Leone remains a desperately poor and low productivity society. Hence, its coalition has not expanded sufficiently to insulate Sierra Leone from future bouts of instability.

Given Sierra Leone's improved, but still elevated risks (and with the coup risk rising) it is unlikely that further liberalization will be carried out during the window of time for which we have data. Given that Sierra Leone's presidents are term limited, it is hard to say whether the life-cycle effects will be strong enough that the risks drop sufficiently for a leader to contemplate modifying the coalition further. Our most recent projections support little more than noisy wiggles up or down around the current size of the winning coalition.

Figure 8.3: Sierra Leone's Coalition Size and Policies, 1985 to 2022



Our brief, non-expert evaluation of Sierra Leone's political risks, choices, and outcomes suggests several nuanced ways in which the methods set out in this study might be used in real-time. They

can help to formulate best responses to rising – or falling – tensions in any society. They can be used to anticipate the incentives and pressures for change either by those who decide on changes or by observers who would benefit from better tools for anticipating instability. To see how such benefits might be accrued, we continue by exploring several other important political transitions over the past several decades. In each case, our interest is to assess how well the tools we have introduced can do at anticipating change.

8.4 The End of the Cold War

The end of the Cold War, variously marked as occurring somewhere between 1989 (when the Berlin Wall fell) and 1991 (when the Soviet Union was dissolved and Mikhail Gorbachev was replaced by Boris Yeltsin) is certainly one of the most dramatic, world-altering events since the end of the Second World War. From an international relations perspective, it is often seen as an unanticipated development that challenged prominent explanations of international stability (Gaddis, 1992; Ray and Russett, 1996). From our perspective, it was much more about domestic political causes of change than about bipolarity, balance of power, or other international considerations. As we consider the unravelling of the Cold War, we draw attention to two cases; the collapse of the government in Poland and then the implosion of the Soviet Union.

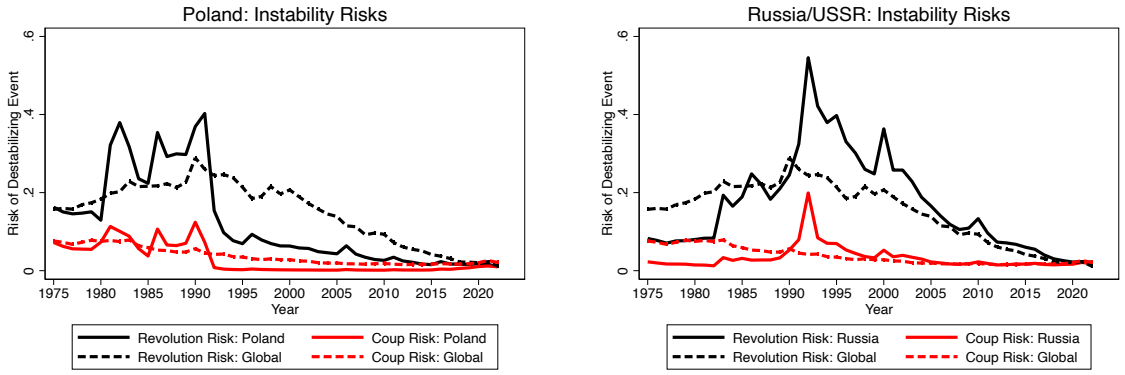
8.4.1 The Polish Case

The unraveling of the Cold War was signaled well before the Soviet Union's collapse. The Solidarity labor movement in Poland, whose beginnings trace back to the Gdansk Agreement in 1980, foreshadowed the domestic economic and political dissatisfaction building across the Soviet sphere of influence that combined to undo the incumbencies of Poland's General Wojciech Jaruzelski and the USSR's Mikhail Gorbachev. The two panels in Figure 8.4 show, respectively, the global median annual risk of a revolution (dashed black lines), the global median annual risk of a coup (dashed red lines), the estimated country-specific risk of revolution (solid black lines) and the country-specific annual risk of coup d'état (solid red lines). Given that the data in year $t-1$ is used to predict the risk of an event in years t and $t+1$, note that the observed risk in 1990 is predicted from 1989 data and is the predicted risk levels for 1990 and 1991 and so forth for any year.

The first notable result across the two panels is the difference in the risks of events relative to the baseline global expectations. As the year drew nearer to 1990, the risks of revolution and coup in Russia began to grow closer to the global background risk. Before 1990, the risk of a coup or of a revolution in the Soviet Union was well below average. In contrast, the risks estimated for Poland, as seen in the left-hand panel, are about equal to or slightly higher than the global risks for coup and much higher for revolution for almost every year between 1980 and about 1990. After 1990, Poland's anticipated risks fall well below the relevant global values until approximately 2018

when they draw about equal again. Russia's risk of mass uprising significantly exceeded the global average for the final decade of the twentieth century and then drew about equal to, though slightly higher than the global risk. The same general temporal pattern describes the anticipation of a coup d'état threat in Russia. That danger exceeded the global average from about 1990 until 2005 and then drew even with the global risk of coup. The anticipated Russian coup risk again is rising, although very slowly, and has been around the global risk average for the last several years.

Figure 8.4: Risks in Poland and the USSR/Russia: The End of the Cold War



We know from the life-cycle elements of selectorate theory that leaders need to provide more public goods during their early time in office while they sort out affinities and try to pack their coalition with loyalists. General Jaruzelski, who was serving as Poland's Defense Minister under Edward Gierek (1970-1980), replaced Gierek as head of the government when Gierek, perhaps under Soviet pressure, was forced to step down shortly after the Gdansk Agreement (August, 1980) amidst Poland's impending economic collapse. Gierek had been in power for 10 years. So, having gone from a government under the same leader for a decade to a new leader, the right stabilizing move for Jareuzelski by our calculations should have been to improve public goods provision and coalition welfare. He did neither. Instead, as we see in Figure 8.4, the risk both of mass uprising and of coup d'état, but especially of mass uprising, rose sharply in 1980 and remained elevated until 1985, then dipped and rose again, staying elevated through the early 1990s. These risks, during the same years in which the Soviet Union's risks remained below average, turned upward in Poland around 1988 and spiked up for the next few years. Poland's government was at risk from about 1980 forward for more than a decade; Russia's was not until the late 1980s.

Jarulselski, faced with labor strikes and social unrest, imposed martial law which was not lifted until 1983. As theory leads us to expect, with the threat of a revolt seemingly elevated, he increased the use of suppressive measures including extra-legal killing. Despite his best suppressive efforts, as the figure shows, the threats to his regime only diminished after he lifted the martial law order and then they resumed their above-average level from about 1986 onward to the end of his time in office.

Coalition size, stable at 0.233 for many years, increased to 0.365 in 1985. It remained there until the collapse of communism in Poland in 1989. But for Jarulselki's political survival it was too little too late. He held democratic elections and, seemingly to his surprise at the time, lost to the labor leader, Lech Walesa. Thus, in the span of three years, Poland went from an autocracy to a coalition of size 0.491 in 1989, of 0.848 in 1990, and then to 0.953 as Walesa replaced Jarulselski as Poland's head of state. While the extraordinary level of democracy achieved in 1991 began to drop around 2014, and is in the high 0.70s as of 2023, Poland's government remains much more accountable than it ever was before Walesa's election. Its risks of coup and of revolution are now both right around the global risk level for destabilizing events. In the most recent few years, public goods have declined, coordination goods have declined sharply, falling below the swoosh curve expectation (although the quantity, while still below the incumbency constraint, has improved recently) and private goods have ticked up. Thus, Poland may well be a place to keep an eye on for a potential government transition especially after the extraordinary circumstances of the war in Ukraine are over.[5]

8.4.2 The Soviet Case

The failure to crush the Solidarity labor movement or to buy off Poland's population with improved living conditions during the first half of the 1980s (an effort made by Gierek that irritated his Soviet sponsors) set the stage for the defeat of Poland's authoritarian government. And the defeat of that government through free elections a few years after martial law was lifted provided a new model for political change within the Soviet sphere. It would not take long for Poland's lessons to spread.

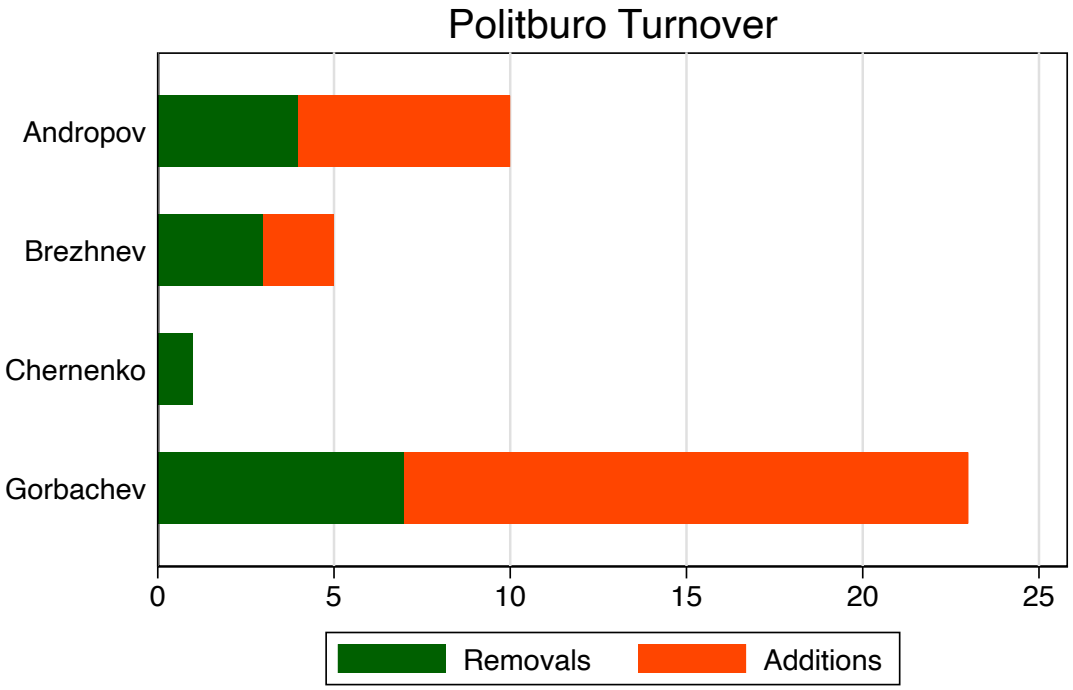
The risk of a coup d'état remained low in the Soviet Union, as Figure 8.4 demonstrates, into the late 1980s. Although still well below the global average in 1988, that risk spiked up, surpassing the global risk in 1989 or 1990, leading to an elevated predicted risk for 1990 and beyond. The increased threat of a coup d'état in the USSR was accompanied by a sharp increase in the risk of revolution. The combination of suddenly high risks both of coup and revolution is extremely dangerous for any incumbent and especially for a newly-installed incumbent. As leadership passed quickly from Yuri Andropov to Konstantin Chernenko to Mikhail Gorbachev in the span of just two years, from 1984 to 1986, life-cycle effects, combined with difficult economic conditions and the example of popular uprising in Poland all were likely contributors to an increased concern for a rebellion and to concerns within the winning coalition. New leaders, after all, shuffle their coalition membership, replacing lower affinity types with new people expected to be more loyal to the new incumbent. Gorbachev responded to both threats immediately upon taking office.

Figure 8.5 compares the level of leadership replacements at the Party Congresses under Brezhnev, Andropov, Chernenko, and Gorbachev. We view the relative magnitude of these changes as a proxy for changes in the membership of the winning coalition. As the U.S. intelligence report from

[5]After writing this discussion, Poland held an election in which seemingly more democratic forces have prevailed, creating a hopeful note.

which the figure is taken notes, "Together with earlier personnel changes—including the removal of three old guardists who were full members of the Politburo—Gorbachev has nearly remade the party's top leadership .... These changes have brought in many allies, albeit few clear-cut clients."[6]

Figure 8.5: Purges and Replacements in the Soviet Union's Leadership



Source: United States Government Directorate of Intelligence. April 1986.
The 27th CPSU Congress: Gorbachev's Unfinished Business, An Intelligence Assessment, p. 2.
See https://www.cia.gov/readingroom/docs/19860401A.pdf, Accessed August 17, 2023.

While shuffling the leadership, presumably to increase loyalty to him, Gorbachev also responded to the rising risk of a mass uprising by trying to buy-off opposition. He diminished the use of suppression and immediately began to expand freedoms, something begun slowly during Chernenko's short time in office. By Gorbachev's second year, public goods provision increased and by his third year corruption began to decline. These changes briefly diminished the risk of revolution but exacerbated the danger of a coup d'état. By 1990, with the Berlin Wall gone and Poland's government collapsed, Gorbachev's coalition grew from a very small 0.142 in 1988 to 0.384 in 1990, probably too small to ward off mass demands and growing too fast, with too much reduction in private goods,

[6]Quoted from p. 2 of `https://www.cia.gov/readingroom/docs/19860401A.pdf`

to maintain the support of his coalition.[7] With all of the challenges of having to gamble between a growing coup threat and a growing threat of a mass uprising, Gorbachev did too little for his coalition to keep their loyalty. The upshot was a coup in 1991.

The anti-Gorbachev coup lasted only a few days. When he returned to power, the coalition was expanded from 0.384 to 0.600. Its rise was accompanied by a substantial drop in our estimate of the belief that a mass uprising was in the offing but Gorbachev's political competitors, especially Yeltsin in Russia along with the leaders of Belarus and Ukraine, were working behind the scenes to dissolve the Soviet Union. Gorbachev, seeing his political base gone, resigned and the Cold War was over.

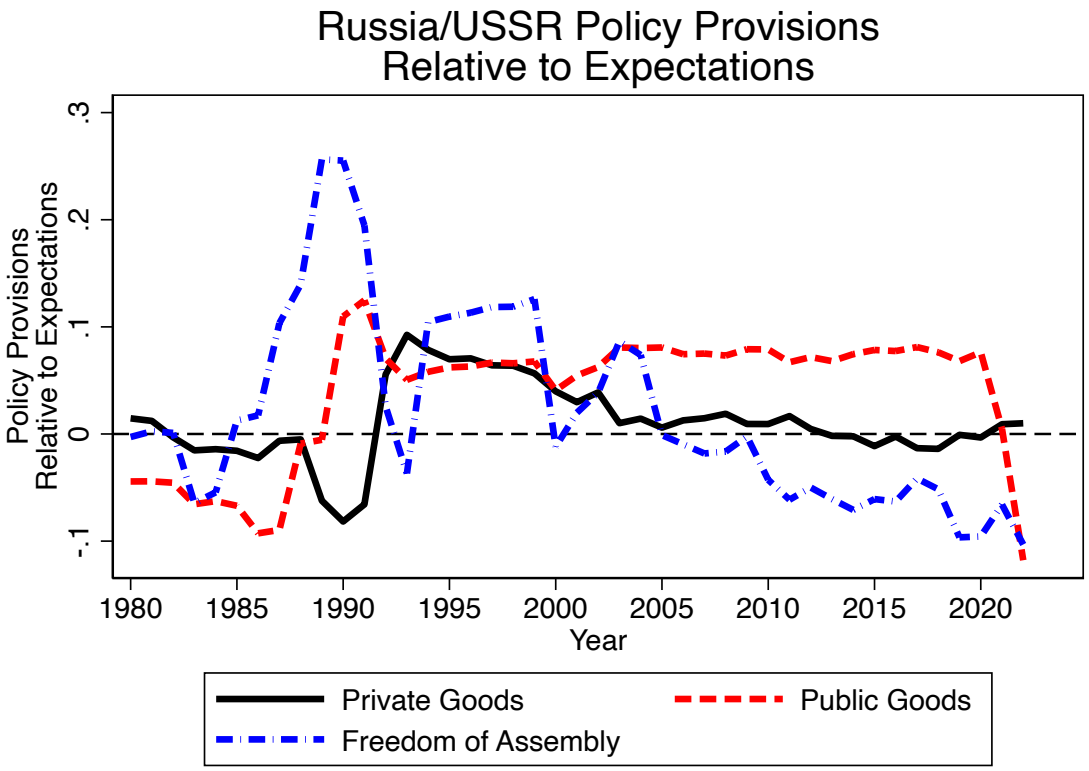
With the demise of the Soviet Union, the new Russian government, under Boris Yeltsin's leadership, expanded the winning coalition to just below 0.70, much more 'democratic' and accountable than it had been before Gorbachev's rise and less 'democratic' than Sierra Leone following Bio's 1996 coup. Russia's coalition declined after Yeltsin's passing from the scene, replaced in 2000 by Vladimir Putin. He notched it down from 0.698 in 1999 to 0.643 in 2001 and kept it moving mostly downward until in 2023, our most recent data, it was 0.475. With that knowledge in hand we might ask, tantalizingly, what has been happening to the risks the Russian government faces and to the goods it provides as its winning coalition has contracted.

Figure 8.6 may help us answer the question. Here we see the residual provision of public goods, private goods, and freedom of assembly; that is, by how much each policy provision deviates from the expected value (0 on the vertical scale) given the incumbency constraint. Public goods in Russia, long slightly above the incumbency constraint expectation, have been under-provided since 2021. Freedom of assembly, less under-provided since about 2019, is persistently below expectations given Russia's coalition size. Private goods are provided right around the equilibrium incumbency-constraint level. These provisions, combined with a decline in coalition size, certainly are not the adjustments expected if Putin is interested in buying off the threat of revolution. Instead, they are consistent with a leader who is interested in suppressing any threat to his continuation in power which, as we saw in Chapter 7, is the optimal response from the perspective of a survival-oriented incumbent. And, indeed, when we look at the use of torture and extra-legal political killing, we see that both have been rising since about 2013 or 2014, with torture persistently increasing and with extra-legal killing less smoothly, but nevertheless, rather consistently on the increase. Thus, Putin's response to the risk of a mass uprising is to suppress the threat of rebellion while working to maintain coalition loyalty, averting the risk of his deposition by a coup from within his inner circle. In fact, when he faced an apparent attempt to depose him in June 2023 by Yevgeny Prigozhin, we saw no outward evidence of breaks within Putin's inner circle. While some may have been suspected of being sympathetic to the coup plotters, no overt action was taken to oust Putin in

[7] The residual provision of private goods in Gorbachev's first full year in office (1986) was -0.022, just $\frac{1}{3}$ of a standard deviation below the mean; that is, the incumbency constraint. By 1990, the residual provision of private goods was -0.082, more than a standard deviation below the incumbency constraint.

a coup d'état; but Putin has taken overt actions to reconstitute his winning coalition. Indeed, Prigozhin's uprising lasted an extremely short time. It seems that Putin had been following the theoretically, if not normatively, right approach to the risks he is likely to have perceived, fully in keeping with the theory's expectations and the findings reported in Chapter 7. We suspect that, given his lengthy tenure in office, whether Putin will face a risk of a coup d'état depends on whether his inner circle believes the rumors that he is seriously sick, receiving chemotherapy, or being treated for Parkinson's disease, or some other serious ailment. We, of course, have no information on the accuracy of such rumors.

Figure 8.6: Russia/USSR Policy Provisions Relative to Expectations



8.5 The Arab Spring

Any set of events that is as extensive as the 'Arab Spring' is certain to have many causes and many explanations. The timeline of the Arab Spring, however, is not much in dispute. It is generally

agreed that the first big step came in Tunisia following the self-immolation of a street vendor, Mohammed Bouazizi, on December 17, 2010. Bouazizi's fruit stand was shut down by the police because he did not have a license but then it was widely agreed that licensing, like pretty much every aspect of government in Tunisia, was highly corrupt. Indeed, by the indicators we use, Tunisia ranked well within the top 30% of all countries and in the top quarter of Middle Eastern countries on corruption in 2010.

Severely injured, Bouazizi was hospitalized and died on January 4, 2011. About 5,000 demonstrators chanted against the government during his funeral and were suppressed by the police when they attempted to make their way to the governor's palace.[8] Although President Zine El Abidine Ben Ali visited Bouazizi in the hospital and promised investigations and reforms, his 23 years in control of Tunisia was clearing slipping away. Just 10 days after Bouazizi's death, on January 14th, Ben Ali fled the country, signaling to others in the region that the moment might be right for rebellion.

Mohammed Bouazizi's suicide did not arise in a vacuum. It is also widely agreed that a broad swath of the Tunisian population was already close to the boiling point when he set himself aflame because of their dissatisfaction with the regime, their country's economy, and corruption, all coupled with rumors that President Ben Ali was seriously ill.[9] As the standard accounts describe it, once the protesters in Tunisia succeeded, people all around the Middle East rose up against their governments, presumably inspired by Ben Ali's fall. Anti-government demonstrations tantamount to open rebellion arose in Egypt, Yemen, Bahrain, Libya, and Syria. In the face of intense mass pressure that eventually brought down several leaders, other governments in the region granted concessions to their subjects and modified policies to avoid similar outcomes. This was true, for instance, in Algeria, Jordan, Morocco, and Oman.[10]

The general accounts describing and explaining the causes of the Arab Spring point to high unemployment, inflation, corruption, and bad governance across the region as the general ills that triggered the uprisings and we certainly do not disagree with those claims. Although some Middle Eastern countries, such as Tunisia, had seen demonstrations on and off for a few years, the uprisings are sometimes described as if they were largely sudden, spontaneous, with their magnitude and near-term impact the unforeseeable and unpredictable consequence of various forms of political contagion (Strakes, 2017). Against that background, we wish to see how the logic and the empirics we have set out might have been used, based only on ex ante information available before Mohammed Bouazizi's

[8] See `https://www.bbc.com/news/world-africa-12120228`

[9] He allegedly suffered a stroke and fell into a coma in February, 2011, in Saudi Arabia where he went into exile after fleeing Tunisia. He died at 83 in 2019. See `https://www.upi.com/Top_News/World-News/2011/02/17/Ben-Ali-reportedly-in-coma-after-stroke/86441297956230/`

[10] For a general discussion of the causes of the Arab Spring and identification of the countries that faced severe threats to their regimes and/or which granted concessions as part of the Arab Spring see `https://www.aljazeera.com/news/2020/12/17/what-is-the-arab-spring-and-how-did-it-start` or`https://www.britannica.com/event/Arab-Spring` or `https://www.history.com/topics/middle-east/arab-spring`, or many other news accounts and scholarly sources.

death, to anticipate the Arab Spring.

8.5.1 Estimating Heightened Deposition Risk

In Chapters 5 through 7 we investigated how to estimate beliefs about the risk of instability and we investigated the responses that theory and evidence point to as ways that leaders could ameliorate threats to their political survival. We also noted that from time to time leaders, faced with uncertainty, must gamble on how best to respond to conflicting pressures and either fail to take the right corrective steps or are unable to do so. According to the theory, if they do not take the right actions then they are likely to fall from power. Now we shall apply the lessons we have learned to see if we can make sense of the choices made by the Middle East's leaders during the run-up to the Arab Spring. We want to know how their choices shaped their success or failure to survive the threats to their regimes. We will see whether their gambles might have been improved – from their perspective – if they had ex ante knowledge of the sorts of indicators on which we have focused while remaining mindful that they were likely to have better information and more resources with which to anticipate problems than are available to us.

Chapter 6 introduced a two-step process by which we developed estimates of changes in the size of winning coalitions. We first estimated whether change was likely without regard to its direction. Then, having identified the observations likely to experience change, we predicted the direction and magnitude of change in coalition size in year $t + 2$ relative to coalition size in the previous year $(t - 1)$. We saw that the method we used to predict changes yielded results that were strongly associated with the subsequently observed actual changes in coalition size. Now we intend to use the building blocks constructed in Chapter 6 as a way to predict leader change, the very thing that every incumbent wants to avoid.

The selectorate theory tells us that predicted adjustments to coalition size and actual adjustments should match closely because, as we saw in Chapter 7, the adjustments predicted in Chapter 6 are compatible with improved prospects of political survival. Of course, neither we nor any leader can know ex ante whether any change in coalition size that they contemplate as a means to avoid an anticipated threat to their survival will, in fact, preserve their position in power. What we can know is what theory tells us is the optimal change in the size of their coalition. Armed with our analyses, we ask whether, based on ex post knowledge, their actual adjustment deviated by only a little or by a lot from our ex ante prediction and whether when it deviated by a lot they were more likely to lose power than when it only deviated by a little.

To evaluate how well leaders did at surviving in power we compare the institution changes that they actually made ($\Delta W = W_{t+2} - W_{t-1}$) with the institution changes predicted by our analyses in Chapter 6, $\widehat{\Delta W}$. We define $\widehat{\Delta W}$ to be the predicted change in W based on Model 3 of Table 6.12 if the observation is predicted to have at least a 50% chance of experiencing change (based on Model 1 of Table 6.8). If the observation is predicted to have been unlikely to experience

Table 8.3: Appropriate or Incorrect Adjustments to W and Leadership Change

		Leader Change		
		No	Yes	Observations
Institution Change	Appropriate	1,674 (86.1%)	271 (13.9%)	1,945
	Incorrect	1,310 (68.9%)	592 (31.1%)	1,902
Observations		2,984	863	3,847

$\chi^2 = 163.34$

institution change, then we code $\widehat{\Delta W}$ as 0. We define the deviation from expected institution change as $|\Delta W - \widehat{\Delta W}|$, the absolute difference between how we anticipated a leader would change W and how they actually did. We compare these deviations to the median deviation in each year. If the absolute difference between predicted and actual is greater than the yearly median difference, then we say the institution change is *incorrect* and if this difference is less than the median we say the institution change is *appropriate*. In order to focus on circumstances where instability and institution change are likely, we exclude larger coalition systems ($W < 0.75$).[11]

Before looking at the conditions predicted and observed throughout the Middle East's Arab Spring based on whether leader's changed institutions appropriately or incorrectly, we examine how making the right institutional adjustments affects leader survival in general. Table 8.3 examines whether changes in institutions made between years $t-1$ and $t+2$ were appropriate or incorrect, comparing the appropriateness or incorrectness of changes to the likelihood of leader change in either year $t+1$ or $t+2$.

