Bay Area to Central Valley Migration and its Impacts

April 2023

Lead Researchers

Marlon G. Boarnet, Seva Rodnyansky, and Bernadette Austin

Associate Researchers

Andre Comandon, Bonnie Wang, and Sarina Rodriguez

USC Price
Sol Price School of Public Policy

OXY Occidental College

UCDAVIS
Center for Regional Change

tinyurl.com/CZI2023

CHAN ZUCKERBERG INITIATIVE

Acknowledgements

This report represents the culmination of multiple years of research in collaboration between the University of Southern California (USC) Sol Price School of Public Policy, METRANS Transportation Consortium, Occidental College Urban and Environmental Policy (UEP) Department, and the University of California Davis Center for Regional Change (CRC).

The report and research benefitted tremendously from multiple fundings sources, data providers, research support and assistance, advisory board and focus group participants, media coverage, and overall guidance. We acknowledge these in detail here.

Funding

We generously acknowledge funding from the Chan Zuckerberg Initiative (CZI) / Silicon Valley Community Foundation. CZI's unwavering support of this project enabled exploration of the diverse and policy relevant topics illustrated in this report, which would not have been possible otherwise. We are grateful to CZI's Michelle Kai and Ruby Bolaria-Shifrin for their support and suggestions throughout the course of this project.

Match funding from California Department of Transportation (Caltrans) and the US Department of Transportation through the Pacific Southwest Region University Transportation Center (PSR, administered by the METRANS Transportation Consortium) for transportation-related segments of this work expanded our ability to delve deeper into relevant topics of interest.

Match funding from the Haynes Foundation helped expand the Fiscal Survey of California Local Governments statewide.

Data and Access

We are grateful to the California Franchise Tax Board for data access.

Disclaimer: Any opinions expressed in this report are those of the authors, not official positions of the California Franchise Tax Board.

We thank StreetLight for making their data available for this project.

We thank the California Policy Lab for facilitating data access.

We thank Bill Ponicki for sharing ZIP Code GIS data.

We thank IPUMS for making census and GIS data available.

We thank the San Joaquin County Council of Governments (SJCOG) for their partnership on the dibs survey, and specifically Diane Nguyen, Yvette Davis, and Stephanie Maynard. Without their strong belief in the value of research and in this project and their hard

work to enable, program, and carry out this survey, the project would have missed out on valuable learnings on shared mobility, its impact on the transportation system, and how it was impacted by the pandemic.

Research Assistance and Project Support

We are grateful for research assistance and project support provided by numerous individuals throughout the lifetime of this project:

USC: Greg Randolph, Manita Rao

Occidental: Emilio Pardi, Jada Ho, Ina Morton, Ellie McKinney, Oliver Corpus, Leah Sweeney, Siana Park-Pearson, Christine Chuong, Amy Jarboe, Sylvia Chico

UC Davis: Brandon Louie

Community Advisory Board and Focus Group Participants

We gratefully acknowledge local stakeholders from the Central Valley and Bay Area who served on the Community Advisory Board for this project and those who participated in the various topical focus groups for this project. Without their candid, thought-out, and relevant comments and suggestions, this project would have lacked for ground truthing and contextual relevance.

Overall Guidance

We thank Christopher Goett for the initial connection to CZI and for constant commitment to our work.

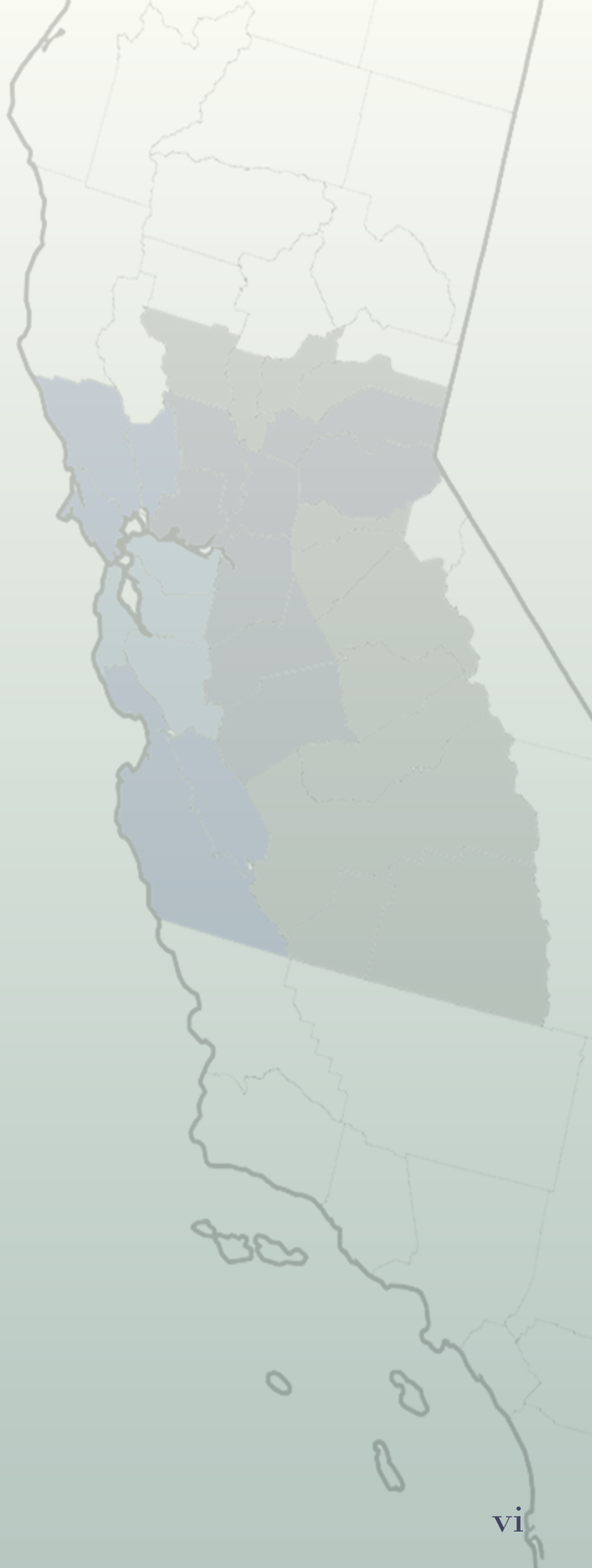
We thank Karen Chapple for help with navigating the funding landscape.

We thank Raphael W. Bostic for initial connections to data providers and partnership on earlier work.

Table of Contents

List of Figures

List of Tables



Executive Summary

What

The Bay Area to Central Valley Migration and Its Impacts project examines the extent and impact of migration from the San Francisco Bay Area to the Central Valley region. The impacts measured and discussed in this report include changes in population and demographics, transportation, housing, and local municipal finance. Led by a team of researchers at USC's Sol Price School of Public Policy, Occidental College's Department of Urban and Environmental Policy, and UC Davis' Center for Regional Change, the project looks at longer-term trends and changes over time, often over several decades.

How

Our methods span quantitative and qualitative approaches, utilizing data from a variety of primary and original sources (interviews, focus groups, surveys) and secondary sources (publicly available data, confidential data, restricted use data). The project was undertaken from 2019 through 2023, with major scope and method shifts in 2020 due to the COVID-19 pandemic. Incorporating the challenges and impacts of the pandemic has enriched and improved the research underlying this report.

The study area for this project (see Figure ES.1) contrasts what we consider the "Core Bay Area" counties (San Francisco, Alameda, Santa Clara, San Mateo, Contra Costa) to a "Central Valley" made up of counties East of the Bay Area (that are within a 2 hour one-way commute) with counties in Greater Sacramento (Sacramento, Yolo, El Dorado, Placer, Solano) and Northern San Joaquin Valley (San Joaquin, Stanislaus, Merced). For additional context, the team also collected data for the "Outer Bay Area" counties North (Marin, Napa, Sonoma) and South (Monterey, Santa Cruz, San Benito) of the Core Bay Area, and counties outside of the 2 hour commute distance that includes the Fresno area counties (Fresno, Madera), the Sierra Foothills counties (Amador, Calaveras, Mariposa, Tuolumne), and exurban counties of the Sacramento region (Colusa, Nevada, Sutter, Yuba). Together these counties form the Northern California Megaregion.

Aim

The aim of the project is to provide a baseline understanding of migration and its impacts to better lead and inform policy and engage policymakers. The cross-regional scope and view of the project seek to bring together stakeholders across California's geographies to improve the well-being and quality of life for California residents. A list of key takeaways from the project findings is provided in this executive summary along with policy suggestions and recommendations. Within the larger report we have included our research methods and an in-depth analysis of the data paired with visual aids and perspectives of regional stakeholders shared with us over the course of the project.

Project Key Takeaways

1. . . . . Migration

Megaregional Spatial Structure

- Migration between the Bay Area and the Central Valley is bi-directional, but the flow from the Bay Area to the Central Valley is 60% higher than the flow from the Central Valley to the Bay Area.

Figure ES.1. The Northern California Megaregion.

- Migration follows geographical patterns. People are moving away from communities in the East Bay and East San Jose to towns near and along main freeway corridors in the Central Valley and to Sacramento and its suburbs.
- Home values are significantly lower in Bay Area ZIP Codes that send the most migrants even though they are comparatively similarly diverse and of comparable income as the rest of the Bay Area.
- Top destination cities have higher housing costs compared to the rest of the Central Valley, but costs are still substantially lower than in the Bay Area.
- The flow of migration and commutes along major transportation corridors is not a new concept, yet the onset of the COVID-19 pandemic accelerated and exaggerated migration impacts on the megaregion.

Mobility and Equity

- Lateral moves between ZIP Codes of similar socioeconomic status at the origin and destination are the most common.
- Many moves from lower socioeconomic status ZIP Codes are to higher status Zip Codes, especially for moves from the Bay Area into the Central Valley.
- Newcomers tend to drive income growth in previously lower-income ZIP Codes. Newcomer income also grows faster than incumbents in those locations.
- Migration has local and macro-level implications. Impacts of migration span

across themes covered in this report: housing, transportation, commute patterns, and local fiscal health. Our advisory board cites additional, often local-level migration impacts felt by those living in the communities of the study region.

2. . . . . Transportation

Supercommuting

- The best data indicate that in some Central Valley counties, supercommutes are as much as four to six percent of all morning commutes, and the data indicate that supercommuting has been becoming more common in the Central Valley over time."
- Supercommutes (commutes longer than 50 miles or 90 minutes one-way) are resilient (either by choice or necessity) and have not been generally deterred by the COVID-19 pandemic.
- Supercommutes are much more prevalent among Central Valley to Bay Area commuters, and much more so among carpool and public transit users. This is in context of very low public transit mode shares.
- Thus, the burden of long duration (and distance) commutes falls heaviest on transit commuters in the region, most of whom are generally of lower socioeconomic status.
- Migration out of the Bay Area and into the Central Valley is correlated with increased supercommuting rates in receiving Central Valley neighborhoods.
- Transportation planning should utilize 'megaregional' thinking. Megaregional transportation planning and sharing resources across the several Northern California regions are important levels of intergovernmental coordination to manage and possibly decrease supercommuting.

COVID and Commute

- Traffic volume dropped by 40% on average relative to pre-COVID-19 norms and had not fully recovered as of September 2021.
- Income and occupational disparities influence commute flexibility. Existing income and occupation disparities in commute flexibility likely made vulnerable populations more likely to contract COVID.
- While primary and secondary industries generated fewer commutes pre-COVID-19, those commutes were most likely to remain throughout the pandemic.
- The work-from-home and remote work models evolved during the pandemic, complicating commute trends and allowing some occupations to be flexible with where employees work and live. Our advisory board notes several case examples for the intertwined nature of migration, the housing market, and supercommuting patterns across the megaregion.

Shared Mobility

- SJCOG's dibs service affects travel behavior and mode choice by increasing the share of commuters who use carpool / vanpool at least some of the time while decreasing the share of those who drive

alone. However, these gains remained sticky during the COVID-19 pandemic.

- Who uses carpools / vanpools? Carpool / vanpool programs in this region are being used by a rather narrow demographic. Of those include government and civil service workers, construction, warehouse and utilities workers, those who live far from work, those with access to vehicles, and those making below a $150,000 annual salary.

3. . . . . Housing

- Central Valley growth in population and housing units has been nearly twice as high as Bay Area growth from 1990 – 2020.

- Much of the growth in housing in both parts of the megaregions has been single-family units, with all of the Central Valley and most of the Bay Area becoming less dense over the past 30 years, despite a large renter population in both regions, for whom multifamily units may have been more relevant.

- Demand for housing overall outstrips supply in both regions, as manifested by home price growth above national levels.

- Bay Area home prices, in particular, have grown over 300% since 1997 and barely dipped during the Great Recession.

- Central Valley home prices have also grown (by 200%- 250%) since 1997 but have only eclipsed pre-Recession peaks during the COVID-19 pandemic boom.

- Rent growth since 2017 has been red hot in the Central Valley and generally tepid in the Bay Area.

- Housing affordability is equally an issue in higher-income Bay Area, middle-income Greater Sacramento and relatively lower-income Northern San Joaquin Valley areas.

- Subsidized affordable units and other strategies to provide affordable housing (such as housing choice vouchers) do not meet the megaregion's demand.

- However, federal subsidies do represent a sizable chunk of the Central Valley's multifamily housing stock, providing much-needed density and acting as a slight deterrent to sprawl.

- Overall, the push of high prices (rents and homes) in the Bay Area and the pull of relatively lower prices (rents and homes) in the Central Valley encourage Bay Area to Central Valley migration. At the same time, the migration itself pushes up home values in the Central Valley.

4. . . . . Fiscal

- Levels of fiscal health and stress fluctuated throughout the pandemic. California local governments indicated being fiscally strained 6 months after COVID-19 began, with 40% unable to or unsure of balancing their budget. One year after COVID-19 began they indicated lower fiscal stress, possibly due to receiving or expecting stimulus payments. Two years after the pandemic began, nearly every agency expected to balance their budget. Most local agencies were adding staff and expanding service delivery, though a substantial number were still deferring capital or maintenance expenditures.

- COVID-19 had reduced local revenues,

especially sales taxes, occupancy taxes, and fees. Pandemic-related costs also strained budgets. To cope, about half of the California agencies surveyed responded to the pandemic by reducing or restructuring services and/or deferring capital and maintenance expenditures. Twenty percent of agencies reported layoffs, while 15% reported furloughs.

- Reserves and stimulus funds were often the difference between fiscal stress and fiscal stability. Over 60% of local agencies had a reserve fund and more than half had used it after one year since the onset of COVID-19. Agencies initially did not expect stimulus money to come or be helpful in their recovery. The passage of the federal American Rescue Plan (ARP), on top of other federal and state stimulus programs, provided confidence and funds to backstop local agency finances.

- The COVID-19 pandemic has further amplified economic disparities and inequalities. A wealth gap between the "have and the have-nots" became more apparent as the pandemic impacted individual-level and community-level fiscal health. Jurisdictions varied in capacity to access federal relief funding. Those jurisdictions already struggling with reduced capacity faced additional disadvantages compared to other, similar jurisdictions.

5. . . . . Policy

- The combined megaregion has a housing production shortfall, accumulated over 30 years, that at past rates of building will require from one to two decades to close. We suggest a focus on policies that will dramatically speed construction of new housing.

- Because past patterns of household migration and housing production have contributed to growing supercommuting rates, housing production going forward should be part of the solution, not part of the problem. We recommend a focus on permit streamlining, including approaches to ministerial approval such as those in the currently proposed Assembly Bill 68 (Ward, Housing and Climate Solutions Act).

- Such streamlined permitting and ministerial approval should focus on locations in the eastern Bay Area and western Central Valley regions that are close to transportation infrastructure – both transit and highway access. Given the dominance of automobile commuting in the megaregion, now and for the foreseeable future, higher-density and multi-family infill development near good transportation links (both highways and transit) will help reduce the incidence of super-commuting.

- Efforts to build more housing near transportation corridors, while essential, will take years to provide relief from affordability pressures. In the meantime, many local officials noted a pressing need for relief for households experiencing extreme rent burden now. We recommend that governments at both the state and local level should explore emergency revolving loan funds, designed to provide short-term relief when households are unable to pay rent.

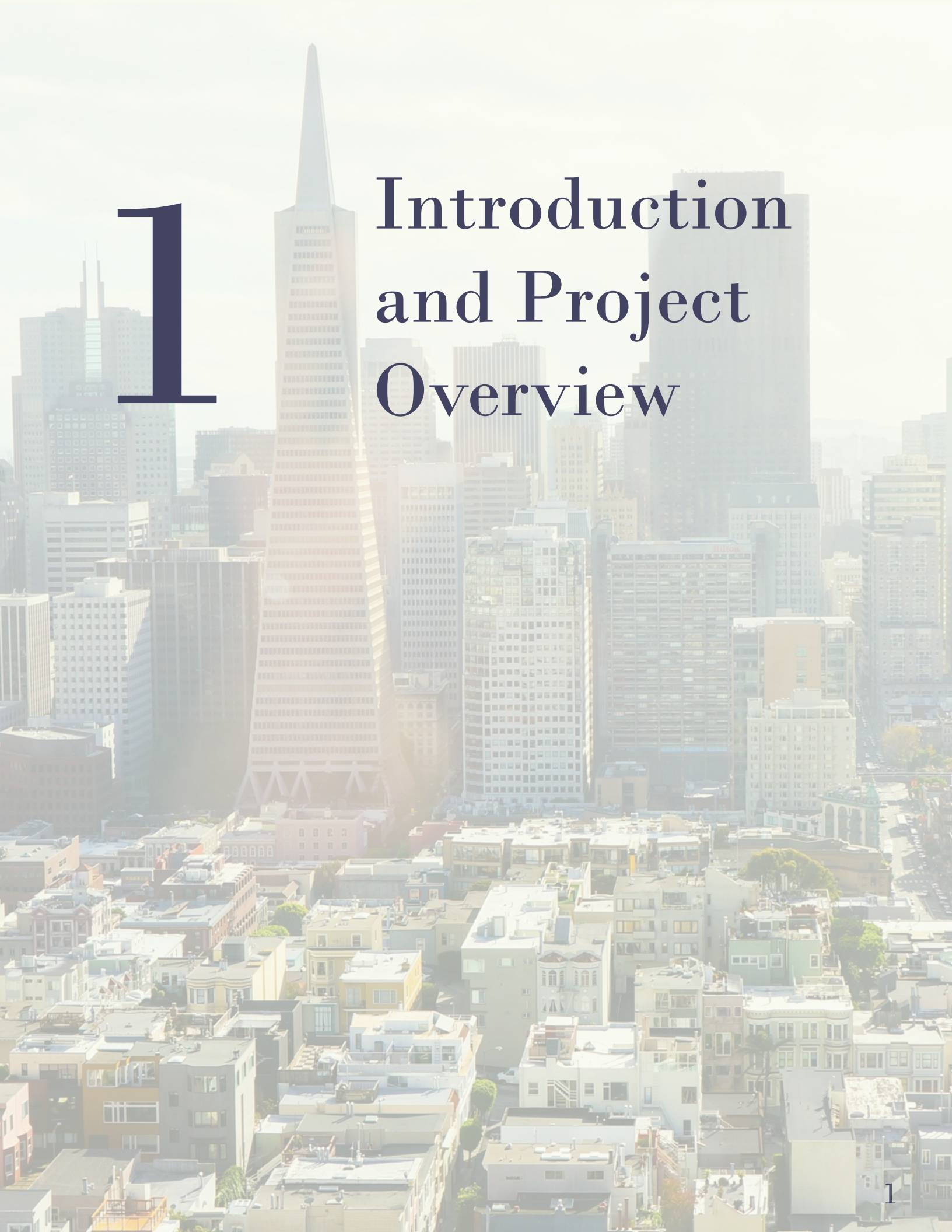
- We also suggest that renter protection programs, while vital, be carefully evaluated to ensure that such programs do not inadvertently reduce the supply of rental housing stock.

- More broadly, California's platform for linking metropolitan housing and transportation planning, SB 375 (Steinberg, 2008), should be expanded to require coordinated transportation and housing planning across the borders of metropolitan planning organizations (MPOs). This is a particularly pressing issue in the Northern California Megaregion, where flows of persons, commutes, and jobs span across MPOs.

- Transportation planning should be focused to support projects and policies that can improve access from the Central Valley into the Bay Area. The MPOs in the Bay Area and Central Valley have formed a megaregion working group which has identified twelve transportation projects – called the "megaregion dozen" – which will improve connections from the Central Valley to the Bay Area. Those projects and that process are a good model for transportation planning that prioritizes Central Valley to Bay Area connections.

- The state government should explore policies that could expand work-from-home flexibility to occupations that are now typically in-person. Our analysis showed that workers in service, production, and manufacturing industries lacked the flexibility to work from home during the COVID-19 pandemic and still bear disproportionate burdens of supercommuting. Policies that incentivize firms to offer flex-time or four-day work weeks to workers in these industries will help spread the benefits of work-from-home beyond its current concentration in white collar occupations.

- For fiscal policies, our survey of local governments showed that municipal rainy-day funds provided an important cushion in the early days of the COVID-19 pandemic. Yet local fiscal stress soon abated in the face of quick provision of substantial amounts of state and federal relief to local governments. Because the local fiscal crisis was acute but short-lived, it remains to be seen how well these rainy-day funds can cushion local governments during more typical economic recessions. We recommend that the state explore fiscal stress tests to assess and grade the sufficiency of both local and state rainy-day funds as a public information tool.



1 Introduction and Project Overview

Project Overview

Migration has been the cornerstone of California since the state's inception in 1850. Mass international and domestic migration transformed the state from sparsely populated at the turn of the 20th century to the most populous state in the nation by the early 1960s. Much of that migration has concentrated in the cities of the San Francisco Bay Area in Northern California and Los Angeles in Southern California. Today, Northern and Southern California are the sites of two of the largest urban megaregions in the nation.

Moving forward in this research report, we will use the term Northern California Megaregion to define the metropolitan clusters that roughly span the greater Bay Area, the Greater Sacramento area, the Sierra foothills, and the upper half of the San Joaquin Valley. This term will be defined and discussed in future chapters. The geographic extent of the megaregion is displayed in Figure 1.1.

A century and a half of growth have significantly altered the Northern California landscape. Opportunities for expansion have become costly around the mostly urbanized Bay Area. Much of the growth in the 21st century has stretched the urban fabric eastward toward and over the Diablo Mountain Range and across the Sacramento River Delta to the north. The map below (Figure 1.1) shows the extent of urbanized areas in the megaregion in 2017. The Diablo Range follows the boundaries between the Bay Area and the Northern San Joaquin Valley. The lack of urban centers along the boundary speaks to the challenge of building in the hilly geography, which extends to transportation development. The Sacramento River Delta acts as another significant obstacle to expansion. Only two major transport corridors connect the Bay Area, Northern San Joaquin Valley, and Sacramento: Interstate 580 and Interstate 80. State routes provide additional but limited connections between the Bay Area and Stockton and Merced County.

The megaregion's geography constrains growth, which, in turn, creates planning challenges for supporting a well-integrated and equitable economy. As population growth spills over into areas separated by difficult geographies, building infrastructure becomes more expensive. The lack of opportunities for expansion leads to competition for space between fast-growing industries and housing for workers. Many workers may move farther from employment centers, exacerbating the need for new infrastructure and requiring workers to commute longer distances on road networks not necessarily designed to support high transit volumes. Communities in the Northern San Joaquin Valley face unique challenges as growing populations can bring economic activity but also bring new costs and disparate demands between those invested in a primarily agricultural local economy and the needs of Bay Area workers and businesses.

This report examines the challenges the shifting urban landscape

in the Northern California Megaregion has created. We combine multiple data sources to show how migration, commuting, and housing fundamentally remade the megaregion and the relationships between its parts.