Table 8.3 makes evident that incorrectly calibrating institution change more than doubles the risk of leader replacement. Leaders who make appropriate changes in institutions are deposed 13.9% of the time. In contrast, leaders are deposed 31.1% of the time when there is a larger than median difference between their predicted and actual institution change. The results in the table indicate that nearly 70% of all leader replacements occurred when coalition size was incorrectly adjusted.

We believe that Table 8.3 establishes a useful baseline expectation of how well our predictions of changes in coalition size do at sorting out the risk of leader deposition in regimes facing the potential of destabilizing threats and events. Having such a benchmark is important to establish confidence among policymakers or analysts about whether the theory's 'prescribed' changes in coalition size provide a useful benchmark for anticipating the likelihood that a regime will remain stable or face destabilization and leadership change. We follow that analysis with what is, perhaps, a more useful benchmark for those real-world leaders who do not head a large coalition government. Table 8.4 has the same structure as Table 8.3 but it examines whether leaders were deposed by irregular means

[11]The analyses reveal similar finding if we use the full sample.

Table 8.4: Appropriate or Incorrect Adjustments to W and Iregular Leadership Change

		Irregular Leader Change		
		No	Yes	Observations
Institution Change	Appropriate	1,898 (97.6%)	47 (2.4%)	1,945
	Incorrect	1,701 (89.4%)	201 (10.6%)	1,902
Observations		3,599	248	3,847

$\chi^2 = 105.94$

in either year $t + 1$ or $t + 2$.

Among leaders who adjusted their coalition size in keeping with the selectorate theory's expectations, more than 97% avoided irregular deposition; that is, ouster by a coup, revolution, or assassination. Conversely, the odds of irregular removal were more than four times higher if W was adjusted incorrectly. More than 80% of irregular removals were associated with an incorrect modification in the size of the winning coalition as defined by selectorate theory expectations of what constituted an appropriate or an incorrect adjustment. This is all the more important when we realize that the predicted change in coalition size is based strictly on ex ante information that any leader could have known and assessed before altering institutions and before facing threats to her political survival.

8.5.2 Adjustment Errors And Political Survival: The Arab Spring

Having established our procedures and their reliability as a method for anticipating survival-oriented adjustments to institutions, we now turn our attention to the Middle East during the years of the Arab Spring. We begin with the simple question, what was the probability of falling from power in 2011 or 2012 if coalition size was appropriately or incorrectly adjusted, as estimated in 2010. Another way to think about this question is to ponder, given what we knew in 2009 and 2010 about each of the 18 countries in the Middle East[12], what 'ought' they have done, if anything, to modify the size of their winning coalition? Then we look at what adjustments, if any, each country actually made in W and we note whether the real adjustments complied with selectorate expectations or not. Finally, we use the answers to our questions to identify who the theory told us, based on ex ante estimates, was at greater or lesser risk of losing power. Translating our questions into practical policy tools we can also ask the counterfactual question, how well would each of the leaders in the Middle East have done if they had been able to follow selectorate theory's 'advice' compared to how they actually did?

[12]Israel and Turkey are excluded as their coalition sizes were above 0.75.

Table 8.5: Middle East, 2010: Leader Change and Appropriate or Incorrect Institution Change

Country	Appropriateness of ΔW	Leader Change	Actual ΔW	Predicted ΔW
Libya	Incorrect	Yes	0.49	0.00
Tunisia	Incorrect	Yes	0.41	0.10
Egypt	Incorrect	Yes	0.10	0.03
Syria	Incorrect	No	0.02	0.06
Bahrain	Incorrect	No	-0.03	0.00
Lebanon	Incorrect	No	0.01	0.03
Kuwait	Incorrect	No	0.02	0.00
Yemen Republic	Incorrect	Yes	0.01	-0.01
Algeria	Incorrect	No	-0.01	0.01
Iraq	Appropriate	No	-0.02	0.00
Oman	Appropriate	No	0.02	0.00
Jordan	Appropriate	No	0.03	0.02
Morocco	Appropriate	No	0.01	0.02
Iran	Appropriate	No	-0.02	-0.02
Sudan	Appropriate	No	0.00	-0.00
Qatar	Appropriate	No	0.00	0.00
Saudi Arabia	Appropriate	No	0.00	0.00
United Arab Emirates	Appropriate	No	0.00	0.00

The actual and predicted changes in W are for differences between the years 2009 and 2012. Leader Change refers to leadership changes in years 2011 or 2012.

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We find that 100% of the 9 leaders who made the 'appropriate adjustment' based on our estimation procedures remained in power. But among the 9 who made the 'incorrect adjustment', 4 leaders were deposed and two more were saved by outside intervention. Table 8.5 shows the countries, the predicted and actual changes in coalition size, as well as whether the leader lost power and the appropriateness of institution change. The countries that had leader change in 2011 or 2012 and made incorrect adjustments to coalition size based on 2010 estimates are highlighted in boldfaced font; that is, Egypt, Libya, Tunisia, and Yemen.

Bahrain and Syria are also generally regarded as among those countries that faced serious threats to their regimes. They each made a consequential error in their coalition adjustment according to our reckoning but managed to hold on to power. In the case of Bahrain, the Gulf Cooperation Council and especially the Saudi government, intervened to help prop up Bahrain's regime presumably because they feared that Bahrain's monarch, King Hamad bin Isa Al Khalifa, was at serious risk of being deposed.[13] While the GCC worked to preserve Bahrain's monarchy

[13]See "Bahrain Mourners Call for End to Monarchy – Mood of Defiance Against Entire Ruling System After Brutal Attack on Pearl Square Protest Camp That Left at Least Five Dead". London: Associated Press (via The Guardian). 18 February 2011, as discussed in `https://en.wikipedia.org/wiki/2011_Bahraini_uprising`

(and, presumably, their own as well), Iran, Iraq, and Russia intervened to protect Bashar al-Assad's regime in Syria against a mass uprising trying to depose his government. Thus, the two survivors both called on, and almost certainly needed, foreign intervention to overcome their failure to resolve the need for appropriate institution change. Before the foreign intervention in Syria, Assad's military faced significant desertions that, combined with demonstrations and open rebellion, might otherwise have toppled his regime (Bou Nassif, 2015; Koehler, Ohl and Albrecht, 2016). Luckily for him, Iran, Iraq, and Russia poured billions of dollars into Syria with which he was able to pay the military and buy greater loyalty in keeping with other analyses within the selectorate framework (Bueno de Mesquita and Downs, 2006; Bueno de Mesquita and Smith, 2009*a*).

We cannot know, of course, whether leaders would have survived had they adjusted their coalition size 'appropriately.' We can just observe that every one of those who did adjust in a manner consistent with selectorate expectations survived and many who did not were removed from power or needed foreign intervention to save their regime. Although our own normative values make us unhappy to explain how dictators could survive, we see our primary mission here as an effort to improve the rigorous, science-based understanding of circumstances that lead to the expectation or realization of instability.

8.6 Lessons from Theory, Evidence, and Applications

The selectorate theory highlights a small set of variables that it contends shape how survival-oriented political leaders govern. Coalition size (W), real selectorate size (S_{Real}), the price of public goods (p), the length of each leader's tenure in office (log(Tenure)), and the health or age of leaders (Old or Sick) were shown to provide detailed, accurate accounts of governance across all country-years or leader-years (roughly from 1960-2022) for which data were available. Even without knowledge of each country's cultural, political, economic, and social history and without insights into each individual leader's personal history, ideology, and personality, these five variables explain substantial proportions of the variance in government policies, stability and longevity. The modeling driven by these five variables has focused our attention, through game-theoretic, counterfactual reasoning, on when leaders anticipate a threat to their hold on power and on what leaders are expected to do to survive anticipated threats. We have seen that the estimated magnitude of expectations about threats and the theory-based causes of those perceptions are more predictive of changes in government policies and institutions than is the realization of such threats in the form of actual coups or revolutions.

The theory's logic yields a large array of hypotheses. Those that are central to understanding the instability themes in this study are enumerated in Chapter 4 and most are tested statistically and probed through case examples in subsequent chapters. Many other implications are tested elsewhere or set aside for future research. With regard to the hypotheses concerned with the anticipation and amelioration of threats to political survival and regime stability, we saw that the theory's

implications explained substantial proportions of the variation across countries, leaders, and years. Nearly all of the variance in when and how severely to suppress opponents, for example, is accounted for by selectorate predictions. Likewise, the amounts of government provided freedom, corruption, and beneficial public policies are consistent with logically-derived, equilibrium expectations. When governments deviate from the incumbency-constraint expectations for the provision of these bundles of policies, we find evidence that supports the hypothesized elevated threats to political survival and the corrective steps to alleviate those threats. Those corrective steps include adjustments in suppression, policy provision, and institutional structure. The theory predicts the circumstances under which a leader will face a quandary over which corrective steps to take. It then identifies what is optimal for the leader to do given the mix of threats, and what the consequences are if they choose incorrectly. The evidence on leadership survival strongly reinforces the theory's expectations and underscores the difficult challenges that leaders sometimes face.

We also saw that the theory demonstrates that a country's level of economic productivity alters the risk of instability contingent on coalition size and that when both coalition size and productivity are sufficiently high, then societies are essentially immune from successful coups or revolutions. Coalition and selectorate size, combined with a leader's seniority, health, and societal productivity, together shape the real and the anticipated risks of coups and revolutions and, as importantly, indicate the survival-optimizing responses under each combination of circumstances. Thus, we saw when a leader's survival is enhanced by liberalizing policies and democratizing governance. We also saw the many more circumstances under which increasing corruption, decreasing freedom, and autocratizing the government is the best way for a leader to survive.

We identified a life-cycle effect for leaders that revealed how differently a new ruler must act compared to a seasoned one. The theory behind the life-cycle effects helped explain why journalists so often mistakenly think of a new leader as a reformer when, instead, the ruler is doing what is necessary to survive long enough to undo her early reforms. These results also help explain that while some rulers may be better at promoting growth than others, growth rates almost always diminish the longer the leader – whether good at growth or not – is in power. We saw, for instance, that early in a leader's time in power she has strong political-survival incentives to adopt growth-enhancing policies but as she becomes more secure in office over time, the incentives to perform well on public policy diminish and with that diminution, growth rates decline.

Besides positive steps, like promoting growth, that are tied to newness in office according to the theory's leadership life-cycle implications, there are several other actions that the leadership life-cycle anticipates and that the evidence backs up. For instance, the theory predicts different rates at which incumbents shuffle their coalition membership depending on how long they have been in office. Not surprisingly, leaders weed out those thought to have weaker affinity for them so that gradually, over time, the incumbent builds a coalition made up of individuals whose inclination is to preserve her in power. Among the theoretical and empirical consequences of longevity in office, we saw that the longer a ruler is in power, the fewer current benefits that coalition members receive,

the fewer public goods provided, the higher the ratio of private to public goods, and the lower the risk that the leader will be ousted in a coup or revolution.

Our analysis of leader survival and several of our illustrative case studies helped to show that the implementation of political-survival governance strategies by leaders, combined with their desire to maximize their discretionary control over revenue, point the way to what they 'ought' to do and to what the likely consequences are if they make errors in implementing their survival strategy. For instance, the welfare of coalition members needs to be just good enough that they do not contemplate defecting to a rival and not so good that the leader underpays herself. The coalition welfare function – the 'swoosh' curve – identifies the efficient allocation of coalition benefits for any given coalition size (as well as productivity level, leadership tenure, and health). If a leader provides too few benefits to the coalition's members then at least some among them may shop around for an alternative leader who will compensate them properly. They may look to an 'everyday' rival to replace the incumbent or they might throw their support behind disgruntled members of the masses who might be contemplating a rebellion to replace the leader and the institutions of government. Or, of course, they may look to themselves and plot a coup d'état to replace the incumbent. As the theory's logic demonstrates, they may even contemplate a coup if they receive too many private benefits and take that abundance as a signal that the incumbent is plotting to purge some of them from the coalition.

All of these findings, and many other theoretical results, speak to the risks that leaders anticipate facing as they get older or sicker or as they first come to power; as they try to work out the precisely correct amount of public goods, private goods, and freedoms to provide to their subjects; and as they contemplate efforts to improve or hold-back productivity and economic growth. It is, indeed, difficult to be a leader and hard to make all of the right choices to survive in office.

We have emphasized throughout that to understand, explain, predict, and maybe influence periods of political change or instability requires that we pay greater heed to Ryszard Kapuściński exhortation that, "People who write history devote too much attention to so-called events heard round the world, while neglecting the periods of silence." It is avoiding bad outcomes; it is what didn't happen, the periods of silence, that drives the politics of stability, change, and instability.

Appendix A2

Basic Selectorate Model with Extensions

A2.1 Alternative deposition rule

We propose one further elaboration of the basic theory before turning to its expansion in Chapter 3. Now we reflect on a change to the rule by which leaders are deposed according to the original theory. The basic model assumes a specific deposition scenario. In particular, the challenger must form a coalition of size W and leader survival depends upon whether her supporters remain loyal or defect to the challenger. Elsewhere we have considered alternative deposition rules (Bueno de Mesquita et al., 2002; Bueno de Mesquita et al., 2003). For instance, suppose we ignore the need for the challenger to have a coalition of size W and simply assume that he needs to buy the defection of enough members of the incumbent's coalition that she is left without W loyal supporters. In this setting the leader would need to oversize her coalition to $w > W$.

Suppose that in order to depose the incumbent, the challenger simply needs to reduce the number of supporters loyal to the incumbent to less than W. If the incumbent formed a coalition of exactly W people, then under this alternative rule the challenger would need to buy-off just a single supporter to depose the leader. The highest offer that a challenger could make then is to spend everything on that single supporter, which might well dwarf what the incumbent can offer as she needs to pay W supporters. By oversizing the coalition, to say a size of w, the incumbent forces the challenger to buy off $(w+1)-W$ supporters. If these $(w+1)-W$ supporters defect then the incumbent is left one person short of the supporters she needs to stay in power. Since we think of the size of the coalition as an order of magnitude of the population, we will treat the required size of the challenger's coalition as $w - W$.

The incumbent faces a tradeoff: by increasing w the leader reduces each supporter's rewards

(for any given level of spending); however, an increase in w forces the challenger to form a larger coalition and as a consequence reduces the amount of rewards he can offer each member of his rival coalition. If we consider a fixed size of w in every period then we can readily modify the conditions in proposition 2 to reflect the alternative deposition rule.

Proposition 7. *If each incumbent forms a coalition of size w composed of her highest affinity supporters in each period, then the challenger forms a coalition of size $w - W$ plus an additional supporter and offers policies g_A, z_A. On the equilibrium path, the leader survives through the policy provisions g^*, z^* that make her supporters indifferent between the rewards she offers and the best possible offer from the challenger; the equilibrium policies are characterized by the following equations.*

$$\frac{u_g(g^*, z^*)}{p} = \frac{u_z(g^*, z^*)}{w} \tag{A2.1}$$

$$\frac{u_g(g_A, z_A)}{p} = \frac{u_z(g_A, z_A)}{w - W} \tag{A2.2}$$

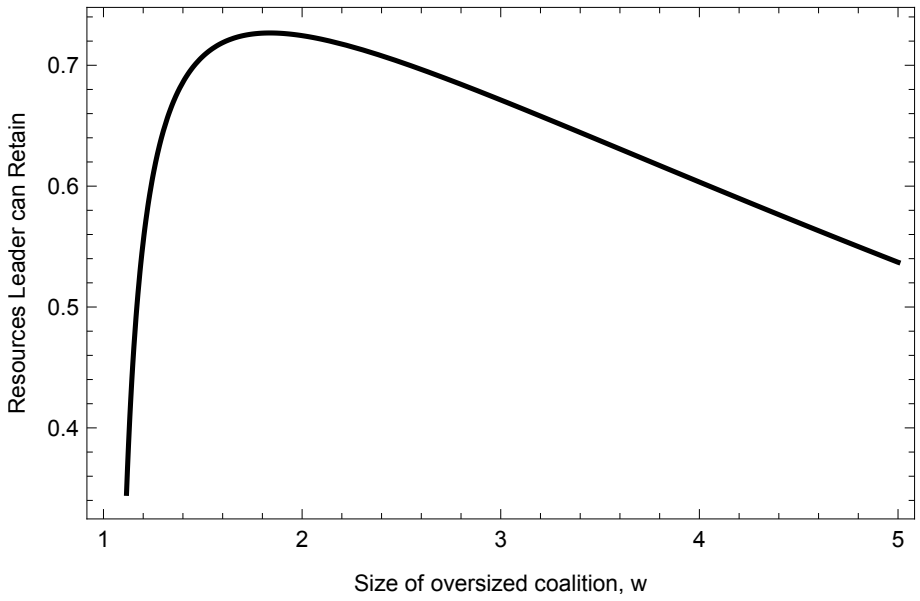
$$R = pg_A + (w - W)z_A \tag{A2.3}$$

$$u(g^*, z^*) - u(g_A, z_A) = \frac{\delta}{1 - \delta}\left(1 - \frac{w}{S}\right)(u(g^*, 0) - u(g^*, z*)) \tag{A2.4}$$

Equation A2.1 ensures the optimal mix of public and private goods given the incumbent's coalition of size w; equation A2.2 is the analogous condition for the challenger given that he forms a coalition of size $w-W$; equation A2.3 states that the challenger makes his highest bid by promising to spend all available resources. Equation A2.4 represents the incumbency constraint that the leader exactly matches to ward off defections given the challenger's best possible offer. We have reorganized this equation, focusing the left-hand side on the difference between the incumbent's and challenger's proposed rewards in the current period. Solving these equations for the illustrative utility function $(u(g, z) = \sqrt{g} + \sqrt{z})$, the equilibrium policies are $g^* = \frac{z^* w^2}{p^2}$ and $z^* = \frac{R(p+w-W)}{p(w-W)\left(\frac{w}{p} - \frac{1}{-1+\delta} + \frac{w\delta}{S(-1+\delta)}\right)^2}$.

To illustrate the extent to which the incumbent should oversize her coalition, Figure A2.1 plots the leader's welfare (measured here as her retained, discretionary resources) as a function of the size of the enlarged coalition, $w > W$. The illustration assumes the incumbent needs to keep the support of a coalition of size $W = 1$ (and $S = 20$, $p = 1$, $\delta = .8$). When the oversized coalition is small the challenger need only pick off a very small subset of the winning coalition. As a result, the challenger can offer each potential defector large rewards. To defend against this large offer, the incumbent must expend a large amount of her available resources. However, by increasing w she increases the size of the coalition that the challenger must form. This allows the incumbent to retain more resources, as seen by the initially increasing slope in the graph. However, increasing coalition size makes it more expensive for an incumbent to reward her supporters, meaning that beyond a certain point, as seen in the graph, further enlargement of the coalition increases the incumbent's cost of rewarding her supporters at a faster rate than it diminishes the expected value of the challenger's

Figure A2.1: Incumbent's Welfare (retained resources) as a Function of the Oversizing of the Coalition, w



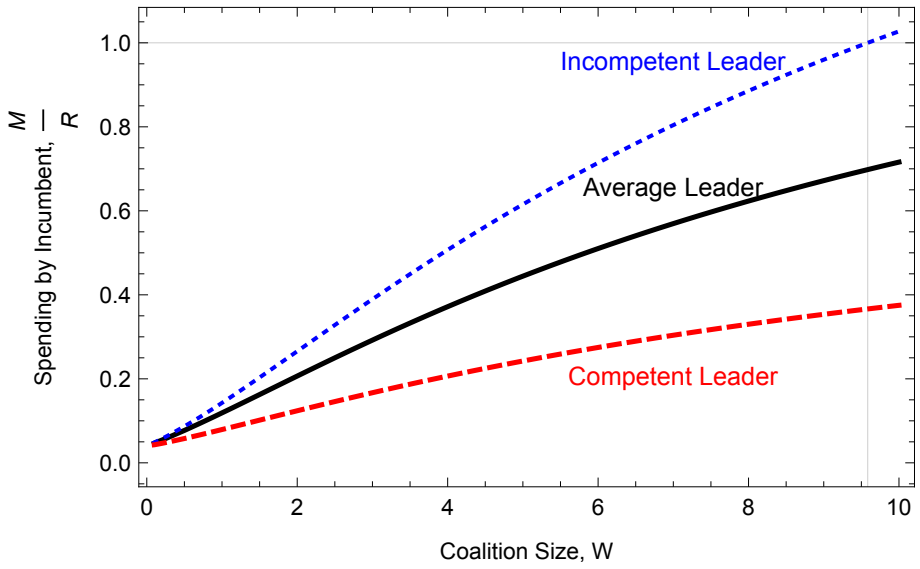
best offer.[1] In the figure the leader's payoff is maximized when the oversized coalition is $w = 1.84$. Thus, we can set a survival-induced upper bound on the extent to which an incumbent oversizes her coalition. The exact amount, of course, depends on the particular circumstances but, nevertheless, is knowable in principle.

A2.2 Heterogeneous Leaders and the Incumbency Constraint

The basic model assumes that the only difference between potential leaders is their affinity ordering for prospective members of their winning coalition. We have noted that the price of public goods production is partially a consequence of a society's technological sophistication and its human capital while we implied that it is also partly a function of its leader's competence. Now we explore

[1] In general, the size of w that maximizes the leader's retained resources solves the following first order condition: $p^2(SW + \delta w(W - 2w)) - p\left(S\left(2\delta w^2 - (\delta+3)wW + W^2\right) + \delta w\left(2w^2 - 2wW + W^2\right)\right) - Sw\left(2\delta w^2 - 2(\delta+1)wW + (\delta+1)W^2\right) = 0$. If we modified the analyses to allow the leader to choose the coalition size in each period, then a number of technical issues arise. In particular, in the immediate period the leader's choice of coalition size is characterized by a FOC of the LHS of equation A2.4. However, choices of coalition size in the immediate period affects supporters' expectation of future coalition inclusion. Since we don't want to engage in a long exposition of these technicalities, Figure A2.1 and the FOC above are based on a comparison of simultaneously selection of w across all period.

Figure A2.2: Spending and Competence: proportion of available resources that a leader must spend to survive given their ability to generate cheap public goods and institutional setting.



the consequences of leadership heterogeneity in terms of competence in producing public goods.

We have noted that p represents society's capacity to produce public goods; the smaller p is, the better society is at providing public goods like national security, infrastructure, education, health care, and the like. Relative to this baseline societal capacity, some leaders might be better or worse at converting revenue into effective public policy through the production of public goods. To examine the consequences of such leader capacity, suppose the incumbent leader produces public goods at price $p_L = p - \Delta$. The parameter Δ can be thought of as leader competence – the capacity to produce public goods effectively at a low price.

Figure A2.2 plots the proportion of available resources that an incumbent leader must spend in order to meet the incumbency constraint; that is, to offer her supporters the same level of expected rewards as a challenger's best offer. The solid line shows the spending required by a leader with average competence, $\Delta = 0$. The dashed line corresponds to a competent leader; that is, someone who produces public goods cheaply ($\Delta > 0$). The upper dotted line corresponds to an incompetent leader ($\Delta < 0$) who can only produce public goods at a high price.

Obviously it is better from the leader's perspective to be competent because it leaves more discretionary resources for her to spend on her pet projects (or to sock away in the bank for a rainy day). An incompetent leader must spend more to survive, and as the figure shows, in large coalition systems the incompetent incumbent does not have enough resources to survive; her required spending is above the upper limit for the ratio $\frac{M}{R}$. It is little wonder that in large coalition

systems, political competition is an 'arms race' among candidates for who has the best policy ideas combined with the competence to convert ideas into policy outcomes. Therefore, another subtle implication of leader competence is its impact on preferences over institutions. While in general leaders always prefer small coalitions over large coalitions, the harm to a leader's welfare from an increase in W is diminished by increased competence. That is to say, highly competent leaders object less to liberalization than do their less competent counterparts.

It is noteworthy that if coalition size is very small and leader competence is extremely high, then the competent leader can actually make herself better off by enlarging W. Thus, competence in producing public goods acts as an incentive to promote democratization while incompetence discourages institution liberalization. Alas, tests of the implications regarding leader competence will have to await the future development of an appropriate indicator of leader competence.

Appendix A3

Dynamic Selectorate Approach

A3.1 Optimal policy choice for leaders in each period.

Here we formalize the arguments in Proposition 3, which characterizes optimal policy choice, and Proposition 4, which characterizes how those policy provisions change as a function of Net Present Value of coalition membership, $y_{W,t}$. As a reminder, for case 1, in which the coalition prefers to depose the incumbent and suppress the masses rather than allow the revolution to succeed, the leader's single period objective function is to maximize

$$\mathcal{L} = l(R - pg - Wz) + \Psi[F(\hat{\theta}) - H(\bar{k})(F(\hat{\theta}) - F(\bar{\theta}))]$$

with respect to the policies g and z. $\bar{k}$ is the critical threshold for the choice of revolution, and $\widehat{\theta}$ and $\bar{\theta}$ are the critical thresholds for the valence shock, such that in the absence of a revolution the leader survives if $\theta \leq \widehat{\theta}$ and in the presence of a revolution the leader survives if $\theta \leq \bar{\theta}$.