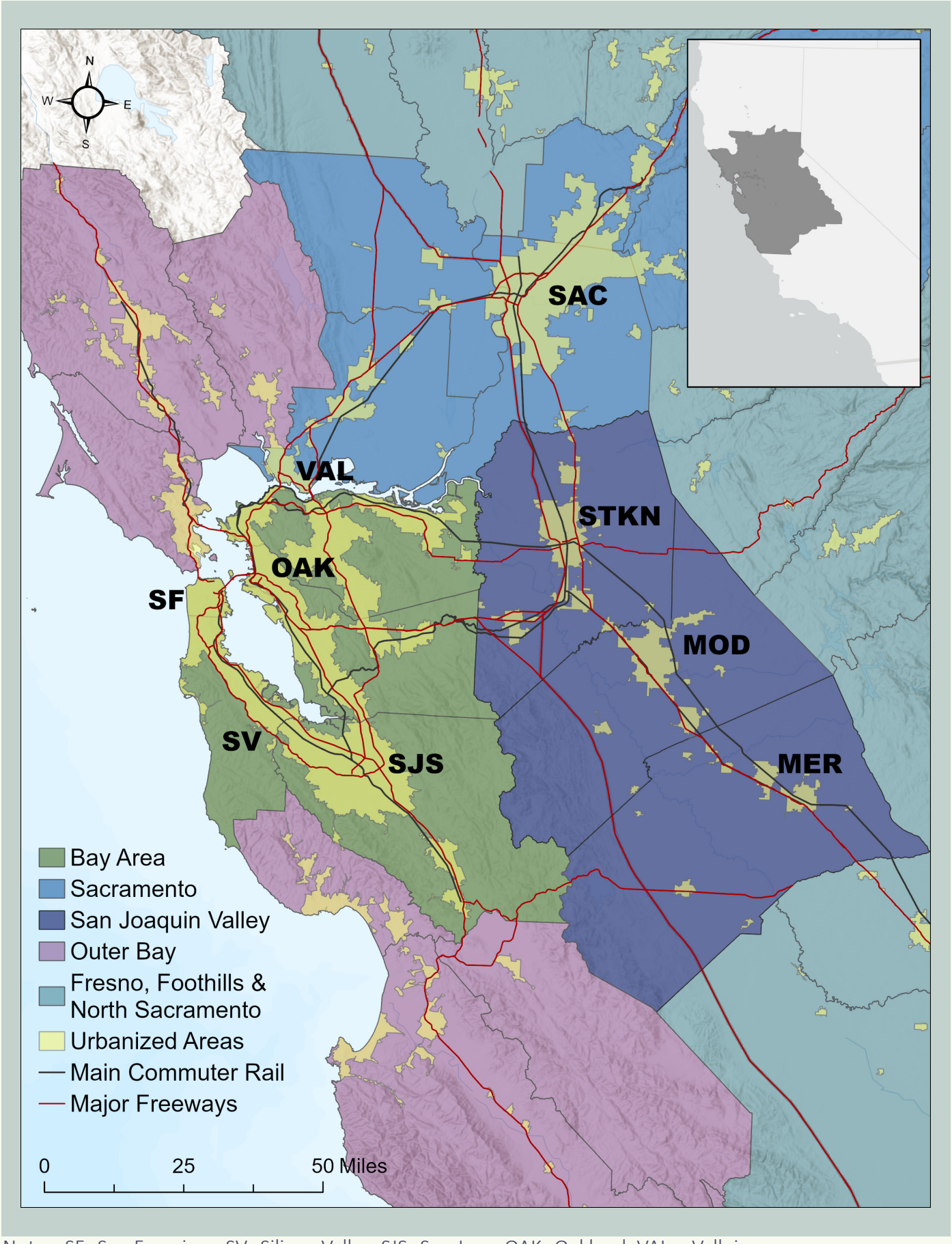
COVID-19 has accentuated the challenges facing the megaregion. Remote work accelerated migration to some communities farther away from the main urban centers with implications on commuting patterns. Home values reached never-before-seen prices while rising rents put thousands of people at risk of eviction or indebtedness across the state. Most of our data does not allow us to examine the impact of COVID-19 systematically, but the scale of the crisis expanded the scope of some parts of the report to add newer data sources. Moreover, the team shifted the project's focus to include tracking local and municipal government fiscal health. We initially planned to examine the balance of rapid growth and increased demand for services and how it impacted the fiscal health in areas receiving a high proportion of Bay Area migrants. However, the pandemic shifted our approach to focus instead on the impact of COVID-19 on the ability of local governments to function.

In later chapters, we will discuss the interconnectedness of migration and supercommuting, housing market trends, and the local economy. The next chapter lays out in detail the methodologies and datasets used in this report. Chapter 3 is on migration trends over the last two decades and a deeper analysis into two subsections: spatial structure and mobility and equity. Chapter 4 takes a deep dive into transportation, divided into three subsections: supercommuting, shared mobility, and the impacts of the COVID-19 pandemic on traffic and supercommutes. Chapter 5 discusses migration impacts on the housing market and supply and explores other priority areas for housing needs. Chapter 6 analyzes the impact of the pandemic on local fiscal conditions and other considerations for a megaregional economy. We conclude this report with our final chapter on policy recommendations generated in tandem with our research team and board of advisors. Together, the chapters of this report intend to uplift the Northern California Megaregion as a geographical and sociopolitical concept that should continue to be examined and discussed further.

A Changing Northern California Megaregion

The megaregion is separated into distinct local economies. Technology and finance dominate in the Bay Area. While technology firms have expanded their operations into the Sacramento region, the public sector plays a disproportionate role in the state's capital. The Northern San Joaquin Valley is mainly agricultural and its urban centers have long served as commercial hubs for the surrounding region. The abundant land around Sacramento and in the Northern San Joaquin Valley has also supported the rapid expansion of new low-density housing developments and land-intensive warehouse clusters. The configuration

Figure 1.1. Map of the Northern California Megaregion



Notes: SF- San Francisco, SV- Silicon Valley, SJS- San Jose, OAK- Oakland, VAL - Vallejo, SAC- Sacramento, STKN- Stockton, MOD- Modesto, MER- Merced

of the megaregion is reflected in the uneven growth of population and jobs.

From 2000 to 2019, the Bay Area grew half as rapidly as Sacramento and the Northern San Joaquin Valley but added almost as many people to their populations as the other metropolitan areas combined (Table 1.1). Growth in the Bay Area's core urbanized areas (surrounding the San Francisco Bay) ranged from slow to middling, with a few areas growing rapidly around San Jose (Figure 1.2). Conversely, the areas with the fastest growth in the Bay Area were in eastern Alameda and Contra Costa counties and in the communities of Morgan Hill and Gilroy south of San Jose. The cities of Dublin and Livermore in Alameda County, in particular, have been among the fastest-growing cities in the state.

High-growth areas in the Greater Sacramento area and Northern San Joaquin Valley are in the suburbs of the main urban centers and along the eastern side of the Diablo Mountain Range. Communities south of Stockton, like Manteca, Ripon, and Tracy further west, have grown more rapidly than the principal cities. The pattern is reproduced around Sacramento, where suburbs like Roseville and Elk Grove have added new developments. While much of the growth in the Central Valley happened in suburban rings, cities farther from established urban areas have often grown just as fast. For example, Newman and Patterson in Stanislaus County and Los Baños in Merced County have doubled or tripled their population since 1990.

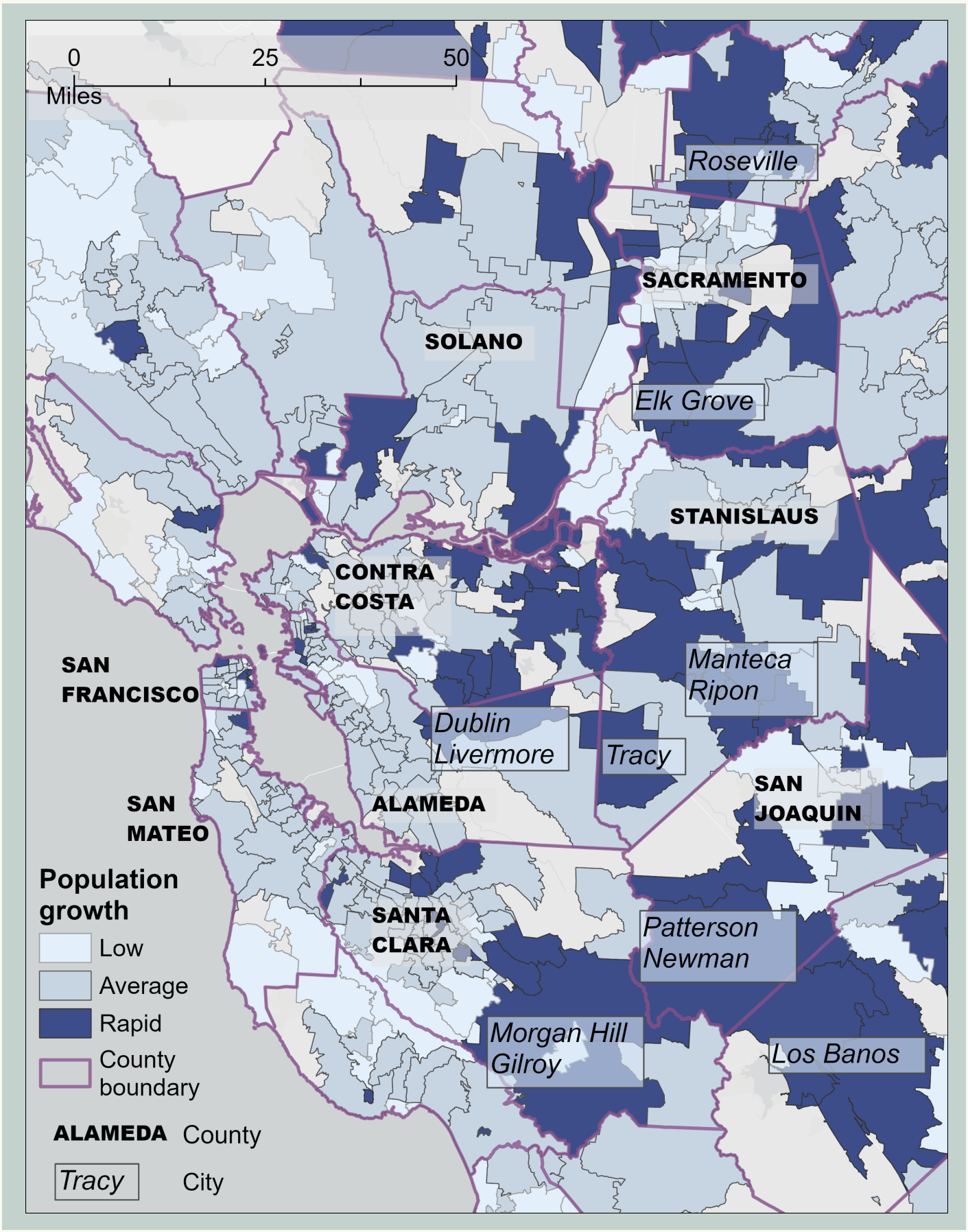
An unbalanced housing supply increase accompanied the uneven population growth. Population growth far outpaced housing production in most of the region. In nearly every county, new housing units were not enough to match the California average household size of 2.8 (number of persons per housing unit). The map in Figure 1.3 highlights the imbalance between average household size and housing production. The household size in the San Joaquin Valley was already high compared to the state and continued to increase between 2000 and 2019. Housing production was higher in the San Jose area, but not enough to reduce the already high household size, which remained close to 3 in 2019. San Francisco illustrates why average household size is an imperfect measure of crowdedness and

Table 1.1. Population and jobs growth from 2000 to 2019.

Region	Population 2000 (in millions)	Population 2019 (in millions)	Population growth (in %)	Jobs in 2002 (in millions)	Jobs in 2019 (in millions)	Jobs growth (in %)
Bay Area	5.56	6.37	14.6	2.74	3.5	27.7
San Joaquin Valley	1.22	1.56	27.9	0.42	0.52	23.8
Sacramento	2.19	2.76	26	0.85	1.15	35.3

Source: US Decenial Census 2000, ACS 5-year 2015-2019, and LEHD LODES 2002 and 2019

Figure 1.2 Population growth rate between 2000 and 2019.



Notes: Low is below 2.5%, average is between 2.5 and 25%, high is above 25%.
Source: US Decennial Census 2000 and ACS 5-year 2015-2019

housing shortage. The average household size in San Francisco is low and housing production has outpaced household formation. Yet, San Francisco's housing cost is among the highest in the United States.

In addition to population growth, housing is responsive to wage levels. Where higher wages are prevalent, people can afford to pay more for housing and outbid lower-income residents. In San Francisco, the Silicon Valley, and San Jose, increases in wages and lagging housing production combine to sustain housing costs that are unaffordable to all but those who have high wages.

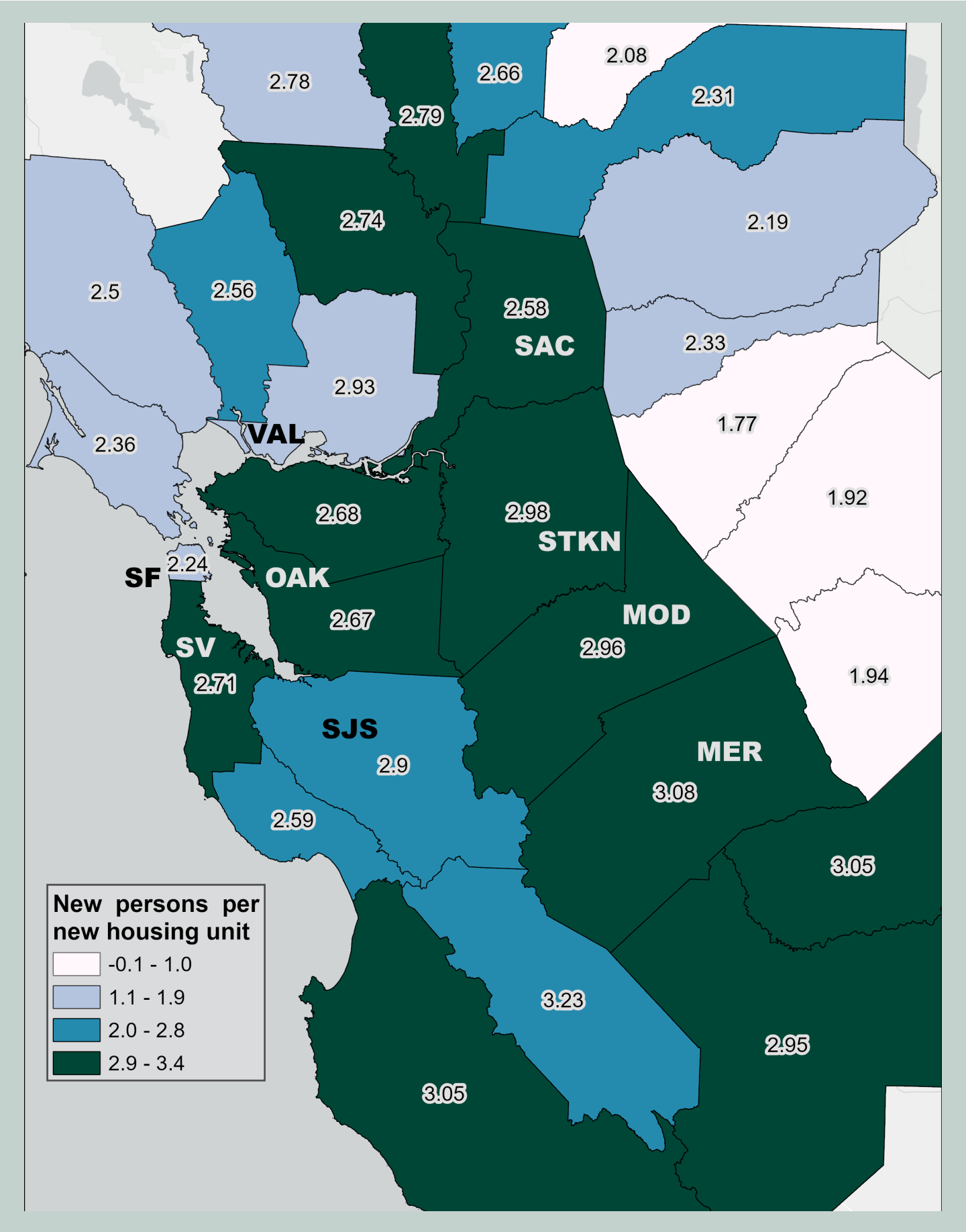
The competition for housing is tied to the labor market. Job growth has remained concentrated in the main Bay Area urban center and, to a lesser extent, in Sacramento. The Bay Area added over 750,000 jobs between 2002 and 2019, nearly double the combined total for Greater Sacramento and the Northern San Joaquin Valley. In short, the Bay Area added as many jobs as it added people, a balance that tips strongly toward population growth in the rest of the megaregion. Figure 1.4 shows the disparity in the number of jobs and job growth. San Francisco, San Mateo County, and San Jose are among the largest job centers in the megaregion and added more jobs than they added people. While growing rapidly, other large employment centers, like Sacramento and Oakland, added more people than they added jobs between 2002 and 2019.

The imbalance between job and population growth creates significant bottlenecks. Tax codes incentivize cities in California to prioritize businesses over housing to generate local revenues. The large footprint of technology firms in terms of land and people employed further reduces the land available for new housing and increases demand for housing close to employment centers. Rents and home values, as a result, increase far beyond what average workers can afford. Some cities in the Bay Area have responded by increasing density through the development of multi-family housing, but supply has yet to match the scale at which the Bay Area has added jobs.

The lack of affordable housing opportunities in the Bay Area and Central Valley leads to spillovers. This report builds on the hypothesis that the rapid growth in Greater Sacramento and Northern San Joaquin Valley since 2000 is not independent of the constrained housing supply in the Bay Area. Figure 1.5 shows total domestic net migration (total that came in minus total that left from anywhere in the U.S.). The timing of the peaks suggests a correlation with the regional business cycle. Migration into the Bay Area was net positive in the years leading to the 2001 dot-com bubble. The housing affordability crisis that accompanied the bubble, however, prompted mass out-migration that bottomed out in 2001. Around the same time, migration into Sacramento and the Northern San Joaquin Valley reached its highest level.

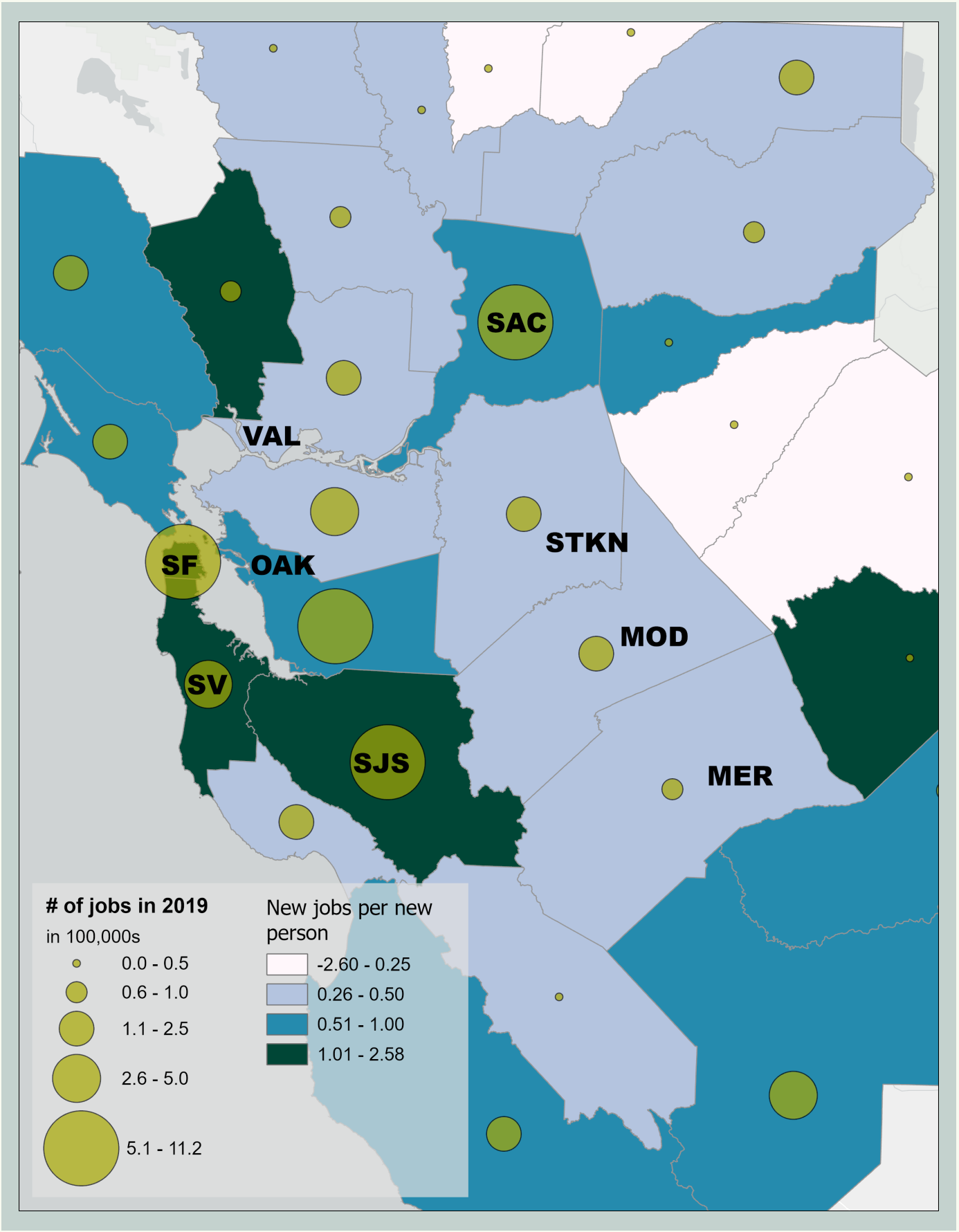
Migration returned to positive levels in the Bay Area in the years leading up to and during the 2008 financial crisis as housing costs plummeted and

Figure 1.3. Average household size in 2000 (labels) and new persons per new housing unit.



Source: US Decennial Census 2000 and ACS 5-year 2015-2019

Figure 1.4. Number of jobs in 2019 and number of new jobs per new resident in megaregion counties.

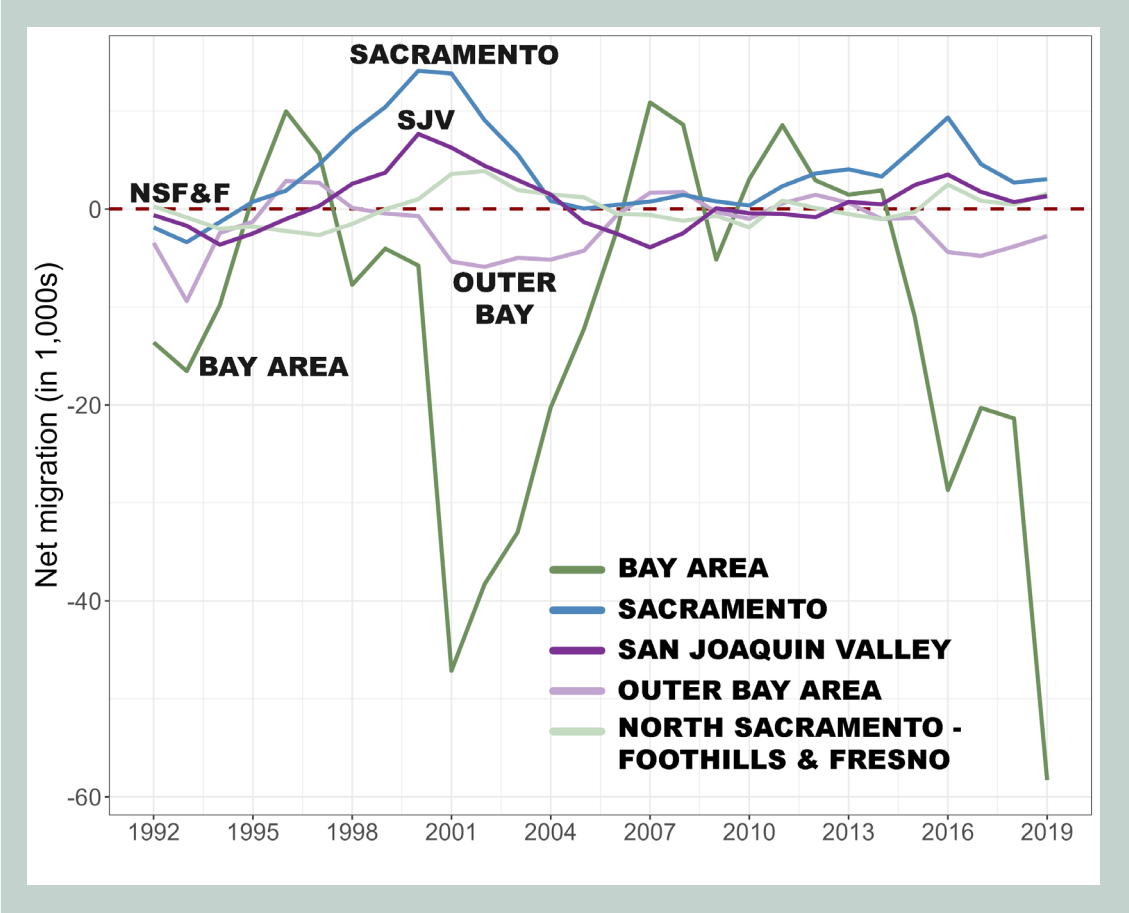


Source: LEHD LODES 2002 and 2019 and US Decennial Census 2000 and ACS 5-year 2015-2019

the crisis hit cities in the Northern San Joaquin Valley particularly hard. As the housing market recovered more rapidly in the Bay Area than in the surrounding metropolitan areas, net migration turned negative again by 2014 and reached its lowest point in 2019. Although the figure's timeline ends right before the 2020 onset of the COVID-19 pandemic in California and the U.S., anecdotal evidence and media press coverage cite another spike in out-migration from the Bay Area and into the larger megaregion.

A large share of the out-migration from the Bay Area is directed toward the neighboring metropolitan areas. Figure 1.6 shows the magnitude of migration flows between the Bay Area, Greater Sacramento, and the Northern San Joaquin Valley. The arrows are proportional to the number of migrants from 2000 to 2019, showing that many more people migrated from the Bay Area to Greater Sacramento and the Northern San Joaquin Valley. The number within each circle is the total migration between counties within the same metropolitan area, providing a sense of scale. While many people leave the Bay Area, many more move between counties within it. In contrast, many more people move in and out of the Northern San Joaquin Valley than between counties within it.