Throughout we suppress the dependence on time. Although we believe the argument holds for a broad class of functional forms, for certain aspects of the proofs we utilize specific functional forms and we will indicate precisely where these functional assumptions are utilized.

$$\bar{k} = (F(\hat{\theta}) - F(\hat{\theta}))(a_M - u(g,0)) \tag{A3.1}$$

$$\hat{\theta} = u(g,z) + y_W - a_W$$

$$\bar{\theta} = u(g,z) + y_W - a_W - \eta/2 = \hat{\theta} - \eta/2$$

$$\frac{d\hat{\theta}}{dz} = \frac{d\bar{\theta}}{dz} = u_z$$

$$\frac{d\bar{k}}{dz} = u_z(F'(\hat{\theta}) - F'(\bar{\theta}))(a - u(g,0))$$

$$\frac{d\bar{k}}{dg} = u_g(F'(\hat{\theta}) - F'(\bar{\theta}))(a - u(g,0)) - u_g(F(\hat{\theta}) - F\bar{\theta}))$$

The First Order Conditions (Equations]3.3 and 3.4) are (using $r = R - pg - Wz$ to reduce notation) :

$$\frac{\partial \mathcal{L}}{\partial z} = (-W)l'(r) + \Psi u_z \left(\underbrace{F'(\hat{\theta}) - (F'(\hat{\theta}) - F'(\bar{\theta}))(H(\bar{k}) + H'(\bar{k})\bar{k})}_{X_1 > 0} \right)$$

$$\begin{aligned} \frac{\partial \mathcal{L}}{\partial g} &= (-p)l'(r) + \Psi u_g \left(\underbrace{F'(\hat{\theta}) - (F'(\hat{\theta}) - F'(\bar{\theta}))(H(\bar{k}) + H'(\bar{k})\bar{k})}_{X_1 > 0} \right) \\ &+ \Psi u_g \left(\underbrace{(F(\hat{\theta}) - F(\bar{\theta}))^2 H'(\bar{k})}_{X_2 > 0} \right) \end{aligned}$$

The second order conditions (SOC) are

$$\begin{aligned} \frac{\partial^2 \mathcal{L}}{\partial z^2} &= (W^2)l''(r) + \Psi u_{zz} X_1 + \Psi u_z^2 X_3 \\ \frac{\partial^2 \mathcal{L}}{\partial g^2} &= (p^2)l''(r) + \Psi u_{gg}\,(X_1 + X_2) + \Psi u_g^2\,(X_3 + 2X_4 + X_5) < 0 \\ \frac{\partial^2 \mathcal{L}}{\partial z \partial g} &= (Wp)l''(r) + \Psi u_z u_g\,(X_3 + X_4) < 0 \\ \frac{\partial^2 \mathcal{L}}{\partial z \partial y_W} &= \Psi u_z\,(X_3) < 0 \\ \frac{\partial^2 \mathcal{L}}{\partial g \partial y_W} &= \Psi u_g\,(X_3 + X_4) < 0 \end{aligned}$$

where

$$\begin{aligned} X_3 &= F''(\hat{\theta}) - (F''(\hat{\theta}) - F''(\bar{\theta}))\left(H(\bar{k}) + H'(\bar{k})\bar{k}\right) \\ &- (F'(\hat{\theta}) - F'(\bar{\theta}))^2(a_M - u(g,0))\left(2H'(\bar{k}) + H''(\bar{k})\bar{k}\right) < 0 \\ X_4 &= (F(\hat{\theta}) - F(\bar{\theta}))(F'(\hat{\theta}) - F'(\bar{\theta}))\left(2H'(\bar{k}) + \bar{k}H''(\bar{k})\right) < 0 \\ X_5 &= -(F(\hat{\theta}) - F(\bar{\theta}))^3 H''(\bar{k}) \end{aligned}$$

Note that if we assume H is the uniform distribution then $H'' = 0$ and so $X_5 = 0$. For F is the exponential distribution, $\Delta = F(\hat{\theta}) - F(\bar{\theta}) = F''(\hat{\theta}) - F''(\bar{\theta}) = -(F'(\hat{\theta}) - F'(\bar{\theta})) > 0$ and

therefore $X_4 = -2X_2$. Further, note that for the uniform distribution, $H(\bar{k}) = H'(\bar{k})\bar{k}$, we can write $X_3 + 2X_1 = F'(\widehat{\theta}) - \Delta H(\bar{k}) - \Delta H'(\bar{k})\bar{k} = F'(\widehat{\theta}) > 0$.

From standard maximization techniques, we state the leader's optimal policies:

Proposition 3: for an interior solution (the leader does not spend all resources), the leader's equilibrium policies that maximize leader payoffs are characterized by $\frac{\partial \mathcal{L}}{\partial z} = \frac{\partial \mathcal{L}}{\partial g} = 0$ and the second order conditions $\frac{\partial^2 \mathcal{L}}{\partial z^2} < 0$, $\frac{\partial^2 \mathcal{L}}{\partial g^2} < 0$, and $denom \geq 0$, where

$$\begin{aligned} denom &= \left| \begin{pmatrix} \frac{\partial^2 \mathcal{L}}{\partial g^2} & \frac{\partial^2 \mathcal{L}}{\partial g \partial z} \\ \frac{\partial^2 \mathcal{L}}{\partial g \partial z} & \frac{\partial^2 \mathcal{L}}{\partial z^2} \end{pmatrix} \right| \\ &= \Psi^2 \left(u_{gg} u_{zz} X_1 \left(X_1 + X_2 \right) + u_{gg} u_z^2 \left(X_1 + X_2 \right) X_3 + u_{zz} u_g^2 X_1 \left(X_3 + 2X_4 + X_5 \right) + u_g^2 u_z^2 \left(X_3 X_5 - X_4^2 \right) \right) \\ &+ \Psi \left(\left(W^2 u_{gg} + p^2 u_{zz} \right) X_1 + W^2 u_{gg} X_2 + \left(W u_g - p u_z \right)^2 X_3 + W u_g \left(W u_g \left(2X_4 + X_5 \right) - 2 p u_z X_4 \right) \right) l''(r) \\ &= \Psi^2 \left(u_{gg} u_{zz} X_1 \left(X_1 + X_2 \right) + u_{gg} u_z^2 \left(X_1 + X_2 \right) X_3 + u_g^2 u_{zz} X_1 \left(-4X_2 + X_3 \right) - 4 u_g^2 u_z^2 X_2^2 \right) > 0 \end{aligned}$$

The final equality in the expression for *denom* utilizes $l''(r) = 0$ and $H'' = 0$.

Comparative Statics

In the main text, we stated the principle results in Proposition 4 and we discussed the basic comparative statics in terms of concavity. Here we provide a more formal characterization.

$$\begin{aligned} \frac{dg}{dy_W} &= -\frac{\left| \begin{pmatrix} \frac{\partial^2 \mathcal{L}}{\partial g \partial y_W} & \frac{\partial^2 \mathcal{L}}{\partial g \partial z} \\ \frac{\partial^2 \mathcal{L}}{\partial z \partial y_W} & \frac{\partial^2 \mathcal{L}}{\partial z^2} \end{pmatrix} \right|}{denom} \\ &= -\frac{\Psi^2 u_g \overbrace{\left(u_{zz} X_1 \left(X_3 + X_4 \right) \right)}^{+} + \Psi W \left(\left(W u_g - p u_z \right) X_3 + W u_g X_4 \right) l''(r)}{denom} \end{aligned}$$

That $l(r)$ is linear is sufficient to ensure that g is decreasing in y_W.

$$\begin{aligned} \frac{dz}{dy_W} &= -\frac{\left| \begin{pmatrix} \frac{\partial^2 \mathcal{L}}{\partial g^2} & \frac{\partial^2 \mathcal{L}}{\partial z \partial y_W} \\ \frac{\partial^2 \mathcal{L}}{\partial g \partial z} & \frac{\partial^2 \mathcal{L}}{\partial z \partial y_W} \end{pmatrix} \right|}{denom} \\ &= -\frac{\Psi^2 \left(\overbrace{u_{gg} u_z \left(X_1 + X_2 \right) X_3}^{+} + \overbrace{u_g^2 u_z \left(X_3 X_5 - X_4^2 \right)}^{-} \right) + \Psi p \left(\left(p u_z - W u_g \right) X_3 - W u_g X_4 \right) l''(r)}{denom} \end{aligned}$$

Again, if $l(r)$ is linear we can ignore the latter terms. However we cannot unambiguously sign $\frac{dz}{dy_W}$ because the numerator contains both positive and negative terms. Substantively these competing terms correspond to the leader cutting back on coalition rewards as y_W increases, while also

substituting away from public goods towards a private goods focus.

we can show that the level of immediate coalition rewards decreases in y_W.

$$\begin{aligned}\frac{du(g,z)}{dy_W} &= \frac{-u_g\left|\begin{pmatrix}\frac{\partial^2\mathcal{L}}{\partial g\partial y_W} & \frac{\partial^2\mathcal{L}}{\partial g\partial z}\\ \frac{\partial^2\mathcal{L}}{\partial z\partial y_W} & \frac{\partial^2\mathcal{L}}{\partial z^2}\end{pmatrix}\right| - u_z\left|\begin{pmatrix}\frac{\partial^2\mathcal{L}}{\partial g^2} & \frac{\partial^2\mathcal{L}}{\partial z\partial y_W}\\ \frac{\partial^2\mathcal{L}}{\partial g\partial z} & \frac{\partial^2\mathcal{L}}{\partial z\partial y_W}\end{pmatrix}\right|}{denom}\\ &= \frac{\Psi^2\left(-u_{gg}u_z^2\left(X_1+X_2\right)X_3 - u_g^2u_{zz}X_1\left(X_3+X_4\right) - u_g^2u_z^2\left(X_3X_5 - X_4^2\right)\right) - \Psi\left(Wu_g - pu_z\right)\left(\left(Wu_g - pu_z\right)X_3 + Wu_gX_4\right)l''(r)}{denom}\end{aligned}$$

Focusing on the case that $l(r)$ is linear, H is uniform and F is the exponential distribution,

$$\frac{du(g,z)}{dy_W} = \frac{\Psi^2\left(-u_{gg}u_z^2\left(X_1+X_2\right)X_3 - u_g^2u_{zz}X_1\left(X_3+X_4\right) + u_g^2u_z^2X_4^2\right)}{\Psi^2\left(u_{gg}u_{zz}X_1\left(X_1+X_2\right) + u_{gg}u_z^2\left(X_1+X_2\right)X_3 + u_{zz}u_g^2X_1\left(X_3+2X_4\right) - u_g^2u_z^2X_4^2\right)}$$

Note that every term in the numerator appears in the denominator ($denom$) so $\frac{du(g,z)}{dy_W}$ takes the form of $-\frac{Y_1}{Y_1+Y_2}$ where Y_1 and Y_2 are positive groups of terms. Hence $-1 < \frac{du(g,z)}{dy_W} < 0$, such that in response to increases in y_W the leader reduces the immediate rewards, but by less than the amount that y_W increases, such that the sum $u(g,z) + y_W$ increases in y_W.

Lemma 4. *Total spending on policy provision, $m = pg + zW$, decreases in y_W.*

Proof of Lemma 4. At equilibrium the FOC defines the ratio of public and private goods: $\frac{u_g}{u_z} = \frac{p}{W}\frac{X_1}{X_1+X_2}$. We represent the ratio as $z = \vartheta g$, so $m = pg + W\vartheta g$. Therefore $g = \frac{m}{p+\vartheta W}$ and $z = \frac{m\vartheta}{p+\vartheta W}$ and so $\frac{dg}{dm} = \frac{1}{p+\vartheta W}$ and $\frac{dz}{dm} = \frac{\vartheta}{p+\vartheta W}$. We can ignore the substitution between public and private goods because at equilibrium the marginal impact of substitution between public and private goods on the leader's objective function is zero. From the FOC

$$l'(R-m) = \frac{\Psi}{W}u_zX_1$$

referring to the left hand side as T_1 and the right hand side as T_2,

$$\frac{dT_1}{dy} = -l''(R-m)\frac{dm}{dy_W} \tag{A3.2}$$

and

$$\begin{aligned}\frac{dT_2}{dm} &= \frac{\partial T_2}{\partial y_W} + \frac{\partial T_2}{\partial g}\frac{dg}{dm}\frac{dm}{dy_W} + \frac{\partial T_2}{\partial z}\frac{dz}{dm}\frac{dm}{dy_W}\\ &= \frac{\Psi}{W}\left(u_zX_3 + u_zu_g(X_3+X_4)\frac{dg}{dm}\frac{dm}{dy_W} + \left(u_{zz}X_1 + u_z^2X_3\right)\frac{dz}{dm}\frac{dm}{dy_W}\right)\\ &= \frac{\Psi}{W}\left(u_zX_3 + u_zu_g(X_3+X_4)\frac{1}{p+\vartheta W}\frac{dm}{dy_W} + \left(u_{zz}X_1 + u_z^2X_3\right)\frac{\vartheta}{p+\vartheta W}\frac{dm}{dy_W}\right)\end{aligned} \tag{A3.3}$$

Equating A3.2 and A3.3,

$$\frac{dm}{dy_W} = -\frac{\frac{\Psi}{W}u_z X_3}{l''(R-m) + \frac{\Psi}{W}(u_{zz}X_1 + u_z^2 X_3)\frac{\vartheta}{p+\vartheta W} + \frac{\Psi}{W}u_z u_g (X_3 + X_4)\frac{1}{p+\vartheta W}} < 0 \tag{A3.4}$$

Therefore spending is decreasing in y_W.

□

Finally we show that the ratio of private to public goods increases as y_W increases.

Proposition 8. *The ratio $\frac{z}{g}$ is increasing in y_W.*

Proof of Proposition 8. Rearranging equations 3.3 and 3.4 yields

$$\frac{u_g}{u_z} = \frac{p}{W}\frac{X_1}{X_1 + X_2}$$

which for our specific utility function can be written as

$$\sqrt{\frac{z}{g}}\frac{W}{p} = \frac{X_1}{(X_1 + X_2)}$$

Therefore

$$\begin{aligned} \frac{d\sqrt{\frac{z}{g}\frac{W}{p}}}{dy_w} &= \frac{X_2\frac{\partial X_1}{\partial y_W} - X_1\frac{\partial X_2}{\partial y_W}}{(X_1+X_2)^2} \\ &= \frac{X_2 X_3 - X_1 X_4}{(X_1+X_2)^2} \end{aligned} \tag{A3.5}$$

If H is the uniform distribution and F is the exponential distribution (such that $X_4 = -2X_2$), then we can write the numerator as $X_2(X_3 + 2X_1) = X_2 F'(\hat{\theta}) > 0$. Thus, as the value of future coalition membership rises, the bias towards public goods diminishes. □

Corner Solutions

Next we consider the characterization of corner solutions. If office holding is particularly valuable, then the leader might spend all available resources. This eventuality is ruled out if as $r \to 0$ then $l'(r) \to \infty$, as would be the case for instance if $l(r) = \sqrt{r}$. In the corner solution, the relevant FOC are $pg + zW = R$ and

$$\frac{u_z}{W}X_1 = \frac{u_g}{p}(X_1 + X_2) \tag{A3.6}$$

which corresponds closely to the interior case.

A3.2 Analysis of Net Present Value Given a Revolutionary Threat

Net Present Values When a Revolutionary Threat Exists

Having examined the case of continuation values when there is no revolutionary threat, we now evaluate the continuation values sequentially when there is a revolutionary threat, beginning with the continuation values for current members of the winning coalition under all of the contingencies that can arise when there is a revolution; that is, when they back the revolution, when they suppress the revolution and remove the incumbent ruler (as in a coup d'état), and when they suppress the revolution and back the incumbent leader. Then we examine the contingent continuation values for the leader followed by an assessment of the masses's continuation values under the set of contingent outcomes.

Case 1: The coalition suppresses the revolution if a new leader is chosen: $a_W - \frac{\eta}{2} \geq r_W$ Absent a revolution, the coalition deposes the leader if $\theta > \widehat{\theta} = u(g_t, z_t) + y_{W,t} - a_W$, where a_W is defined by equation 3.2. In the presence of revolution, the coalition deposes the leader if $\theta > \bar{\theta} = u(g_t, z_t) + y_{W,t} - a_W - \frac{\eta}{2}$.

$$
\begin{aligned}
V_{in,t} \;=\; & \underbrace{\left(1 - \left(F(\widehat{\theta}_t) - H(\bar{k}_t)\left[F(\widehat{\theta}_t) - F(\bar{\theta}_t)\right]\right)\right)}_{\text{leader deposed}} a_W \\
& + \underbrace{\left(F(\widehat{\theta}_t) - H(\bar{k}_t)\left[F(\widehat{\theta}_t) - F(\bar{\theta}_t)\right]\right)}_{\text{leader retained}} \overbrace{\left(u(g_t, z_t) + \delta h \rho_t V_{in,t+1} + \delta h(1-\rho_t)(V_{out,t+1}) + \delta(1-h)a_W\right)}^{\text{immediate reward } +y_{W,t}} \\
& - \underbrace{\left(\eta H(\bar{k}_t)F(\bar{\theta}_t) + \frac{\eta}{2}H(\bar{k}_t)(1 - F(\bar{\theta}_t))\right)}_{\text{suppression cost}} - \underbrace{\left(F(\widehat{\theta}_t)(1 - H(\bar{k}_t))E[\theta_t | \theta_t \leq \widehat{\theta}_t] + F(\bar{\theta}_t)H(\bar{k}_t)E[\theta_t | \theta_t \leq \bar{\theta}_t]\right)}_{E[\theta|\text{leader retained}]}
\end{aligned}
$$

The suppression cost term assesses the cost of suppressing a revolution, which occurs with probability $H(\bar{k}_t)$, and whether the coalition retains the leader, which happens with probability $F(\bar{\theta})$ and involves a suppression cost of η or the coalition deposes the leader and pay the half repression cost. The last term relates to the expected value of θ if the leader survives multiplied by the probability that the leader survives. In particular, the probability of no revolution and leader survival is $(1 - H(\bar{k}_t))F(\widehat{\theta})$. The probability of revolution and leader survival is $H(\bar{k}_t)F(\bar{\theta})$.

Likewise the continuation value for being outside of the coalition:

$$V_{out,t} = \underbrace{\left(1-\left(F(\widehat{\theta}_t)-H(\bar{k}_t)\left[F(\widehat{\theta}_t)-F(\bar{\theta}_t)\right]\right)\right)}_{\text{leader deposed}}(u(g_0,0)+\rho_{s,0}\delta V_{in,0}+(1-\rho_{s,0})\delta V_{out,0})$$
$$+ \underbrace{\left(F(\widehat{\theta}_t)-H(\bar{k}_t)\left[F(\widehat{\theta}_t)-F(\bar{\theta}_t)\right]\right)}_{\text{leader retained}}\overbrace{(u(g_t,0)+\delta h V_{out,t+1}+(1-h)(\rho_{s,0}\delta V_{in,0}+(1-\rho_{s,0})\delta V_{out,0}))}^{\text{immediate public goods and expected future payoffs}}$$

Case 2: Coalition lets revolution succeed rather than replace L with a new leader: $a_W - \frac{\eta}{2} \leq r_W$ Absent a revolution, the coalition deposes the leader if $\theta > \widehat{\theta} = u(g_t, z_t) + y_{W,t} - a_W$. In the presence of revolution, the coalition acquiesces to the revolution if $\theta > \tilde{\theta} = u(g_t, z_t) + y_{W,t} - r_W - \eta$.

$$V_{in,t} = \underbrace{\left(1-H(\tilde{k}_t)\right)(1-F(\widehat{\theta}_t))\,a_W}_{\text{depose absent revolution}} + \underbrace{H(\tilde{k}_t)(1-F(\tilde{\theta}_t))\,r_W}_{\text{acquiesce to revolution}}$$
$$+ \underbrace{\left(F(\widehat{\theta}_t)-H(\tilde{k}_t)\left[F(\widehat{\theta}_t)-F(\tilde{\theta}_t)\right]\right)}_{\text{Pr L survives}}\overbrace{(u(g_t,z_t)+\delta h\rho_t V_{in,t+1}+\delta h(1-\rho_t)(V_{out,t+1})+\delta(1-h)a_W)}^{\text{immediate reward } +y_{W,t}}$$
$$- \underbrace{\eta\,H(\tilde{k}_t)(1-F(\tilde{\theta}_t))}_{\text{suppression cost}} + \underbrace{\left(F(\widehat{\theta}_t)(1-H(\tilde{k}_t))E[\theta_t|\theta_t\leq\widehat{\theta}_t]+F(\tilde{\theta}_t)H(\tilde{k}_t)E[\theta_t|\theta_t\leq\tilde{\theta}_t]\right)}_{E[\theta|\text{leader retained}]}$$

The last term relates to the expected value of θ when the leader survives multiplied by the probability that the leader survives.

$$V_{out,t} = \underbrace{\left(1-H(\tilde{k}_t)\right)(1-F(\widehat{\theta}_t))}_{\text{deposition absent revolution}}(u(g_0,0)+\rho_{s,0}\delta V_{in,0}+(1-\rho_{s,0})\delta V_{out,0}) + \underbrace{H(\tilde{k}_t)(1-F(\tilde{\theta}_t))}_{\text{acquiesce to revolution}}\ r_W$$
$$+ \underbrace{\left(F(\widehat{\theta}_t)-H(\tilde{k}_t)\left[F(\widehat{\theta}_t)-F(\tilde{\theta}_t)\right]\right)}_{\text{leader retained}}(u(g_t,0)+\delta h\,VM_{t+1}+\delta(1-h)\,VM_0)$$

Leader's continuation values

The leader's NPV for holding office, like the coalition's net present value, is defined recursively. In case 1, in period t she retains $R - pg_t - Wz_t$ resources and survives with probability $F(\widehat{\theta}) - H(\bar{k}_t)\left[F(\widehat{\theta}) - F(\bar{\theta})\right]$. If she survives she receives the immediate benefit of holding office (Ψ) and

the discounted (and health conditioned) value of being leader in the next period, $\Psi + \delta h\, VL_{t+1}$.

$$VL_t = \underbrace{l(R - pg_t - Wz_t)}_{\text{retained resources}} + \underbrace{\left(F(\widehat{\theta}_t) - H(\bar{k}_t)\left[F(\widehat{\theta}_t) - F(\bar{\theta}_t)\right]\right)}_{\text{leader retained}} \overbrace{(\Psi + \delta h\, VL_{t+1})}^{\text{office plus future periods}}$$

In case 2, the leader's NPV is an analogous expression with $\bar{\theta}$ and $\bar{k}_t$ replaced by $\tilde{\theta}$ and $\tilde{k}_t$, since we assume the leader does not differentiate the value she expects to receive by the means of her removal (althougth others such as Goemans (2008); Debs and Goemans (2010) assume irregular removal carries an increased risk of post tenure punishment).

Masses's continuation values

To simplify the analysis we assumed that the masses made their revolution choice on a period-by-period basis. However, we could readily endogenize the masses's continuation in much the same way as for the coalition. Following the same logic and contingencies as for coalition members and leaders, the masses face two cases that define their continuation values; the absence and presence of a revolution (by them) that fails or succeeds (directly or indirectly, through a coup) in removing the incumbent ruler, with their benefits dependent as well on the probability the incumbent does or does not face a terminal health crisis..

Case 1:

$$\begin{aligned} VM_t &= \underbrace{\left(1 - \left(F(\widehat{\theta}_t) - H(\widehat{k}_t)\left[F(\widehat{\theta}_t) - F(\bar{\theta}_t)\right]\right)\right)}_{\text{leader deposed}}(u(g_0, 0) + \delta\, VM_1) \\ &+ \underbrace{\left(F(\widehat{\theta}_t) - H(\widehat{k}_t)\left[F(\widehat{\theta}_t) - F(\bar{\theta}_t)\right]\right)}_{\text{leader retained}}(u(g_t, 0) + \delta h\, VM_{t+1} + \delta(1-h)(u(g_0, 0) + \delta\, VM_1)) \\ &- \underbrace{H(\bar{k}_t)\; E[K_t | K_t \leq \bar{k}_t]}_{\text{cost of rebelling}} \end{aligned}$$

Case 2:

$$\begin{aligned} VM_t &= \underbrace{\left(1 - H(\tilde{k}_t)\right)(1 - F(\widehat{\theta}_t))}_{\text{deposition absent revolution}}(u(g_0, 0) + \delta\, VM_0) + \underbrace{H(\tilde{k}_t)(1 - F(\tilde{\theta}_t))}_{\text{revolt succeeds}}\, r_M \\ &+ \underbrace{\left(F(\widehat{\theta}_t) - H(\tilde{k}_t)\left[F(\widehat{\theta}_t) - F(\tilde{\theta}_t)\right]\right)}_{\text{leader retained}}(u(g_t, 0) + \delta h V_{out,t+1} + (1-h)(\rho_{s,0}\delta V_{in,0} + (1-\rho_{s,0})\delta V_{out,0})) \\ &- \underbrace{H(\tilde{k}_t)\; E[K_t | K_t \leq \tilde{k}_t]}_{\text{cost of rebelling}} \end{aligned}$$

A3.2.1 Analysis of the Institution Change Global Game

Proof of Proposition 5. The proof follows by standard global game techniques. We use an iterative dominance argument to show that equilibria are characterized by a pair $(\widehat{\Omega}, \widehat{s})$.

To start the iterative argument, consider the critical states if everyone supports L (effectively $\widehat{s} = -\infty$) or if everyone supports C (effectively $\widehat{s} = \infty$) . We refer to these critical states as $\Omega_{(0)}$ and $\Omega^{(0)}$, respectively. Given these states we find the signals that would make a supporter indifferent between supporting L or C, $s_{(0)}$ and $s^{(0)}$. Given any strategy by all the other supporters, these signal cutpoints define dominant strategies for a supporter. Irrelevant to how every other supporter plays, if i observes $s_i < s_{(0)}$ he should support C and if i observes $s_i > s^{(0)}$ he should support L. Some mass of supporters will receive such extreme signals and have a dominant strategy to support C or L. Given the set of supporters with dominant strategies we can re-calculate the critical states. The argument is reiterated. From $\Omega_{(t)}, \Omega^{(t)}$ we find $s_{(t)}, s^{(t)}$ and this induces new critical states, $\Omega_{(t=1)}, \Omega^{(t+1)}$. Then we show that sequence $\{(\Omega_{(0)}, \Omega^{(0)}), ..., (\Omega_{(t)}, \Omega^{(t)}), (\Omega_{(t+1)}, \Omega^{(t+1)})...\}$ converges to the fixed points that satisfy equation 3.14.

Define $\Omega_{(0)} = -1 - f$ and $\Omega^{(t)} = 1 - f$, these are the critical states if everyone supports L or everyone supports C.