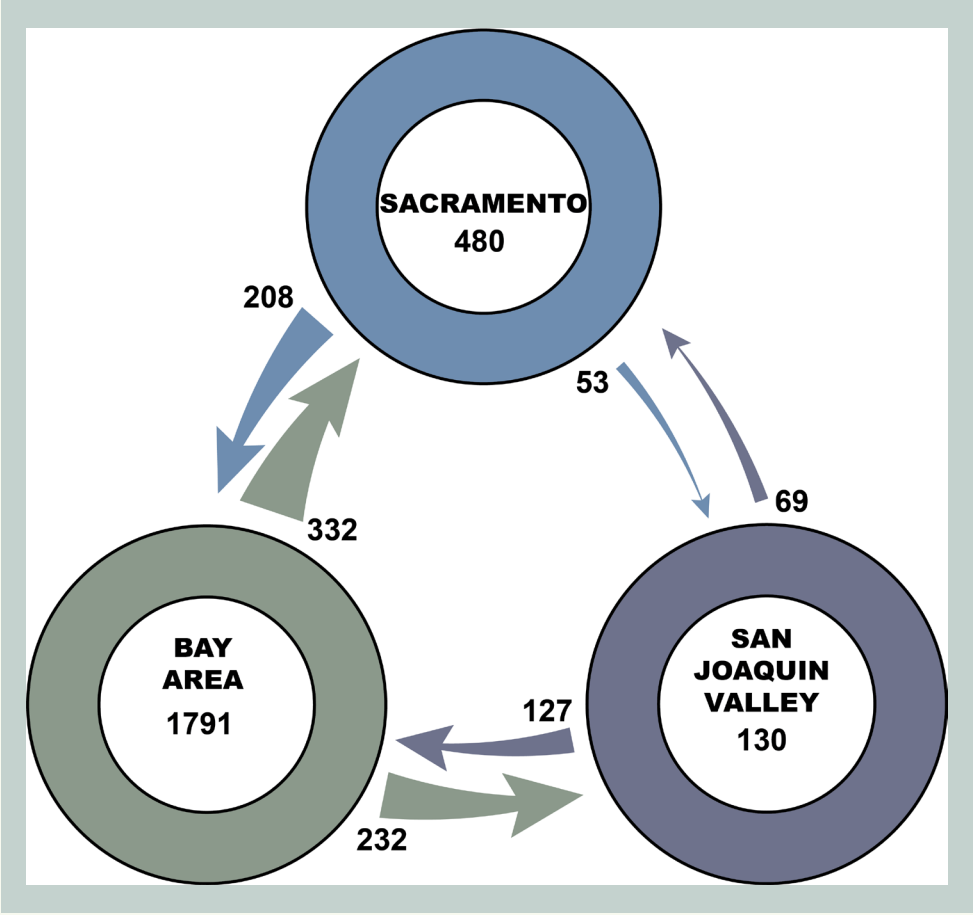
Figure 1.5 - Net migration for metropolitan areas between 1992 and 2019



Source: Internal Revenue Service- Statistics of Income (IRS- SOI)

The more significant flows from the Bay Area into Sacramento and the Northern San Joaquin Valley are an important factor in understanding the changing structure of the megaregion. People leaving the Bay Area can be lower-income and find greater affordability in neighboring cities. If movers cannot find jobs locally, however, they may continue to work in the Bay Area, exacerbate transportation bottlenecks, and see smaller benefits to moving as housing cost is replaced with commuting cost. Irrespective of income, the large migration flow inflates housing demand in Greater Sacramento and the Northern San Joaquin Valley, driving housing costs up if supply lags. In short, the equity implications are ambiguous and different for movers and existing residents.

Figure 1.6 - Migration flows (in thousands) between metropolitan areas [arrows] and between counties within each metro area [within the circles].



Source: IRS- SOI

2 Methodologies and Data

The transformation of the Northern California Megaregion is the sum of complex interactions between labor markets, housing, and politics. The goal of this report is not to examine the causes of megaregional integration. Our goal in this project was to build a fact base that can inform planning at the megaregional level. Each chapter documents how the constituent parts of the megaregion interact, beginning with migration.

While migration is the cornerstone of the analysis and we focus on the impacts of migration, the movement of people is always part of a two-way relationship. For example, migration from the high-housing value market of the Bay Area to the significantly more affordable Central Valley market can increase home values in the receiving area. Migration has an impact on housing values, but housing values are also a contributing factor that increases migration from expensive to cheaper areas. The diagram in Figure 2.1 provides an overview of the relationships we examine. For each chapter in the center of the diagram, we use insights from the analysis of migration in the megaregion from Chapter 3 to document the kind of two-way relationship discussed above.

COVID-19 added another potent transformative force that we could not ignore. The pandemic shifted the focus of the local government fiscal and transportation analyses. Despite the pandemic's significant impact on migration and housing, our analysis focuses primarily on the pre-COVID period due to the difficulty in obtaining reliable data that matches the scale of the analysis across data sources.

Megaregional planning is a nascent project with no formal organizations comparable to metropolitan planning organizations and councils of governments. Yet, the scale at which people move (through migration and commuting), and the impacts these movements have on infrastructure and housing markets emphasize the needs for megaregional coordination. This report is also an example of how to approach such a complex issue that brings disparate actors together at a scale with which they are unaccustomed. Figure 2.2 illustrates the combination of methods we applied to develop a framework that takes quantitative and qualitative data as inputs to produce an overview that is relevant to local and state policymakers. The results in this report often stem from deeper analysis using statistical models that yield unwieldy tables. We make all results available upon request if they are not already published.

Figure 2.1. Structure of the report

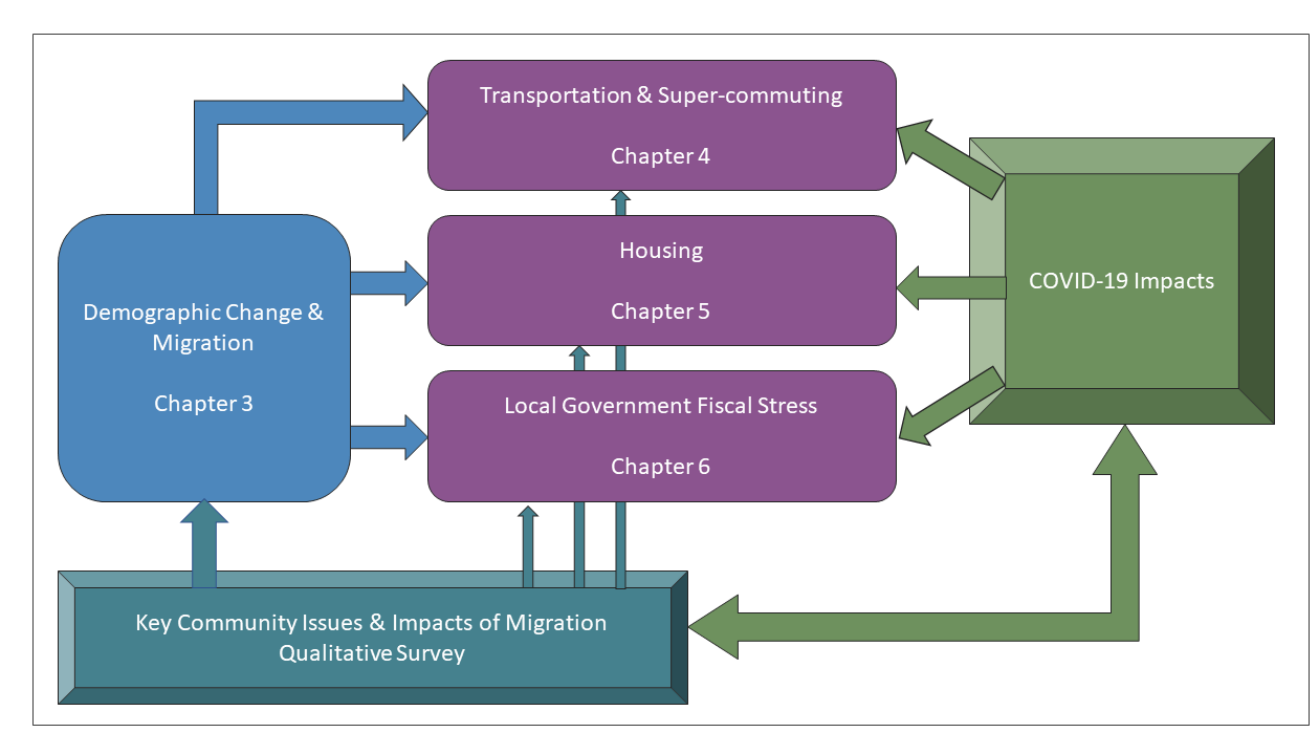
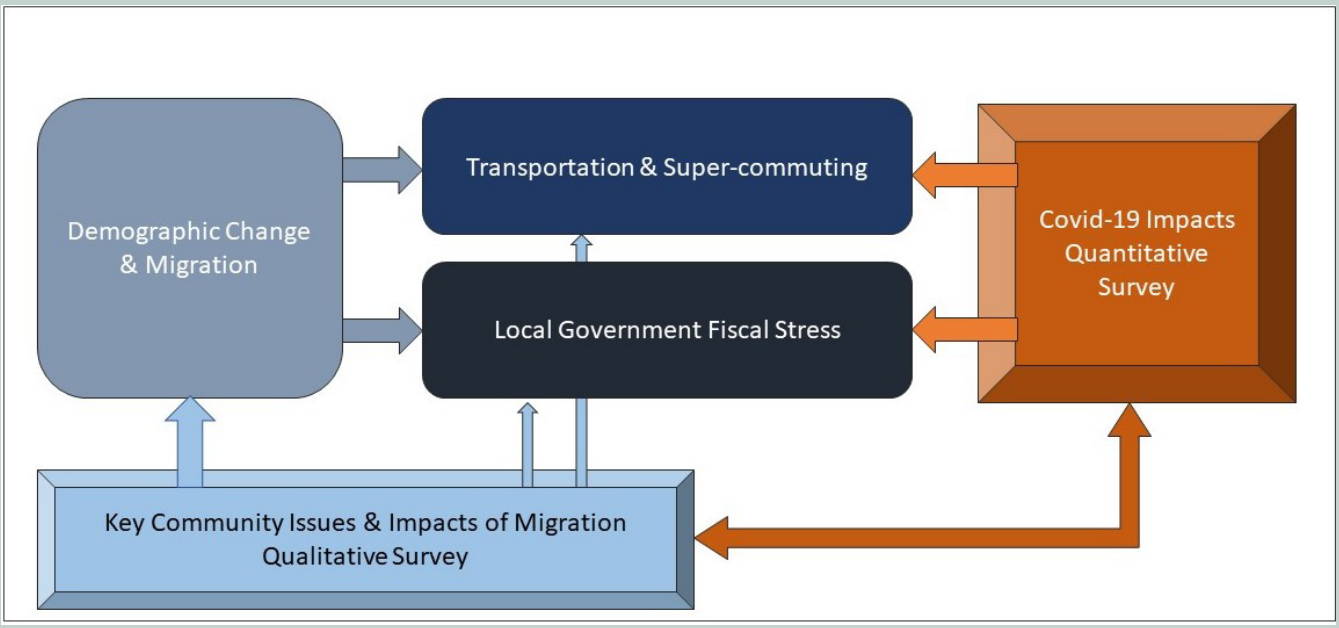


Figure 2.2. Methodological approach



Geographic Units

The concept of megaregion is not well established; there is no equivalent in the US Census geographic nomenclature. The Regional Planning Association (RPA), a regional planning organization in the New York City region, for example, defines megaregions as "agglomerations of metropolitan regions with integrated labor markets, infrastructure, and land use systems".[1] Back in 2005, the RPA identified 10 emerging megaregions in the US, including Northern California as one of them. The Lincoln Institute of Land Policy, a national think tank on land use, sees megaregions as having "shared economies, natural resource systems, infrastructure, history, and culture, these linked networks of metropolitan areas and their hinterlands … can strengthen climate resilience, natural resource management, economic competitiveness, and equity at the local, regional, and national levels in the United States". In 2022, they came out with a book Megaregions and America's Future that further delves into the concept and provides updated data on the 13 U.S. megaregions identified therein, including the Northern California Megaregion.[2]

While our approach to defining the megaregion deviates from both RPA, the Lincoln Institute, and established US Census standards for metropolitan areas, there are nonetheless parallels in construction that provide useful background. From a data perspective, the closest equivalent to the megaregion in the US Census nomenclature is the Combined Statistical Area (CSA). The CSA is developed from the aggregation of smaller Core-Based Statistical Areas (CBSA). If a commuting flow between two adjacent CBSAs are greater than 15% (i.e., 15% of commutes end in a neighboring CBSA), the two CBSAs are considered part of the same CSA. The CBSA definition also relies on commuting intensity to determine which counties (the base unit for CBSA) belong together but begins with a central county or counties to initially establish a CBSA based on population size.

The US census approach, however, omits links that are critical from a planning and policy perspective by prioritizing standard metrics. For example, Sacramento anchors its own CSA, separate from the Bay Area, a separation we did not want to maintain. We, nonetheless, rely on a similar nomenclature of megaregion as an aggregation of metropolitan areas.

We define the extent of the Northern California Megaregion to include counties that are within two-hours commute of the Core Bay Area metropolitan area, defined as Alameda, Contra Costa, San Mateo, San Francisco, and Santa Clara counties (Bay Area henceforth). The Bay Area includes the counties that form an uninterrupted urbanized area wrapping around the San Francisco Bay (Figure 1.1). A dense network of public transit links cities within the urbanized area and the housing market is homogeneously expensive. We divide the counties outside the Bay Area into another two metropolitan areas and two comparison areas.

The Greater Sacramento metropolitan area includes Sacramento, Solano, El Dorado, Placer, and Yolo

counties. Sacramento is a mid-size city with a growing population and even faster-growing suburbs. The size of Sacramento and its economy centered on the state public sector makes the metropolitan area a distinct part of the megaregion. Most residents in the area work in Sacramento rather than the Bay Area. However, Sacramento's growth is clearly linked to the Bay Area. Several large technology firms moved operations to the area and the housing market provides attractive opportunities for Bay Area residents.

The Northern San Joaquin Valley metropolitan area is traditionally an agricultural economy with the main urban centers of Stockton and Modesto serving as commercial and transportation hubs for the industry. Like Sacramento, the growth of technology has spilled over into the region, albeit in a different sector. The logistics element of the digital element has established a large footprint in the Northern San Joaquin Valley where agricultural land has been converted into large warehousing districts. Housing growth has also been robust and provides opportunities for cheaper housing within 20 miles of the Bay Area.

The comparison areas are counties that are within the megaregion but are less central due to their lower population, leisure-focused economies, and greater distance from the Bay Area. We include these counties because they can provide useful comparisons and play important roles within the megaregion. The first comparison area is the Outer Bay. The area includes counties to the south and north of the Bay Area. Despite the proximity of many of the counties in the Outer Bay, we separated the area because the urbanized areas are clearly separated by a major topographical feature (either by the San Francisco Bay or by the Santa Cruz Mountains). The Outer Bay counties lack major urban centers and mix a high reliance on leisure, expensive housing markets along the coast, and an agricultural economy farther away from the coast.

The second comparison area includes counties to the north of Sacramento, east of the Northern San Joaquin Valley, and the Fresno area. These counties lie just outside the 2-hour range from the Bay Area. Except for Fresno, most of the counties are among the lowest density in the state and rely on tourism and leisure, agriculture, and natural resource extraction for the bulk of the economy.

The ZIP Code is the unit of analysis we most commonly use throughout the report. ZIP Codes are not standard geographic units. The ZIP Code is a numbering system the US Postal Service uses to sort and deliver mail. As such, there are no boundaries associated with ZIP Codes and the area of service can change substantially from year to year. The ZIP Code is nonetheless used extensively for research because many administrative data sources are only available at that level of aggregation for privacy purposes. The US Census Bureau created the Zip Code Tabulation Area (ZCTA) in 2000 to approximate the geographic extent of ZIP Code service areas and provide a unit that could be easily matched with census data.

ZCTAs vary significantly in area and population size due to its origin as mimicking a postal unit. ZIP Codes in dense urban areas can be small in area but have populations in the tens of thousands. In contrast, rural ZIP Codes have large areas and sometimes very small populations. While we cannot mitigate the limitations associated with ZIP Codes' variation in size, we take steps to standardize the boundaries over time to match the 2010 ZCTA boundaries.

The primary source of migration data for this project is state tax records (see next section for details on the data). The ZIP Code information is, therefore, the ZIP Code listed on people's taxes, which corresponds to a mailing address. In other words, the geographic information corresponds to the postal ZIP Codes rather than the census ZCTA. We created a crosswalk program to assign every tax record to the 2010 census ZCTA based on the following steps.

Maps derived from the extent of postal delivery routes have been maintained yearly since 2002. We use these maps as approximations of the postal ZIP Codes and the best way to locate records geographically. Figure 2.3 illustrates the succession of steps taken to locate records geographically for a small area highlighted in the first (top-left) panel. The second panel shows areas where the postal ZIP Code matches the ZCTA in green. The areas in red are either areas that the ZCTA do not cover or areas where the ZCTA code differs from the postal ZIP Code. The third panel shows that the large areas in red are mostly uninhabited (the ZCTA do not cover places with no population). The gray areas are census blocks where the population is above three and the density is at least 50 persons per square kilometer. The mismatched areas are mostly small misalignments at the boundaries. We ignore all mismatched areas with no population.

For the next step, we take advantage of the information on detailed ZIP Code of residence that is available for some records. Detailed ZIP Codes (also known as 9-digit ZIP Codes) have an additional four digits and are much smaller in extent (usually a block). The fourth panel shows the center of the detailed ZIP Codes provided by Geolytics, Inc.[3] The detailed ZIP Code is a sensitive piece of information due to the small size of the unit. Therefore, any ZIP Code where the number of addresses is too small lacks this detailed information, giving us better coverage in dense urban areas than in suburban and rural areas. For the complete records, we can assign the record to the 2010 ZCTA based on the location of the detailed ZIP Code center.

Some records list a PO Box rather than a ZIP Code that corresponds to a physical address. In those cases, we use a separate crosswalk developed by the Department of Housing and Urban Development and PO Box locations provided by zip-code.com to allocate the records to the ZCTA.[4] The fifth panel of figure 2.3 shows examples of the location of ZIP Code location information. The red dots are PO Boxes that do not match the ZIP Code within which they are located. All records associated with this

PO Box ZIP Code are reassigned to the corresponding ZCTA. This is an imperfect allocation as people may use a PO Box in a ZIP Code different from where they reside (especially if close to the border), but there are no alternatives. The total number of records associate with PO Boxes is around 3% of all records and we believe our allocation is a reasonable geographic assignment for these records.

Finally, we use the share of workers in the mismatched blocks to proportionally reassign remaining records that have not yet been reallocated. We use LODES employment data (description below) from 2002 to 2015 to calculate the share of workers that should be in a different ZCTA than the ZIP Code. If, for example, 5% of workers should be in ZCTA 94520 instead of postal ZIP Code 94519 and 3% of records have already been reallocated to that ZCTA based on previous steps, we randomly reassign the number of records that would bring the total to 5%. This last step is the least precise, but affects less than one in five records as detailed in Table 2.1.

The first row of Table 2.1 shows that two thirds of records have ZIP Codes that match their ZCTA. The reallocation based on detailed ZIP Code information brings the total of reassigned records to 78% and PO Box locations increase the total to 81%. We begin the crosswalk from 2015 because records are linked across

Figure 2.3. Illustration of the crosswalk steps

years (the same person filing taxes year after year). The ZIP Code boundaries in 2015 matched ZCTA boundaries well, giving us a large share of records needing no reassignment. Once, we assign as many records as possible using available information, we allocate the remaining records proportionally. We then take every record that was present in 2015 and 2014 that did not change ZIP Codes and assign the same ZCTA. That last step means that in earlier years the share of records proportionally reallocated is smaller.

ZIP Codes do not fit neatly into counties. We use the population-weighted ZIP Code median center to allocate every ZIP Code to a county. The population-weighted center uses block level data to determine where most of the population of the ZIP Code resides. If the population is evenly distributed, the center will be the same as the geographic center. In many larger ZIP Codes, the population is concentrated in one portion and the weighted center will put the center nearer the higher density part of the ZIP Code. For clarity, we only use the term ZIP Code to refer to ZCTA or ZIP Codes unless a distinction is required.

Table 2.1. Share of records allocated to ZCTA geography after each step for the year 2015

	Cumulative share of records allocated
Concordant ZCTA	64.3%
5+4-digit Matching	78.7%
PO Box matching	81%
Retroactive matching	97%

Migration and demographic change

Migration refers to any move between two ZIP Codes. Local moves are often termed residential mobility because people who move locally usually seek different housing and people who move longer distances often are changing employment. We do not draw this distinction because the megaregional scale blurs the difference between residential mobility and migration. The US Census considers Sacramento a different labor market than the Bay Area and moving between the two metropolitan areas would therefore be considered migration. However, the integration of the two economies, increasing commuting, and large-scale migration flows suggest that many moves would be considered residential mobility if it were not for the administrative distinction between the two metropolitan areas. We use the terms migrations and moves interchangeably and specify where relevant whether the move crossed metropolitan boundaries or was local.

Franchise Tax Board (FTB)

The FTB compiled and shared anonymized tax records for the counties in this study for all people who file state income taxes in California between 1994 and 2015. All data were anonymized and analyzed in secure data environments per research agreements with the FTB and under terms of USC's Institutional Review Board, and reported in aggregated formats. We used those records as the

primary means of measuring migration. A record corresponds to an individual who filed taxes in a given year. If someone filed taxes every year between 1994 and 2015, the data will include 22 records, each linked to a unique anonymized identification number. In addition to the identification number, each record includes the individual's ZIP Code used for filing, filing status (i.e., married or head of household), number of dependents, adjusted gross income, and year of birth. We use this information to identify moves when the individual's reported ZIP Code is different from one year to the next. We further determine if the move resulted in a change in county and metropolitan area to classify the type of move.

While individuals file taxes and are listed as the primary filers, each record can correspond to multiple people. Individuals have a choice in how they file their taxes (e.g., married couples can file as single). The variation in how people file taxes and the fact that many people live with people with whom they share a household but do not file taxes as a household creates limitations in how we can interpret the data. We generally use the record as the unit of analysis, counting each record rather than the number of people associated with the record. This approach leads to a conservative estimate of the number of people moving. The lack of information on household structure also affects interpretation of income, which we use in several analyses. The reported income may not reflect the household or family income. When counting lower-income filers, for example, some low-income filers may be part of a multi-income household that would change their status. There are no data available to overcome these limitations.

Internal Revenue Service (IRS) Statistic of Income Division (SOI)

The U.S. federal tax agency- Internal Revenue Service (IRS) – also calculates migration based on federal tax filings. The IRS SOI migration data uses a method similar to the one we use for the FTB data, comparing the ZIP Code used for filing from one year to the next to determine moves. The SOI, however, is only available at the county level. We use the SOI data as a check on the overall migration flows we calculate and to extend the range of the data to more recent years, since the SOI data are available from 1992 to 2019, while our FTB data are available 1994 to 2015.

US Postal Service (USPS) Change of Address (COA)

The USPS COA data are another publicly available measure of migration. The US Postal Service (USPS) records all changes of address on a monthly basis and releases the total number of people leaving and entering a ZIP Code. Unlike the SOI and FTB data, the COA does not report the ZIP Code of origin and destination. It is, therefore, possible to calculate the net migration for every ZIP Code, but not where people are moving to or moving from. The COA data differentiates between moves that are permanent and

temporary moves as well as whether an individual moved out of a household or a family moved. We use a standard formula to approximate the number of households who moved.[5] While the COA has limitations, the monthly cadence of the data and the regular updating makes one of the only ways to track migration up to the most recent quarter.

American Community Survey (ACS)

Census data from US Census Bureau's American Community Survey (ACS) 5-year average commuting characteristics, available at the Zip Code Tabulation Area (ZCTA) level from 2006-2010 to 2015-2019. ACS data can be aggregated to the county and state levels. Commuting data include travel time, travel mode, and workplace location, as well as key demographic variables. This database is free to the public. We access the data through IPUMS NHGIS (IPUMS NHGIS, University of Minnesota, www.nhgis.org).

Transportation and supercommuting

The number of people driving long distances to work (supercommuters) has steadily increased in the United States, impacting individuals' health and environmental sustainability. Supercommuting affects at least 3% of U.S. commuters. We define supercommute as a one-way commute longer than 90 minutes (Moss et al., 2012) or at least 50 miles (FHWA, 2018), following existing literature. California's Central Valley has several metropolitan areas within the top ten of the highest shares of supercommuters in the U.S. According to ACS, San Joaquin, Stanislaus, and Merced Counties had 10.2%, 8.6%, and 8.6% share of super-commuters, as a fraction of commutes originating in those counties. The Bay Area has also seen rapid increases in its share of supercommuters, as measured by time, growing from a 2.3% share of all Bay Area commutes in 2005 to a 4.8% share in 2016.

The study of supercommuting has suffered from a lack of consistent definition and available data. We, therefore, empirically assess supercommuting using five data sources to highlight the strengths and shortcomings of each source. We are the first to systematically compare census-derived data such as American Community Survey (ACS) and Census LEHD Origin-Destination Employment Statistics (LODES), to mobile-derived data (StreetLight Insight), and travel survey data (CHTS and NHTS). These data enable us to examine how demographic factors such as income, occupation, age, and residence are associated with supercommuting. Finally, we use tax records data to analyze the relationship between migration from the Bay Area to the Central Valley at the Zip Code level and supercommuting.

Travel Surveys

Travel diary data from the US Department of Transportation's (USDOT) 2017 National Household Travel Survey (NHTS) and Caltrans' 2012 California Household Travel Survey (CHTS). Data include travel distance, mode, and time, as well as personal and household

characteristics variables. Access to this database is obtained to the geocoded spatial data for the 2012 CHTS and 2017 NHTS through Dr. Marlon Boarnet's active National Center for Sustainable Transportation (NCST) and Pacific Southwest Region (PSR) University Transportation Center contracts with Caltrans. Researchers and transportation planners can obtain access to public use files from these datasets. Secure versions of the data include residential locations and trip origin and destination locations.

LEHD LODES

State-level employment and administrative data from the US Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics (LODES), available from 2002 – 2018. The Origin-Destination (OD) data contains information on census block to census block home to work flows, which aggregate to the ZIP Code, county, or state levels. OD data also includes high-level demographic and industry group characteristics. LEHD LODES also contains a Workplace Area Characteristics (WAC) database with more detailed employment information at the census block level and a Residential Area Characteristics (RAC) database that provides population information at the census block level. We use the WAC to better understand employment growth and trends and the RAC as an additional data point on area populations.