Given the pair $(\Omega_{(t)}, \Omega^{(t)})$, define $(s_{(t)}, s^{(t)})$ as solutions of equation SI given the critical states:

$$s_{(t)} = \frac{\alpha_\Omega + \beta}{\beta}\Omega_{(t)} + \frac{\sqrt{\alpha_\Omega + \beta}}{\beta}\Phi^{-1}(Q) \tag{A3.7}$$

and

$$s^{(t)} = \frac{\alpha_\Omega + \beta}{\beta}\Omega^{(t)} + \frac{\sqrt{\alpha_\Omega + \beta}}{\beta}\Phi^{-1}(Q) \tag{A3.8}$$

Supporters that receive $s_i < s_{(t)}$ has a dominant strategy to support C, and an analogous argument for high signals. We find the mass of such supporters with dominant strategies and recalculate the Conflict Technology condition to find the critical thresholds $((\Omega_{(t+1)}, \Omega^{(t+1)}))$ that solve.

$$2\Phi\left(\sqrt{\beta}(\Omega_{(t+1)} - s_{(t)})\right) + \Omega_{(t+1)} + f - 1 = 0 \tag{A3.9}$$

$$2\Phi\left(\sqrt{\beta}(\Omega^{(t+1)} - s^{(t)})\right) + \Omega^{(t+1)} + f - 1 = 0 \tag{A3.10}$$

By substitution for $(s_{(t)}, s^{(t)})$ the following equations define the relation between the critical states in the sequence:

$$2\Phi\left(\sqrt{\beta}(\Omega_{(t+1)} - \frac{\alpha_\Omega + \beta}{\beta}\Omega_{(t)} - \frac{\sqrt{\alpha_\Omega + \beta}}{\beta}\Phi^{-1}(Q))\right) + \Omega_{(t+1)} + f - 1 = 0 \tag{A3.11}$$

$$2\Phi\left(\sqrt{\beta}(\Omega^{(t+1)} - \frac{\alpha_\Omega + \beta}{\beta}\Omega^{(t)} - \frac{\sqrt{\alpha_\Omega + \beta}}{\beta}\Phi^{-1}(Q))\right) + \Omega^{(t+1)} + f - 1 = 0 \tag{A3.12}$$

We define the implicit function $\mathcal{W}(\bar{\Omega})$ as the solution that solves equation A3.11 for $\Omega_{(t+1)}$ given the input $\Omega_{(t)} = \bar{\Omega} \in [-1-f, 1-f]$. Since $s_(0) > -\infty$, $\mathcal{W}(-1-f) > \Omega_{(0)}$; likewise $\mathcal{W}(1-f) < \Omega^{(0)}$, further $\mathcal{W}(\bar{\Omega})$ is continuous and strictly increasing:

$$\frac{d\mathcal{W}(\bar{\Omega})}{d\bar{\Omega}} = \frac{2\frac{\alpha_\Omega+\beta}{\sqrt{\beta}}\phi(Y)}{2\sqrt{\beta}\phi(Y)+1}$$

where $Y = \sqrt{\beta}(\Omega^{(t+1)} - \frac{\alpha_\Omega+\beta}{\beta}\Omega^{(t)} - \frac{\sqrt{\alpha_\Omega+\beta}}{\beta}\Phi^{-1}(Q))$. As a result $\mathcal{W}(\bar{\Omega})$ crosses the 45 degree line at least one. Such crossing are fixed points and solutions to equation 3.14: $\bar{\Omega} = \mathcal{W}(\bar{\Omega})$. If the slope of $\mathcal{W}(\bar{\Omega})$ is less than 1 for all $\bar{\Omega} \in (-1-f, 1-f)$ then the $\mathcal{W}(\bar{\Omega})$ can cross the 45 degree line only once, which implies a unique fixed point. Since the maximum value of $\phi(Y)$ is $\frac{1}{\sqrt{2\pi}}$, the condition $\alpha_\Omega < \frac{\sqrt{\pi}\sqrt{\beta}}{\sqrt{2}}$ is sufficient to ensure that $\frac{d\mathcal{W}(\bar{\Omega})}{d\bar{\Omega}} < 1$ and there is a unique solution to equation 3.14. □

Proof of Proposition 6. The argument follows directly from differentiating Q:

$$\frac{dQ}{d\rho_T^B} = -\frac{(V_{in,T}^B - V_{out,T}^B)\delta\left((V_{in,T}^C - V_{out,T}^C)\delta\rho_T^C + u(0,z_C)\right)}{\left(u(0,z_C) + \rho_T^C\left(\delta\, V_{in,T}^C - \delta\, V_{out,T}^C\right) + u(0,z_g+z_x) + \rho_T^B\left(\delta\, V_{in,T}^B - \delta\, V_{out,T}^B\right)\right)^2} < 0 \quad \text{(A3.13)}$$

$$\frac{dQ}{d\rho_T^C} = \frac{(V_{in,T}^C - V_{out,T}^C)\delta\left((V_{in,T}^B - V_{out,T}^B)\delta\rho_T^B + u(0,z_t+z_x)\right)}{\left(u(0,z_C) + \rho_T^C\left(\delta\, V_{in,T}^C - \delta\, V_{out,T}^C\right) + u(0,z_g+z_x) + \rho_T^B\left(\delta\, V_{in,T}^B - \delta\, V_{out,T}^B\right)\right)^2} > 0 \quad \text{(A3.14)}$$

$$\frac{dQ}{d(V_{in,T}^B - V_{out,T}^B)} = -\frac{\delta\,\rho_T^B\,\left((V_{in,T}^C - V_{out,T}^C)\delta\rho_T^C + u(0,z_C)\right)}{\left(u(0,z_C) + \rho_T^C\left(\delta\, V_{in,T}^C - \delta\, V_{out,T}^C\right) + u(0,z_g+z_x) + \rho_T^B\left(\delta\, V_{in,T}^B - \delta\, V_{out,T}^B\right)\right)^2} < 0 \quad \text{(A3.15)}$$

$$\frac{dQ}{d(V_{in,T}^C - V_{out,T}^C)} = \frac{\delta\,\rho_T^C\,\left((V_{in,T}^B - V_{out,T}^B)\delta\rho_T^B + u(0,z_t+z_x)\right)}{\left(u(0,z_C) + \rho_T^C\left(\delta\, V_{in,T}^C - \delta\, V_{out,T}^C\right) + u(0,z_g+z_x) + \rho_T^B\left(\delta\, V_{in,T}^B - \delta\, V_{out,T}^B\right)\right)^2} > 0 \quad \text{(A3.16)}$$

$$\frac{dQ}{dz_x} = -\frac{\left((V_{in,T}^C - V_{out,T}^C)\delta\rho_T^C + u(0,z_C)\right)\frac{du(0,z_t+z_x)}{dz_x}}{\left(u(0,z_C) + \rho_T^C\left(\delta\, V_{in,T}^C - \delta\, V_{out,T}^C\right) + u(0,z_g+z_x) + \rho_T^B\left(\delta\, V_{in,T}^B - \delta\, V_{out,T}^B\right)\right)^2} < 0 \quad \text{(A3.17)}$$

$$\frac{dQ}{dz_C} = \frac{\left((V_{in,T}^B - V_{out,T}^B)\delta\rho_T^B + u(0,z_t+z_x)\right)\frac{du(0,z_C)}{dz_C}}{\left(u(0,z_C) + \rho_T^C\left(\delta\, V_{in,T}^C - \delta\, V_{out,T}^C\right) + u(0,z_g+z_x) + \rho_T^B\left(\delta\, V_{in,T}^B - \delta\, V_{out,T}^B\right)\right)^2} < 0 \quad \text{(A3.18)}$$

□

Appendix A5

Conditions for Instability

A5.1 Policy Provision

Table A5.1 is analogous to Tables 5.1 and 5.2 using the educational attainment measure of productivity rather than the GDP based productivity measure. The results support the same substantive conclusions as the tables presented in the main text. Table A5.2 contains a cubic specification of political institutions and each of the other regressors interacted with linear and quadratic versions of W_{t-1}. While this specification allows for subtle differences in the impact of regressors in different regions of the institution space, the basic pattern is similar and the improvement in model fit is very marginal. It is for this reason we present the simpler models in the main text (Tables 5.1 and 5.2) .

Table A5.1: Provision of Public Goods, Private Goods, Assembly and Coalition Welfare

	(1) Public	(2) Private	(3) Assembly	(4) CW	(5) Public	(6) Private	(7) Assembly	(8) CW
W_{t-1}	-1.001***	-0.235	0.0300	-0.764***	-0.380*	-0.491***	-0.194	-0.563**
	(0.212)	(0.181)	(0.157)	(0.148)	(0.164)	(0.132)	(0.189)	(0.179)
W^2_{t-1}	1.039***	-0.0124	0.469**	0.962***	0.519**	0.0953	0.768***	0.748***
	(0.208)	(0.148)	(0.142)	(0.141)	(0.168)	(0.125)	(0.191)	(0.172)
Log(Tenure)	-0.0514**	0.00752	-0.0529**	-0.0433**	-0.0137	-0.00572	-0.0450***	-0.0300**
	(0.0184)	(0.0150)	(0.0168)	(0.0144)	(0.0103)	(0.00945)	(0.0125)	(0.00915)
W_{t-1} *Log(tenure)	0.0718**	-0.0177	0.0598*	0.0515**	0.0146	0.0187	0.0437**	0.0368**
	(0.0244)	(0.0203)	(0.0242)	(0.0184)	(0.0127)	(0.0124)	(0.0152)	(0.0119)
Old or Sick	-0.0299	-0.0174	0.00768	-0.00890	-0.0423*	-0.00428	0.0166	-0.0275+
	(0.0341)	(0.0406)	(0.0350)	(0.0312)	(0.0170)	(0.0240)	(0.0197)	(0.0161)
W_{t-1} * Old or Sick	0.0116	0.0306	-0.0263	-0.00693	0.0497*	0.0125	-0.0242	0.0368+
	(0.0457)	(0.0503)	(0.0461)	(0.0406)	(0.0214)	(0.0297)	(0.0261)	(0.0207)
$\text{Productivity}_{t-1}$	0.195	0.374***	-0.204*	0.320**	0.0242	0.209+	-0.0198	0.241+
	(0.143)	(0.0993)	(0.0956)	(0.0997)	(0.167)	(0.112)	(0.129)	(0.124)
W_{t-1} * $\text{Productivity}_{t-1}$	0.0310	-0.706***	0.334*	-0.0666	0.119	-0.275*	0.0498	-0.0822
	(0.173)	(0.117)	(0.131)	(0.129)	(0.177)	(0.111)	(0.158)	(0.151)
$\text{Log(Population}_{t-1})$	-0.00355	0.00818+	-0.0108*	-0.00459	0.0167	0.0319+	-0.0412	-0.0383
	(0.00582)	(0.00436)	(0.00497)	(0.00491)	(0.0306)	(0.0177)	(0.0301)	(0.0259)
Growth_{t-1}	0.00124	-0.000194	-0.000953	0.000213	0.000570	0.000883+	-0.00119+	-0.0000146
	(0.00107)	(0.00101)	(0.00109)	(0.00104)	(0.000627)	(0.000483)	(0.000649)	(0.000722)
W_{t-1} *Growth_{t-1}	-0.00157	-0.000635	0.00145	0.0000787	-0.000325	-0.00160*	0.00231*	0.000987
	(0.00148)	(0.00135)	(0.00160)	(0.00151)	(0.000891)	(0.000776)	(0.00105)	(0.00106)
$\text{Resource Rents}_{t-1}$	0.000618	0.00125	0.000496	0.00549***	0.00184+	0.00103	0.00221*	0.00308***
	(0.00162)	(0.000955)	(0.00118)	(0.00140)	(0.000933)	(0.000629)	(0.00102)	(0.000863)
W_{t-1} *Res. Rents_{t-1}	-0.00353	0.000965	-0.00355+	-0.0102***	-0.00472**	0.0000639	-0.00456*	-0.00565**
	(0.00270)	(0.00160)	(0.00195)	(0.00230)	(0.00159)	(0.00108)	(0.00204)	(0.00169)
Observations	5850	5851	5851	5782	5850	5851	5851	5782
Number Nations	129	129	129	128	129	129	129	128
Years	1971-2022	1971-2022	1971-2022	1971-2022	1971-2022	1971-2022	1971-2022	1971-2022
Nation FE	N	N	N	N	Y	Y	Y	Y
Year FE	N	N	N	N	Y	Y	Y	Y
Fit: R2	0.598	0.757	0.781	0.703	0.921	0.937	0.898	0.907
Bootstrap N	5850	5851	5851	5782	5850	5851	5851	5774
Bootstrap Fit	0.593	0.747	0.772	0.699	0.878	0.912	0.856	0.866

Standard errors in parentheses
Standard Errors Clustered by Country
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A5.2: Provision of Public Goods, Private Goods, Assembly and Coalition Welfare (Regression with country and year fixed effects)

	(1) Public	(2) Private	(3) Assembly	(4) CW
W_{t-1}	1.325	-0.107	-0.814	0.466
	(1.480)	(1.333)	(1.702)	(1.618)
W^2_{t-1}	-1.556	-0.399	1.808	-0.230
	(1.398)	(1.236)	(1.607)	(1.535)
W^3_{t-1}	-0.0543	0.481	-0.902^{+}	-0.204
	(0.421)	(0.445)	(0.481)	(0.469)
Log(Tenure)	-0.00328	-0.0292*	-0.0176	-0.0244^{+}
	(0.0153)	(0.0127)	(0.0146)	(0.0139)
W_{t-1} *Log(tenure)	-0.0407	0.140**	-0.0332	0.0311
	(0.0550)	(0.0452)	(0.0559)	(0.0507)
W^2_{t-1} *Log(tenure)	0.0476	-0.115**	0.0536	-0.00568
	(0.0457)	(0.0369)	(0.0488)	(0.0422)
Old or Sick	-0.0319	-0.0228	0.0439	-0.00144
	(0.0268)	(0.0282)	(0.0267)	(0.0238)
W_{t-1} * Old or Sick	0.0595	0.0929	-0.132	-0.00618
	(0.0965)	(0.109)	(0.0994)	(0.0976)
W^2_{t-1} * Old or Sick	-0.0302	-0.0732	0.0937	0.00938
	(0.0800)	(0.0942)	(0.0861)	(0.0859)
Log($GDPpc_{t-1}$)	0.0162	0.0299	-0.0251	0.0835***
	(0.0289)	(0.0228)	(0.0191)	(0.0201)
W_{t-1} *Log($GDPpc_{t-1}$)	-0.0110	-0.126	0.0370	-0.0947
	(0.0886)	(0.0963)	(0.0854)	(0.0845)
W^2_{t-1} *Log($GDPpc_{t-1}$)	0.0279	0.0787	0.0268	0.0997
	(0.0779)	(0.0864)	(0.0816)	(0.0783)
Log($Population_{t-1}$)	0.0362	0.0112	-0.0226	0.00572
	(0.0289)	(0.0260)	(0.0311)	(0.0258)
W_{t-1} *Log(Pop_{t-1})	-0.0911	0.0477	-0.00884	-0.0202
	(0.0786)	(0.0776)	(0.0994)	(0.0916)
W^2_{t-1} *Log(Pop_{t-1})	0.113	-0.0492	0.00141	0.0249
	(0.0722)	(0.0607)	(0.0903)	(0.0817)
$Growth_{t-1}$	0.000755	0.00107	0.000121	0.000792
	(0.000744)	(0.000706)	(0.000754)	(0.000749)
W_{t-1} *$Growth_{t-1}$	-0.00144	-0.00330	-0.00246	-0.00265
	(0.00306)	(0.00280)	(0.00357)	(0.00315)
W^2_{t-1} *$Growth_{t-1}$	0.00112	0.00207	0.00381	0.00287
	(0.00287)	(0.00244)	(0.00359)	(0.00305)
Resource $Rents_{t-1}$	0.00120	0.00421*	-0.000186	0.00262^{+}
	(0.000982)	(0.00163)	(0.00123)	(0.00136)
W_{t-1} *Res. $Rents_{t-1}$	-0.00343	-0.0176*	0.00612	-0.00718
	(0.00553)	(0.00727)	(0.00621)	(0.00690)
W^2_{t-1} *Res. $Rents_{t-1}$	-0.000925	0.0180*	-0.0105^{+}	0.00316
	(0.00586)	(0.00707)	(0.00632)	(0.00684)
Observations	7142	7152	7150	7136
Years	1971-2022	1971-2022	1971-2022	1971-2022
Nations	164	164	164	164
Nation FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
R2	0.929	0.936	0.902	0.914
Within Nation R2	0.292	0.465	0.494	0.325
Out-of-Sample N	7126	7136	7134	7120
Out-of-Sample Fit	0.891	0.909	0.860	0.877

Standard errors in parentheses
Robust Standard Errors Clustered by Country
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Volatility of Policy Provisions

Table A5.3 examines the volatility of policy provisions. The estimates in the table were used to generate Figure A5.1. The analyses explicitly model the variance of the error term, σ^2, as a function of coalition size (W_{t-1} and W^2_{t-1}). In particular, we estimate $Log(\sigma^2) = constant + \beta_1 W_{t-1} + \beta_2 W^2_{t-1}$. As the figure clearly shows, there is relatively little variance in the error term in large W systems. Put another way, large coalition leaders produce policies close to expectation. In contrast in small and medium sized coalitions, policy provisions can differ more substantially from expectation.

Figure A5.1: Policy Volatility and Coalition Size

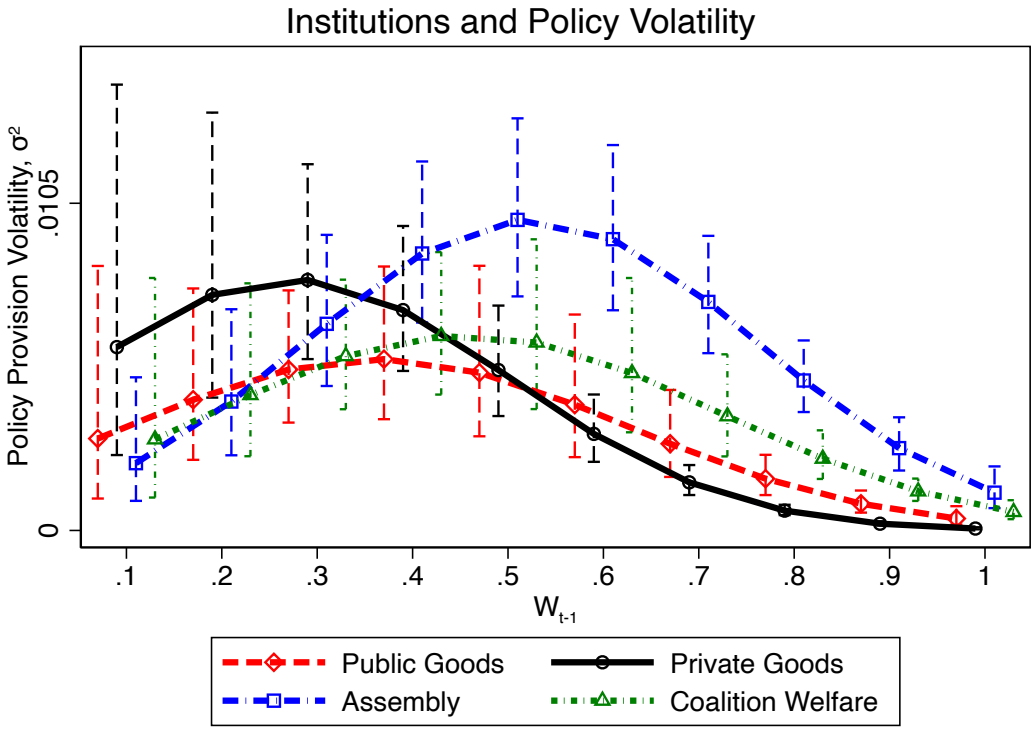


Table A5.3: Heteroskedasticity in Policy Provision

	(1) Public Goods	(2) Private Goods	(3) Assembly	(4) Coalition Welfare
main				
W_{t-1}	-0.428**	-0.533***	-0.299	-0.413*
	(0.164)	(0.132)	(0.194)	(0.165)
W^2_{t-1}	0.430**	0.151+	0.567***	0.547**
	(0.133)	(0.0881)	(0.164)	(0.169)
Log(Tenure)	-0.0149+	0.0171*	-0.0280**	-0.0200**
	(0.00892)	(0.00799)	(0.00940)	(0.00754)
W_{t-1} *Log(tenure)	0.0135	-0.0170+	0.0244*	0.0201*
	(0.0105)	(0.00903)	(0.0113)	(0.00920)
Old or Sick	-0.0403**	-0.00190	0.0180	-0.0136
	(0.0149)	(0.0180)	(0.0143)	(0.0137)
W_{t-1} * Old or Sick	0.0433*	0.00422	-0.0245	0.0145
	(0.0179)	(0.0198)	(0.0200)	(0.0174)
Log($GDPpc_{t-1}$)	0.00452	-0.00354	-0.0221+	0.0642***
	(0.0196)	(0.0144)	(0.0127)	(0.0141)
W_{t-1} *Log($GDPpc_{t-1}$)	0.0220	-0.00491	0.0450*	0.00901
	(0.0243)	(0.0173)	(0.0180)	(0.0200)
Log($Population_{t-1}$)	0.0422*	0.0223*	-0.0260	0.00174
	(0.0195)	(0.00995)	(0.0184)	(0.0147)
$Growth_{t-1}$	0.000648	0.000138	-0.000458	0.000131
	(0.000498)	(0.000465)	(0.000485)	(0.000506)
W_{t-1} *$Growth_{t-1}$	-0.000549	-0.000174	0.00116	0.000443
	(0.000721)	(0.000564)	(0.000870)	(0.000788)
Resource $Rents_{t-1}$	0.00148*	0.000409	0.00146*	0.00205***
	(0.000674)	(0.000583)	(0.000583)	(0.000595)
W_{t-1} *Res. $Rents_{t-1}$	-0.00352**	0.000437	-0.00369**	-0.00363**
	(0.00121)	(0.000790)	(0.00125)	(0.00114)
Cons	-0.216	0.168	0.867*	-0.111
	(0.418)	(0.196)	(0.390)	(0.300)
lnsigma2				
W_{t-1}	5.698	5.350*	9.180***	6.111+
	(3.518)	(2.472)	(2.198)	(3.173)
W^2_{t-1}	-7.243*	-9.474***	-8.928***	-7.168**
	(2.981)	(2.037)	(1.816)	(2.587)
Cons	-6.324***	-5.576***	-6.966***	-6.374***
	(0.843)	(0.665)	(0.607)	(0.798)
Observations	7142	7152	7150	7136
Years	1971-2022	1971-2022	1971-2022	1971-2022
Nation FE	Y	Y	Y	Y
Time Trend	Y	Y	Y	Y
AIC	-23063.8	-26920.9	-17352.7	-21254.4

Standard errors in parentheses
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A5.1.1 Predicting Instability

A5.1.2 Instability

In the main text, Table 5.3 compares the occurrence of instability and irregular leader change as a function of productivity and coalition size. Table A5.4 disaggregates the instability events into the occurrence of coup and revolutions as a function of productivity and coalition size.

Table A5.4: Coalition Size, Productivity and the Occurrence of a Revolution or Coup in Year t or t+1

	Revolution		Coup	
Coalition Size	Low Productivity	High Productivity	Low Productivity	High Productivity
Small W	30.31% (328/ 1082)	9.51% (45 / 473)	14.66% (167 / 1139)	5.09% (25 / 491)
Medium W	28.50% (653 / 2291)	15.98% (128 / 801)	11.23% (267 / 2377)	5.05% (42 / 831)
Large W	18.47% (145 / 785)	4.78% (124 / 2592)	2.75% (22 / 801)	0.49% (13 / 2634)

A5.1.3 Impact of Policy Provisions Relative to Expectations

To supplement the main analyses, we start this section with a series of simple tables to show the relationship between under-, over- or expected policy provisions and the occurrence of instability.

Table A5.5 assesses the likelihood that revolution, coup or irregular leader change occurred in either years t or $t+1$ as a function of whether policy provisions were under-, over- or around expectations in year t. Policy provisions are coded as below expectations if they were more that a standard deviation below expected value and policy provisions is considered an over-provision if they are more than a standard deviation above expectations. With the exception of the relationship between private goods and irregular leader change, the table shows that revolution, coup and irregular leader change are more likely when a leader under- or over- provides policy than when she provides the expected level of policy. The assessment in Table A5.5 shows the likelihood of instability in years t or $t+1$ based on policy provision is year t. As an even more demanding test, Table A5.6 examine the under, over or expected provision of policy in year $t-1$ and, as in Table A5.5, shows that leaders who provide the expected level of policy generally experience less instability and irregular leader change in years t and $t+1$ (again with exception of the relationship between private goods provision and irregular leader change, where the differences are small).

In the main text, Table 5.7 shows logit models of the impact of residual policy provision on the occurrence of revolution, coup and irregular leader change (in year t or $t+1$). Table A5.7 replicates these analyses using a linear probability model with nation and year fixed effects. Table A5.7

Table A5.5: How Under, Over or Expected Provisions of Policy Affect the Occurrence of Revolutions, Coups, and Leader Change by Irregular Means in Year t or t+1

Policy Provision		Revolution	Coup	Irregular LC	Observations
CW	Under Provision	28.4%	7.5%	6.4%	890
	Expected Provision	14.7%	4.6%	4.0%	5,234
	Over Provision	20.6%	8.5%	6.1%	953
Private Goods	Under Provision	26.8%	6.7%	4.3%	771
	Expected Provision	15.8%	5.2%	4.6%	5,479
	Over Provision	17.3%	6.6%	4.3%	833
Public Goods	Under Provision	25.5%	8.5%	6.0%	781
	Expected Provision	14.6%	4.0%	3.5%	5,573
	Over Provision	27.7%	13.8%	11.0%	739
Assembly	Under Provision	27.0%	8.7%	7.7%	946
	Expected Provision	14.5%	4.4%	3.8%	5,271
	Over Provision	22.8%	8.5%	5.8%	874

The table reports the proportion of nation-year observations that experience the event in year t or year t+1.
Under-provision indicates the policy is at least one standard deviation less than the expected level of policy provision. Over-provision indicates policy more than a standard deviation larger than the expected level of policy provision. The number of observations reported is based on coup data; the number of observations for revolution and leader change data are similar but not identical.