StreetLight InSight®

StreetLight is a private firm specializing in mobility metrics and analysis, which uses Global Positioning System data from phones to create measures of flow between locations. They temporarily licensed their data platform to academics researching the impact of COVID-19, providing a valuable up-to-date source. Their system uses a machine learning algorithm trained with census data to infer demographic information about commuters from a sample of phones. The platform provides information about travelers' origin and destination, travel distance, travel purpose, and basic demographic information (income, ethnicity, educational level, etc.) and has gone through extensive validation using transportation data.[6] Unlike the ACS and LEHD-LODES, StreetLight data includes all trips, not just work commutes. It is available monthly from 2016 onwards. We use this data to measure the changes in ZIP Code to ZIP Code commuting flows before and during the COVID-19 pandemic. Because the data rely on sampling and impose limits on the total number of ZIP Codes included, we only use ZIP Codes that intersect urbanized areas in our study area or that have a population over 3,000 and are in our study area.

Rideshare Survey

In 2021, we partnered with the San Joaquin Council of Governments (SJCOG) who run the "dibs" vanpool and app-based rideshare programs. These programs serve over 10,000 people in San Joaquin, Stanislaus, and Merced counties. Together with SJCOG Assistant Program Specialist Stephanie Maynard and with input from

SJCOG Senior Program Specialist Yvette Davis and other key agency partners, the USC / Occidental team developed a user-friendly questionnaire via the MetroQuest survey tool. The questions focused on the joint goals of understanding dibs members' travel behaviors and dibs resource access and marketing. Regarding the research questions above, the survey queried the following topics:

1. User demographics
2. Trip origin, destination, and frequency
3. Sector of employment
4. Access to alternative mode of transportation (e.g., # of cars per working adult in household)
5. Reason for using vanpool or carpool (cost, lack of alternatives, convenience, etc.)
6. Impact of COVID-19
   a. Usage frequency
   b. Concerns about using service
   c. Satisfactory protective measures
7. Post-COVID-19 use expectations

A demo version of the survey is available here.[7]

The email-based survey was sent out in September 2021 to about 10,000 dibs members with active accounts, located in San Joaquin, Stanislaus, and Merced counties. We received 157 completed survey responses over about a month-long period, representing a 1.6% response rate. Given the relatively low response rate, we also supplemented our sample with a survey conducted by the National Association for Commuter Transportation (ACT) in 2020. This national survey queried commuters' responses to COVID-19. The ACT survey had reasonable overlap in the types of questions asked with the dibs survey described above.[8] SJCOG graciously provided ACT survey responses for respondent in San Joaquin, Stanislaus, and Merced counties. We note where data comes from ACT vs dibs surveys in Chapter 4.

COVID-19 Data

The California Department of Public Health provides access to daily counts of COVID-19 cases, deaths, and testing at the county level since February 1, 2020. The data is not reported on weekends or state holidays. The vaccine progress dataset provides weekly updates on full, partial, and at least one vaccine dose coverage rate by ZIP Code for the whole state since January 5, 2021.

The Blueprint for a Safer Economy is the main policy tool California has used to guide counties in implementing restrictions for a safe progression to reopen business and activities during the pandemic. The framework assigned one of four safety tiers to each county weekly. Tier 1 is the widespread disease transmission stage (least safe to re-open), tier 2 is substantial, tier 3 is moderate, and tier 4 is minimal (most safe to re-open). The state of California announced this policy on August 31, 2020, and retired it on June 15, 2021, because the whole State had met the criteria to fully reopen. All datasets are publicly available on the California Open Data Portal.

Housing

Among our project areas, housing in the area in which plentiful data is available from a variety of public, private, and proprietary sources, at multiple geographic scales. Given this project's focus on understanding housing as it relates to migration, and vice versa, we focus on a select set of generally representative data points and data sets that are publicly available, making the analyses mostly reproducible by other researchers or in other regions.

California Department of Finance (DOF)

The DOF produces population and housing estimates for California cities, counties, and statewide on an annual basis. This presents a more frequently timed population and housing dataset at the city and county level than the US Census or ACS. Housing variables include the number and types of units in existence from starting from 1990. We specifically use the following estimates "E-5 Population and Housing Estimates for Cities, Counties, and the State" and "E-8 Historical Population and Housing Estimates for Cities, Counties, and the State" to understand housing supply growth trends and multifamily unit growth trends.

Zillow Home Value Index (ZHVI)

There are many data sources that catalog home values, including public ones such as the US Census, ACS, and the American Housing Survey, and private ones such as Zillow, CoreLogic, etc. Of these, Zillow's Home Value Index provides publicly available dataset with a long data span (1997 to present) on a frequent basis (annual or better) and sufficiently covers each county as well as the cities necessary to our study. By definition, the "Zillow Home Value Index (ZHVI): [is a] measure of the typical home value and market changes across a given region and housing type. It reflects the typical value for homes in the 35th to 65th percentile range. Available as a smoothed, seasonally adjusted measure and as a raw measure."[9] This means it is a general measure that includes single-family residential units, condominiums, and co-ops, and reflects home prices toward, but not at, the median of a particular city or county. We use the smoothed, seasonally adjusted measure, which combines home prices for all numbers of bedrooms. We use ZHVI to analyze home price levels and trends over the available ~25 year time period.

Apartment List Rent Estimates

Rent data at the unit level are considerably difficult to obtain in the US context. Data at the city and county level are considerably more common. Public data from the US Census, ACS, and American Housing Survey provides average and median rents for census geographies but lags the current market by several years. Proprietary data sources tend to be aggregators of rent data or companies whose business it is to rent units. Many of these then collect, anonymize, and aggregate this data and make it available for purchase or in some cases for public download.

Apartment List is such a company which markets units for rent. They also have a sophisticated research arm that publishes publicly available aggregated monthly rent trend data for most counties and many cities in our study areas. We use their "Apartment List Rent Estimates: monthly estimates of the median rent paid for new leases in a given market. These rent estimates are available at the national, state, metro, county, and city levels back to January 2017. We also provide a summary file which contains the current rent levels as well as month-over-month and year-over-year growth rates for all locations in our sample."[10] This means that our rent data reflect up to date current market conditions in each year, with data available monthly from 2017 onwards.[11] We use Apartment List data to analyze rent levels and trends over the available time period.

National Housing Preservation Database (NHPD)

There are many different types of affordable housing subsidies in the US at multiple levels of government (federal, state, local). The National Housing Preservation Database (NHPD) aggregates and cleans information on federally assisted housing projects and makes it available to researchers and community groups with a free login. NHPD's database is current and includes both active and inactive subsidies well into the past. It does not include state or locally subsidized units for California, though the bulk of affordable units are subsidized through federal subsidies. We use NHPD to understand the impact of subsidies on housing supply and density.

Regional Housing Needs Assessment (RHNA)

The Regional Housing Needs Assessment (RHNA) process is the first two steps of the housing planning process for California governments. Since 1969 the state of California has required that every county and city plan for housing needs of its community members. In this process, the Housing and Community Development (HCD) Department determines housing needs by region and works with regional governments to allocate housing unit growth targets by affordability target at the city and county level. HCD reviews and approves the allocations and then local governments update the housing element of their general plan to align with their allocation, which is then again reviewed by HCD. The process recurs in eight-year cycles; currently most jurisdictions are on the 6th RHNA cycle. This project uses data on allocations and completions from the 5th cycle (roughly the 2010s) and allocations from the 6th cycle (roughly 2020s) to better understand state and local growth projections and priorities. RHNA data is publicly available through HCD's Annual Progress Report dashboard. Where 6th cycle RHNA data was not yet available from the dashboard, we used individual council of government (COG) allocations, specifically for San Joaquin, Merced, and Stanislaus counties.

Fiscal Data

Local government fiscal data on

budgets, revenues, expenditures, etc., is generally publicly available, either aggregated in dashboards or as a series of comprehensive financial and accounting statements that local agencies are required to file annually. California's Office of the Comptroller maintains a rich data dashboard on a variety of fiscal topics for different geographic levels and political units. However, this data is often several years old before publicly available. More current data is potentially obtainable via public records requests from individual government agencies, but here too it may not be current nor is this an expedient method to obtain data for all the cities and counties in our study regions. Moreover, budget and accounting data may be limited in what they can tell researchers about the fiscal health and condition of a particular entity.

The disruption of the COVID-19 pandemic and its impact on government finances made many of the available fiscal datasets instantly obsolete, or at least woefully incomplete. This project filled such a hole by carrying out the COVID-19 Fiscal Impact Survey of California Local Governments (Fiscal Impact Survey). The survey was designed to get an updated grasp on the fiscal conditions of local agencies from the perspectives of budget officers in those agencies and compare them to pre-pandemic norms.

The survey was administered in three waves: Wave 1 (Fall 2020) six months after the pandemic started, Wave 2 (Spring 2021) one year since the pandemic started, and Wave 3 (Spring 2022) two years since pandemic started. Survey questions changed slightly from wave to wave to reflect updated understanding of pandemic and its fiscal impacts. See survey website for questionnaire and further description.

The survey targeted budget officers and fiscal directors in California's municipalities, counties, and school districts. Wave 1 sampled 870 agencies in Northern California and the Central Valley, while waves 2 and 3 sampled about 1500 agencies statewide. 11% of agencies responded in wave 1, 15% in wave 2, and 14% in wave 3. Response rates were robust for an expert email survey. In total, we received 514 responses across the three waves.

California has 58 counties, 483 municipalities, and 1,029 school districts. Survey responses reflect these underlying counts: about two thirds of responses come from school districts, the remainder from municipalities and counties (Table 2.2). Response counts by region were generally in line with the number of entities in the sample (Table 2.3).

Qualitative Data

We collected and managed qualitative data in partnership with the UC Davis Center for Regional Change (CRC). The role of the CRC research team was to collect qualitative data, organize, conduct and facilitate meetings with community stakeholders that represent the Central Valley to contextualize quantitative data, and disseminate results from the project to appropriate stakeholders for local policy improvement and evaluation. The

Table 2.2. Fiscal Impact Survey sample and response rates by agency type

	School Districts	Cities & Counties	Total Responses	Total Sampled	Response Rate
Wave 1: Oct – Dec 2020	49	46	95	870	11%
Wave 2: Apr – May 2021	144	73	217	1470	15%
Wave 3: Apr - Jun 2021	124	85	210	1545	14%
All Waves	317	204	522	3885	13%

Table 2.3. Fiscal Impact Survey responses by region

	Bay Area & Outer Bay	Central Valley	Southern California	All Other California
Wave 1: Oct – Dec 2020	54	17	Not Surveyed	24
Wave 2: Apr – May 2021	54	16	62	85
Wave 3: Apr - Jun 2021	39	16	79	68
All Waves	147	49	141	177

Center for Regional Change specializes in community engagement research best practices particularly for research projects that impact the Greater Sacramento and Northern California regions.

Stakeholder Engagement

Stakeholders were hand-selected members of Community-Based Organizations (CBOs) from the Central Valley. Split into two groups, stakeholders either participated on our Community Advisory Board (CAB) and met over the course of the project study every six (6) months, or participated in ad hoc focus groups and/or interviews when CRC team needed additional details in a subject matter.

Each interaction with focus groups, interviews, and Community Advisory Board meetings prompted an Executive Overview of events, meant to serve stakeholders with their own personal and professional recourse. Additionally, some stakeholders participated in an optional demographics survey via Qualtrics to capture representation by subject, geography, and individual demographics such as income, race/ethnicity, gender identity and age. Stakeholders participated on a voluntary basis and were not compensated for being a part of the study. Stakeholders were read a consent form before every meeting and qualitative data was anonymized before submitting for publication.

Community Advisory Board (CAB)

The aim of the CAB was for the research teams to work together with local policymakers and community stakeholder groups towards a better understanding of what is happening in the Central Valley and the Bay Area megaregion. We sought out representatives from local and county government agencies, nonprofits and commerce who had a background in transportation planning, affordable housing and/or planning and development. An internet search resulted in the creation of a list of 298 organizations within the Central Valley focused in the aforementioned areas that could be potentially considered to join the CAB.

Participation in the CAB included an initial email outreach from the CRC team inviting participants to join the study for the remainder of the project timeline (2020 – 2023) and a letter describing the project scope of work. Of the original list of possible candidates, the CRC team reached out to 37 people via email inviting them to join our CAB. With 22 interested participants, our first CAB meeting was composed of 19 individuals representing housing agencies, local government, philanthropy and social justice oriented nonprofit work. After the initial CAB meeting the CRC team used snowball sampling methods to acquire additional CAB members to participate in project-related tasks and meetings during the qualitative data collection phase in Year 1. By the end of Year 2, the CAB grew to include participants in El Dorado and Placer Counties with a total count of 30 members representing 21 organizations in Sacramento, San Joaquin, Merced, El Dorado, Stanislaus counties as well as statewide.

At CAB meetings- which were held semi-annually between December 2020 and May 2022- stakeholders were asked to share their firsthand and on-the-ground understanding of how demographic changes in their communities impacted migration patterns, fiscal health, and overall quality of life. Additionally, the CRC team frequently asked stakeholders to share vital insights with the research team to help contextualize and guide further stages of our research project. In this way, the CRC team advocated for shared knowledge and ownership of data with our selected stakeholders. CAB members and their organizations were also encouraged to participate in the quantitative data surveys over the course of the study.

Focus Groups + Interviews

In 2021 the CRC team proposed individual focus groups in addition to Community Advisory Board (CAB) meetings for more focused content depth in specified subjects. These focus group interviews operated independently from the CAB – despite the fact that there is overlap in individual participant attendance (especially seen in Year 1 data).

The first set of focus groups were held in February 2021 and were divided by three major subject matters: transportation, economy/fiscal stress and housing. The second set of focus groups were individual interviews conducted in

March 2021 and were divided regionally to include more geographical representation in our study area. The third set of focus group interviews were individual interviews conducted in September 2021 and were focused on including Bay Area region perspectives. In all three cases, these ad hoc focus groups and interviews were with hand-selected invitees chosen by the CRC team. Content experts were chosen based on gaps in our then-current understanding of a topic, geography, or perspective as it relates to our project aims. Some members of the CAB or additional representatives from associated organizations already on the CAB also participated in these focus groups interviews.

Participant Agreements + Confidentiality

Prior to every focus group, interview, and CAB meeting, a member of the CRC team would read and provide a copy of the project consent form. This form outlined that participation in any part of the research project was voluntary and compensation would not be provided. No known risks were identified with participation in the study. Consent for participating in the study could be revoked at any time without penalty, should any participant choose not to participate. Participants were also given the opportunity to withdraw anything said at any point of their participation which would then be removed completely from the final collected dataset. Focus group and interview stakeholders nor the CAB were provided any financial compensation for their time or insights while working on this project.

All participants and data was recorded on Zoom. All participants' direct quotes used in this report have been anonymized and the names of participants will not be released publicly in association with the information provided without said participant's prior consent.

Data Management

Data collected from this study was stored in a Box folder protected by password and 2-factor authentication (DUO service required by all UC Davis staff). Data transferred between the UC Davis CRC team and our partners at Occidental College and University of Southern California (USC) is protected under the UC Davis Data Transfer Agreement for De-Identified Two Way Sharing form 2021-0177-D (Document ID #6B547C69-25AB-4823-A4E7-B02F93AB7628).

Chapter 2 notes

1 RPA (2005). America 2050 Prospectus. Page 4

2 Yaro, D., Zhang, M., Steiner, F. (2022) Megaregions and America's Future. Lincoln Institute of Land Policy.

3 GeoLytics, Inc (2016) Zip+4 2000, Zip+4 2004, Zip+4 2007, Zip+4 2009, Zip+4 2012, Zip+4 2013, Zip+4 2014, Zip+4 2016. GeoLytics, Inc. Available at: https://geolytics.com/zip-4-product

4 Department of Housing and Urban Development. USPS Zip Code Crosswalk. See also, Wilson R and Din A (2018) Understanding and Enhancing the US Department of Housing and Urban Development's ZIP Code Crosswalk Files. Cityscape 20(2): 277–294

5 We multiply the number of households who moved by 2.5, the national average household size, and add the number of indivudals. In addition, we input a value of 5 for rows that are bottom coded because the flow of migration was less than 10. See Ramani, A., & Bloom, N. (2021). The Donut effect of COVID-19 on cities (No. w28876). National Bureau of Economic Research.

6 For additional detail, see Boarnet et al. (2021) Displacement and Commuting in the San Francisco Bay Area and Beyond: An Analysis of the Relationship Between the Housing Crisis, Displacement, and Long Commutes.

7 For questionnaires and details on survey respondent demographics, see Boarnet et al. (2022) Commuting During and after COVID-19: The Impact of COVID-19 on Shared Mobility and Extreme Commuting in the Bay Area- Central Valley.

8 SJCOG (2020). RETURN TO WORK SURVEY RESULTS. Smart Travel: During & Post COVID-19.

9 From https://www.zillow.com/research/data/

10 From https://www.apartmentlist.com/research/category/data-rent-estimates

11 See detailed methodology here: https://www.apartmentlist.com/research/rent-estimate-methodology

3 Demographic Change and Migration

The movement of people binds regions together and divides them. People's outward move out of central cities spurred the growth of suburbs since the 1940s and created a new layer of segregation. Central cities competed for resources with each other and with their suburbs; some inevitably became financially burdened as more affluent people moved out, and governments covered services with a shrinking tax base. While job growth in the suburbs generally outpaced growth in central cities, traditional employment centers continue to dominate, meaning that many people commute daily from the suburbs into central cities.

This chapter and the next focus on how mobility continues to create interdependent relationships between large employment centers and more residential suburbs as the movement of people spills over the boundaries of single metropolitan areas. This chapter examines two aspects of mobility:

1. how migration extends urban regions' functional scale beyond traditional conceptualizations of metropolitan areas and
2. the equity implications for movers and the ZIP Codes they move to and from.

The analyses in this chapter only include moves within the Northern California Megaregion, what we call internal migration. Focusing on internal migration, we identify local factors that push people to move and attract them to a specific destination. In other words, we observe the places people leave and the places they move to. While migration from outside the megaregion is essential to understanding growth patterns, it says little about the internal spatial dynamics of the megaregion and how people rearrange themselves when they move locally. Furthermore, we lack data on international migration, a significant share of migration in the Bay Area, precluding a comprehensive analysis of migration.

The first part of the chapter focuses on how internal migration changes the spatial population distribution. Most moves are very local, suggesting that internal mobility may not necessarily shift the megaregion's overall structure. However, even a small fraction of the hundreds of thousands of moves that happen each year significantly impact the places people depart and the places to which they move. Transmetropolitan moves – moves between metropolitan areas within the same megaregion – originate in the East Bay and primarily fed the growth of Greater Sacramento suburbs and the Northern San Joaquin Valley's suburbs and rural communities. .

The second part examines the impacts of migration more closely. Moving is often paired with opportunities but can also be driven by a lack of choice. The analysis emphasizes the duality of mobility in the megaregion and details how migration affects people and places. Lower-income movers struggle to move out of marginalized ZIP Codes, yet moving is nonetheless associated with significant improvements in income and place of residence. The influx of

long-distance movers who have upward income trajectories fueled income growth at the ZIP Code level in the Bay Area and Greater Sacramento, but existing residents played a more prominent role in the Northern San Joaquin Valley.

MIGRATION – SPATIAL STRUCTURE

Aim:

The movement of people can fundamentally reshape regions and neighborhoods. This section examines how migration between the Bay Area and Central Valley, and locally, reshaped the spatial structure of the region and the most impacted communities.

How:

The analysis in this section relies primarily on tax record data from the Franchise Tax Board paired with ZIP-Code-level census data. The tax data tracks households during a period from 1994 and 2015 (although not all households are present every year) and provides insights into the patterns and outcomes of moves for people who moved multiple times. Throughout the chapter, the analysis focuses on movement within the megaregion.

What:

Households moving from the Bay Area into the Central Valley concentrate in the Sacramento suburbs and communities on the border between the Central Valley and Bay Area along main transportation corridors. These households are moving from areas in the East Bay between Oakland and San Jose. The top-sending ZIP Codes stand out for their lower-than-average home values and average rents. Top receiving locations are more spatially differentiated and have higher median income and housing values than the Central Valley. The COVID-19 pandemic reinforced these patterns. ZIP Codes with the highest positive net migration concentrate in the same areas as those that historically received the most migrants from the Bay Area. The migration flow from the Bay Area to the Central Valley is a subset of moves that begin locally, pointing to the East Bay, particularly the areas south and north of Oakland, as the most likely points of origin for people moving east.

The geography of moves

The majority of moves are very local. The median move distance between 1994 and 2015 that resulted in a change in ZIP Code was 7 miles. Among people who moved more than once, the total distance from their ZIP Code of origin doubles by the fourth move, suggesting that even after multiple moves, most movers stay close to their initial ZIP Code of residence in the megaregion. In addition, we find that up to a quarter of movers return to their original ZIP Code of residence on their second move (i.e., they moved from 94110 to 94103 and then back to 94103).

In cities like San Francisco, where gentrification is widespread, the ability to stay local may be highly constrained as housing cost increase locally and in surrounding locations. We defined gentrifying ZIP Codes as having income growth or an increase in the share of college students higher than the metropolitan area median and rent or home value increases higher than the metro median.[1] Table 3.1 shows the distance moved for a sample of ZIP Codes that gentrified and ZIP Codes that did not gentrify from a comparable context. Residents of gentrifying ZIP Codes moved longer distances everywhere except in San Francisco, but the differences are minor in all cases.

In gentrifying ZIP Codes as elsewhere, the rate of return is high for both lower- and higher-income movers. The lack of information about movers prevents us from drawing any conclusions about the reason for moving back or who is more likely to come back, but the consistency with which people return points to a phenomenon rarely examined in the literature on residential mobility.

Box 3.1. ZIP Code income level classification

We classify ZIP Codes based on the median income derived from reported income in tax records. While the income levels differ significantly from that reported in the census due to differences in definition, the levels correlate strongly between tax and census sources. We use one measure based on income level and the other relative to the area median income (AMI).

We define four categories:

1. Lowest income – income below 25,000 or 50% of AMI
2. Low income – income between 25,000 and 50,000 or between 50% and 80% of AMI
3. Medium income – income between 50,000 and 100,000 or between 80% and 120 % of AMI
4. Higher income – income above $100,000 or above 120% of AMI

Table3.1. Summary of median distance moved for all filers who left a ZIP Code classified as gentrifying (G) or non-gentrifying (NG).

Median Distance								
	Oakland		**Sacramento**		**San Francisco**		**San Jose**	
Mover Income	G	NG	G	NG	G	NG	G	NG
Lowest income	9.3	8.1	8.1	8	6.6	7.6	7.9	7.2
Low income	9.9	8.2	8.4	8.2	6.6	8	7.9	7.8
Middle income	12.3	10.3	10	9	6.7	8.8	9.4	8.8
Higher income	13.2	11.8	14.1	10.6	5.6	8.7	11.5	10.4

Source: authors' calculations based on FTB data

The short distance of moves and high rate of return moves suggest a high degree of spatial stability. Indeed, less stability would imply an even greater pace of sprawl. Most people move locally, but one in four moves, or 3.4 million, within the megaregion was longer than 20 miles. We used statistical modeling on all moves between 1994 and 2015 to better understand what factors increase the distance people move.[2] The greater the distance from a main job center, the greater the distance moved at the origin and destination. For all income levels except the higher-income category, distance from a job center at the origin has a greater effect on distance moved (about twice as high), suggesting that households who live close to a job center tend to move shorter distances, presumably to maintain access. For higher-income movers, destinations farther from a main urban center are associated with longer distance.

Moving away from a gentrifying ZIP Code increases distance moved for at all income levels, but moving into a gentrifying ZIP Code increases distance more, except for higher-income households. The effect is smaller, considering the variable is binary, but the coefficient for gentrification at the destination is twice as large as the coefficient at the origin, suggesting households are moving longer distances to move into a gentrifying area. Higher rents are associated with longer distance moved. On average, the extra distance people living in a ZIP Code with a $100 higher median rent move is equivalent to moving out of a gentrifying ZIP Code. The opposite is true for home values. People leaving high-rent, low home values ZIP Codes, then, move farther, and still farther if they are far from a large employment center.

Transmetropolitan moves

Migration at the megaregional scale blurs some of the traditional distinctions between moves primarily motivated by changes in housing and tend to be very local and moves motivated by changes in employment and are longer distances (i.e., to a different metropolitan area). The term migration is usually reserved for longer moves and residential mobility is reserved for short moves. Focus group participants shared many instances of people moving from the Bay Area to Roseville, north of Sacramento, or even Fresno, and commuting back to the Bay Area – distances of 2 or more hours each way. People moved to a different metropolitan area without changing their employment location. Supercommuting data show that these are not isolated cases but a growing, if still small, share of all commutes in the megaregion (Chapter 4). We use transmetropolitan moves to identify such moves that sit ambiguously between migration and residential mobility.

The high volume of moves within the megaregion means that a small share of all moves can substantially impact spatial structure. Table 3.2 shows that the greatest migration flow is out of the Bay Area and into Greater Sacramento and the rest of the megaregion. The lower volume of migration to the Northern San Joaquin Valley is no less impactful because the total population in the Northern San Joaquin Valley is also smaller. Migration out of the Bay Area is 48% higher than migration into the Bay Area from the entire megaregion. The imbalance is even more pronounced for Greater Sacramento (55%) and the Northern San Joaquin Valley (76%). The unit is a move, which can be a person or family, and the reported number is, therefore, smaller than the number of people who moved. In short, the equivalent of a city the size of Sacramento relocated from the Bay Area to Greater Sacramento between 1994 and 2015.

Migration flows vary systematically over time in a way that correlates closely with housing market cycles. The housing bubble that preceded the dot.com burst of 2001 correlates with the greatest volume difference between the Bay Area and the Central Valley (Figure 3.1). The home price-to-income ratio in the years preceding the 2001 crash reached an unprecedented level in the Bay Area that has not been equaled since.[3] The home price-to-income ratio is a better indicator than home values alone because, as the second panel in Figure 3.1 shows, home values had already eclipsed the 2001 level by 2015 and have continued to increase. Unlike 2001, however, incomes have also gone up in the Bay Area, so home values are driven by higher income and a tight supply (see Chapter 5 for more details). The growth of incomes since the 2000s explains why the gap in migration between the Bay Area to the Central Valley has not reached 2000 levels since converging after the 2007 financial crisis. Home values have escalated to their highest levels, but so have incomes.

There were three principal flows of population from the Bay Area to the Central Valley, each with different implications for the Central Valley and its relationship to the

Table 3.2. Total flows (in 1000s) between metropolitan areas within the megaregion between 1994 and 2015. Diagonal values are internal to the metropolitan areas and excluded from the total columns.

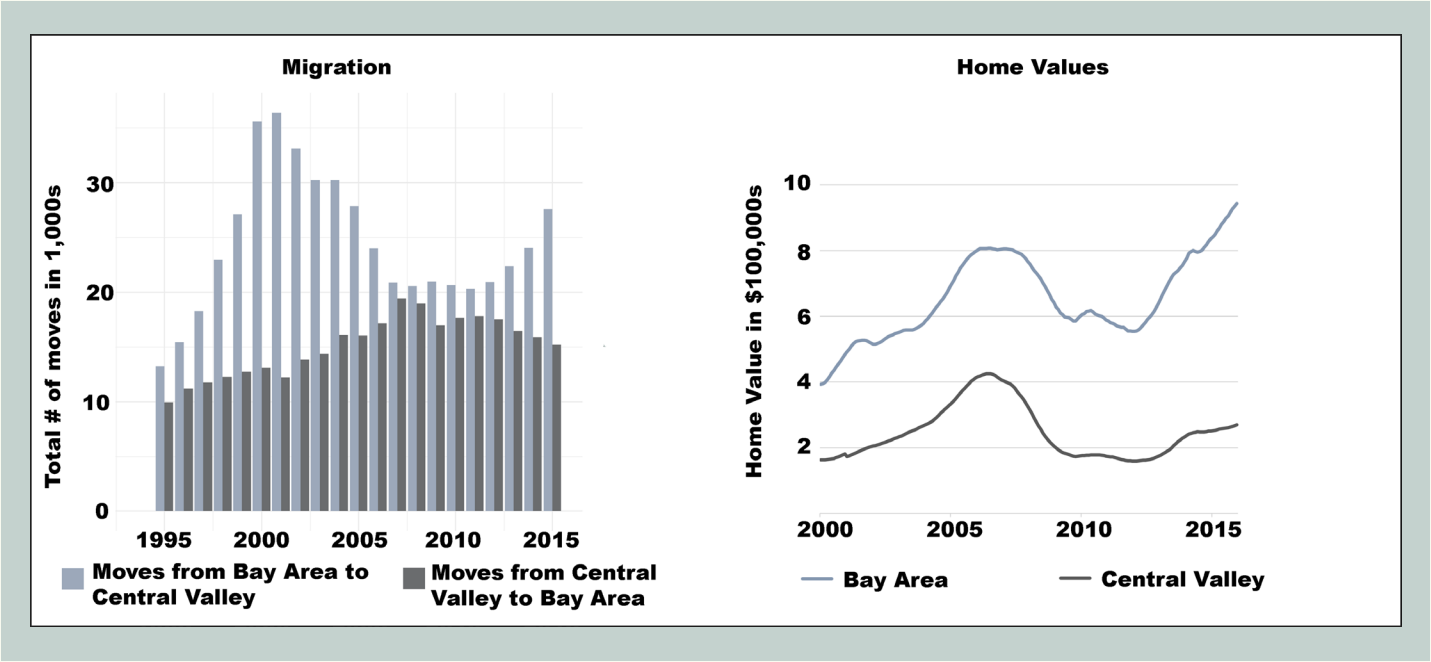
DESTINATION						
		Bay Area	**Sacramento**	**San Joaquin Valley**	**Rest of megaregion**	**Total outmigration**
ORIGIN	**Bay Area**	5,756	304	208	307	819
	Sacramento	195	2,332	46	132	373
	San Joaquin Valley	118	63	1,060	63	244
	Rest of megaregion	244	155	59	2,271	458
	Total in-migration	557	522	313	502	1894

Source: FTB data

Bay Area (Figure 3.2). The first migration flow focuses on Greater Sacramento. Sacramento is the site of several high-growth suburbs that have experienced an influx of firms promoting commensurate housing investments. Much of that economic activity focused on high-paying jobs and housing at the upper end of the market in suburbs such as Roseville. The tax data shows that the share of higher-income households migrating to Roseville is about 50% higher than to cities like Stockton (Figure 3.3). Migration to the Sacramento metropolitan area is also different because it draws from the broadest array of ZIP Codes in the Bay Area. All the top-sending ZIP Codes send migrants into Sacramento, even those as far south as San Jose.

The second migration flow connects the Bay Area to other major cities in the

Figure 3.1. Total migration flows between the Bay Area and the Central Valley in both directions and median home values

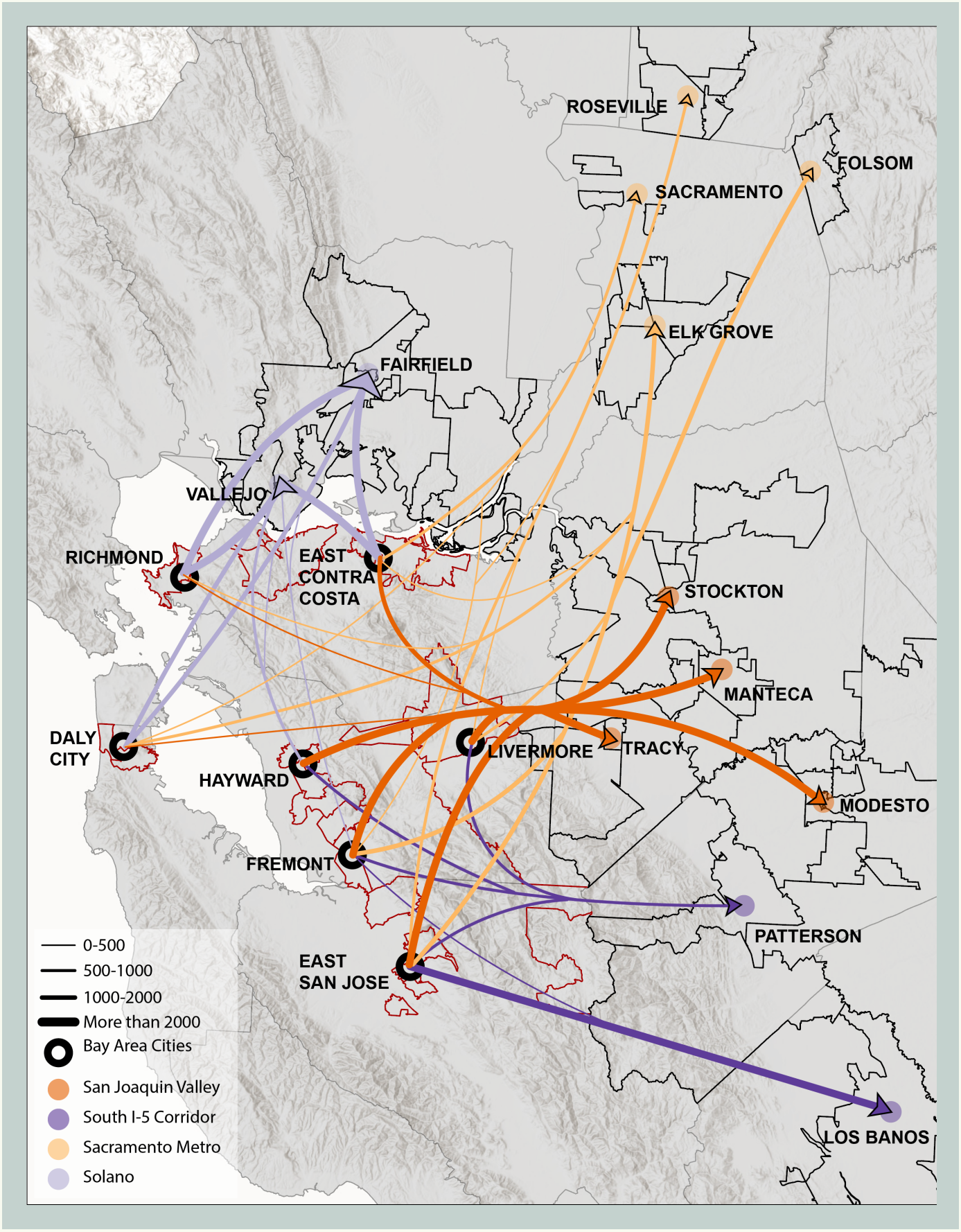


Source: FTB data and Zillow ZHVI

Central Valley. The metro areas of the Northern San Joaquin Valley, such as Stockton, Modesto, and Merced, have long suffered from economic uncertainty and high poverty rates. The poverty rate (from the US Census) in Stockton and Modesto was 15% or higher from 1990 to 2015; the rate was above 20% in Merced. In contrast, the poverty rate in the Bay Area was below 10% for most counties in 1990 and decreased significantly by 2015 to below 8% in all counties. Vallejo, a city between the Bay Area and Sacramento, has also struggled economically after the 2008 financial crisis that caused a surge in foreclosures. The lower wages offered in these cities, especially compared to the Bay Area, make their population especially vulnerable to displacement if migration causes housing costs to increase. The map (Figure 3.2) shows that the households moving to the Northern San Joaquin Valley and Vallejo tend to come from the locations in the Bay Area within the closest proximity; households appear to take a "next farther out" approach. The destinations also reflect that most migration concentrates in the suburbs rather than across the main urban centers.

The third migration flow connects Bay Area cities to burgeoning towns in the Northern San Joaquin Valley. The population in places like Newman and Patterson has more than tripled between 1990 and 2010. These smaller towns provide lower housing costs but are poorly connected to the broader megaregion. The commute from Newman to San Jose, the main point of origin for migrants, is 80 miles, whereas Modesto, Newman's closest job center, is still 25 miles away. In contrast to the other migration flows, small, remote towns are difficult to integrate as they are far from highways or rail line stops.

Figure 3.2. Main migration links between the 20 top sending ZIP Codes in the Bay Area and destinations in the Central Valley (# of households).



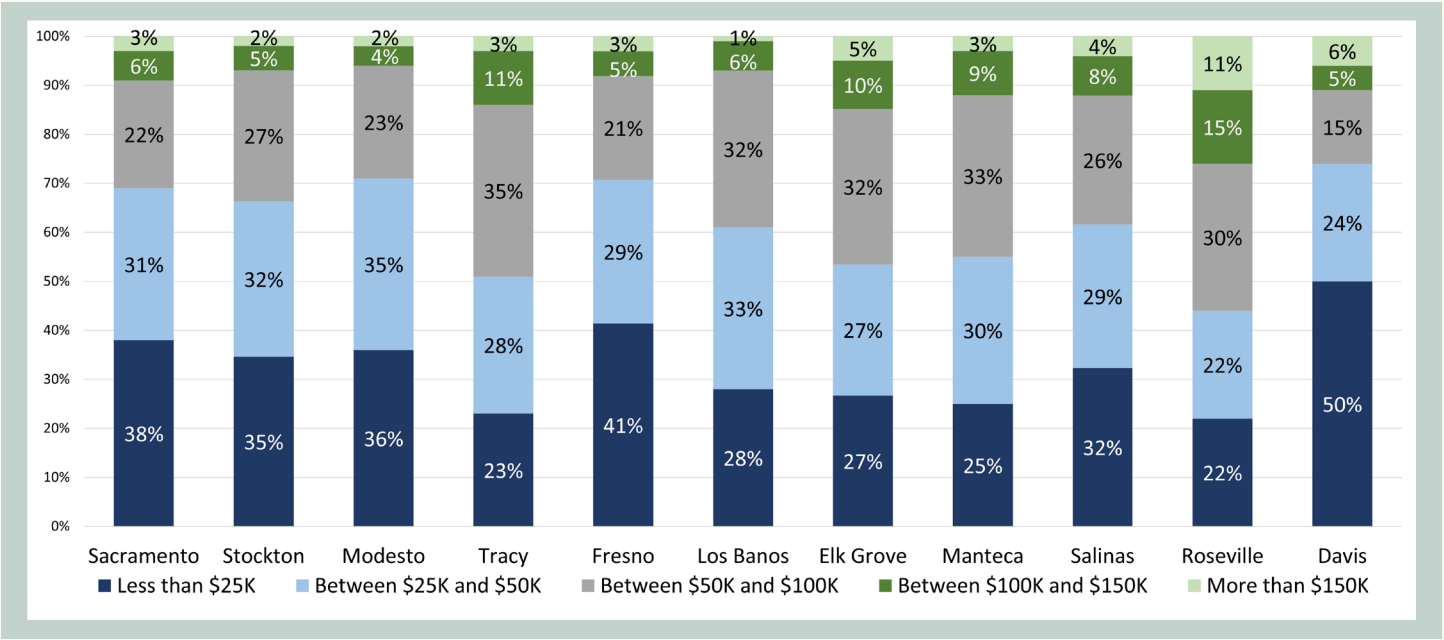
Source: FTB data

Despite the spatial heterogeneity of destinations in the Central Valley, the top destinations for movers from the Bay Area exhibit consistent traits. As early as 1990, top destinations had higher income, higher rents, and higher home values (Table 3.3). Job access was lower in top destinations, speaking to the separation between the ZIP Codes that received the most migrants from the Bay Area and job centers in the Central Valley. There is no indication, however, that migration is significantly changing the socioeconomic composition of ZIP Codes. The share of college-educated adults and Latino residents closely parallels the metropolitan levels.

The top migration destinations are widely dispersed across the Central Valley, but most migrants into the Central Valley originated in the East Bay between Richmond and San Jose. The major cities, San Francisco, Oakland, and San Jose sent relatively few migrants east between 1994 and 2015. The top sending ZIP Codes are similar to the rest of the region. They tend to be highly diverse, have high rents, and have a similar share of college-educated adults. They are not hot spots of gentrification or among the most marginalized communities. However, home values in these locations have been significantly lower than in the rest of the region since the 1990s. These are the kind of places that generated longer moves. They have poor job access, lower home values, and high rents. For people living in such ZIP Codes, the trade-off between staying local or moving a little further where housing is significantly cheaper is minimal compared to people living in the core urbanized areas.

The results in Figure 3.2 and Table 3.3 offer little evidence that people who migrated from the Bay Area to the Central Valley are exiting the most expensive or intensely gentrifying ZIP Codes. A long-

Figure 3.3. Migrants' income for the top receiving cities in the Central Valley.



Source: FTB data

standing hypothesis is that people are priced out of central locations and gradually move farther away to find more affordable housing. The data we have presented so far examined single moves, and it may be that the migration to the Central Valley happens over several shorter moves. The analysis of move distance corroborates this hypothesis. The length of moves increases with each additional move after factoring out return moves. Figure 3.4 shows the ZIP Codes of origin for people who eventually moved to the Central Valley (and moved more than once). The map shows that the geographic pattern is persistent. People who moved to the Central Valley from the Bay Area originated in mostly the same areas as their final Bay Area ZIP Code before moving to the Central Valley. Notable differences are the greater emphasis on the area between Hayward and East San Jose and the absence of the far eastern suburbs of Contra Costa (e.g., Antioch, Pittsburg).

The map in Figure 3.4 focuses on the move history of households who made a transmetropolitan move. While the data extends over 20 years, not all households are present in the data for the entire 20 years, and only about 2 in 5 households have more than one move recorded. A complementary image emerges if we flip the approach to focus instead on places

Table 3.3. Comparison of the top decile of sending and receiving Zip Codes for Bay Area to Central Valley flow specifically and top deciles in moves overall, to the regional average.

BAY AREA									
	Regional average	Top sending to CV	Top sending overall	Regional average	Top sending to CV	Top sending overall	Regional average	Top sending to CV	Top sending overall
Year	% Latino			Job access			% college education		
1990	16.1	22.3	22.1				32.2	19.4	28.4
2000	20	28	25.3	3.5	1.6	4.5	39.6	24.4	37.9
2009	23.1	33.6	27.4	3.3	1.5	4.4	44.9	28.2	43
2015	23.3	33.3	26.5	3.9	1.5	5.1	49.1	32.8	47.8
	Regional average	Top sending to CV	Top sending overall	Regional average	Top sending to CV	Top sending overall	Regional average	Top sending to CV	Top sending overall
Year	Median household income ($1,000)			Median rent ($)			Median home value ($1,000)		
1990	74.8	74.1	68.7	1411	1405	1412	562	393	585
2000	97	89.6	90.3	1545	1474	1541	596	390	600
2009	91	79.7	82.9	1560	1485	1533	703	498	692
2015	101.4	87	97.5	1837	1741	1842	811	542	791

CENTRAL VALLEY									
	Regional average	Top sending to CV	Top sending overall	Regional average	Top sending to CV	Top sending overall	Regional average	Top sending to CV	Top sending overall
Year	% Latino			Job access			% college education		
1990	16.4	17.6	13.1				19.6	20.1	21.4
2000	20.2	19.7	15.8	1.2	0.9	1.3	22.1	24.1	23.4
2009	26.6	27	21.9	1.1	0.8	1.3	25.2	25.9	24.8
2015	30.4	30.8	25.4	1.2	0.8	1.4	27	27.9	27.1
	Regional average	Top sending to CV	Top sending overall	Regional average	Top sending to CV	Top sending overall	Regional average	Top sending to CV	Top sending overall
Year	Median household income ($1,000)			Median rent ($)			Median home value ($1,000)		
1990	57.5	64.5	64	1059	1141	1117	261	289	266
2000	67.8	77.2	70.3	1022	1146	1065	226	259	216
2009	65.3	72.7	65	1191	1337	1204	323	338	298
2015	64.6	72.2	64.3	1217	1410	1232	311	340	290

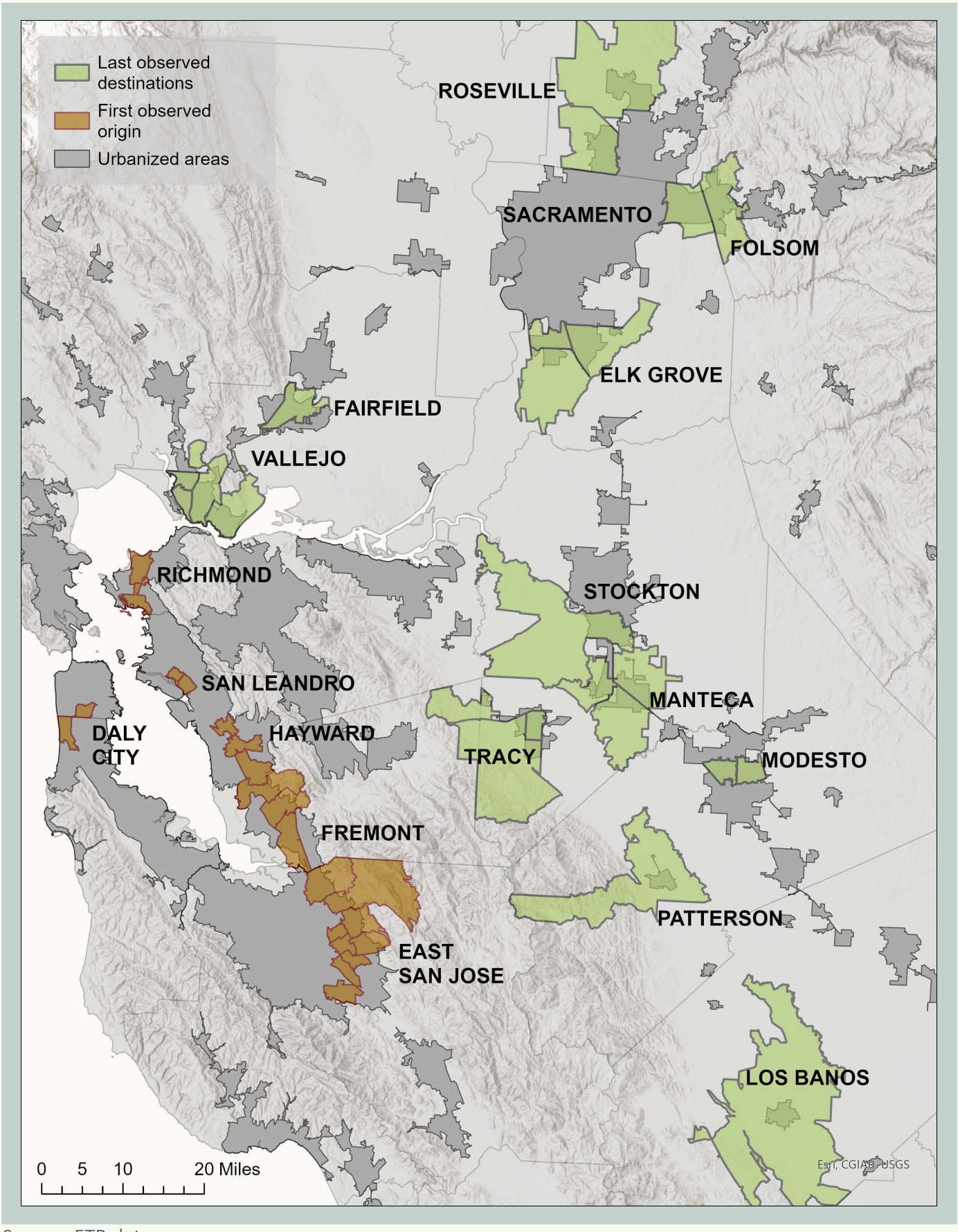
Source: US Decennial Census and ACS 5-year 2007-2011 and 2013-2017

with the highest risk of displacing people (Figure 3.5). Many households moving out of historically marginalized (Comparison) and gentrifying (Focal) ZIP Codes in Oakland move into the locations that send the most migrants to the Central Valley. A similar pattern emerges in San Jose where people leaving marginalized ZIP Codes especially are moving to East San Jose ZIP Codes.

San Francisco is an interesting comparison case as the most distant city from the Central Valley. Move patterns in San Francisco show a strong concentration within the city (consistent with the shorter move distance in Table 3.1) with a non-negligible subset of moves going toward Oakland, Richmond, and Daly City. San Francisco illustrates the pull of vibrant and fast-growing (in terms of jobs) cities. San Francisco ZIP Codes generate among the largest volumes of moves in the megaregion, but the vast majority of these moves are contained within the city's boundaries and immediate vicinity.

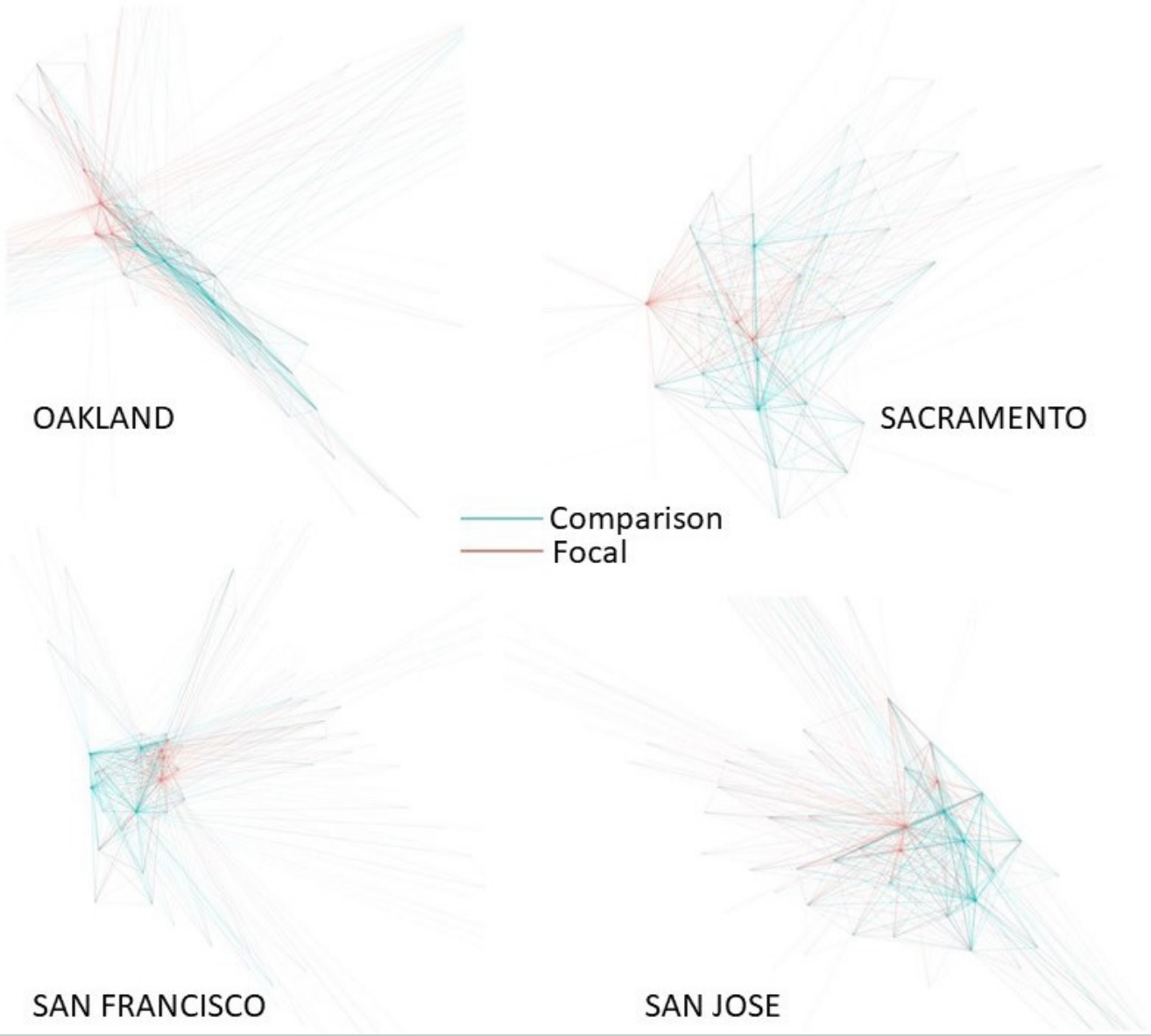
The data are suggestive but point to a clear mechanism: a subset of movers live in areas close enough to the cheaper housing market of the Central Valley to justify moving a further 20 to 50 miles and possibly commuting the same distance daily (see more in our Supercommuting chapter). Our on-the-ground experts and focus group participants echoed this narrative of migration and a shifting

Figure 3.4. Map of the first and last ZIP Code of residence for households who moved at least twice and moved from the Bay Area to the Central Valley



Source: FTB data

Figure 3.5. Flow network of migration out of gentrifying and comparison ZIP Codes.