Table A5.6: How Under, Over or Expected Provisions of Policy in Year t-1 Affect the Occurrence of Revolutions, Coups, and Leader Change by Irregular Means in Year t or t+1

Policy Provision		Revolution	Coup	Irregular LC
CW_{t-1}	Under Provision	26.9% (828)	5.3% (890)	4.4% (893)
	Expected Provision	14.9% (5052)	4.8% (5233)	4.1% (5289)
	Over Provision	20.9% (898)	8.5% (953)	6.1% (953)
$\text{Private Goods}_{t-1}$	Under Provision	26.3% (738)	7.8% (781)	5.2% (782)
	Expected Provision	14.8% (5364)	4.3% (5572)	3.8% (5630)
	Over Provision	25.8% (686)	10.6% (739)	8.1% (739)
$\text{Public Goods}_{t-1}$	Under Provision	27.2% (718)	6.6% (771)	3.9% (775)
	Expected Provision	15.8% (5281)	5.0% (5478)	4.5% (5533)
	Over Provision	17.6% (780)	6.4% (833)	4.3% (833)
Assembly_{t-1}	Under Provision	25.5% (864)	6.8% (946)	5.6% (951)
	Expected Provision	14.7% (5104)	4.5% (5270)	4.0% (5324)
	Over Provision	23.9% (820)	8.7% (874)	5.4% (874)

The table reports the proportion of nation-year observations that experience the event in with year t or year t+1.
Under-provision indicates the policy is at least one standard deviation less than the expected level of policy provision. Over-provision indicates policy more than a standard deviation larger than the expected level of policy provision.

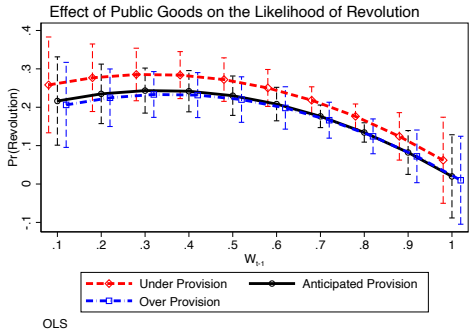
presents analogous results using logit analyses with fixed effects and a cubic time trend.

The analyses in Table 5.7 include interactions between the level of private goods residuals and changes in these residuals. Those models did not include analogous interactions for the public goods and assembly residuals. Table A5.9 presents logit and fixed effects regression models including analogous interactions for the public goods and assembly residuals.

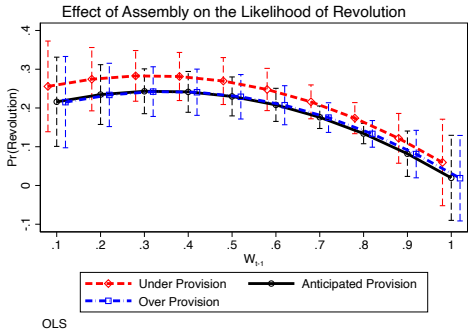
In the main text, Figures 5.7, 5.8, and 5.9 show margin plots of the impact of policy provisions on the occurrence of revolution, coup, and irregular leader change (in year t or t+1) based on the logit analyses in Table 5.7. Figures A5.2, A5.2, and A5.2 show analogous plots based on the linear probability models with nation and year fixed effects shown in Table A5.7.

Figure A5.2: Policy Provisions and the Likelihood of Revolution (based on Model 1 fixed effects regression analyses in Table A5.7)

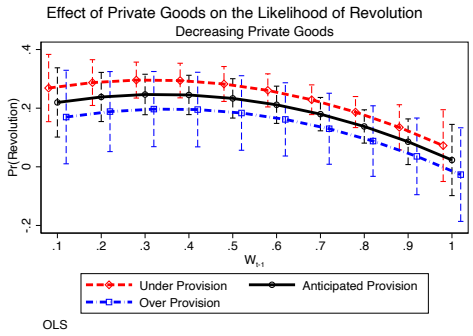
(a) Impact of Public Goods on Revolution



(b) Impact of Assembly on Revolution



(c) Impact of Private Goods Provision When Private Goods are Declining



(d) Impact of Private Goods Provision When Private Goods are Increasing

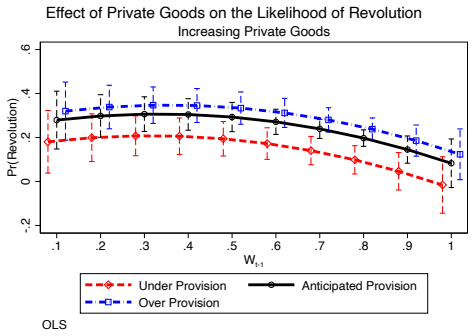


Table A5.7: Policy Provision on the Occurrence of Revolutions, Coups and Irregular Leader Change (OLS with country and year fixed effects)

	(1) Revolution	(2) Coup	(3) Irregular LC	(4) Revolution	(5) Coup	(6) Irregular LC
W_{t-1}	0.372	0.433^{+}	0.233	0.335	0.396^{+}	0.185
	(0.356)	(0.232)	(0.175)	(0.356)	(0.230)	(0.172)
W^2_{t-1}	-0.547^{+}	-0.455*	-0.269^{+}	-0.508	-0.422*	-0.230
	(0.324)	(0.195)	(0.153)	(0.324)	(0.193)	(0.151)
Res(Public)	-0.337^{+}	0.0514	-0.0142	-0.331^{+}	0.0575	-0.00599
	(0.184)	(0.0698)	(0.0728)	(0.184)	(0.0695)	(0.0720)
Res(Public)^2	2.315^{+}	0.692	-0.115	2.346^{+}	0.802	0.0518
	(1.333)	(0.953)	(0.829)	(1.261)	(0.893)	(0.743)
Res(Assembly)	-0.150	-0.0148	-0.0431	-0.153	-0.0164	-0.0453
	(0.101)	(0.0737)	(0.0585)	(0.102)	(0.0740)	(0.0588)
Res(Assembly)^2	1.110	0.935^{+}	0.588	1.169	0.927*	0.540
	(0.743)	(0.481)	(0.426)	(0.763)	(0.466)	(0.431)
Res(Private)	0.00836	0.193^{+}	0.143	0.0365	0.208*	0.151
	(0.176)	(0.108)	(0.0917)	(0.181)	(0.104)	(0.0930)
Res(Private)^2	-0.640	0.620	0.265	-0.774	0.308	-0.426
	(1.665)	(0.916)	(0.975)	(1.712)	(1.038)	(0.940)
ΔRes(Private)	0.285	0.363**	0.382*	0.362	0.361*	0.346^{+}
	(0.197)	(0.129)	(0.159)	(0.233)	(0.173)	(0.185)
Δ Res(Private)^2	3.479*	2.661*	4.774**	4.500*	2.851^{+}	4.169*
	(1.728)	(1.168)	(1.489)	(2.091)	(1.630)	(1.878)
Log(Tenure)	-0.0402***	-0.00836	-0.000978	-0.0395***	-0.00819	-0.00130
	(0.0103)	(0.00564)	(0.00557)	(0.0104)	(0.00557)	(0.00567)
Old or Sick	-0.0151	0.0109	0.0355**	-0.0148	0.0112	0.0360**
	(0.0229)	(0.0124)	(0.0135)	(0.0231)	(0.0124)	(0.0135)
Log($GDPpc_{t-1}$)	-0.0414	0.0153	0.0227^{+}	-0.0418	0.0151	0.0227^{+}
	(0.0462)	(0.0152)	(0.0130)	(0.0464)	(0.0150)	(0.0127)
$Growth_{t-1}$	-0.00257**	-0.000667	-0.000290	-0.00258**	-0.000664	-0.000308
	(0.000960)	(0.000557)	(0.000419)	(0.000945)	(0.000545)	(0.000407)
Log($Population_{t-1}$)	-0.0391	-0.0445^{+}	-0.0342	-0.0359	-0.0412^{+}	-0.0292
	(0.0634)	(0.0228)	(0.0239)	(0.0633)	(0.0224)	(0.0228)
Resource $Rents_{t-1}$	0.000680	-0.00127^{+}	-0.000837	0.000647	-0.00129^{+}	-0.000863
	(0.00121)	(0.000681)	(0.000576)	(0.00122)	(0.000676)	(0.000565)
Δ Res(Private)*Res(Private)				9.439*	8.131*	10.52***
				(3.726)	(3.262)	(2.361)
Δ Res(Private)*Res(Private)^2				-27.93^{+}	-1.562	1.414
				(16.00)	(13.54)	(15.51)
ΔRes(Private)^2*Res(Private)				12.61	-3.013	-1.454
				(17.51)	(17.36)	(17.97)
Δ Res(Private)^2*Res(Private)^2				-217.2**	-163.5*	-169.4**
				(78.08)	(70.33)	(59.69)
Method	OLS	OLS	OLS	OLS	OLS	OLS
Observations	6770	6914	6971	6770	6914	6971
Number Nations	164	162	164	164	162	164
Years	1972-2021	1972-2022	1972-2022	1972-2021	1972-2022	1972-2022
Nation FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
R2	0.304	0.170	0.116	0.307	0.176	0.127
Bootstrap N	6753	6900	6957	6753	6900	6957
Bootstrap Fit	0.159	0.073	0.032	0.161	0.075	0.037

Standard errors in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A5.8: Policy Provision on the Occurrence of Revolutions, Coups and Irregular Leader Change (Logit with country fixed effects and a cubic time trend)

	(1) Revolution	(2) Coup	(3) Irregular LC	(4) Revolution	(5) Coup	(6) Irregular LC
main						
W_{t-1}	3.948**	9.676***	8.252***	3.892**	9.587***	7.775**
	(1.484)	(2.064)	(2.458)	(1.493)	(2.089)	(2.493)
W^2_{t-1}	-5.305***	-9.504***	-8.877***	-5.184***	-9.330***	-8.381***
	(1.386)	(1.968)	(2.247)	(1.392)	(1.988)	(2.276)
Res(Public)	-2.227**	-2.192+	-2.623+	-2.104**	-2.262+	-2.465+
	(0.809)	(1.279)	(1.406)	(0.815)	(1.303)	(1.432)
Res(Public)^2	18.07*	15.87	-2.643	18.82*	11.27	-3.204
	(7.907)	(10.81)	(14.20)	(8.064)	(11.00)	(14.33)
Res(Assembly)	-1.736**	-0.258	-1.069	-1.709**	-0.248	-0.945
	(0.530)	(0.747)	(0.815)	(0.531)	(0.748)	(0.816)
Res(Assembly)^2	9.167*	11.66**	9.789*	9.323**	14.24**	10.84*
	(3.702)	(4.467)	(4.941)	(3.616)	(4.502)	(4.874)
Res(Private)	-0.382	2.364*	2.605*	-0.196	2.527*	3.151*
	(0.810)	(1.111)	(1.279)	(0.842)	(1.186)	(1.383)
Res(Private)^2	2.297	-3.613	-7.439	4.617	1.926	-17.00
	(7.384)	(8.793)	(9.776)	(8.475)	(10.66)	(13.10)
ΔRes(Private)	2.602*	1.923	2.513+	3.408*	1.745	3.048
	(1.160)	(1.434)	(1.509)	(1.440)	(1.850)	(2.024)
Δ Res(Private)^2	14.56*	20.78*	37.79***	24.34*	30.36+	24.26
	(6.914)	(9.307)	(8.222)	(12.34)	(15.84)	(16.73)
Log(Tenure)	-0.352***	-0.108	0.00369	-0.347***	-0.0937	0.00520
	(0.0634)	(0.0910)	(0.0975)	(0.0640)	(0.0917)	(0.0980)
Old or Sick	-0.119	0.190	0.836***	-0.129	0.169	0.863***
	(0.124)	(0.183)	(0.177)	(0.124)	(0.185)	(0.179)
Log(GDPpc$_{t-1}$)	-0.332+	-0.0985	0.459	-0.347*	-0.155	0.448
	(0.170)	(0.288)	(0.291)	(0.171)	(0.291)	(0.295)
Growth$_{t-1}$	-0.0155*	-0.0125	-0.00684	-0.0157*	-0.0124	-0.00688
	(0.00684)	(0.0111)	(0.0117)	(0.00687)	(0.0113)	(0.0117)
Log(Population$_{t-1}$)	1.021*	0.921	-1.509*	1.049*	0.962	-1.381*
	(0.415)	(0.659)	(0.592)	(0.416)	(0.663)	(0.591)
Resource Rents$_{t-1}$	0.00944	-0.0169	-0.0166	0.00976	-0.0165	-0.0191
	(0.00714)	(0.0121)	(0.0139)	(0.00715)	(0.0122)	(0.0141)
Δ Res(Private)*Res(Private)				67.02**	100.2***	143.7***
				(20.84)	(27.65)	(33.19)
Δ Res(Private)*Res(Private)^2				-333.8*	-120.1	-69.82
				(138.9)	(157.5)	(166.2)
ΔRes(Private)^2*Res(Private)				213.1+	98.47	-60.98
				(125.7)	(138.2)	(145.0)
Δ Res(Private)^2*Res(Private)^2				-1968.6***	-3539.7***	-2926.2***
				(588.6)	(878.6)	(759.2)
Method	OLS	OLS	OLS	OLS	OLS	OLS
Observations	4755	3144	3425	4755	3144	3425
Number Nations	111	65	75	111	65	75
Years	1972-2021	1972-2022	1972-2022	1972-2021	1972-2022	1972-2022
Nation FE	Y	Y	Y	Y	Y	Y
Time Trend	Y	Y	Y	Y	Y	Y
ROC	0.760	0.674	0.546	0.761	0.684	0.560
Bootstrap N	4522	2948	3080	4522	2948	3080
Bootstrap Fit	0.764	0.686	0.622	0.765	0.689	0.622

Standard errors in parentheses
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

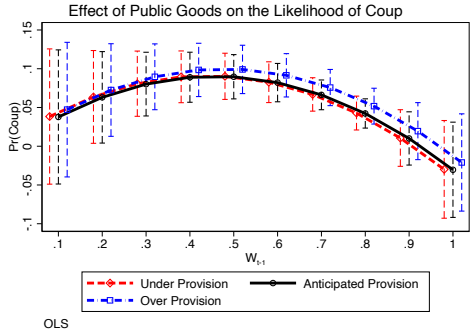
Table A5.9: Policy Provision on the Occurrence of Revolutions, Coups and Irregular Leader Change (Logit and OLS with year and country fixed effects)

	(1) Revolution	(2) Coup	(3) Irregular LC	(4) Revolution	(5) Coup	(6) Irregular LC
main						
W_{t-1}	6.806***	10.39***	9.263***	0.312	0.385+	0.185
	(1.936)	(2.248)	(2.366)	(0.359)	(0.229)	(0.170)
W^2_{t-1}	-6.780***	-11.30***	-9.654***	-0.490	-0.427*	-0.240
	(1.782)	(2.242)	(2.118)	(0.327)	(0.190)	(0.149)
Res(Public)	-2.508+	-0.876	-1.113	-0.325	0.0126	-0.00122
	(1.471)	(1.454)	(1.906)	(0.197)	(0.0745)	(0.0734)
Res(Public)^2	-0.712	-18.12	-24.42	2.196	0.230	0.161
	(13.01)	(20.38)	(24.51)	(1.572)	(1.011)	(0.922)
ΔRes(Public)	2.015	6.137+	3.299	0.450+	0.545**	0.277
	(1.900)	(3.229)	(3.740)	(0.257)	(0.205)	(0.219)
ΔRes(Public)^2	7.363	-39.82	-16.52	2.008	-2.311	0.330
	(17.22)	(29.34)	(25.89)	(2.487)	(1.731)	(1.753)
Res(Public)ΔRes(Public)	16.79	94.80*	41.95	0.958	4.993*	-0.768
	(28.94)	(39.25)	(40.18)	(3.794)	(2.515)	(2.876)
Res(Public)^{2}ΔRes(Public)	-168.1	174.6	492.0*	-13.05	4.536	27.37
	(173.4)	(241.5)	(224.6)	(25.70)	(19.96)	(18.89)
Res(Public)ΔRes(Public)^2	-37.41	-399.2	-735.3**	-24.15	-24.58	-47.01+
	(188.9)	(285.1)	(280.6)	(27.40)	(20.90)	(25.49)
Res(Public)^{2}ΔRes(Public)^2	-13.68	-86.83	-423.3	-49.03	14.43	41.04
	(959.3)	(1116.5)	(2212.1)	(145.3)	(101.9)	(100.3)
Res(Assembly)	-1.002	1.276	0.0137	-0.125	0.0630	-0.00814
	(0.730)	(1.370)	(1.406)	(0.112)	(0.0850)	(0.0645)
Res(Assembly)^2	7.753	5.576	-7.709	1.088	0.459	-0.103
	(7.756)	(6.604)	(7.023)	(0.884)	(0.493)	(0.384)
ΔRes(Assembly)	-1.454	-2.994+	-2.556	-0.225	-0.300*	-0.242*
	(1.118)	(1.568)	(1.708)	(0.156)	(0.117)	(0.119)
ΔRes(Assembly)^2	8.839	14.52*	3.259	1.375	1.597*	1.096
	(6.287)	(6.623)	(8.684)	(0.983)	(0.673)	(0.688)
Res(Assembly)ΔRes(Assembly)	19.24+	24.39*	46.99**	2.314	1.513+	2.294**
	(10.06)	(11.51)	(16.49)	(1.420)	(0.820)	(0.825)
Res(Assembly)^{2}ΔRes(Assembly)	49.62+	-62.73+	5.267	8.148	-2.782	3.933
	(25.37)	(34.32)	(55.61)	(5.094)	(3.343)	(3.859)
Res(Assembly)ΔRes(Assembly)^2	-36.00	-15.69	-12.16	-5.074	0.0291	-3.298
	(25.69)	(38.06)	(46.67)	(4.146)	(2.855)	(3.145)
Res(Assembly)^{2}ΔRes(Assembly)^2	-174.8**	-345.2**	-266.4*	-22.30***	-16.82**	-14.12***
	(54.20)	(116.0)	(103.8)	(4.172)	(5.483)	(3.507)
Res(Private)	-0.163	2.209	2.312	0.0435	0.213*	0.157+
	(1.074)	(1.513)	(1.746)	(0.181)	(0.103)	(0.0925)
Res(Private)^2	13.67	6.618	-9.448	-0.857	0.367	-0.465
	(11.80)	(10.32)	(14.72)	(1.740)	(1.049)	(0.961)
ΔRes(Private)	-0.549	-0.181	1.117	0.263	0.223	0.204
	(1.629)	(2.149)	(2.740)	(0.264)	(0.191)	(0.205)
Δ Res(Private)^2	15.38	29.27+	21.77	2.523	2.132	3.053
	(13.76)	(15.87)	(21.49)	(2.236)	(1.721)	(1.985)
Δ Res(Private)*Res(Private)	45.58*	101.6**	144.2**	9.801*	7.608*	10.30***
	(22.85)	(35.98)	(48.07)	(3.805)	(3.284)	(2.500)
Δ Res(Private)*Res(Private)^2	-259.7*	-131.7	-63.54	-28.87+	-1.612	3.434
	(121.2)	(143.6)	(191.1)	(15.14)	(14.77)	(16.85)
ΔRes(Private)^2*Res(Private)	254.3+	160.7	5.438	19.34	0.0452	1.508
	(131.4)	(163.9)	(213.6)	(18.19)	(17.77)	(18.44)
Δ Res(Private)^2*Res(Private)^2	-1121.4*	-3369.4***	-2752.6**	-174.1*	-144.9*	-138.4*
	(528.0)	(921.1)	(1027.2)	(76.94)	(71.62)	(58.55)
Log(Tenure)	-0.297***	-0.350***	-0.366***	-0.0388***	-0.00773	-0.000828
	(0.0818)	(0.0994)	(0.109)	(0.0104)	(0.00563)	(0.00561)
Old or Sick	-0.455*	-0.0453	0.500*	-0.0176	0.00877	0.0342*
	(0.194)	(0.256)	(0.251)	(0.0231)	(0.0122)	(0.0134)
Log(GDPpc$_{t-1}$)	-0.396***	-0.502***	-0.235**	-0.0424	0.0147	0.0241+
	(0.0799)	(0.100)	(0.0845)	(0.0470)	(0.0148)	(0.0125)
Growth$_{t-1}$	-0.0200*	-0.00940	-0.00887	-0.00236*	-0.000379	-0.000131
	(0.00787)	(0.00946)	(0.00875)	(0.000946)	(0.000530)	(0.000391)
Log(Population$_{t-1}$)	0.256***	-0.0964	-0.0904	-0.0356	-0.0388+	-0.0276
	(0.0622)	(0.0749)	(0.0584)	(0.0635)	(0.0220)	(0.0225)
Resource Rents$_{t-1}$	0.0180*	-0.00820	-0.0259**	0.000623	-0.00133+	-0.000897
	(0.00814)	(0.00918)	(0.00926)	(0.00123)	(0.000681)	(0.000562)
Method	Logit	Logit	Logit	OLS	OLS	OLS
Observations	6769	6913	6970	6769	6913	6970
Number Nations	164	162	164	164	162	164
Years	1972-2021	1972-2022	1972-2022	1972-2021	1972-2022	1972-2022
Nation FE	N	N	N	Y	Y	Y
Time Trend	Y	Y	Y	Y	Y	Y
Fit	0.806	0.841	0.783	0.311	0.187	0.137
Bootstrap N	9090	9454	8855	9085	9436	8823
Bootstrap Fit	0.371	0.329	0.417	0.158	0.056	0.016

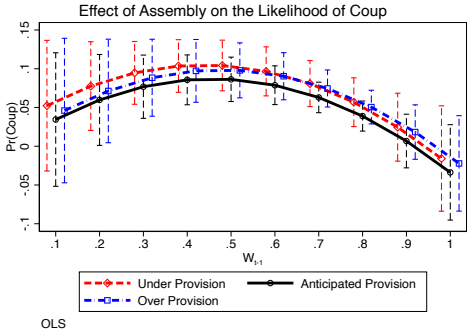
Standard errors in parentheses
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure A5.3: Policy Provisions and the Likelihood of Coup (based on Model 2 fixed effects regression analyses in Table A5.7)

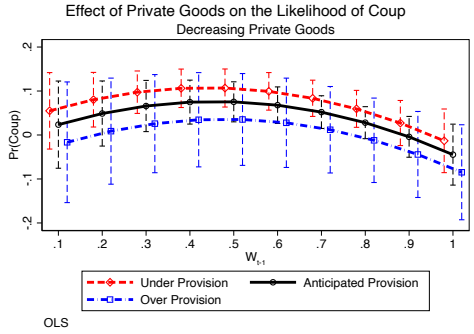
(a) Impact of Public Goods on Coup



(b) Impact of Assembly on Coup



(c) Impact of Private Goods Provision When Private Goods are Declining



(d) Impact of Private Goods Provision When Private Goods are Increasing

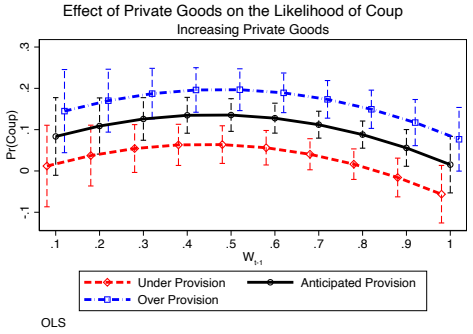
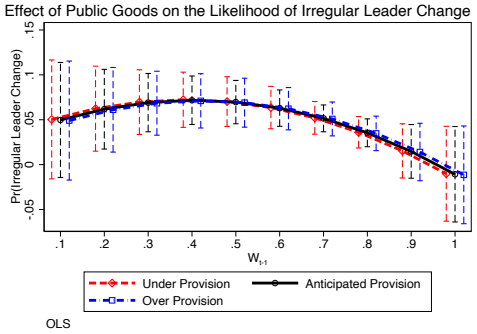
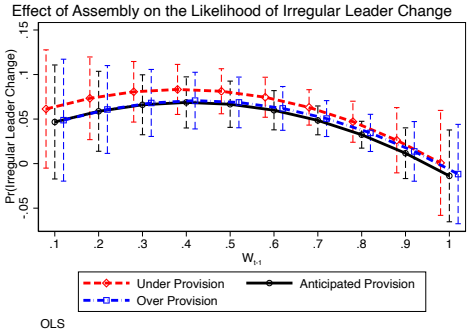


Figure A5.4: Policy Provisions and the Likelihood of Irregular Leader Removal (based on Model 3 fixed effects regression analyses in Table A5.7)

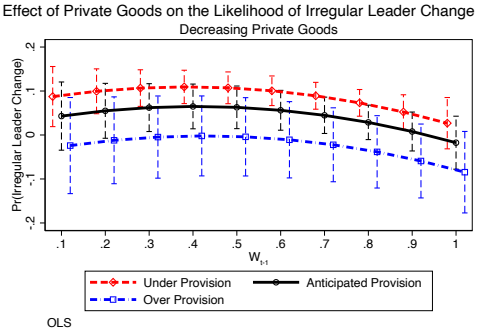
(a) Impact of Public Goods on Irregular LC



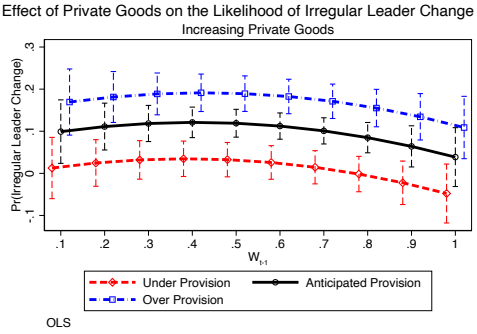
(b) Impact of Assembly on Irregular LC



(c) Impact of Private Goods Provision When Private Goods are Declining



(d) Impact of Private Goods Provision When Private Goods are Increasing



Appendix A6

Leader Response to Threats

A6.1 Suppression and Additional Payment to the Winning Coalition

In order to incentivize coalition members to undertake the unpleasant work of suppressing the masses, the leader increases private goods rewards as the level of suppression increases. Table A6.1 examines changes in the provision of private goods in relation to changes in the level of suppression, measured in terms of torture. Each model in the table examines the change in private goods between years $t+2$ and $t-1$ as a function of changes in the level of torture (ΔTorture=Torture$_{t+2}$-Torture$_{t-1}$) and the interaction of this suppression variable with lagged coalition size (W_{t-1}). Model 1 contains our standard set of control variables. Model 2 includes residual policy provisions and Model 3 includes additional variables to reflect the risk of revolution and coup ($\widehat{Rev}$ and $\widehat{Coup}$) and leader change. Model 4 excludes observations if leader change occurs in either year t or $t+1$. In each model, leaders increase private goods compensation as the level of repression increases, with the impact of increased torture being strongest in small coalition systems and weakest in large coalition systems.