Notes: The dots are the centers of ZIP Codes of origin and the weight of the lines is proportional to the number of moves and represents at least 100 moves
Source: FTB data

geographic structure through a series of examples coming out of the East Bay Area:

Livermore, a top sender, in eastern Alameda County illustrates three narratives that emphasize financial stress as a reason for migrating to the Central Valley (Bay Area Focus Group):

1. Individuals and families who have lived in the Bay Area at times for generations are priced out of the local rental market yet are unable to qualify for affordable housing. In this case, the Bay Area has a different definition of what is considered "low-income" than other surrounding regions.

2. Renters looking to buy are unable to afford a home in the Bay Area and must look elsewhere. Particularly for families,

there is a driver to seek out housing in less population-dense areas where single-family homes are larger and more spacious.

3. Agrarian companies and family-operated farms are moving out of the region and out of state as the price of land increases in California. Those able to stay are facing pressure amid changes in city zoning to accommodate more residential housing.

Concord, a city in Contra Costa County near top senders Pittsburg, Antioch, and Oakley, illustrates the role of overlapping local (within the Bay Area) and transmetropolitan (Bay Area to Central Valley) migration flows (Bay Area Focus Group).

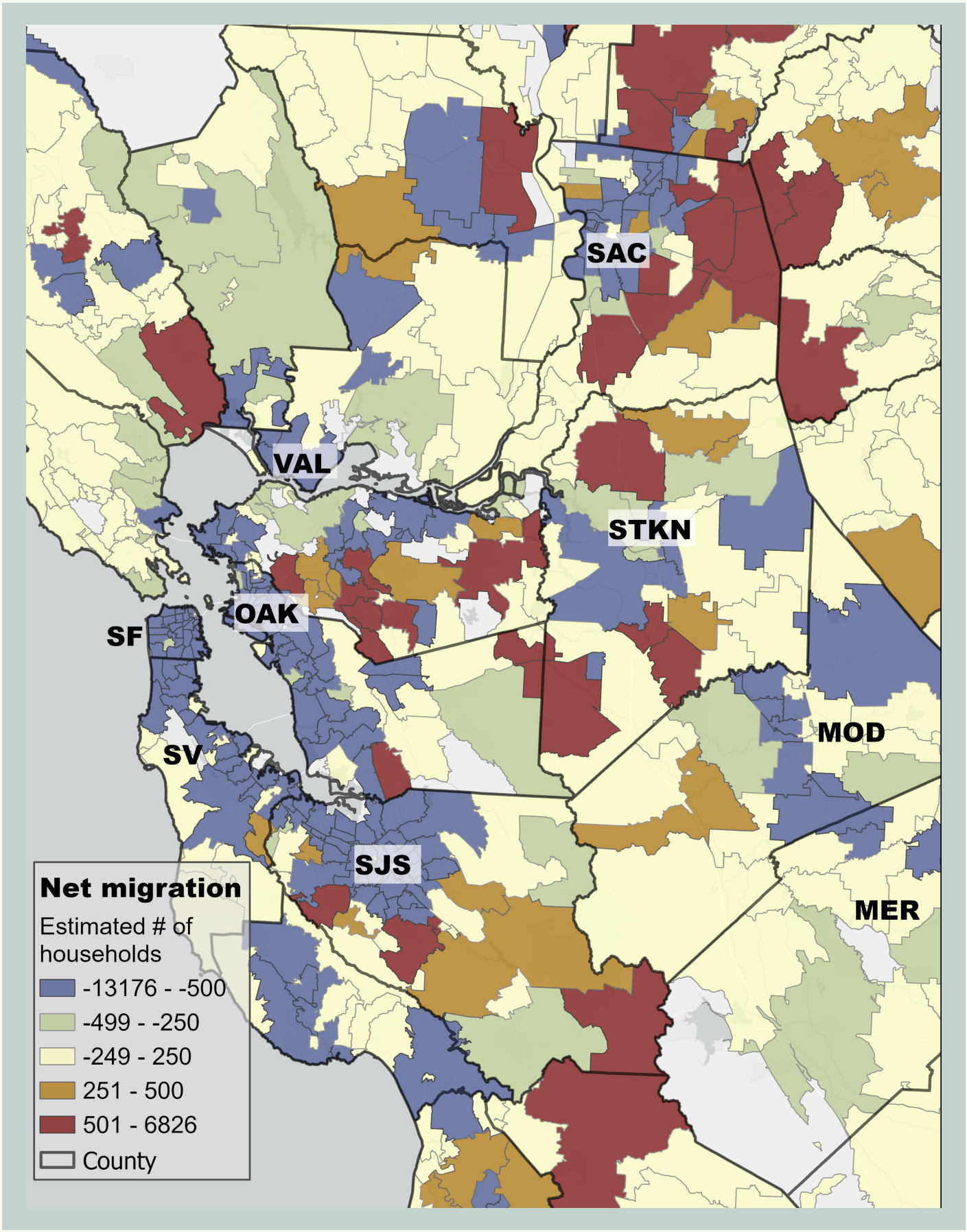
1. Newcomers (in-migration) to Concord are most often relocating from San Francisco or Oakland, driving up the median housing prices and local median income.

2. This creates a forced shift of existing residents migrating outward into areas farther east into Contra Costa County as well as spillover into surrounding regions and into the Central Valley.

3. For lower-income populations and those at risk of displacement who are currently served by the social service organizations net in a place like Concord, moving further east often means losing this support network. Once people move out of the catchment area, organizations lose track of them and often lack the mission or mandate to serve them.

For Northern California, there is nothing new nor unique in hearing about a friend, a colleague, or a family member who decides to leave the Bay Area and relocate to somewhere quieter, more spacious, or perhaps both. Common locales for Bay Area transplants have historically included Greater Sacramento and Stockton. However, the COVID-19 pandemic brought this narrative into sharper relief. The US Postal Service change of address data shows a net migration pattern during the pandemic that mirrors the migration pattern within the megaregion in the previous 20 years (Figure 3.6). Suburbs of Sacramento and Northern San Joaquin Valley metropolitan areas received more people than have left, while most of the urban center ZIP Codes lost population.

Figure 3.6. Net migration for the years 2020-2021.



Source: USPS COA

MIGRATION – MOBILITY AND EQUITY

Aim:

The deep inequalities that define the Northern California Megaregion pressure lower-income people to move and, at the same time, severely constrain where they can move. This section examines how mobility intersects with equity through analyses of the ZIP Codes lower-income people move between, the economic trajectory of movers, and how mobility affects ZIP Code income trajectories.

How:

For this analysis, we put greater emphasis on household and ZIP Code income and how it changes or not over time. We classify households based on long-term average income and ZIP Codes either using data derived from tax records or with a socioeconomic index based on several census variables.

What:

People mainly move between ZIP Codes of similar socioeconomic status. While people moving out of lower-status ZIP Codes are more likely to move into higher-status locations, the lower starting point means that many movers stay in lower-resource ZIP Codes. With additional moves, improvements in the status of destinations decrease. Flows among ZIP Codes of similar status imply a large degree of stability in the ZIP Codes unless movers' income changes over time. Indeed, most ZIP Codes remained at similar levels of income over time and their socioeconomic status relative to other ZIP Codes was stable. Among lower-income ZIP Codes that experienced substantial median income growth between 1994 and 2015, the share of residents that had moved from outside their county of residence was higher and the income of newer residents was generally higher upon entry into the ZIP Code when compared to lowe- income ZIP Code where income growth was slow. The income of newcomers into ZIP Codes increases faster than incumbent resident incomes but from a much lower base. Importantly, the high rate of turnover among younger residents means that their rapid income growth has less impact on the ZIP Code trajectory than the higher income and income growth of movers.

Movers' socioeconomic mobility

Individual characteristics and the context in which individuals grow up and live are important for understanding socioeconomic mobility (improvements in people's income and social well-being). This section focuses on the environment in which people move. Ideally, spatial and socioeconomic mobility go hand in hand. As people's income goes up, they can afford locations that provide a higher quality of life for themselves and their children and access to opportunities that reinforce upward mobility over time. However, discrimination tied to persistent social hierarchies and segregation means that for many people, especially people of color, this mechanism fails. Research shows that as the income of Black families increases, many continue to live in neighborhoods with much higher poverty rates than White families of equal income.[4]

While we lack the data on filers to examine the racialized nature of inequality, we analyzed people's mobility based on their income and their ZIP Code socioeconomic status (see Boxes 3.1 and 3.2 for definitions).[5] This tells, for example, if lower-income households are less likely to experience upward mobility if they begin in a low socioeconomic status ZIP Code than if they live in higher status ZIP Codes.

Nearly half of the lower-income households who live in the bottom quintile of ZIP Codes socioeconomic status stay in that quintile after moving (Figure 3.7). That share increases significantly after a second move. That is explained by the high rate of return noted above and implies that among households who moved to a higher quintile, many return to the lowest quintile. After additional moves, the share decreases slightly but remains above 50% for lower-income households. More than half of the one in ten households who moved four times were still in the bottom quintile of ZIP Codes.

Box 3.2. ZIP Code socioeconomic status

We use an index of four variables to better capture the socioeconomic context than income alone. The index is a combination of:

a) Poverty rate

b) Unemployment rate

c) Share of single mother household

d) Share with a high school diploma or lower

Based on the index we rank ZIP Codes from the lowest score to the highest on a 0-100 scale and use that ranking for analysis and to classify ZIP Codes into quintiles.

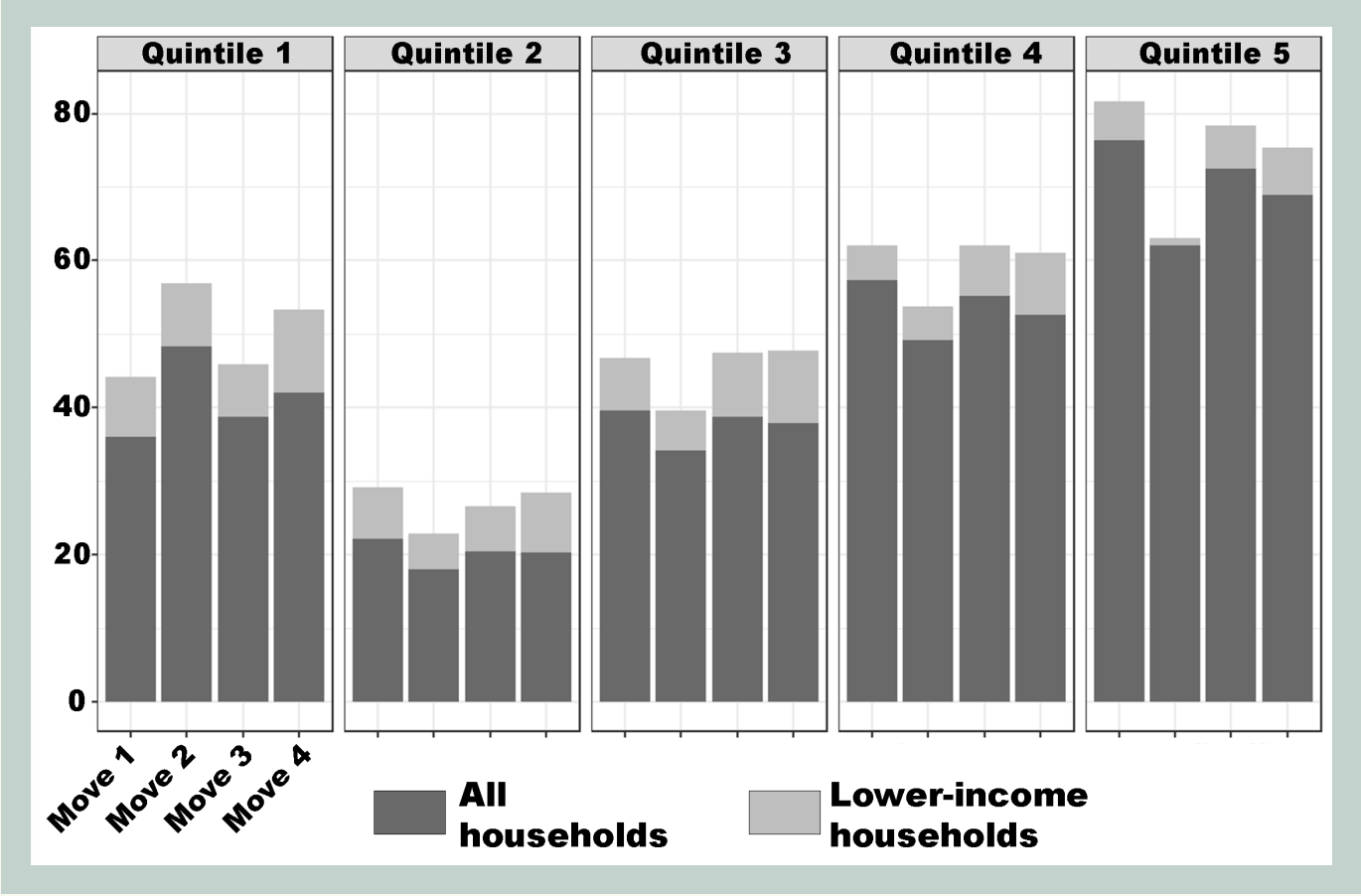
The share of households who move down to a lower quintile increases with higher rankings and across quintiles, lower-income households are more likely to move down than all households. The third quintile shows that lower-income households are as likely to move up or down. Statistical analysis confirms that lower income movers are more likely to move down the ranking,

but that mobility is balanced between those who move up and down, resulting in small average effects of moving.

The role of repeated moves is more distinctive. Repeated moves can be a sign of instability. People struggle to afford housing and are either forced to move through evictions or foreclosure or to find cheaper housing. The high cost of moving can deplete household resources and make it increasingly difficult to move to better-resourced ZIP Codes. This mechanism is consistent with lower-income households moving down the ranking and staying near the bottom when that is the starting point.

Alternatively, households who move repeatedly may accumulate financial and social resources (in the form of better information about housing opportunities, for example) which enables them to move to higher-ranking ZIP Codes. The statistical analysis shows no evidence of resource accumulation. Additional moves are associated with a continuing downward trajectory for lower-income households in contrast to higher-income households who exhibit a pattern of moves consistent with resource accumulation.

Figure 3.7. Share of households (in %) who moved down the distribution of ZIP Code by socioeconomic status.



Notes: Quintile 1 shows the share of households who stay within the same quintile
Source: FTB data and Census data

ZIP Code income trajectory

The migration data in this section provide unique insights into how places change. Movement between neighborhoods is one of the two processes that lead to neighborhood change. The other process is the economic trajectory of the people who live and stay within a community. The influence of people who remain within a community is easier to measure. Over 20 years, we can see how the income changes of those who stay in place relative to the overall neighborhood income. The larger the share of people who stay, the greater their influence is on the overall neighborhood trajectory.

Mobility in and out of communities accounts for all the other changes. If people tend not to stay in place long, the churn of newcomers can completely overwhelm the influence of the stable population. In high-turnover situations, characterizing neighborhoods' trajectories becomes more complicated as change is more about who decides to move into and out of the community rather than who stays.

Population stability, the share of people who stay from one year to the next, varies significantly by neighborhood type as well. High-income communities where most people own their homes tend to have lower turnover than neighborhoods dominated by college students, for example. Based on feedback we received from our community advisors, we classified and mapped ZIP Codes in the Northern California Megaregion into categories based on their income level and growth to parse out some of this variation (see Box 3.3).

Most ZIP Codes quickly turn over their population. Figure 3.8 shows the

Box 3.3. ZIP Code trajectories and resident types.

We focus the analysis of ZIP Code change on lower-income places and use the following definitions to identify fast-changing ZIP Codes and ZIP Codes that changed little in terms of income:

Low income – High growth: ZIP Code median income is below area median income in 1994, but growth rate is above the 75th percentile of ZIP Code income growth between 1994 and 2015.

Low income – Low growth: ZIP Code median income is below area median income in 1994, and growth rate is below the median ZIP Code growth between 1994 and 2015.

We then examine the composition of the ZIP Codes in each category based on the following classification of movers:

Incumbents: residents who have lived in the ZIP Code since 1994.

New entries: residents who appeared in the ZIP Code after 1994 with no prior recorded move.

Local migrants: residents who only have moved within the same county as their final ZIP Code of residence.

Regional migrants: residents who have moved outside the county of their final ZIP Code of residence.

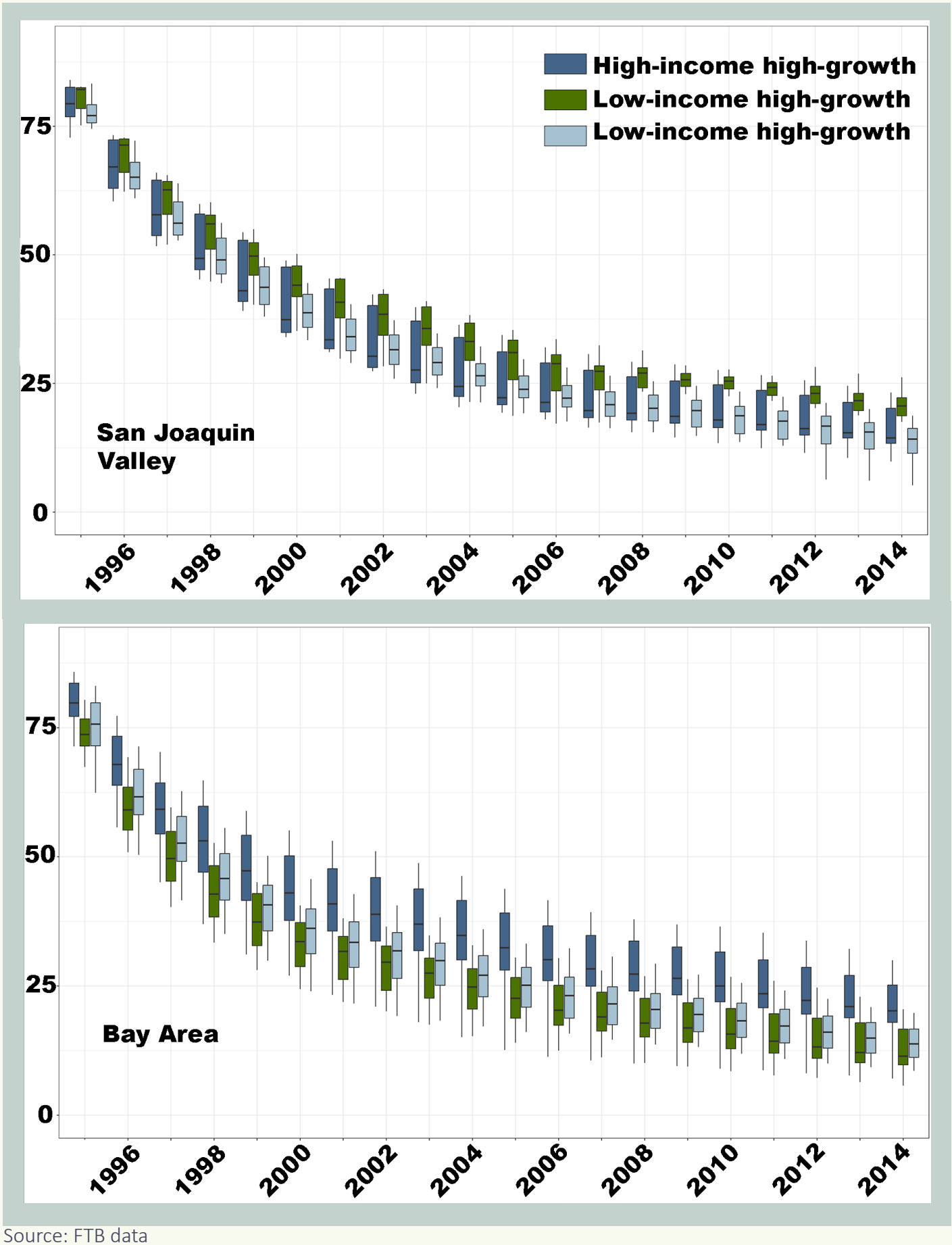
share of the population that stays from year to year and how this turnover results in a gradual accretion over time. In most places, between 1 in 10 and 1 in 5 residents move out of the ZIP Code each year. This means that over 20 years, nearly 90% of original residents will have left the ZIP Code even after accounting for returns. The share of people who remain varies by income level and region. The Bay Area panel in Figure 3.8 shows that turnover is slower in high-income ZIP Codes despite their high rate of income growth. Lower-income ZIP Codes had higher turnover regardless of their rate of income growth, but the high-growth ZIP Codes had the highest rate of turnover. Sacramento (not shown) mirrors the Bay Area in overall trends. The trends are flipped in the Northern San Joaquin Valley. Lower-income, high-growth ZIP Codes retain more of their original resident than higher-income ZIP Codes pointing to a different underlying mechanism of growth than in the Bay Area.

The rapid population turnover in most ZIP Codes means that the composition of people moving in is important for the long-term ZIP Code income trajectory. The discrepancies between the Bay Area and Northern San Joaquin Valley highlight possible differences in the mechanism of change in the two regions. Figure 3.9 summarize the composition of high-growth and low-growth lower-income ZIP Codes in 2015. We break down the composition by type of residents and cohort (based on when a household moved into the ZIP Code in 5-year tranches). For example, the top-left rectangle in the top Bay Area chart shows that of the 35% of residents who were new entries into this type of ZIP Code, 75% had moved since 2010. In addition to the share of each cohort, we report the average ratio of the cohort's 2015 income to the ZIP Code median under each year.

Despite significant differences, four characteristics are consistent across metropolitan areas and ZIP Code classes. First, the most recent cohort (filers who moved after 2010) is the largest in all cases. The dominance of newer cohorts highlights the importance of relative newcomers in defining low-income areas. The greatest deviation, in this respect, is high-growth areas in the Northern San Joaquin Valley, where one in five filers has resided in the same ZIP Code since 1994 (nearly double the share of other areas) and they have a higher income than in the other metropolitan areas. Elsewhere, incumbents are a smaller share of the overall population, and while their income is higher than the ZIP Code median, it usually is not the highest. This distinction also explains the different turnover rates in the Northern San Joaquin Valley in Figure 3.8.

The second consistent characteristic is that new entries are the largest filer type in all the panels except low-income, high-growth ZIP Codes in Sacramento, where long-distance movers dominate. The combination of these characteristics – large recent cohorts and new entries – explains much of the difference between high- and low-growth, low-income ZIP Codes. The two most recent cohorts of new entries are the only groups with incomes lower than the ZIP Code median. The cohorts' size and

Figure 3.8. Share of residents who remain in the ZIP Code they lived in in 1994.



Source: FTB data

income level can, therefore, significantly alter the overall composition of ZIP Codes.

In the Bay Area, new entries to the high-growth area have an income similar to the ZIP Code median. In contrast, in low-growth areas, the recent cohort of new entries have income half that of the ZIP Code median and are the largest group. In Sacramento, new entries are a relatively small group, and long-distance movers, who have a higher income than the ZIP Code median across all areas, dominate. Finally, in the Northern San Joaquin Valley, new entries in the high-growth areas are the largest group, but they are balanced by the largest share (and highest relative income) cohort of incumbents of any ZIP Code class.

The third consistent characteristic is the status of local movers. Local movers fall in between new entries and long-distance movers in terms of income, which is higher than the ZIP Code median but not by as much as long-distance movers. This is significant because long-distance movers are a larger group in high-growth areas than in low-growth areas. Still, while local movers' income is lower, the more recent cohorts (lowest-income) are smaller than for other filer types so that, as a group, they have a significant upward influence on overall ZIP Code income.

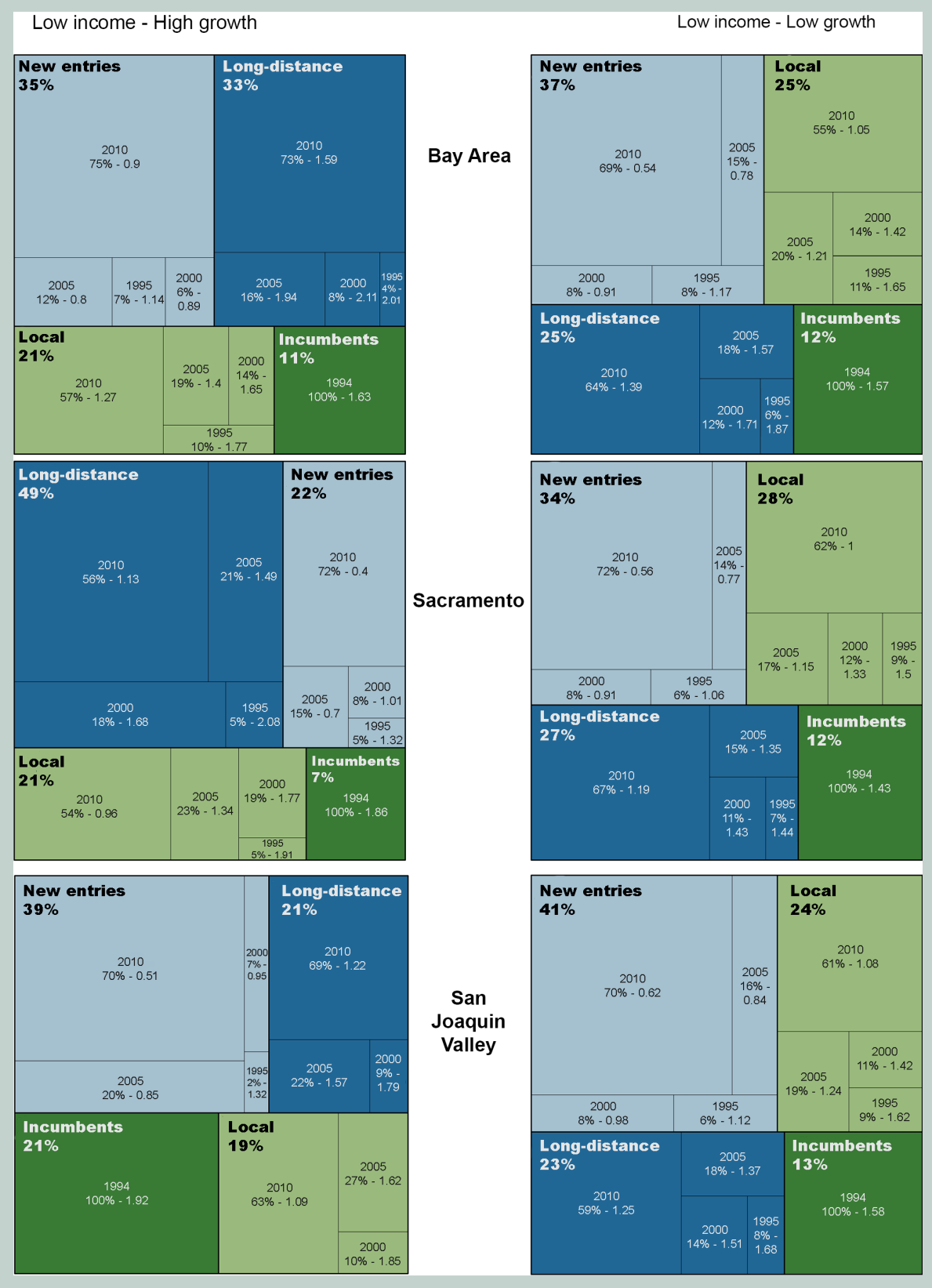
The last commonality is that, with few exceptions, cohorts in high-growth ZIP Codes have higher relative income than cohorts in low-growth ZIP Codes. Where the differential runs in the other directions, as with new entries in Sacramento, the size of the group reduces the influence of lower incomes.

In sum, low-growth ZIP Codes have larger recent cohorts of new entries with income significantly lower than the ZIP Code median and fewer long-distance movers to drive income up. There is greater variation among high-growth ZIP Codes. The higher income of new entries and long-distance movers are the main drivers of higher income in the Bay Area. In Sacramento, high-income long-distance movers dominate. Incumbents are far more prominent in the Northern San Joaquin Valley, where new entries otherwise mirror the trends in low-growth areas.

The composition of ZIP Codes shown in Figure 3.9 is static, it represents who is present in ZIP Codes in 2015. Places, however, are dynamic; how the income of different groups changes is consequential for how places evolve and the relationships between residents. We used regression analysis to illustrate how income changes with the length of time living in a ZIP Code, assuming households entered at the same age and with the same marital status and the number of dependents. We use 2004 for the analysis to maximize the number of years before and after the observation. In other words, for all households present in the data in 2004, we examined their income from the first year they entered their 2004 ZIP Code of residence to the last year they resided there. A household who moved into ZIP Code 94103 in 2000 and left in 2006 would have a tenure of seven years.[6]

In all cases, incumbents begin with a higher income (intercept) and have a slower income growth (flatter lines) than other filer types (Figure 3.10). The

Figure 3.9. Treemap plots show the composition of the two ZIP Code types in 2015. Each rectangle of different color represents a resident type and rectangles within each type represent the size of the cohort based on when the resident entered the ZIP Code.



Notes: Bolded % show the share of each mover type. Non-bolded % show the share of movers since the year printed in each box. Ratios show the cohort's 2015 income to the ZIP Code median.
Source: FTB data

estimates reflect the lower initial income of new entries and incumbents' higher average income. The regression output shows, however, that despite beginning with substantially lower initial incomes, new entries converge with other filer types. In low-growth ZIP Codes, the line for new entries intersects with the lines for movers within six years. New entries intersect incumbents within ten years. The convergence between the new entries and new filer types suggests that new entries who stay long term eventually converge with the ZIP Code median income. However, most new entries do not stay longer than six years in their initial ZIP Code, perhaps not long enough for their income to converge with incumbents. Figure 3.9 shows that long-term residents among new entries (i.e., the 1995 cohort) is always small. The income of these cohorts, however, tends to converge with the ZIP Code median.

The lines for movers are steeper than those for incumbents but not as steep as for new entries. The main difference between low- and high-growth ZIP Codes for movers is the intercept. In high-growth ZIP Codes, the intercept is high enough that movers' income surpasses incumbents' income within ten years. In contrast, movers in lower-growth ZIP Codes begin at a lower income and take longer to converge. Like incumbents, the estimated time of convergence, all else equal, is longer than the average duration of residency in the ZIP Code.

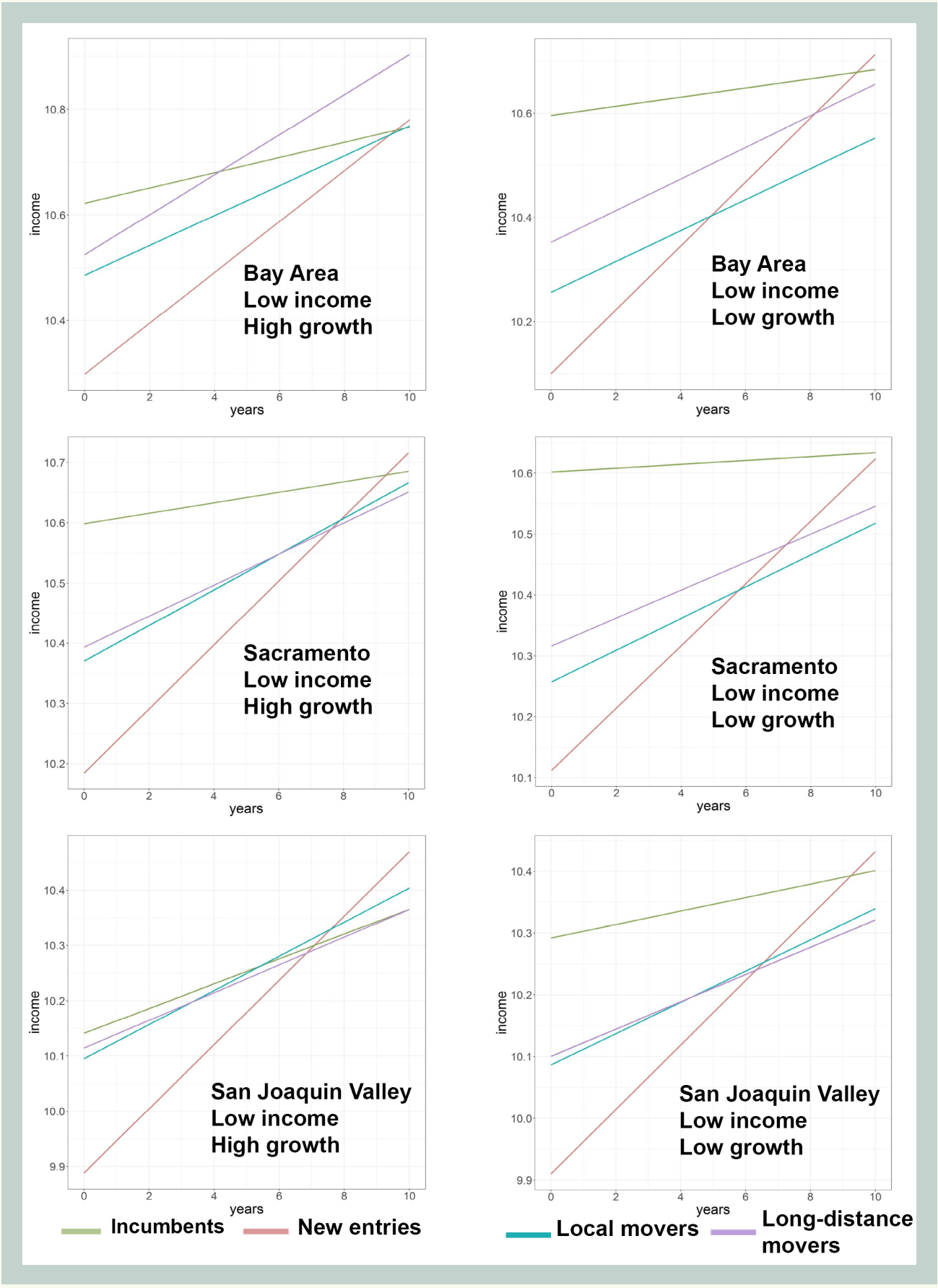
The charts in Figure 3.10 are not a representation of reality. The selection process inherent in mobility means that filers never all enter a ZIP Code with the same characteristics. The charts, however, show the role of filers' income trajectories in explaining the difference between high- and low-growth ZIP Codes. The trajectories help explain why some ZIP Codes' income changes rapidly, despite the lower initial income of entries relative to exiters and the slow growth of incumbents' income. The differences in intercepts and steepness of the lines also point to important differences between metropolitan areas and the selection process at play in each location.

The typical new entry is younger than the other groups by about ten years. This explains the lower initial income and shorter tenure in ZIP Codes as younger people move more often. As they age, new entries are likely to become migrants. The lines for migrants provide further evidence that one of the driving factors determining ZIP Code trajectories is the self-selection of movers rather than change among the people who live there.

During discussions with our advisory board, a common thread among several community stakeholders was that migration out of the Bay Area boils down to a matter of social class. Those who are low-income or "working class people are being pushed out"- in many cases these same individuals are leaving California altogether in search of a more affordable place to live. Indeed, out of state moves make up about 4% of all moves from 1994 to 2015, and higher still in the Bay Area. Though we did not track ZIP Code moves to out-of-state in detail, this context enriches

a larger conversation about the impacts of socioeconomic status on pressures to migrate. The last analysis summarized in Figure 3.10 paints a picture of general upward mobility. There is no doubt that the robust economic growth in the megaregion created many opportunities. However, those trends not only represent averages but also do not take into account the broader inequality between places.

Figure 3.10. Predicted income trajectories of different resident types if they were to have the same characteristics when they initially settle in a ZIP Code



Source: FTB data

Chapter 3 notes

1 This is a modified version of that used in Hwang, J., & Shrimali, B. P. (2021). Constrained Choices: Gentrification, Housing Affordability, and Residential Instability in the San Francisco Bay Area. Federal Reserve Bank of San Francisco, Community Development Research Brief Series.

2 Full results of the regression analysis are available upon request

3 See https://www.jchs.harvard.edu/home-price-income-ratios

4 See, e.g., Jargowsky, P. A. (1997). Poverty and place: Ghettos, barrios, and the American city. Russell Sage Foundation. Charles, C. Z. (2003). The dynamics of racial residential segregation. Annual review of sociology, 29(1), 167-207. Huang, Y., South, S. J., & Spring, A. (2017a). Racial Differences in Neighborhood Attainment: The Contributions of Interneighborhood Migration and In Situ Change. Demography, 54(5), 1819–1843. https://doi.org/10.1007/s13524-017-0606-y. Huang, Y., South, S. J., & Spring, A. (2017b). Racial Differences in Neighborhood Attainment: The Contributions of Interneighborhood Migration and In Situ Change. Demography, 54(5), 1819–1843. https://doi.org/10.1007/s13524-017-0606-y

5 For greater details on the socioeconomic status index, see Aliprantis, D., Carroll, D. R., & Young, E. R. (2019). What Explains Neighborhood Sorting by Income and Race? (Working Paper WP 18-08R). Federal Reserve Bank of Cleveland.

6 Full results of the regression analysis are available upon request

4 Transportation

This chapter examines how residents navigate the demands of living in the large, atomized megaregion that spans the San Francisco Bay Area east to California's Central Valley and the Sierra Nevada Foothills. This megaregion has an uneven distribution of people and economic centers. The Bay Area created many high-paying jobs, and the associated increase in housing demand raised housing costs in the metropolitan area beyond what most residents can or are willing to pay. As a result, in the past 3 decades, the population in surrounding counties has increased much faster than in the Bay Area, but the highest concentration of jobs remains in the Bay Area, leading to some of the highest rates of long-distance commutes.

Several counties in California's Central Valley are among the ten highest nationwide by share of supercommuters. A supercommute is defined as a one-way commute longer than 90 minutes or at least 50 miles.[1] According to the American Community Survey (2015-2019 5-year estimates), 10.2%, 8.6%, and 8.6% of commute trips originating in San Joaquin, Stanislaus, and Merced counties were supercommutes.

The literature on supercommuting has suffered from a lack of consistent definitions and available data. We, therefore, empirically assess supercommuting using four different data sources to highlight the strengths and shortcomings of each source. We also analyzed the link between residential moves from the Bay Area to Central Valley communities and the share of supercommuting as a fraction of total commutes originating in a ZIP Code over time.

The COVID-19 pandemic has exposed inequitable disparities built into commute patterns in which higher-income and higher-education populations followed stay-at-home orders more closely than lower-income populations who feared losing their income and were more likely to have jobs considered "essential", or whose work was unable to be performed remotely. While disparities across groups are clear, evidence is lacking in explaining the magnitude of disparities and uncovering the causal mechanism behind them. Our analysis relates the impact of the pandemic to ZIP Code-level socioeconomic composition to better understand variation across income and industry categories.

Many of the mobility disadvantaged workers are lower-income and lack reliable transportation options. In this fragmented region, transportation options that balance flexibility and efficiency, like van-sharing and commuter rail, have the potential to fill a critical segment of the transportation needs of mobility-disadvantaged workers. While ride-hail services and private transit options (e.g., tech buses) have garnered attention in the media and in academia, vanpool, app-based rideshare, and commuter rail are often-overlooked options that are more affordable and efficient thanks to larger passenger capacity. Our study analyzes the spatial distribution of mobility-disadvantaged workers and where and how they commute before and after the pandemic.

SUPERCOMMUTE

Aim:

Policy analysts and urban planners have linked extreme commuting with a lack of housing affordability in the urban core. The imbalance between affordable housing in the Central Valley and thriving job opportunities in the Bay Area increases the need for long-distance commuting. Our analysis aims to answer the following questions:

- Do existing data sources provide a consistent assessment of supercommuting? What is the general commute pattern? What is the traffic flow?
- How are demographic characteristics such as income, occupation, age, and residence associated with supercommuting?
- What is the relationship between migration from the Bay Area to the Central Valley and supercommuting trends?

How:

We use four different data sources to evaluate different methods of measuring supercommuting based on the same definition. We use these data to document trends over time, and the demographic composition of supercommuting at the household and ZIP Code levels. Data sources include travel surveys (California Household Travel Survey (CHTS), National Household Travel Survey (NHTS)), the American Community Survey (ACS), US Census LEHD Origin-Destination Employment Statistics (LODES), and mobile-derived data (StreetLight). Each dataset provides a different snapshot, and we illustrate them together to yield a more comprehensive picture of supercommuting.

What:

Our findings suggest several takeaways for transportation planning in the Bay Area and Central Valley, California, and nationally:

- Analyzing multiple data sources is necessary when looking at supercommuting, as no single dataset provides thorough enough coverage.
- Supercommutes are much more prevalent among Central Valley to Bay Area commuters, and even more so among carpool and public transit mode shares. This is in the context of very low public transit mode shares. Thus, the burden of long-duration (and distance) commutes falls heaviest on transit commuters in the region, most of whom are already of lower socioeconomic status.
- In-migration from the Bay Area is correlated with increased supercommuting in receiving Central Valley ZIP Codes. Strategies to better connect employees with employers whether to commute, telecommute, or switch to more local employment may relieve these commuting burdens, and should at least be explored.
- Transportation planning across the Northern California Megaregion is an important level of intergovernmental coordination to increase well-being by managing and possibly decreasing supercommuting.

Supercommuting Trends

The section documents the characteristics of supercommutes from four different data sources: travel surveys, ACS, LODES, and StreetLight. The four datasets are collected and sampled with different methods, and each enables different understandings of long commutes. High rates of supercommuting are a relatively recent phenomenon (and remain rare in most of the US) and no data source has been designed to capture longer commutes specifically. It is, therefore, important to establish a baseline of knowledge based on available data before delving into the implications for planning and policy.

Exploring Supercommute – Trends and Flows

All data sources show that more than half of the commuters travel fewer than 15 miles or 30 minutes to work regardless of the year of data collection. The share of supercommuters by distance (commute more than 50 miles one way) is around 2% in the Bay Area, according to a number consistent across sources except for LODES, where it is over 9%. In the Central Valley, the supercommute share of 3% is consistent between NHTS 2017 and StreetLight, but around 8% in the 2012 CHTS and, again, much higher in LODES results.

The reasons for LODES's deviation from other sources are discussed in greater detail elsewhere, but some of the differences are important for the interpretation of the results.[2] LODES focuses on the place of residence and place of work without observing where people commute. People may report a place of work that is different than where they commute daily if, for example, they work at a branch of a larger company or on a construction site. In contrast, ACS and travel surveys rely on asking people directly about their typical commute. StreetLight uses mobile phone positioning to observe people's movement and uses algorithms to determine the purpose of the trips (we report on all trips).

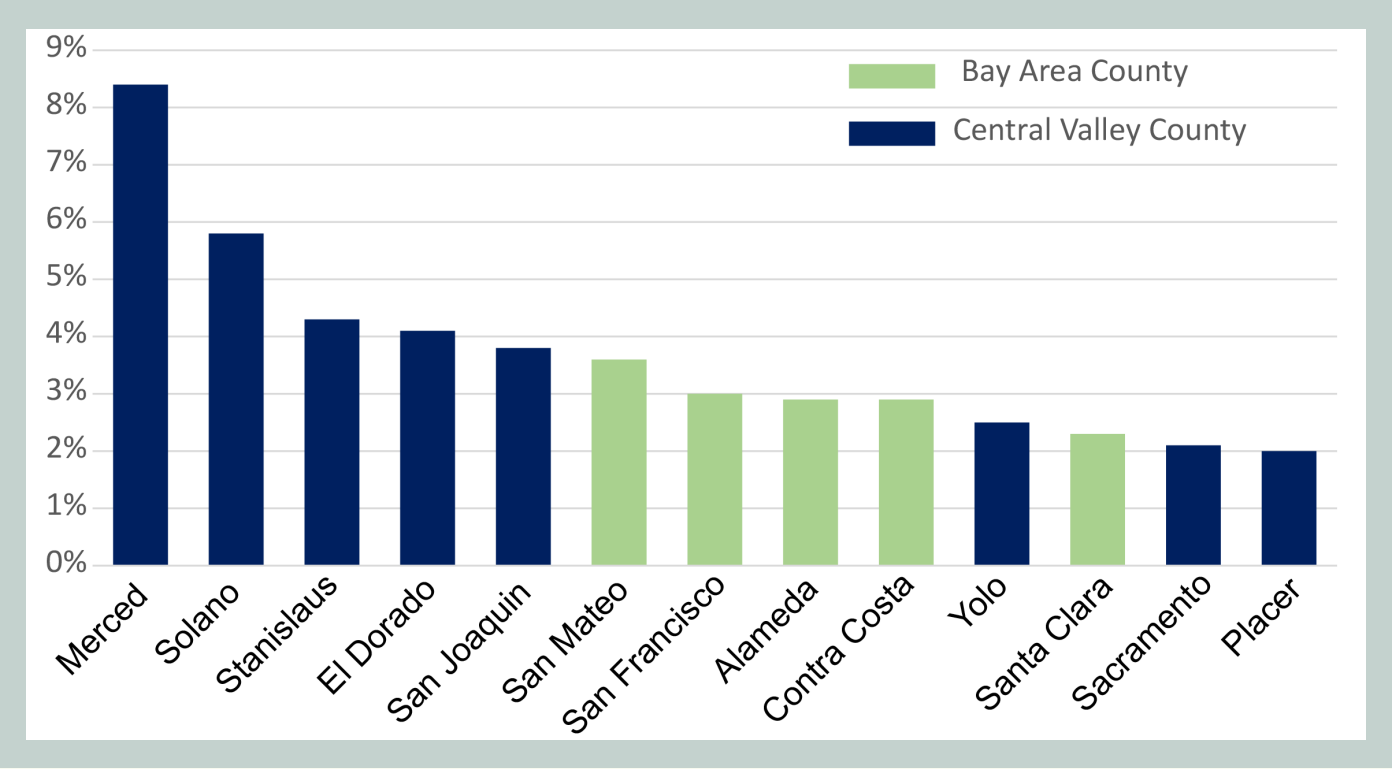
Despite differences between data sources, we find large degrees of agreement. Figure 4.1 shows the share of supercommutes by travel distance (miles) by county based on the most recent travel survey (NHTS, 2017). While the supercommute levels vary by data source, the counties with the highest supercommute share do not: Merced, Solano, Stanislaus, El Dorado, and San Joaquin. The Northern San Joaquin Valley counties (Stanislaus, San Joaquin, and Merced) all have below-average job concentration and many residents commute into the Bay Area rather than the closest urban centers of Stockton and Modesto. Solano County also lacks large employment centers and sits between the Bay Area and Sacramento so people commuting to either job center drive long distances. The relationship between Sacramento and the Bay Area was highlighted by a focus group participant who noted that many residents in counties at the borders of both metropolitan areas rely on access

to the two job markets or have different household members commuting to each of the metropolitan areas (Focus Group Interviews Feb. 16-23 2021).

Figure 4.2 shows the share of outbound commute of workers living in the Central Valley counties and traveling to Bay Area counties for work using 6 cross-sections of census-based estimates, including the US Census (1990, 2000), ACS (2006-2010, 2009-2013, 2011-2015), and the Census Transportation Planning Package (CTPP) (2012-2016). San Joaquin stands out as the county with the greatest increase in the share of commutes to the Bay Area. The explosive growth of Tracy at the boundary with the Bay Area may go a long way in explaining this trend. Tracy's population nearly tripled between 1990 and 2020 and it is uniquely placed as the city closest to the Bay Area outside Solano County. The trends for Merced and Stanislaus show that for some counties, supercommuting is not a new phenomenon and, rather, has been the norm for many residents.

While Northern San Joaquin Valley counties and Solano stand out, San Mateo and San Francisco are not far behind in terms of supercommute by distance. A commute of 50 miles out of San Francisco is equal to the distance to San Jose. Supercommuting, then, is not unique to mostly residential counties on the outskirts of large employment centers. The presence of multiple large employment centers itself, which is true of many polycentric regions,

Figure 4.1. Share of supercommuters travel by distance (>= 50 miles) by County



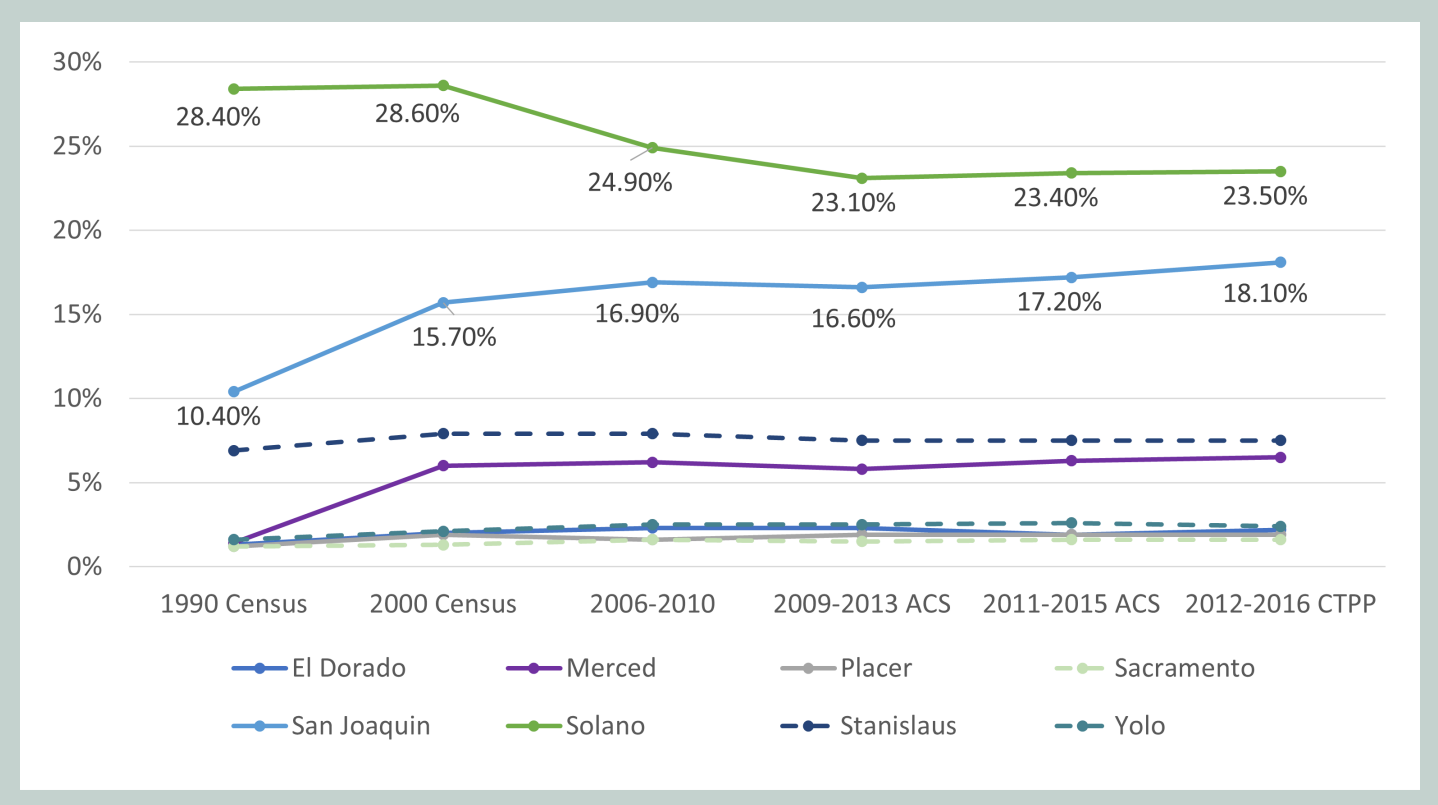
Source: NHTS, 2017

generates long commutes as people live in one center and work in another.