Table A6.1: Change in Private Goods (Δ Private=Private$_{t+2}$ -Private$_{t-1}$) and Changes in the Level of Torture (Δ Torture=Torture$_{t+2}$ -Torture$_{t-1}$) (OLS with nation and year fixed effects: Model 4 excludes observations with leader change in year t or t+1.)

	(1)	(2)	(3)	(4)
	Δ Private	Δ Private	Δ Private	Δ Private
Δ Torture	0.0740***	0.0721***	0.0646***	0.0481***
	(0.0122)	(0.0116)	(0.0114)	(0.0113)
W$_{t-1}$ *Δ Torture	-0.0598***	-0.0621***	-0.0534***	-0.0445**
	(0.0166)	(0.0158)	(0.0152)	(0.0155)
W$_{t-1}$	0.207***	0.156**	0.0337	0.000274
	(0.0507)	(0.0502)	(0.0671)	(0.0775)
W$^2_{t-1}$	-0.0862*	-0.0265	0.106$^+$	0.113
	(0.0400)	(0.0404)	(0.0594)	(0.0767)
Log(Tenure)	-0.00104	0.000372	0.00392$^+$	0.00641*
	(0.00126)	(0.00131)	(0.00209)	(0.00281)
Old or Sick	0.00360	0.00348	-0.0000482	-0.000462
	(0.00272)	(0.00275)	(0.00477)	(0.00366)
Log(GDPpc$_{t-1}$)	0.00287	0.00216	0.00526	0.00832$^+$
	(0.00350)	(0.00389)	(0.00465)	(0.00438)
Growth$_{t-1}$	-0.0000945	-0.0000610	0.0000469	0.0000621
	(0.000139)	(0.000118)	(0.000168)	(0.000156)
Log(Population$_{t-1}$)	-0.0198**	-0.0192*	-0.0155*	-0.00330
	(0.00688)	(0.00738)	(0.00764)	(0.00599)
Res(Public)		-0.00514	-0.0188	-0.0125
		(0.0212)	(0.0281)	(0.0231)
Res(Private)		-0.0140	-0.0537$^+$	-0.0452
		(0.0236)	(0.0275)	(0.0304)
Res(Assembly)		-0.0672***	-0.0641***	-0.0444**
		(0.0132)	(0.0147)	(0.0148)
$\widehat{Rev}$			-0.00765	-0.00344
			(0.00809)	(0.00747)
$\widehat{Coup}$			0.0154**	0.0160*
			(0.00478)	(0.00713)
Leader Change			-0.0110	
			(0.00909)	
W$_{t-1}$ *Leader Change			0.0119	
			(0.0114)	
Observations	7769	6985	6816	4793
Number Nations	164	164	164	162
Years	1962-2021	1971-2021	1972-2021	1972-2021
Nation FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Fit: R2	0.270	0.287	0.298	0.214
Fit: R2 within	0.219	0.238	0.249	0.133
Bootstrap N	7022	6971	6804	4784
Bootstrap Fit	0.157	0.170	0.176	0.067

Standard errors in parentheses
$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A6.2 Policy Change in Response to Threats

Table 6.4 in the main text examines changes between years $t-1$ and $t+2$ (i.e. $\Delta Private = Private_{t+2} - Private_{t-1}$). For brevity, that table excludes our standard control variables, although the results are similar if these controls are included. Table A6.2 shows similar analyses looking at policy changes between years $t-1$ and $t+1$ with the inclusion of our standard set of control variables.

Table A6.2: Change in Policy as a Response to Revolution and Coup Threats: Δ Private=Private$_{t+1}$ - Private$_{t-1}$

	(1) Δ Private	(2) Δ Public	(3) Δ Assembly	(4) Δ Private	(5) Δ Public	(6) Δ Assembly
$\widehat{Rev}$	-0.0134**	-0.0120***	-0.0206**	-0.0145***	-0.0120**	-0.0201*
	(0.00417)	(0.00356)	(0.00783)	(0.00433)	(0.00365)	(0.00793)
Revolution				-0.00180	-0.000736	-0.00216
				(0.00273)	(0.00188)	(0.00403)
$\widehat{Coup}$	0.0295***	-0.00358	-0.0120*	0.0285***	-0.00392	-0.00995*
	(0.00449)	(0.00248)	(0.00469)	(0.00420)	(0.00242)	(0.00435)
Coup				0.0247***	0.000451	-0.0359**
				(0.00655)	(0.00428)	(0.0115)
res(Private)$_{t-1}$	-0.164***	-0.0230^{+}	-0.106***	-0.166***	-0.0259^{+}	-0.105***
	(0.0196)	(0.0134)	(0.0279)	(0.0198)	(0.0136)	(0.0281)
res(Public)$_{t-1}$	-0.0360*	-0.159***	0.0671^{+}	-0.0425**	-0.159***	0.0680^{+}
	(0.0161)	(0.0172)	(0.0356)	(0.0160)	(0.0175)	(0.0366)
res(Assembly)$_{t-1}$	-0.0485***	0.00818	-0.264***	-0.0470***	0.00555	-0.263***
	(0.0112)	(0.0103)	(0.0269)	(0.0110)	(0.0107)	(0.0263)
W$_{t-1}$	-0.159**	0.194***	0.406***	-0.151**	0.194***	0.393***
	(0.0560)	(0.0345)	(0.0706)	(0.0544)	(0.0342)	(0.0708)
W$^2_{t-1}$	0.270***	-0.221***	-0.498***	0.261***	-0.222***	-0.484***
	(0.0554)	(0.0347)	(0.0713)	(0.0536)	(0.0346)	(0.0716)
Log(Tenure)	0.00813***	-0.00795***	-0.0136***	0.00756***	-0.00799***	-0.0138***
	(0.00198)	(0.00134)	(0.00304)	(0.00195)	(0.00136)	(0.00301)
Leader Change	-0.0338***	0.0345***	0.0756***	-0.0426***	0.0345***	0.0925***
	(0.00913)	(0.00689)	(0.0142)	(0.0107)	(0.00724)	(0.0166)
W$_{t-1}$ *Leader Change	0.0365**	-0.0372***	-0.0859***	0.0456***	-0.0363***	-0.104***
	(0.0114)	(0.00818)	(0.0174)	(0.0134)	(0.00855)	(0.0203)
Growth$_{t-1}$	0.000242^{+}	-0.000278**	-0.000733***	0.000252^{+}	-0.000298**	-0.000791***
	(0.000143)	(0.0000894)	(0.000189)	(0.000151)	(0.0000895)	(0.000194)
Log(GDPpc$_{t-1}$)	0.00959**	-0.00927***	-0.0147*	0.00767*	-0.00955***	-0.0125*
	(0.00329)	(0.00243)	(0.00583)	(0.00341)	(0.00258)	(0.00586)
Log(Population$_{t-1}$)	-0.00707	0.00921*	0.0161^{+}	-0.00675	0.0102*	0.0142
	(0.00467)	(0.00427)	(0.00920)	(0.00456)	(0.00408)	(0.00900)
Observations	6970	6969	6968	6707	6706	6706
Number Nations	164	164	164	162	162	162
Years	1972-2022	1972-2022	1972-2022	1972-2021	1972-2021	1972-2021
Nation FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Fit: R2	0.226	0.186	0.205	0.237	0.198	0.218
Fit: R2 within	0.185	0.108	0.138	0.196	0.115	0.148
Bootstrap N	6956	6955	6954	6690	6689	6689
Bootstrap Fit	0.108	0.072	0.072	0.112	0.077	0.078

Standard errors in parentheses

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A6.3 Difference-in-Difference Approach

In the main text Table 6.5 examines $\Delta y = y_{t+1} - y_{t-1}$, where y is economic growth, public goods, private goods, assembly, and coalition welfare. The table contrasts the cases where the leader changes in year t with cases in which no leader change occurs in year t. Table 6.5 excludes cases of irregular leader change. Table A6.3 replicates the analyses comparing all possible form of leader change in year t with cases where no leader change occurred. The pattern is largely similar to that observed earlier; leader change results in increased growth, public goods, assembly, and coalition welfare and a reduction in private goods. However, the impact of leader change on economic growth is only marginally statistically significant when irregular leader change events are considered. Table A6.4 examines policy changes between the years $t-2$ and $t+2$ and, over this extended time frame, finds similar patterns to those in Table 6.5.

Table A6.3: Change in Growth Rate and Policy Provision When Leader Change Occurs: $\Delta y = y_{t+1} - y_{t-1}$

Variable	No Leader Change	Leader Change	Difference	t-statistic
Δ Growth	-0.178	0.252	0.430	1.618
	(5,700)	(1,021)		p=0.1056
Δ Public Goods	0.002	0.008	0.006	6.664
	(6,724)	(1,145)		p=0.0000
Δ Private Goods	-0.000	0.000	0.001	0.417
	(6,781)	(1,155)		p=0.6766
Δ Assembly	0.001	0.011	0.009	4.628
	(6,726)	(1,139)		p=0.0000
Δ CW	0.003	0.010	0.007	5.304
	(5,548)	(1,000)		p=0.0000

This table is constructed looking at all forms of leader change, regular and irregular. It excludes observations with leader change in previous year.

Table A6.4: Change in Growth Rate and Policy Provision When Leader Change Occurs: $\Delta y = y_{t+2} - y_{t-2}$

Variable	No Leader Change	Leader Change	Difference	t-statistic
Δ Growth	-0.431	0.066	0.496	2.038
	(4,631)	(702)		p=0.0416
Δ Public Goods	0.003	0.013	0.010	8.031
	(5,604)	(798)		p=0.0000
Δ Private Goods	-0.001	-0.008	-0.007	4.444
	(5,652)	(803)		p=0.0000
Δ Assembly	0.003	0.020	0.017	6.680
	(5,614)	(791)		p=0.0000
Δ Growth	0.003	0.013	0.010	6.217
	(4,680)	(709)		p=0.0000

This table is constructed looking at only regular leader change with cases of irregular leader change and cases of leader change in the previous two years eliminated from the analysis.

A6.3.1 Institution Change

Table A6.5 is analogous to Table 6.9 in the main text. It shows the percentage of observations that experience a change in winning coalition size ($|\Delta W| = |W_{t+2} - W_{t-1}|$) greater that 0.01, 0.05 and 0.10 given policy provisions in year $t-1$. The rows of the table consider whether the provision of Coalition Welfare (CW), Private Goods, Public Goods, and Assembly in year $t-1$ were below, above, or close to expectations. Over and under provision refers to the policy residual being more than a standard deviation away from expectations. For each magnitude of institution change and for each of the policies, the probability of institution change occurring is significantly lower when policies are close to expectations than when policies are either under- or over-provided.

Table A6.6 uses similar specifications as those in Table 6.8, but instead looks at the occurrence of large institution changes, namely, $|\Delta W| = |W_{t+2} - W_{t-1}| > 0.05$ (Models 1 and 2) and $|\Delta W| = |W_{t+2} - W_{t-1}| > 0.10$ (Models 3 and 4).

Table A6.7 replicates the logit analyses in Table 6.8 using linear probability models with country and year fixed effects and logit models with country and year fixed effects.

Figure 6.10 examines the predictive ability of Model 1 in Table 6.8. The table is constructed by coding a predicted change in W if the estimated probability of change is greater than 50%. Table A6.8 looks at the predictive power of an analogous logit model examining the occurrence of large institution change (Model 1 of Table A6.6), $|W_{t+2} - W_{t-1}| > 0.05$. Table A6.9 shows the predictive power if country and year fixed effects are added to the basic specification shown in Model 1 of Table 6.8 (Model 3 of Table A6.7).

Table A6.10 replicates the Model 1 and 2 analyses in Table 6.8 either excluding all observations that involve leader change in year t or $t+1$ (Models 1 and 2) or excluding all observations that involve

Table A6.5: How Under, Over or Expected Provisions of Policy in Year t-1 Affect the Likelihood Change in Winning Coalition Size

Policy Provision		$\lvert\Delta W\rvert > 0.01$	$\lvert\Delta W\rvert > 0.05$	$\lvert\Delta W\rvert > 0.10$	Observations
CW_{t-1}	Under Provision	50.9%	21.6%	14.3%	835
	Expected Provision	42.2%	13.8%	7.7%	5,092
	Over Provision	56.2%	23.6%	14.4%	898
Private $Goods_{t-1}$	Under Provision	55.3%	23.7%	16.5%	739
	Expected Provision	41.9%	13.4%	7.1%	5,398
	Over Provision	58.5%	28.7%	19.3%	698
Public $Goods_{t-1}$	Under Provision	52.7%	23.4%	15.3%	719
	Expected Provision	43.1%	14.1%	7.8%	5,325
	Over Provision	51.8%	22.9%	14.7%	782
$Assembly_{t-1}$	Under Provision	51.1%	23.3%	16.1%	890
	Expected Provision	41.9%	13.3%	7.4%	5,125
	Over Provision	58.0%	25.6%	14.5%	820

The table shows the percentage of nation-year observation that experience change in winning coalition size between year t-1 and t+2.
Under-provision indicates the policy is at least one standard deviation less than the expected level of policy provision. Over-provision indicates policy more than a standard deviation larger than the expected level of policy provision.

irregular leader change in year t or t+1 (Models 3 and 4). These robustness tests produce remarkably similar results. These similarities are most easily observed by comparing the margins plots shown in Figure A6.2 (which excludes events with leader change, based on Model 1 of Table A6.10) and Figure A6.3 (which excludes events with irregular leader change, based on Model 3 of Table A6.10) with Figure 6.1 in the main text. These models also have similar predictive power to that shown in Table 6.10 when attention is restricted to cases without leader change or irregular leader change.

Table A6.6: Political Threats and Institutional Change

	(1) $\|\Delta W\| > .05$	(2) $\|\Delta W\| > .05$	(3) $\|\Delta W\| > .10$	(4) $\|\Delta W\| > .10$
main				
Revolution		0.652***		0.648***
		(0.138)		(0.157)
Coup		0.939***		1.150***
		(0.177)		(0.186)
W_{t-1}	6.250***	5.296***	8.187***	6.966***
	(1.525)	(1.548)	(1.897)	(1.971)
W^2_{t-1}	-7.757***	-6.796***	-10.83***	-9.651***
	(1.377)	(1.391)	(1.840)	(1.898)
Res(Public)	0.632	0.952	1.941+	2.257+
	(1.092)	(1.098)	(1.167)	(1.189)
Res(Public)^2	6.774	7.780	9.102	9.843
	(10.87)	(10.03)	(9.713)	(8.689)
Res(Assembly)	1.366*	1.417*	1.459*	1.469*
	(0.663)	(0.673)	(0.737)	(0.710)
Res(Assembly)^2	23.28***	21.48***	25.95***	24.27***
	(4.706)	(4.404)	(4.200)	(4.097)
Res(Private)	0.246	0.0493	-1.217	-1.782
	(1.195)	(1.185)	(1.457)	(1.509)
Res(Private)^2	13.64*	12.79+	18.53**	17.57**
	(6.832)	(6.552)	(7.148)	(6.697)
ΔRes(Private)	-4.763**	-5.219**	-6.523***	-7.688***
	(1.594)	(1.688)	(1.963)	(2.106)
Δ Res(Private)^2	145.1***	135.4***	118.3***	112.1***
	(21.18)	(20.37)	(15.07)	(13.67)
Δ Res(Private)*Res(Private)	63.56**	49.08*	91.14***	73.59**
	(21.67)	(21.12)	(26.61)	(24.35)
Δ Res(Private)*Res(Private)^2	-78.51	-44.80	73.54	163.5
	(174.9)	(176.1)	(156.4)	(159.7)
ΔRes(Private)^2*Res(Private)	-576.3	-719.3+	-164.1	-267.2
	(416.9)	(391.7)	(319.1)	(334.0)
Δ Res(Private)^2*Res(Private)^2	-103.3	709.0	-2569.7*	-2084.4
	(2605.1)	(2518.1)	(1141.0)	(1721.4)
Log(Tenure)	-0.227***	-0.169**	-0.292***	-0.226**
	(0.0658)	(0.0657)	(0.0807)	(0.0822)
Old or Sick	0.0190	0.0516	-0.0262	0.00767
	(0.126)	(0.134)	(0.179)	(0.181)
Growth_{t-1}	-0.0143+	-0.0112	-0.0250**	-0.0233**
	(0.00797)	(0.00818)	(0.00772)	(0.00774)
$\text{Log(GDPpc}_{t-1})$	-0.196***	-0.140*	-0.227**	-0.155*
	(0.0577)	(0.0565)	(0.0706)	(0.0702)
$\text{Log(Population}_{t-1})$	-0.0164	-0.0270	0.00635	0.00382
	(0.0460)	(0.0484)	(0.0575)	(0.0595)
$\text{Resource Rents}_{t-1}$	-0.0116	-0.0127+	-0.0150+	-0.0159+
	(0.00709)	(0.00726)	(0.00836)	(0.00895)
Method	logit	logit	logit	logit
Observations	6816	6714	6816	6714
Number Nations	164	162	164	162
Years	1972-2021	1972-2021	1972-2021	1972-2021
Nation FE	N	N	N	N
Time Trend	Y	Y	Y	Y
ROC	0.800	0.812	0.860	0.878
Bootstrap N	6816	6702	6816	6702
Bootstrap Fit	0.690	0.698	0.783	0.794

Standard errors in parentheses
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A6.7: Political Threats and Institutional Change

	(1) $\|\Delta W\| > .01$	(2) $\|\Delta W\| > .01$	(3) $\|\Delta W\| > .01$	(4) $\|\Delta W\| > .01$
main				
Revolution		0.0584*		0.297*
		(0.0285)		(0.151)
Coup		0.115**		0.620**
		(0.0345)		(0.201)
W_{t-1}	2.057***	1.961***	10.91***	10.45***
	(0.372)	(0.367)	(2.194)	(2.168)
W^2_{t-1}	-2.174***	-2.071***	-11.56***	-11.08***
	(0.318)	(0.314)	(1.883)	(1.863)
Res(Public)	0.0857	0.0958	0.451	0.442
	(0.189)	(0.186)	(1.103)	(1.096)
Res(Public)^2	1.049	0.748	6.541	4.436
	(1.945)	(1.909)	(12.86)	(12.89)
Res(Assembly)	0.324**	0.317**	2.082**	2.025**
	(0.118)	(0.120)	(0.768)	(0.777)
Res(Assembly)^2	2.539**	2.310**	18.25**	16.37*
	(0.809)	(0.816)	(6.924)	(6.730)
Res(Private)	-0.153	-0.166	-0.0990	-0.105
	(0.223)	(0.220)	(1.276)	(1.261)
Res(Private)^2	4.534*	4.357**	27.73**	25.81**
	(1.741)	(1.590)	(9.998)	(9.570)
ΔRes(Private)	-0.319	-0.389+	-3.536+	-3.582+
	(0.221)	(0.229)	(1.926)	(2.011)
Δ Res(Private)^2	11.52***	10.80***	111.4***	104.6***
	(1.748)	(1.760)	(29.10)	(29.72)
Δ Res(Private)*Res(Private)	3.118	1.486	69.94*	59.57+
	(2.396)	(2.303)	(29.91)	(30.63)
Δ Res(Private)*Res(Private)^2	-8.324	-6.889	-173.0	-186.4
	(14.03)	(12.95)	(240.9)	(239.6)
ΔRes(Private)^2*Res(Private)	14.71	12.96	-950.8*	-1024.6*
	(12.60)	(11.56)	(444.8)	(433.0)
Δ Res(Private)^2*Res(Private)^2	-243.1***	-210.6***	2634.9	3345.3
	(56.05)	(54.23)	(2592.9)	(2580.5)
Log(Tenure)	-0.0251*	-0.0213+	-0.102	-0.0789
	(0.0125)	(0.0121)	(0.0722)	(0.0707)
Old or Sick	0.000163	-0.000872	-0.00899	-0.00741
	(0.0228)	(0.0231)	(0.131)	(0.134)
Growth_{t-1}	-0.00252*	-0.00235*	-0.0132*	-0.0127*
	(0.00104)	(0.00105)	(0.00601)	(0.00598)
$\text{Log(GDPpc}_{t-1})$	-0.0217	-0.0165	-0.224	-0.182
	(0.0365)	(0.0381)	(0.215)	(0.226)
$\text{Log(Population}_{t-1})$	-0.0132	-0.00448	-0.338	-0.277
	(0.0571)	(0.0591)	(0.366)	(0.379)
$\text{Resource Rents}_{t-1}$	0.000351	0.0000515	0.00300	0.00122
	(0.00152)	(0.00157)	(0.00940)	(0.00993)
Observations	6816	6714	6777	6675
Method	OLS w FE	OLS w FE	logit w FE	logit w FE
Number Nations	164	162	163	161
Years	1972-2021	1972-2021	1972-2021	1972-2021
Nation FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Fit	0.293	0.300	0.822	0.826
Bootstrap N	6804	6804		
Bootstrap Fit	0.038	0.038		

Standard errors in parentheses

$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A6.8: Ability to Predict When Winning Coalition Size Changes: Based on Model 1 of Table A6.6

		Large Change in W, $\|\Delta W\| > .05$		
		No	Yes	Total
Predicted Change in W	No	5,636	874	6510
	Yes	85	221	306
	Total Obs	5,721	1,095	6,816

$\chi^2 = 749.29$

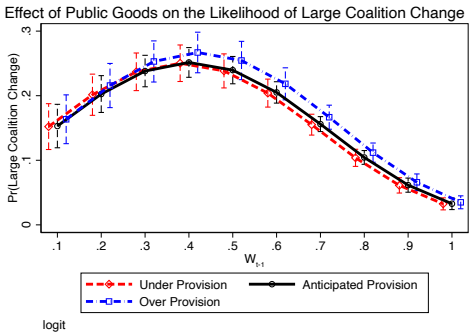
Table A6.9: Ability to Predict When Winning Coalition Size Changes: Based on Model 3 of Table A6.7

		Change in W, $\|\Delta W\| > .01$		
		No	Yes	Total
Predicted Change in W	No	2,969	938	3,907
	Yes	737	2,133	2,870
	Total Obs	3,706	3,071	6,777

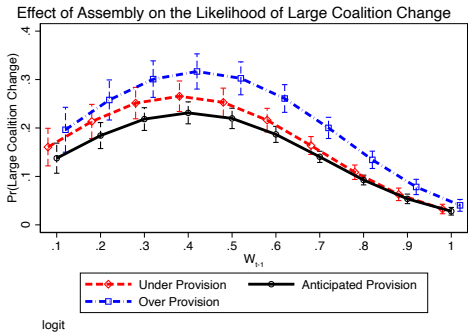
$\chi^2 = 1690.16$

Figure A6.1: Policy Provisions and the Likelihood of Change in Coalition Size: $|\Delta W| = |W_{t+2} - W_{t-1}| > .05$ (logit)

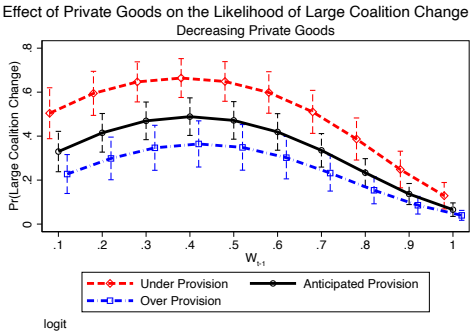
(a) Impact of Public Goods on $|\Delta W| > .05$



(b) Impact of Assembly on $|\Delta W| > .05$



(c) Impact of Private Goods Provision When Private Goods are Declining



(d) Impact of Private Goods Provision When Private Goods are Increasing

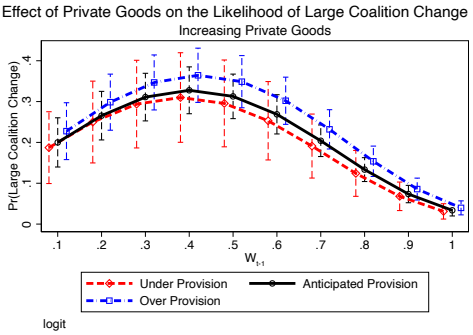


Table A6.10: Political Threats and Institutional Change: Models 1 and 2 exclude observations with leader change in year t or t+1; models 3 and 4 exclude observations with irregular leader change in year t or t+1

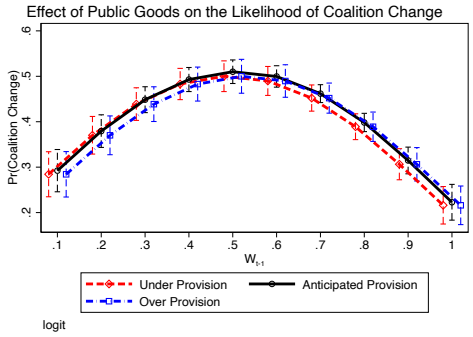
	(1) $\|\Delta W\| > .01$	(2) $\|\Delta W\| > .01$	(3) $\|\Delta W\| > .01$	(4) $\|\Delta W\| > .01$
AnyD2W				
Revolution		0.178		0.294*
		(0.137)		(0.136)
Coup		0.00235		0.280
		(0.275)		(0.240)
W_{t-1}	6.475***	6.470***	7.353***	7.315***
	(1.296)	(1.308)	(1.226)	(1.223)
W^2_{t-1}	-6.319***	-6.351***	-7.137***	-7.117***
	(1.164)	(1.181)	(1.094)	(1.096)
Res(Public)	-0.0114	0.0419	-0.0182	0.0334
	(0.899)	(0.898)	(0.882)	(0.867)
Res(Public)^2	-7.337	-6.661	-3.079	-3.315
	(9.328)	(9.081)	(10.38)	(9.816)
Res(Assembly)	1.799**	1.774**	2.052**	2.053**
	(0.660)	(0.669)	(0.632)	(0.638)
Res(Assembly)^2	16.99**	16.62**	19.86**	19.24**
	(5.646)	(5.475)	(6.287)	(5.991)
Res(Private)	0.672	0.757	-0.0729	0.00568
	(1.076)	(1.080)	(1.040)	(1.047)
Res(Private)^2	24.47**	24.43**	27.16***	26.43***
	(8.006)	(7.839)	(7.732)	(7.318)
ΔRes(Private)	-4.284*	-4.010+	-4.078*	-3.814+
	(2.126)	(2.152)	(1.908)	(1.946)
Δ Res(Private)^2	142.7***	140.8***	142.5***	138.3***
	(34.43)	(34.55)	(38.44)	(38.50)
Δ Res(Private)*Res(Private)	24.83	25.40	50.30+	50.66+
	(35.72)	(35.63)	(28.30)	(28.66)
Δ Res(Private)*Res(Private)^2	-204.7	-224.0	-397.4	-413.0
	(325.7)	(327.8)	(254.2)	(254.4)
ΔRes(Private)^2*Res(Private)	-1684.8**	-1643.1**	-1531.4**	-1533.4**
	(581.3)	(550.6)	(548.3)	(531.9)
Δ Res(Private)^2*Res(Private)^2	6006.9+	5541.9+	5889.5*	5921.2*
	(3380.7)	(3142.5)	(2873.1)	(2841.1)
Log(Tenure)	-0.184**	-0.189**	-0.136*	-0.131*
	(0.0646)	(0.0673)	(0.0603)	(0.0625)
Old or Sick	-0.190	-0.165	-0.118	-0.0823
	(0.119)	(0.121)	(0.110)	(0.112)
Growth_{t-1}	-0.00863	-0.00753	-0.00899+	-0.00752
	(0.00576)	(0.00570)	(0.00510)	(0.00492)
$\text{Log(GDPpc}_{t-1}\text{)}$	-0.149***	-0.144***	-0.148***	-0.135**
	(0.0431)	(0.0434)	(0.0433)	(0.0430)
$\text{Log(Population}_{t-1}\text{)}$	0.0151	0.00216	0.0280	0.0141
	(0.0334)	(0.0343)	(0.0340)	(0.0350)
$\text{Resource Rents}_{t-1}$	-0.00635	-0.00768	-0.00754	-0.00890
	(0.00553)	(0.00572)	(0.00543)	(0.00562)
Method	logit	logit	logit	logit
Observations	4794	4712	6509	6415
Number Nations	163	161	164	162
Years	1972-2021	1972-2021	1972-2021	1972-2021
Nation FE	N	N	N	N
Time Trend	Y	Y	Y	Y
ROC	0.740	0.742	0.750	0.753
Bootstrap N	4794	4703	6509	6403
Bootstrap Fit	0.536	0.545	0.596	0.612

Standard errors in parentheses

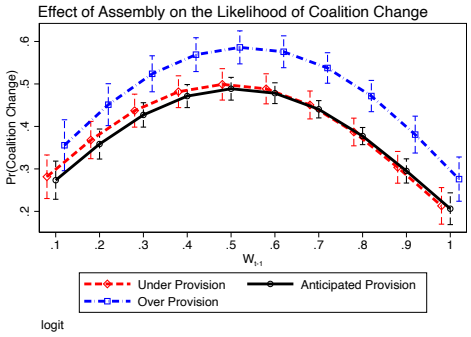
$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure A6.2: Policy Provisions and the Likelihood of Change in Coalition Size: $|\Delta W| = |W_{t+2} - W_{t-1}| > .01$. Based on Sample that Excludes Observation with Leader Change in Year t or t+1 (logit)

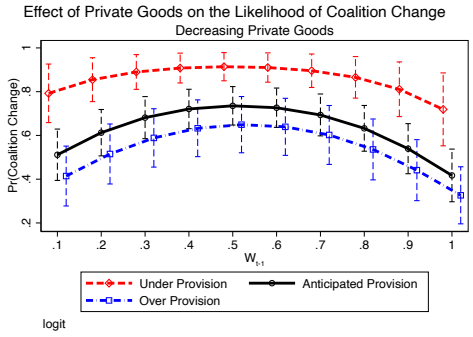
(a) Impact of Public Goods on $|\Delta W| > .01$



(b) Impact of Assembly on $|\Delta W| > .01$



(c) Impact of Private Goods Provision When Private Goods are Declining



(d) Impact of Private Goods Provision When Private Goods are Increasing

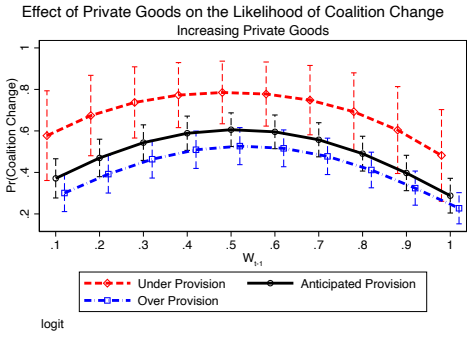
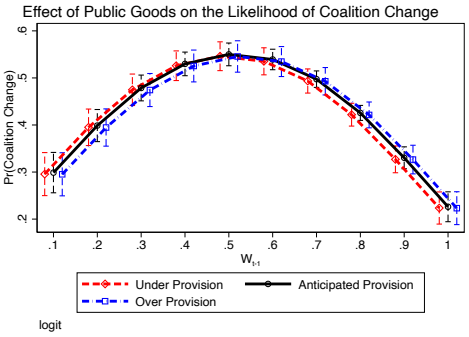
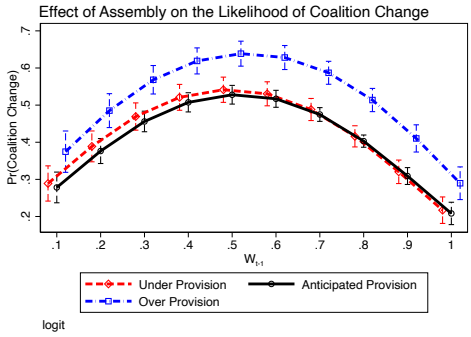


Figure A6.3: Policy Provisions and the Likelihood of Change in Coalition Size: $|\Delta W| = |W_{t+2} - W_{t-1}| > .01$ Based on Sample that Excludes Observation with Irregular Leader Change in Year t or t+1 (logit)

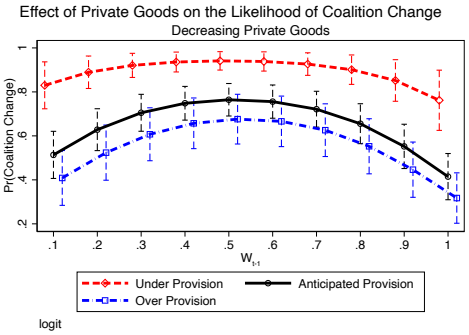
(a) Impact of Public Goods on $|\Delta W| > .01$



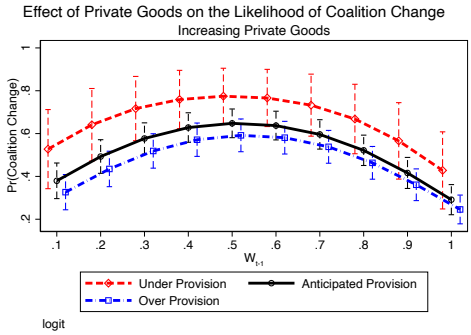
(b) Impact of Assembly on $|\Delta W| > .01$



(c) Impact of Private Goods Provision When Private Goods are Declining



(d) Impact of Private Goods Provision When Private Goods are Increasing



A6.4 Democratization or Autocratization: The Direction of Institution Change

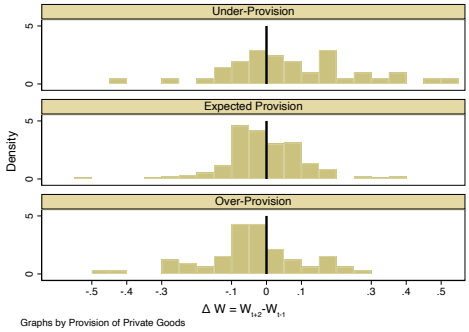
Table A6.11 categorizes the size of seven ranges of change in coalition size, $\Delta W < -.1$, $\Delta W \in [-.1, -.05)$, $\Delta W \in [-.05, -.01)$, $\Delta W \in [-.01, .01]$, $\Delta W \in (.01, .05]$, $\Delta W \in (.05, .1]$, and $\Delta W > .1$. The rows of the table show whether each policy was under-provided (1 standard deviation below expectation), close to expected provision, or over-provided (1 standard deviation above expectation). The table shows similar information to Figures 6.2 and 6.3 in the main text.

Figures A6.4 and A6.5 show how the under-, over-, or expected provision of policy affect the direction of institution change for the set of observation where there is no leader change in either year t or year $t+1$. The figures are histograms of the change in winning coalition size, $\Delta W = W_{t+2} - W_{t-1}$

conditional on $|\Delta W| > .03$. This latter restriction is made to ease interpretation; there are so many instances of zero or negligible changes in W. These tiny changes are excluded as the height on that column dwarfs the other columns.

Figure A6.4: Change in Coalition Size and the Under, Over or Expected Provision of Private Goods (Only observations in which the leader survives in years t and $t+1$.)

(a) Increasing Private Goods



(b) Decreasing Private Goods

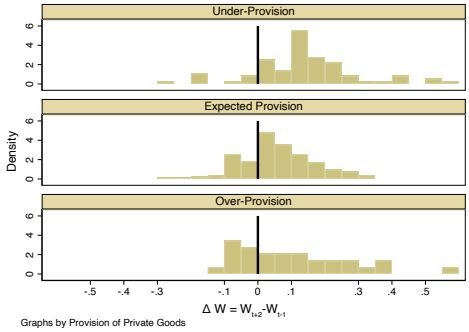
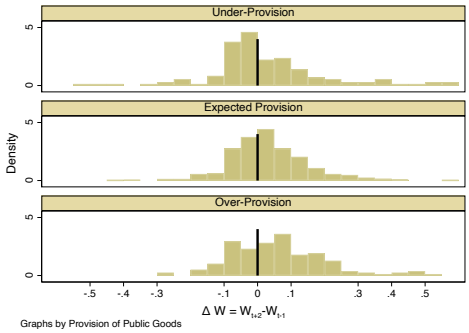


Figure A6.5: Change in Coalition Size and the Under, Over or Expected Provision of Public Goods and Assembly (Only observations in which the leader survives in years t and $t+1$.)

(a) Public Goods



(b) Assembly

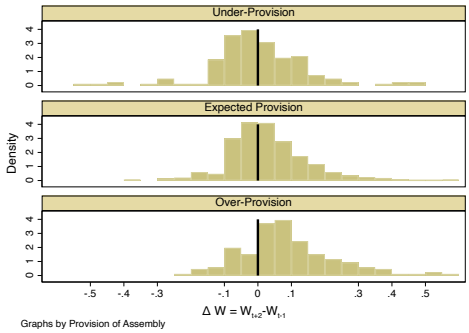


Figure A6.6 examines the predicted change in W relative to the actual change in W. In all three panels the horizontal axis plots the actual change in W ($\Delta W = W_{t+2} - W_{t-1}$) and the vertical axis shows the predicted change in W based on each of the models in Table 6.12. The first panel corresponds to Model 1 in Table 6.12 which uses all observations, whether W actually changes or not (although we have not plotted the unchanged observations in the figure because of the high density of points at $\Delta W = 0$). The second panel corresponds to the second model in Table 6.12 that predicts the change in W using only those observations in which $|\Delta W| > 0.01$. Unfortunately, such

Table A6.11: Deviations in Coalition Welfare Provisions and Change in Winning Coalition

Policy Provision		Change in Winning Coalition Size, $\Delta W = W_{t+2} - W_{t-1}$ $< -.1$	$[-.1, -.05)$	$[-.05, -.01)$	$[-.01, .01]$	$(.01, .05]$	$(.05, .1]$	$> .1$	Observation
Private Goods	Under Provision	3.0%	2.5%	14.2%	38.5%	15.4%	4.2%	22.0%	758
	Expected Provision	2.4%	3.0%	13.2%	58.8%	15.3%	3.3%	4.0%	5521
	Over Provision	7.5%	4.6%	15.9%	43.7%	13.4%	4.6%	10.2%	716
Assembly	Under Provision	5.2%	5.1%	16.6%	47.9%	13.7%	3.6%	7.9%	747
	Expected Provision	2.6%	2.8%	13.3%	57.5%	15.4%	3.3%	5.3%	5431
	Over Provision	3.6%	3.5%	13.0%	45.2%	15.1%	5.1%	14.6%	808
Public Goods	Under Provision	7.8%	4.3%	14.4%	47.8%	14.8%	3.6%	7.3%	923
	Expected Provision	2.1%	2.8%	13.9%	59.1%	14.2%	2.9%	4.9%	5221
	Over Provision	3.1%	3.3%	10.9%	38.2%	20.9%	7.2%	16.4%	850
Coalition Welfare	Under Provision	5.8%	4.5%	15.6%	48.4%	13.9%	3.7%	8.2%	868
	Expected Provision	2.4%	2.9%	13.6%	58.2%	14.4%	3.1%	5.4%	5188
	Over Provision	3.8%	2.8%	12.1%	43.8%	20.2%	5.6%	11.9%	928

Under-provision indicates the policy is at least one standard deviation less than the expected level of policy provision. Over-provision indicates policy more than a standard deviation larger than the expected level of policy provision.

an estimation strategy utilizes ex post information, namely that the nation experienced institution change. To ameliorate this concern, Model 3 in Table 6.12 includes only observations that were predicted to have at least a 50% change of changing (based on Model 1 of Table 6.8).

Table A6.12 is similar to Table 6.12 in the main text with the difference being that it estimates the change in the winning coalition between years t and $t+3$. The first model in the table includes all observations, the second model includes only those observations in which the coalition size changes, and the third model includes only those observations estimated to have a least a 50% chance of experiencing institution change. Figure A6.7, based on the analyses in Table A6.12, shows the analogous predicted changes in W to those shown in Figure A6.6.

Table A6.13 replicates Table 6.12 in the main text with the difference that the second model includes only those observations in which the coalition size changes by more that 0.05, and the third model includes only those observations estimated to have a least a 50% chance of experiencing institution change of $|\Delta W| > 0.05$. Figure A6.8, based on the analyses in Table A6.13, shows the analogous predicted changes in W to those shown in Figure A6.6.

Table A6.12: Political Threats, Policy Provision and the Direction of Institutional Change between t and t+3 ($\Delta W = W_{t+3} - W_t$): Model 2 restricts sample to observations in which there is some change in W)

	(1) ΔW	(2) ΔW	(3) ΔW
W_{t-1}	-0.364***	-0.587***	-0.746***
	(0.0739)	(0.122)	(0.142)
W^2_{t-1}	0.0254	0.00563	0.181
	(0.0669)	(0.105)	(0.129)
Res(Public)	-0.0152	0.0246	-0.0376
	(0.0392)	(0.0592)	(0.0611)
ΔRes(Public)	0.0757^{+}	0.0529	0.166*
	(0.0425)	(0.0721)	(0.0777)
Res(Assembly)	0.0237	-0.0186	-0.0294
	(0.0259)	(0.0349)	(0.0350)
ΔRes(Assembly)	0.0585*	0.0704^{+}	0.0408
	(0.0238)	(0.0373)	(0.0345)
Res(Private)	0.0360	0.0603	0.145*
	(0.0313)	(0.0499)	(0.0570)
ΔRes(Private)	0.161***	0.304***	0.262***
	(0.0345)	(0.0581)	(0.0627)
Log(Tenure)	0.000746	0.00259	0.00396
	(0.00218)	(0.00355)	(0.00350)
Old or Sick	-0.00104	-0.00948	-0.000198
	(0.00420)	(0.00749)	(0.0105)
Log($GDPpc_{t-1}$)	-0.00446	-0.0106	0.00335
	(0.00639)	(0.0128)	(0.0173)
$Growth_{t-1}$	0.000256	0.000735*	0.000103
	(0.000159)	(0.000335)	(0.000392)
Log($Population_{t-1}$)	0.0388**	0.0364	0.00798
	(0.0118)	(0.0229)	(0.0339)
Resource $Rents_{t-1}$	0.000378	-0.000188	0.0000428
	(0.000292)	(0.000379)	(0.000430)
Observations	6656	3009	2486
Number Nations	164	162	156
Years	1972-2020	1972-2020	1972-2020
Nation FE	Y	Y	Y
Time Trend	Y	Y	Y
R2	0.296	0.493	0.453
R2within	0.213	0.357	0.278
Bootstrap N	6646	2966	2966
Bootstrap Fit	0.115	0.282	0.282

Standard errors in parentheses

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A6.13: Political Threats, Policy Provision and the Direction of Institutional Change between t-1 and t+2 ($\Delta W = W_{t+2} - W_{t-1}$): Model 2 restricts sample to observations in which $\Delta W > 0.05$. Model 3 includes only observations w=estimated to have a 50% chance of $\Delta W > 0.05$.

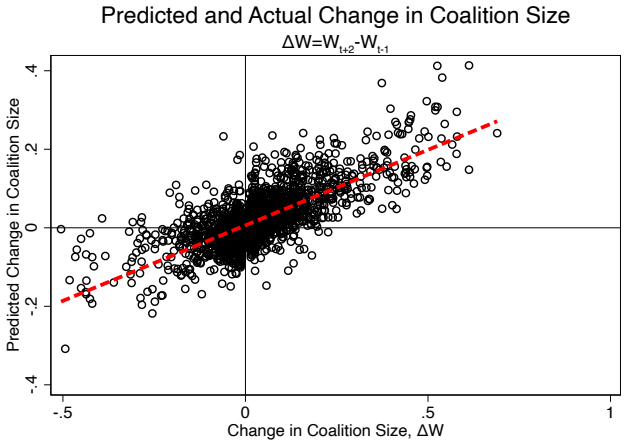
	(1) ΔW	(2) ΔW	(3) ΔW
W_{t-1}	-0.210**	-0.419*	-0.728**
	(0.0700)	(0.164)	(0.218)
W^2_{t-1}	-0.0808	-0.393*	0.366
	(0.0670)	(0.155)	(0.247)
Res(Public)	0.0157	0.241*	-0.120
	(0.0468)	(0.103)	(0.196)
ΔRes(Public)	0.0781	-0.153	0.0212
	(0.0542)	(0.0957)	(0.188)
Res(Assembly)	0.127***	0.178*	0.0326
	(0.0299)	(0.0694)	(0.0972)
ΔRes(Assembly)	0.0556*	-0.0126	0.0637
	(0.0271)	(0.0641)	(0.0953)
Res(Private)	-0.173***	-0.291**	0.459**
	(0.0397)	(0.0957)	(0.134)
ΔRes(Private)	-0.484***	-0.249**	-0.0557
	(0.0459)	(0.0841)	(0.126)
Log(Tenure)	-0.00334	-0.00216	0.0171+
	(0.00238)	(0.00725)	(0.0101)
Old or Sick	-0.00216	-0.00694	-0.00728
	(0.00351)	(0.0150)	(0.0273)
$\text{Log(GDPpc}_{t-1}\text{)}$	-0.00326	-0.00828	-0.0214
	(0.00631)	(0.0304)	(0.0495)
Growth_{t-1}	0.0000563	0.000611	0.000512
	(0.000169)	(0.000523)	(0.00129)
$\text{Log(Population}_{t-1}\text{)}$	0.0348**	0.0889+	-0.149
	(0.0129)	(0.0495)	(0.143)
$\text{Resource Rents}_{t-1}$	0.000216	-0.000311	0.000415
	(0.000298)	(0.000994)	(0.00192)
Observations	6815	1087	263
Number Nations	164	123	63
Years	1972-2021	1972-2021	1972-2020
Nation FE	Y	Y	Y
Time Trend	Y	Y	Y
R2	0.389	0.741	0.634
R2within	0.318	0.590	0.299
Bootstrap N	6803	966	966
Bootstrap Fit	0.189	0.463	0.463

Standard errors in parentheses

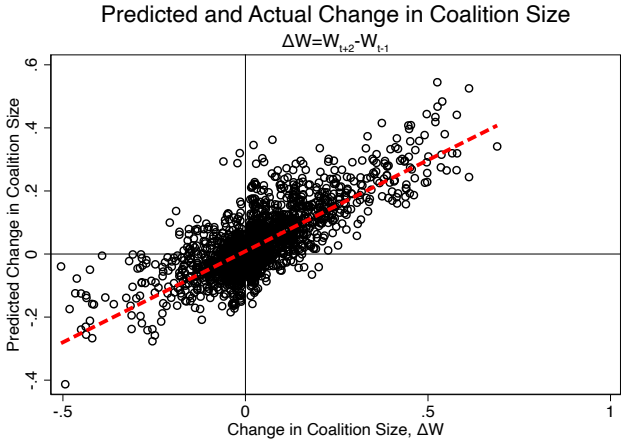
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure A6.6: Actual and Predicted Changes in Coalition Size: $\Delta W = W_{t+2} - W_t$. Predictions based in Model 1, 2, and 3 in Table 6.12.

(a) All Observations



(b) Observations with Change in W, $|\Delta W| > 0.01$



(c) Observations Predicted to Experience $|\Delta W| > 0.01$

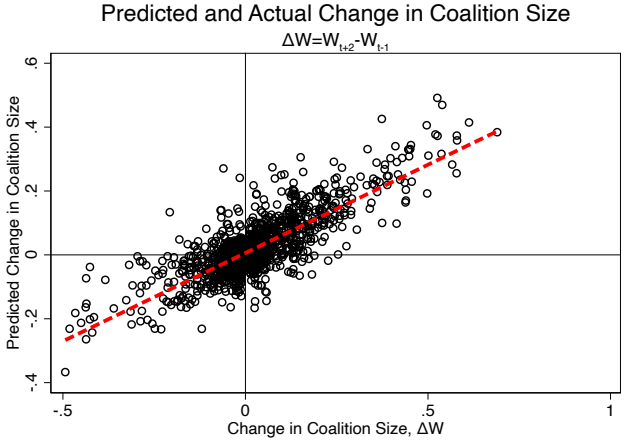
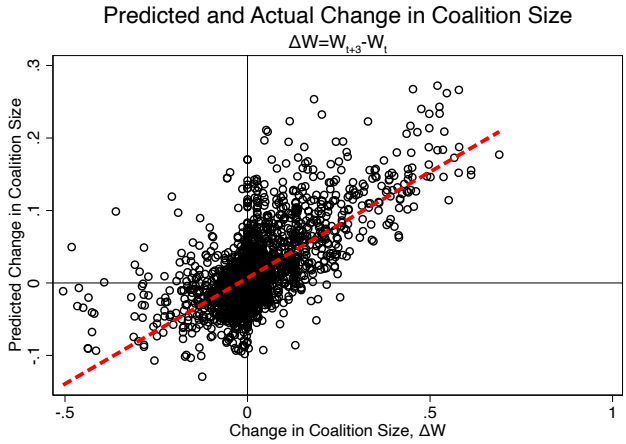
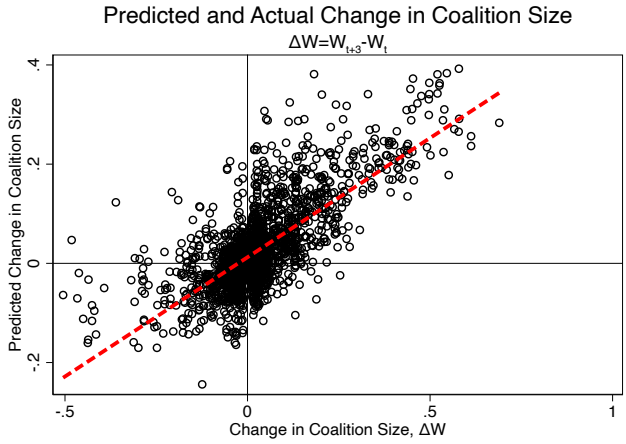


Figure A6.7: Actual and Predicted Changes in Coalition Size: $\Delta W = W_{t+3} - W_t$

(a) All Observations



(b) Observations with Change in W, $|\Delta W| > 0.01$



(c) Observations Predicted to Experience $|\Delta W| > 0.01$

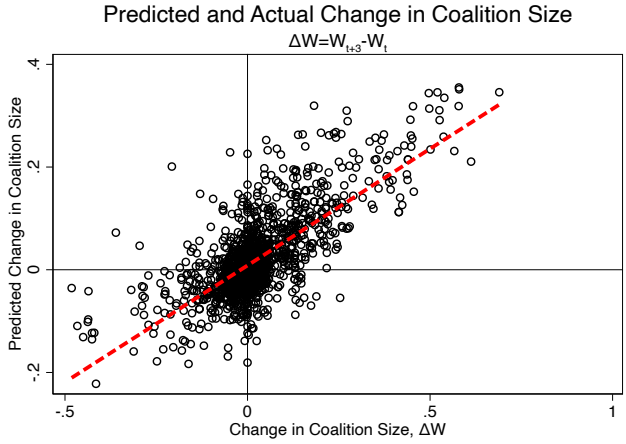
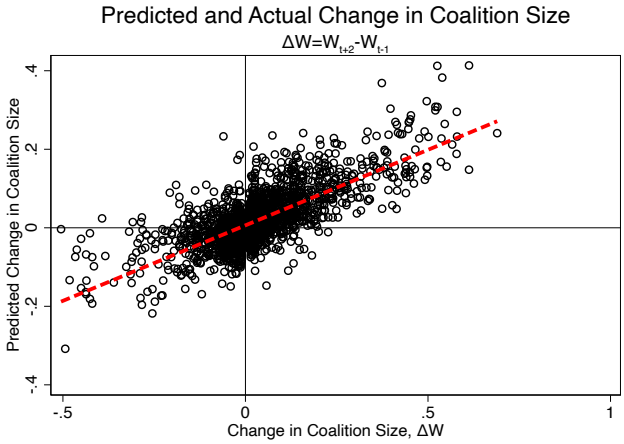
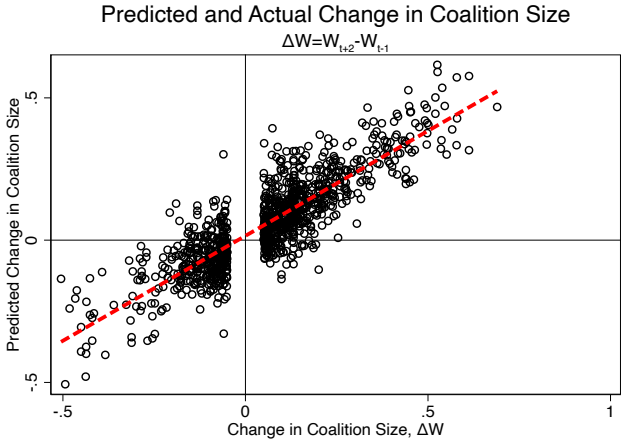


Figure A6.8: Actual and Predicted Changes in Coalition Size (for relatively large changes in W, $|W_{t+2} - W_{t-1}| > 0.05$)

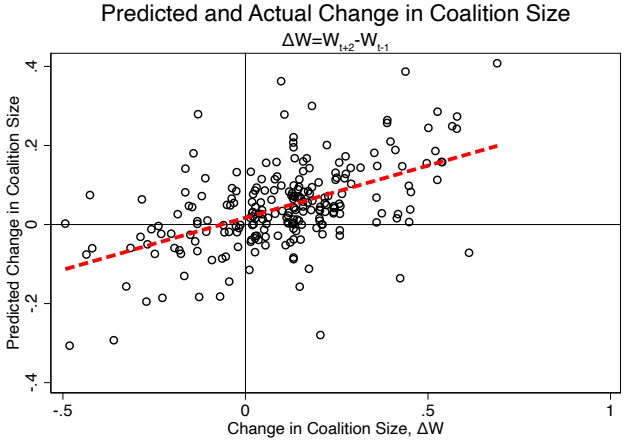
(a) All Observations



(b) Observations with Change in W, $|\Delta W| > 0.05$



(c) Observations Predicted to Experience $|\Delta W| > 0.05$



A6.4.1 Heteroskedastic Analyses

Many of the hypotheses address the volatility of an action or policy rather than just the level of a policy. As with the analyses in Section A5.1 we explicitly model the variance of the error term, $Log(\sigma^2)$, as a function of coalition size and other factors.

Heteroskedastic Analyses of Coalition Reshuffles

In Section 6.2 (Table 6.3) we argued that the risk of coup ($\widehat{Coup}$) was likely to have an ambiguous impact on the rate of reshuffling of the coalition. If the coup risk is high because the leader is underpaying her coalition, then she is unlikely to further undermine coalition loyalty by reshuffling. In contrast, if the high coup risk is induced by a leader's over-provision of private goods, then reshuffles are likely. A high coup risk might be associated with either a high or low rate of coalition reshuffles; so while the variable $\widehat{Coup}$ has an ambiguous prediction on the level of reshuffling, a high coup risk should increase the variability in the rate of coalition turnover. Table A6.14 tests this volatility hypothesis. The table presents a heteroskedastic regression of the rate of turnover in cabinet membership. As with the results in the main text (Table 6.3), coup risk does not systematically affect the level of cabinet reshuffles. Yet, a high coup risk is associated with high variance in the rate of coalition reshuffles. The variance of the error term is modeled as a function of coalition size and the coup risk ($\widehat{Coup}$). The results indicate the volatility in the rate of cabinet turnover increases in large coalition systems and when there is a high risk of coup.

Table A6.14: Heteroskedastic Regression of Impact of Institutions and Regime Risks on Cabinet Turnover (Excludes observations with leader change)

	(1) Turnover
turnover	
$\widehat{Rev}$	0.0574***
	(0.0147)
$\widehat{Coup}$	0.0145
	(0.0164)
Coup	0.0743*
	(0.0291)
Revolution	0.0170
	(0.0132)
W_{t-1}	0.0997
	(0.228)
W^2_{t-1}	0.176
	(0.227)
Log(Tenure)	-0.00163
	(0.0147)
W_{t-1} *Log(tenure)	-0.116***
	(0.0219)
Old or Sick	0.0494***
	(0.0124)
$Growth_{t-1}$	-0.000661
	(0.000648)
$Log(Population_{t-1})$	0.0282
	(0.0253)
$Log(GDPpc_{t-1})$	0.0198
	(0.0155)
lnsigma2	
W_{t-1}	-1.169*
	(0.533)
W^2_{t-1}	2.612***
	(0.510)
$\widehat{Coup}$	0.215***
	(0.0232)
Observations	4903
Number Nations	160
Years	1972-2018
Nation FE	Y
Year FE	Y

Standard errors in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Heteroskedastic Analyses of Changes in Coalition Size

Table A6.15 shows heteroskedastic regressions examining changes in winning coalition size. As with Table 6.12 in the main text, Models 1 and 4 examine all possible observations. Models 2 and 5 examine only those observations in which institutions change ($|W_{t+2} - W_{t-1}| > 0.01$). Models 3 and 6 examine cases in which the predicted probability of institution change (in Model 1 of Table 6.8) is above 50%. All models include a cubic time trend and Models 4-6 include country fixed effects within the standard $X\beta$ estimate of expected value. The heteroskedastic component of the specification models the log of the variance in the error term as a linear function of W_{t-1} and W_{t-1}^2.

The $X\beta$ component of the model shows similar results to the main text, so here we focus on the volatility component. In Models 1 and 4, that include all observations, the volatility in the change in W is greatest when $W_{t-1} \approx 0.3$. In the other models the greatest institutional volatility is anticipated in the smaller coalition systems. In large W systems our ability to predict the size of institution change is better than our ability to make the same prediction in smaller W systems.

Table A6.15: Heteroskedastic Regression Analysis of Changes in Winning Coalition Size, $\Delta W = W_{t+2} - W_{t-1}$ (Models 1 and 4 include all possible observation, model 2 and 5 include only observation in which coalition size changes and models 3 and 6 include observations in which institutional change is predicted)

	(1) ΔW	(2) ΔW	(3) ΔW	(4) ΔW	(5) ΔW	(6) ΔW
D2W						
W_{t-1}	-0.162***	-0.453***	-0.469***	-0.297***	-0.557***	-0.465*
	(0.0459)	(0.0925)	(0.104)	(0.0789)	(0.131)	(0.201)
W^2_{t-1}	0.0824**	0.240***	0.290***	0.0329	0.0408	0.0159
	(0.0304)	(0.0666)	(0.0786)	(0.0708)	(0.111)	(0.172)
Res(Public)	0.0326	0.0927	0.0652	0.00307	0.0889	0.0143
	(0.0355)	(0.0671)	(0.0526)	(0.0425)	(0.0793)	(0.0885)
ΔRes(Public)	-0.0395	0.0510	0.114	-0.0309	-0.0198	0.0468
	(0.0422)	(0.0774)	(0.0827)	(0.0381)	(0.0634)	(0.0666)
Res(Assembly)	0.0803***	0.143**	0.0646*	0.106***	0.151***	0.107**
	(0.0239)	(0.0444)	(0.0309)	(0.0292)	(0.0442)	(0.0412)
ΔRes(Assembly)	0.0542**	0.0637+	0.112**	0.0243	0.0167	0.0471
	(0.0203)	(0.0368)	(0.0351)	(0.0199)	(0.0318)	(0.0370)
Res(Private)	-0.0937**	-0.114*	-0.156***	-0.123***	-0.220***	-0.249***
	(0.0308)	(0.0481)	(0.0441)	(0.0325)	(0.0481)	(0.0616)
ΔRes(Private)	-0.362***	-0.555***	-0.459***	-0.305***	-0.370***	-0.279***
	(0.0626)	(0.0828)	(0.0725)	(0.0501)	(0.0659)	(0.0651)
Log(Tenure)	-0.00215*	-0.00358	-0.00303	-0.00328**	-0.00207	0.000759
	(0.00102)	(0.00247)	(0.00240)	(0.00109)	(0.00261)	(0.00306)
Old or Sick	-0.00288	-0.00430	0.00464	-0.00159	-0.00609	0.00428
	(0.00179)	(0.00521)	(0.00558)	(0.00193)	(0.00569)	(0.00749)
$\text{Log(GDPpc}_{t-1})$	0.00239**	0.00779***	0.00574**	-0.00780	-0.00430	0.00497
	(0.000761)	(0.00203)	(0.00202)	(0.00562)	(0.0116)	(0.0196)
Growth_{t-1}	0.000187	0.000430	0.000450	0.000215	0.000640*	0.000203
	(0.000140)	(0.000280)	(0.000290)	(0.000138)	(0.000269)	(0.000309)
$\text{Log(Population}_{t-1})$	-0.000305	-0.000591	-0.00289*	0.0281**	0.0413	0.0214
	(0.000386)	(0.00121)	(0.00113)	(0.0104)	(0.0262)	(0.0322)
$\text{Resource Rents}_{t-1}$	-0.0000988	-0.000161	0.00000683	0.000315	0.000152	0.0000733
	(0.000189)	(0.000363)	(0.000236)	(0.000229)	(0.000405)	(0.000397)
lnsigma2						
W_{t-1}	7.480***	1.616	-2.738	8.178***	2.026	-2.326
	(1.706)	(1.503)	(2.229)	(1.832)	(1.840)	(2.865)
W^2_{t-1}	-10.71***	-4.829***	-0.961	-11.12***	-4.764**	-1.640
	(1.486)	(1.360)	(1.948)	(1.591)	(1.651)	(2.623)
Observations	6815	3071	2522	6815	3071	2522
Number Nations	164	163	163	164	163	163
Years	1972-2021	1972-2021	1972-2021	1972-2021	1972-2021	1972-2021
Nation FE	N	N	N	Y	Y	Y
Time Trend	Y	Y	Y	Y	Y	Y
Fit	0.225	0.351	0.381	0.363	0.562	0.520

Standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix A7

Survival Analyses

Much of the analysis in this appendix expands on different forms of leader deposition, rather than simply considering regular and irregular categories examined in the main text. Table A7.1 defines of the different forms of deposition. Turnover refers to leader replacement via any mechanism. Removed refers to any form of domestic political replacement whether by regular or irregular means. This category excludes natural death in office and deposition by a foreign power. The Mass and Elite categories differentiate between cases of irregular deposition according to whether the people or the coalition were they the primary actors in the leader's replacement.

Table A7.1: Definitions of Different Forms of Deposition

Removal Type	Definition
Turnover	Any form of leader change
Removed	Any form of domestic leader replacement. Excludes leaders who died in office (by natural causes and not as a result of the deposition) and leaders removed by foreign powers.
Regular	Considers only political deposition via 'regular' means
Irregular	Considers only political deposition via 'irregular' means such as revolution or coup
Mass	Considers only political deposition via 'irregular' enacted by the masses, such as revolution
Elite	Considers only political deposition via 'irregular' enacted by elites, such as coups

Table A7.2 expands on Table 7.2 by examining additional categories of deposition. Table **??** extends the analyses in Table 7.3. Table A7.4 expands on the analyses in Table 7.4. Table A7.5 has the same model specification as seen in Table 7.5, with deposition risks disaggregated into

additional categories. Table A7.6 provides a simple tabular form of the impact of private goods provision on regular and irregular deposition.

Table A7.2: Baseline Determinants of Regular and Irregular Removal (Weibull Model)

	Turnover b/se	Removed b/se	Regular b/se	Irregular b/se	Mass Removal b/se	Elite Removal b/se
$X\beta$						
W_{t-1}	1.838	2.776*	4.147**	7.778***	24.759**	11.026***
	(0.970)	(1.134)	(1.528)	(1.748)	(8.855)	(2.523)
W^2_{t-1}	-1.771*	-2.539**	-3.053*	-9.563***	-22.260**	-14.431***
	(0.829)	(0.942)	(1.237)	(1.599)	(7.171)	(2.280)
S_{t-1}	-1.287***	-1.374***	-1.659***	-1.171	-2.902*	-0.868
	(0.357)	(0.392)	(0.494)	(0.745)	(1.206)	(0.988)
Log($GDPpc_{t-1}$)	0.038	0.053	0.095	-0.223**	-0.313*	-0.306**
	(0.044)	(0.047)	(0.054)	(0.068)	(0.148)	(0.100)
Log($Population_{t-1}$)	0.024	0.028	0.045	-0.024	0.077	-0.076
	(0.024)	(0.026)	(0.028)	(0.044)	(0.118)	(0.068)
$Growth_{t-1}$	-0.007	-0.006	-0.001	-0.018*	-0.052***	-0.001
	(0.005)	(0.005)	(0.005)	(0.009)	(0.013)	(0.010)
Old or Sick	0.453***	0.317***	0.271***	0.471**	1.127**	0.285
	(0.065)	(0.074)	(0.079)	(0.174)	(0.380)	(0.197)
Const.	-1.473*	-1.862**	-3.191***	-0.862	-8.280*	-0.163
	(0.649)	(0.690)	(0.809)	(1.142)	(3.920)	(1.686)
Ln(p)						
W_{t-1}	1.037***	1.222***	1.399***	0.864**	-0.711	1.133***
	(0.134)	(0.136)	(0.158)	(0.309)	(0.836)	(0.336)
Const.	-0.903***	-1.056***	-1.207***	-0.769***	0.214	-0.956***
	(0.093)	(0.094)	(0.117)	(0.175)	(0.432)	(0.180)
Observations	9626	9626	9626	9626	9626	9626
Number of Leaders	1748	1748	1748	1748	1748	1748
Failures	1575	1477	1219	276	40	182
LogLikelihood	-2766.367	-2733.907	-2423.470	-878.275	-174.879	-630.336

$*p < 0.05, **p < 0.01, ***p < 0.001$

Table A7.3: The Impact of Instability Risks and Occurrence of Revolutions and Coups on Leader Deposition (Weibull Model)

	Turnover b/se	Removed b/se	Regular b/se	Irregular b/se	Mass Removal b/se	Elite Removal b/se
$X\beta$						
W_{t-1}	1.370	2.437	4.372*	-1.495	28.486*	-3.605
	(1.403)	(1.516)	(1.705)	(2.174)	(12.018)	(2.639)
W^2_{t-1}	-0.640	-1.543	-3.297*	2.060	-23.312*	1.706
	(1.339)	(1.388)	(1.395)	(1.958)	(9.852)	(2.478)
S_{t-1}	-1.498**	-1.620**	-1.808**	-1.482*	-2.328	-1.395
	(0.511)	(0.546)	(0.576)	(0.651)	(1.672)	(0.743)
$\widehat{Rev}$	0.042	0.045	0.103*	-0.354**	-0.293	0.342*
	(0.042)	(0.042)	(0.046)	(0.126)	(0.313)	(0.137)
Revolution	0.395***	0.368***	0.218	1.209***	2.670***	0.500
	(0.107)	(0.109)	(0.115)	(0.319)	(0.713)	(0.344)
$\widehat{Coup}$	0.004	-0.015	-0.104**	0.731***	0.430	0.586***
	(0.088)	(0.083)	(0.032)	(0.117)	(0.364)	(0.140)
Coup	0.939***	0.932***	0.053	1.991***	0.186	3.395***
	(0.134)	(0.141)	(0.174)	(0.286)	(0.550)	(0.422)
$\text{Log(GDPpc}_{t-1})$	0.107	0.109	0.093	0.162*	-0.123	0.352***
	(0.073)	(0.075)	(0.075)	(0.064)	(0.215)	(0.083)
$\text{Log(Population}_{t-1})$	0.015	0.017	0.010	0.145*	0.114	0.000
	(0.028)	(0.030)	(0.030)	(0.059)	(0.177)	(0.081)
Growth_{t-1}	-0.003	-0.002	0.001	-0.021*	-0.029	0.002
	(0.006)	(0.006)	(0.006)	(0.010)	(0.016)	(0.013)
Old or Sick	0.470***	0.334***	0.281**	0.496**	1.222**	0.493*
	(0.075)	(0.082)	(0.086)	(0.167)	(0.428)	(0.218)
Const.	-2.259**	-2.538**	-2.767**	-5.717***	-13.639**	-4.575**
	(0.775)	(0.813)	(0.911)	(1.180)	(4.980)	(1.567)
Ln(p)						
W_{t-1}	0.819***	1.007***	1.385***	0.372	-0.925	0.955**
	(0.140)	(0.142)	(0.179)	(0.321)	(0.949)	(0.331)
Const.	-0.676***	-0.835***	-1.175***	-0.123	0.558	-0.293
	(0.100)	(0.102)	(0.133)	(0.177)	(0.561)	(0.184)
Observations	7976	7976	7976	7976	7976	7976
Number of Leaders	1469	1469	1469	1469	1469	1469
Failures	1307	1229	1047	201	33	120
LogLikelihood	-2143.646	-2134.947	-2006.413	-445.792	-112.635	-223.307

$*p < 0.05, **p < 0.01, ***p < 0.001$

Table A7.4: Change and Levels of Policy Provision and Leader Deposition (Weibull Model)

	Turnover b/se	Removed b/se	Regular b/se	Irregular b/se	Mass Removal b/se	Elite Remo b/se
$X\beta$						
W_{t-1}	2.295	3.340*	4.860*	4.859*	41.470**	6.180*
	(1.184)	(1.383)	(1.919)	(2.134)	(15.485)	(2.706)
W^2_{t-1}	-1.279	-2.099	-2.852	-6.119***	-34.409**	-9.895**
	(0.997)	(1.133)	(1.503)	(1.854)	(11.762)	(2.446)
S_{t-1}	-1.610***	-1.719***	-2.012***	-1.420*	-3.500	-1.381
	(0.457)	(0.500)	(0.605)	(0.722)	(1.891)	(0.965)
Res(Public)	0.614	0.484	0.458	-0.400	-3.693	0.366
	(0.624)	(0.686)	(0.746)	(1.443)	(4.612)	(1.389)
Res(Public)^2	-4.651	-7.233	-6.858	-8.408	-68.399	-6.007
	(5.459)	(5.524)	(5.111)	(12.193)	(35.579)	(12.316)
Res(Assembly)	0.147	0.139	0.624	-1.729	-0.621	-3.294*
	(0.372)	(0.371)	(0.408)	(1.085)	(2.350)	(1.340)
Res(Assembly)^2	3.533	3.773	3.096	6.624	19.900**	6.031
	(1.998)	(2.158)	(2.439)	(3.792)	(7.130)	(4.658)
Res(Private)	-1.477*	-1.334	-3.861***	3.242	5.241	3.131
	(0.727)	(0.803)	(0.857)	(2.064)	(3.021)	(3.155)
Res(Private)^2	5.593	4.725	-5.247	-3.678	-20.974	-1.253
	(5.833)	(6.019)	(9.688)	(10.116)	(39.282)	(10.621)
ΔRes(Private)	-0.192	-0.519	-2.591*	4.553	-3.011	5.856
	(1.227)	(1.348)	(1.282)	(2.789)	(5.931)	(3.711)
Δ Res(Private)^2	29.958***	25.829**	27.420**	30.960	52.638*	29.340
	(6.979)	(8.319)	(9.437)	(15.853)	(25.915)	(23.564)
Δ Res(Private)*Res(Private)	40.426*	43.064*	7.984	131.004*	110.771	162.467
	(19.791)	(21.504)	(19.018)	(56.753)	(89.597)	(88.326)
Δ Res(Private)*Res(Private)^2	-107.324	-107.380	-191.974*	-136.320	-290.543	-96.577
	(72.413)	(71.319)	(82.153)	(133.475)	(334.367)	(221.964
ΔRes(Private)^2*Res(Private)	82.001	78.785	160.554*	-97.841	93.981	-161.957
	(70.300)	(76.137)	(68.305)	(164.984)	(343.355)	(246.842
Δ Res(Private)^2*Res(Private)^2	-837.518**	-792.940**	-378.819	-2881.985**	-2184.137	-4068.906
	(297.431)	(288.237)	(227.628)	(1064.531)	(1201.655)	(1839.032
Log($GDPpc_{t-1}$)	0.038	0.046	0.078	-0.219**	-0.334	-0.308**
	(0.048)	(0.051)	(0.058)	(0.072)	(0.215)	(0.098)
Log($Population_{t-1}$)	0.031	0.036	0.047	-0.006	0.056	-0.053
	(0.028)	(0.030)	(0.031)	(0.051)	(0.137)	(0.088)
$Growth_{t-1}$	-0.007	-0.006	0.002	-0.027**	-0.050**	-0.014
	(0.006)	(0.006)	(0.006)	(0.008)	(0.015)	(0.011)
Old or Sick	0.417***	0.282***	0.225**	0.539**	1.324**	0.232
	(0.071)	(0.079)	(0.085)	(0.198)	(0.421)	(0.238)
Const.	-2.183**	-2.530**	-3.589***	-1.295	-13.479*	0.025
	(0.814)	(0.851)	(1.000)	(1.268)	(6.346)	(1.917)
Ln(p)						
W_{t-1}	0.725***	0.903***	1.071***	0.608	-1.227	1.080***
	(0.137)	(0.143)	(0.174)	(0.332)	(0.994)	(0.312)
Const.	-0.609***	-0.759***	-0.910***	-0.453*	0.685	-0.704**
	(0.095)	(0.102)	(0.132)	(0.196)	(0.579)	(0.193)
Observations	8279	8279	8279	8279	8279	8279
Number of Leaders	1518	1518	1518	1518	1518	1518
Failures	1350	1271	1081	208	34	124
LogLikelihood	-2229.688	-2217.132	-2022.272	-604.406	-122.602	-387.451

$*p < 0.05, **p < 0.01, ***p < 0.001$

Table A7.5: Change in Winning Coalition Size and Leader Deposition (Weibull Model,)

	Turnover b/se	Removed b/se	Regular b/se	Irregular b/se	Mass Removal b/se	Elite Removal b/se
$X\beta$						
W_{t-1}	-0.524	0.584	5.339**	-2.026	32.640	-2.813
	(1.255)	(1.422)	(2.012)	(2.533)	(16.824)	(3.089)
W^2_{t-1}	1.602	0.753	-2.954	1.568	-25.794*	-0.153
	(1.138)	(1.248)	(1.636)	(2.326)	(13.113)	(2.917)
S_{t-1}	-1.380**	-1.437**	-1.785**	-1.178	-1.952	-0.626
	(0.457)	(0.497)	(0.587)	(0.691)	(1.520)	(0.840)
ΔW	0.953*	1.228**	4.269***	-3.049***	-0.966	-2.914**
	(0.461)	(0.460)	(0.574)	(0.855)	(2.442)	(1.000)
$\widehat{Rev}$	0.005	0.003	0.045	-0.209	0.089	0.259
	(0.036)	(0.037)	(0.037)	(0.108)	(0.243)	(0.138)
$\Delta W * \widehat{Rev}$	0.221	0.192	0.178	1.323	1.948	0.527
	(0.392)	(0.385)	(0.287)	(1.102)	(2.912)	(1.145)
$\widehat{Coup}$	0.300***	0.295***	0.020	0.909***	0.685*	0.837***
	(0.053)	(0.055)	(0.072)	(0.115)	(0.294)	(0.138)
$\Delta W * \widehat{Coup}$	-0.669***	-0.648***	-0.108	-1.783***	-1.943*	-1.170
	(0.139)	(0.145)	(0.146)	(0.309)	(0.763)	(0.956)
$\text{Log}(\text{GDPpc}_{t-1})$	0.170**	0.172*	0.090	0.136	0.037	0.245*
	(0.065)	(0.068)	(0.082)	(0.084)	(0.199)	(0.112)
$\text{Log}(\text{Population}_{t-1})$	0.052	0.056	0.037	0.131*	0.098	-0.017
	(0.028)	(0.030)	(0.031)	(0.058)	(0.171)	(0.091)
Growth_{t-1}	-0.001	0.000	0.003	-0.018*	-0.028	0.002
	(0.006)	(0.006)	(0.006)	(0.009)	(0.015)	(0.012)
Old or Sick	0.429***	0.285***	0.240**	0.491*	1.291**	0.392
	(0.073)	(0.080)	(0.085)	(0.199)	(0.487)	(0.238)
Const.	-2.154**	-2.552**	-3.811***	-2.988*	-13.888*	-1.170
	(0.741)	(0.784)	(0.970)	(1.246)	(6.407)	(1.875)
Ln(p)						
W_{t-1}	0.829***	1.009***	1.080***	0.640	-0.966	1.157***
	(0.147)	(0.151)	(0.185)	(0.344)	(1.140)	(0.322)
Const.	-0.670***	-0.819***	-0.912***	-0.398*	0.590	-0.599**
	(0.103)	(0.108)	(0.140)	(0.193)	(0.668)	(0.188)
Observations	8279	8279	8279	8279	8279	8279
Number of Leaders	1518	1518	1518	1518	1518	1518
Failures	1350	1271	1081	208	34	124
LogLikelihood	-2256.341	-2235.212	-2025.797	-600.206	-133.103	-370.431

$*p < 0.05, **p < 0.01, ***p < 0.001$

Table A7.6: Impact of Private Goods Provisions and Changes in Private Provisions on the Relative Risk of Regular and Irregular Deposition

Regular Deposition	Private Goods		
	Under-Provision	Expected Provision	Over-Provision
Declining Provision	2.63	1.51	.94
Stable Provision	1.40	1.00	.60
Increasing Provision	.76	.97	.71

Irregular Deposition	Private Goods		
	Under-Provision	Expected Provision	Over-Provision
Declining Provision	2.13	.87	.15
Stable Provision	.65	1.00	1.30
Increasing Provision	.26	2.03	6.86

Expected private policy provision refers to $res(Private) = 0$. Over and under provision refer to $res(Private) = -.1$ and $res(Private) = 0.1$, approximately 10th and 90th percentile. Likewise declining and increasing private policy provisions correspond to $\Delta res(Private)$ equals -0.1 and 0.1.

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