Solano County stood out in Figure 4.2 as the only county where supercommuting appears to have decreased. Based on LODES data, however, commuting to the Bay Area from Solano did not change from 2002 to 2018. Table 4.1 shows the share of outbound commuters between 2002 and 2018 for the same set of counties as Figure 4.2. The results suggest that the growth in employment in the Central Valley did little to stem the flow of commuters to the Bay Area. In all counties except Sacramento (where much of the job growth is concentrated) commuting to the Bay area increased. The highest percentage point growth from 2002 to 2018 according to LODES was in Merced, followed by El Dorado and Placer counties. If commutes from Solano to the Bay Area did decrease, it is likely that commutes to Sacramento increased.

While the share of commuters to the Bay Area may have remained stable for most Central Valley counties, the total volume of commutes certainly grew. Given the explosive population growth in the region over the past 30 years, with a similar share commuting to the Bay Area, congestion became the norm. Community advisors note that traffic congestion is not a new issue in the Central Valley. The Sacramento and Stockton areas specifically were noted to have increased congestion over the last decade (2010-2020).

Figure 4.2. Share of outbound commuters going to the Bay Area from Central Valley



Source: US Census (1990, 2000), ACS (2006-2010, 2009-2013, 2011-2015), and the Census Transportation Planning Package (CTPP) (2012-2016)

Table 4.1. Proportion commuting to Bay Area from the Central Valley (LODES)

Region	Counties	Total Employed			Proportion Commuting to Bay Area			Supercommuter % (50+ miles)		
		2002	2018	2018 minus 2002	2002	2018	2018 minus 2002	2002	2018	2018 minus 2002
Central Valley	**Central Valley**	**1,352,257**	**1,795,281**	**443,024**	**16.4%**	**16.6%**	**0.3%**	**18%**	**23%**	**5%**
	El Dorado	60,866	76,335	15,469	10.1%	11.4%	1.3%	21%	28%	7%
	Merced	76,404	98,140	21,736	11.4%	13%	1.6%	23%	32%	9%
	Placer	104,964	160,558	55,594	9.5%	10.7%	1.3%	17%	24%	7%
	Sacramento	480,259	662,007	181,748	11.9%	10.5%	-1.5%	17%	20%	3%
	San Joaquin	232,538	296,147	63,609	23.1%	26.4%	3.3%	18%	24%	6%
	Solano	147,507	199,831	52,324	34.3%	34.6%	0.4%	12%	15%	3%
	Stanislaus	182,595	217,126	34,531	16.1%	16.3%	0.2%	24%	28%	4%
	Yolo	67,424	85,137	17,713	7.9%	8.8%	1%	12%	17%	5%

Source: LODES (2002, 2018)

Clues regarding the tradeoff between job accessibility and housing affordability

The length of workers' commutes is the result of a tradeoff between housing and job accessibility. Locations farther from employment centers are often more affordable but require longer commutes. In a megaregion, the distance needed to reach affordable housing is much greater than in smaller-scale metropolitan areas. In the Northern California Megaregion, the Bay Area / Central Valley boundary acts as a demarcation between expensive and relatively affordable housing (see Chapter 5).

We combined multiple datasets to shed some light on how the tradeoff between housing and job accessibility plays out in the Northern California Megaregion. There are no datasets that allow for the reliable study of who supercommutes. The combination of multiple sources and a regression model with the latest travel diary data (2017 NHTS) provides some insights into the broader pattern and the connection

between migration and supercommuting.

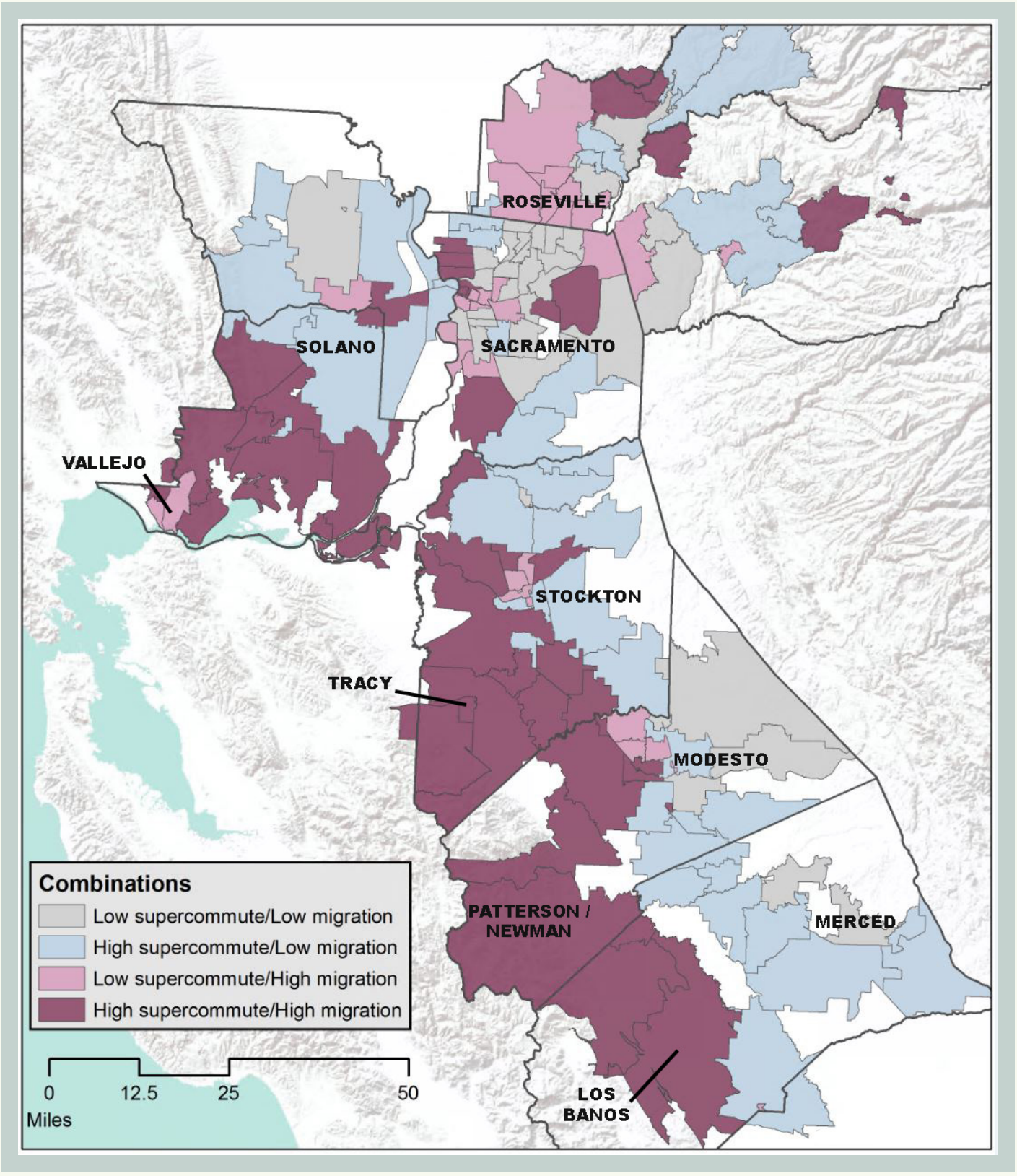
The picture that emerges suggests that supercommuters are more likely to be higher-income workers, younger, or work in manufacturing, construction, maintenance, and farming, without necessarily overlapping. Higher-income people have long been able to afford longer commutes thanks to reliable access to car transportation. The share of young supercommuters is especially high in the Central Valley (three times as high as in the Bay Area) suggesting that young workers may choose to live in the more affordable Central Valley while working in the Bay Area. Neighborhoods with higher shares of renters tend to generate fewer supercommutes. This adds to the narrative where people choose to live in locations more distant to job centers but more affordable. Finally, the industry composition is consistent with occupations that often require long-distance travel and are prominent in the Central Valley.

The demographic profile of supercommuters suggests that people may migrate from the Bay Area into the Central Valley and commute back into the Bay Area. We cannot analyze this connection directly, but by combining migration and commuting data, we test whether a correlation between migration and supercommuting is present. The map in Figure 4.3 shows the intersection of supercommuting and migration at the ZIP Code level. The color scheme indicates ZIP Codes that are above or below median supercommuting rate of 2% (based on the fraction of daily commutes longer than 50 miles one-way using 2017 Streetlight) and above or below the median migration rate of 6% (using the total volume of migration from the Bay Area into the Central Valley between 2002 and 2015 divided by the 2015 ZIP Code population). The map legend shows the four possible options:

- Low / Low: below median supercommuting rate and below median migration rate
- High / Low: above median supercommuting rate and below median migration rate
- Low / High: below median supercommuting rate and above median migration rate
- High / High: above median supercommuting rate and above median migration rate

The pattern in Figure 4.3 is clear. ZIP Codes along the Bay Area- Central Valley boundary are with few exceptions high supercommute and high in-migration. What is striking is that this pattern extends down to communities that are far from the urbanized areas of the Bay Area (e.g., Los Baños). As noted in Chapter 3, cities in Merced County and the southwest corner of San Joaquin County are among the top destinations for people migrating from San Jose into the Central Valley. StreetLight data shows that 3 to 5% of trips originating in these cities end in San Jose. While we cannot establish a causal link, but the results suggest a strong connection between places that otherwise should have little relationship based on the lack of transportation connection (there

Figure 4.3. Supercommuting and Migration (Streetlight and FTB): below and above median values by ZIP Code



Note: ZIP Codes that do not meet sample size criteria are not displayed on the map
Source: StreetLight 2017, FTB data

are no freeways connecting Patterson and San Jose directly, for example).

Several other high supercommute / high migration ZIP Codes are in and around Sacramento, including the neighborhoods directly North of the city and in the city of West Sacramento. Most ZIP Codes in the suburbs of Sacramento, however, are in the low supercommute / high migration category, suggesting that people move to the area to work there rather than commute to another employment center.

The pattern in Solano County provides more clues as to why the county ranks among the top producer of supercommutes. Vallejo ZIP Codes are not above the median for supercommuting rates, but most ZIP Codes in the rest of the county are (except the far northern part closer to Sacramento). While Vacaville, in the middle of the county, is more than 50 miles away from San Francisco, most of the county's population lives within 50 miles of San Francisco and Oakland. Many of the supercommuters in Solano drive to locations south of Oakland and San Francisco, which along with the lower housing prices in Solano compared to the Bay Area, is one of the reasons we grouped the county with the Central Valley despite its proximity to the Bay Area.

We used regression analysis to further investigate the relationship between migration and supercommuting. The analysis can only confirm the correlation that we observe in Figure 4.3, but it has the advantage of isolating the relationship between migration and supercommuting after controlling for other relevant factors such as the age composition and occupation of the workforce (LODES), and neighborhood income, racial/ethnic composition, transit use, educational attainment, and housing tenure (ACS). We use LODES data from 2002 to 2018, ACS from 2007 to 2017, StreetLight in 2017, and FTB migration data from 1993 to 2015. The major findings are listed below.

- The share of Bay Area in-migration into a ZIP Codes is positively correlated with the supercommuting rate in that ZIP Code in nearly all specifications and highly statistically significant in many.
- ZIP Code with substantial annual in-migration (say 10% of the population) are correlated with often large supercommute shares.
- The cumulative effect of migration over more than two decades on supercommuting is likewise positive and statistically significant.
- An increase from no migration to the median cumulative in-migration rate (6 moves per 100 people) increases the rate of one-way commuting over 90 minutes by about 1.4 percentage points or by almost a third of the mean value.
- Other variables correlated with high shares of supercommuters include housing tenure, transit usage, and industry composition.
- Across most specifications, the proportion of renters in a ZIP Code is statistically significantly negatively correlated with supercommute share. We infer that, ZIP Codes with higher renter proportions are more likely to

be closer to job centers (i.e., within larger urban areas) and therefore associated with less supercommuting.

- Transit share is slightly positively correlated with supercommuting in several specifications, though generally only for the durations above 60 minutes. It is possible that transit is not viable or not available for commutes over 90 minutes in this region.
- A ZIP Code's higher share of workers in trade or manufacturing also correlates positively with supercommute share.

IMPACTS OF COVID-19 ON COMMUTING

Aim:

The COVID-19 pandemic saw one of the most significant changes in work and commute patterns ever experienced. Our study aims to contribute to the long-term understanding of travel behavior recovery during a prolonged shock such as a pandemic. Our analysis answers the following questions:

- How did peak AM and home-based work trip volumes change in the early days of the pandemic, at peak transmission, and in the post-vaccination phase of COVID-19?
- How did local industry composition impact peak AM and home-based work trips during COVID-19? Is there evidence of convergence between industries over time?
- What other demographic characteristics affect trip volume overall?
- How did COVID-19 affect supercommutes?

How:

To better understand the impact of COVID-19 on commuting, we analyze traffic volume trends before and throughout the pandemic in the combined San Francisco Bay Area and California's Central Valley. We use StreetLight's daily trip volume data at the ZIP Code level to examine how morning peak period driving patterns changed based on income levels, occupation, and pre-COVID-19 travel volume characteristics.

What:

Our findings on factors associated with the change in commuting behavior suggest several takeaways for planning more equitable responses to future health or climate induced emergency events:

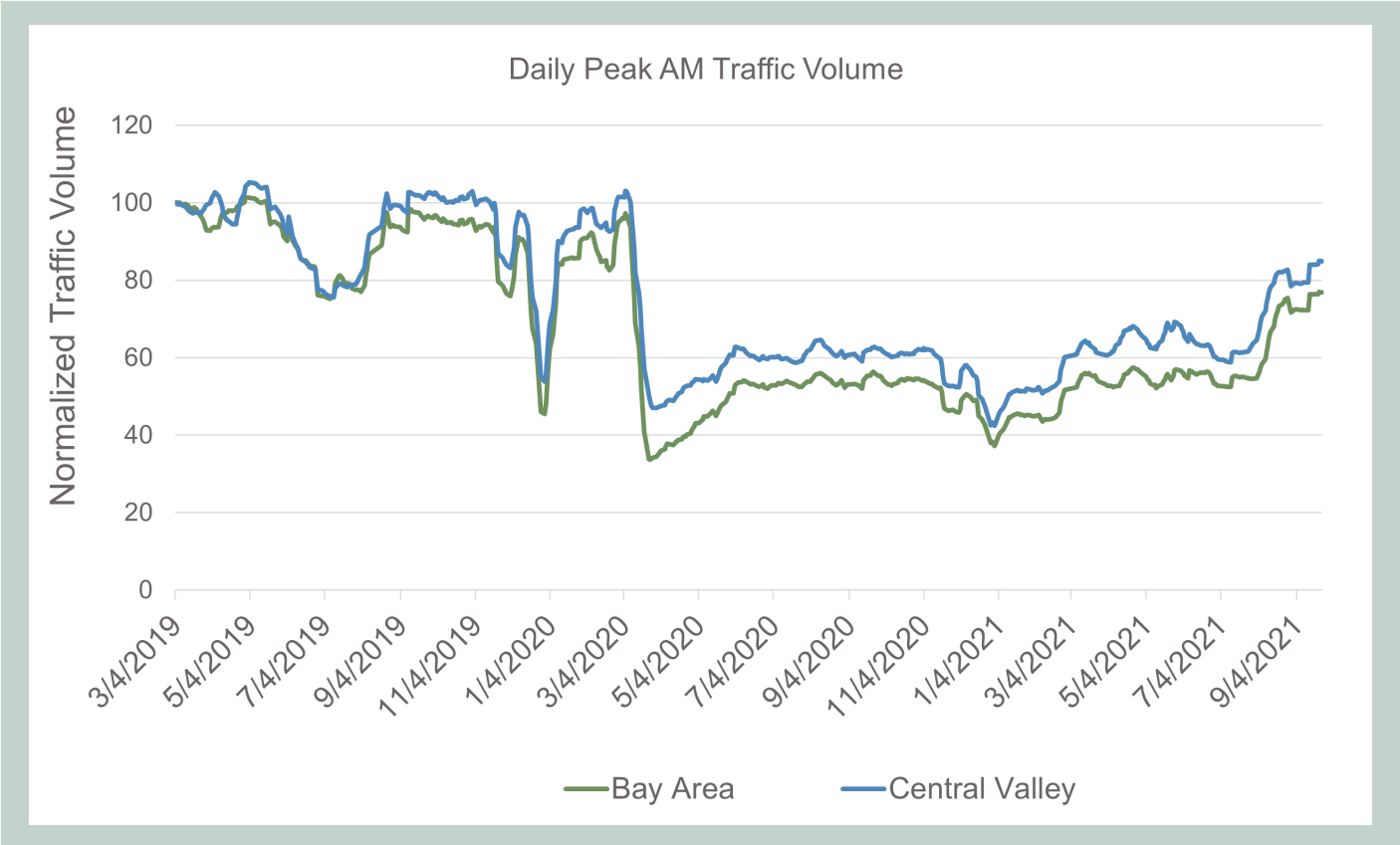
- Traffic volumes dropped by 40% on average relative to pre-COVID-19 norms and had not fully recovered as of September 2021, 1.5 years into the pandemic.
- Our results verify that existing income and occupation disparities in commute flexibility are likely to make vulnerable populations more vulnerable to health crises.
- Although primary (farming, mining, etc.) and secondary (manufacturing, construction, etc.) industries generate fewer commutes pre-COVID-19, the commutes in those industries were most likely to continue during the pandemic, making those industries the largest commute generators during the early COVID-19 pandemic.
- Vaccination progress had more impact on increases in peak AM traffic and home-based work trips compared with the Blueprint assignments (which measured COVID prevalence by county) and COVID-19 case rate.

The COVID-19 pandemic saw one of the most significant changes in work and commute patterns ever experienced. The first confirmed case of COVID-19 in California was on January 26, 2020. The U.S. declared a National Emergency on March 13, 2020. State and local governments began to issue stay-at-home and social distancing orders by mid-March 2020 to constrain human movement and curb the spread of the disease. This section documents the traffic volume trends before and throughout the COVID-19 pandemic in the San Francisco Bay Area and California's Central Valley.

Commute during covid

The first confirmed case of COVID-19 in California was on January 26, 2020 and the number jumped to two digits around March 6th to 9th in Bay Area counties. Although California did not issue a statewide shelter-in-place order until March 19, 2020, the data (Figure 4.4) show a cliff-like drop in peak AM volume as early as March 10, 2020. Peak AM (6-10AM) traffic volume dropped 70% in Bay Area, 50% in Central Valley, in March 2020. Peak AM volume decreased more in the Bay Area than in the Central Valley initially. One possible reason for the quick response

Figure 4.4. Daily peak AM traffic volume from March 2019 to September 2021 normalized to March 2019 = 100



Source: StreetLight 2019- 2021

is that many tech companies had already announced remote working options to their employees in late February 2020. In contrast, workers in other industries might have had to continue commuting until the state-wide emergency order was issued. As of September 2021, peak AM volume was still below historical average by 25% in Bay Area and 15% in Central Valley. COVID-19 has complicated the traffic situation.

The quantitative evidence agrees with qualitative evaluations on the ground. Community advisors reported that in the first year of the pandemic, traffic congestion overall was low due to health advisories and a stay-at-home quarantine that restricted all non-essential travel. Moreover, the work-from-home work model adapted by some meant that a daily commute was no longer necessary. Focus group participants revealed that COVID-19 has created a "new normal" for transportation, housing, and economic development in the megaregion (Focus Group Interviews Feb. 16-23 2021). Stakeholders are wary to use pre-2020 data in transportation development and planning for the megaregion. Transit planners are still making note of which industries have and will become permanently remote, hybrid work-from-home, or back to fully in-person.

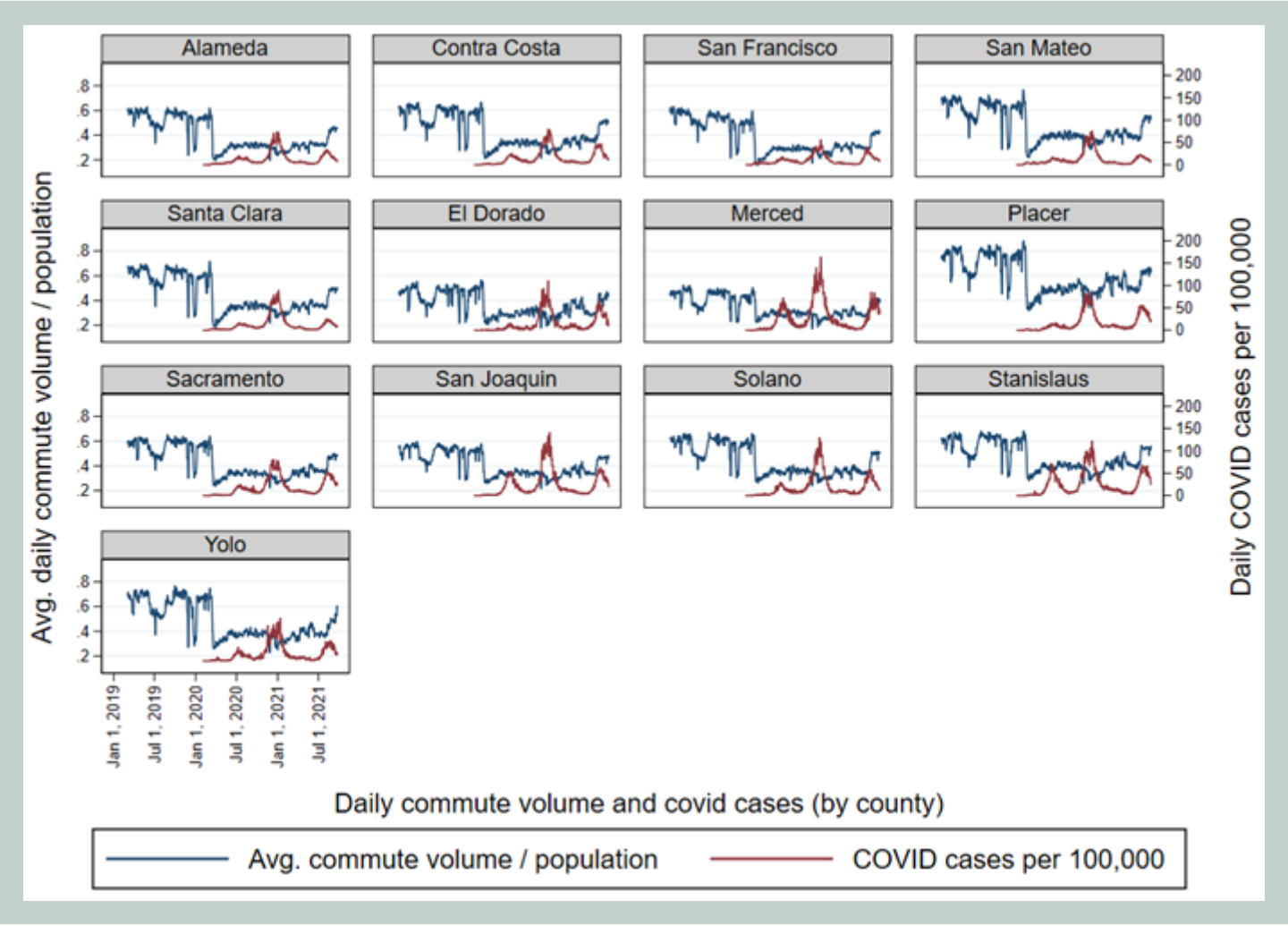
Figure 4.5 compares the overall trend of workday (without weekends and national holidays) peak AM traffic volume and COVID-19 cases per 100,000 by county from March 4, 2019 to September 25, 2021. Trip volumes show a modest correlation to the COVID-19 case rate during the first half of 2020 and the Blueprint period. The lack of correlation is indicative of the policy response to the spread of the virus (which was informed by national and international trends rather than the local context) rather than the observed case load. However, when California experiences its highest peaks in transmission in summer of 2020 and in January 2021, there is, again, no equivalent drop in traffic volume. At this point, the policy framework to stem the spread of the virus was well established and people had adapted to new work arrangements. Traffic levels prior to the two peaks remained near their low point, just as traffic volumes did not increase much at times of lower transmission in the first half of 2021 except for some counties (Placer and Stanislaus in particular) where lower transmission in the first half of 2021 translated to higher traffic volume.

Clear recovery in traffic volume began only with restrictions being lifted statewide. A big part of this relaxation was the introduction of the COVID-19 vaccine. Most people did not receive their first dose until March 2021. By the end of June 2021, 70% of the Bay Area residents were fully vaccinated, 20 percentage points more than the Central Valley share. We used regression analysis to investigate some of the differences we observe graphically. The focus of the analysis is the interaction between income, occupation, travel distance, and different COVID-19 stages while controlling for a variety of ZIP Code characteristics. We defined five stages to analyze changes in trip volume

based on the chronology of the pandemic and policy interventions in California:

- Stage 0. Pre-COVID-19: 03/04/2019 – 03/09/2020. This period is a full year before the COVID-19 outbreak, which can serve as a baseline representing pre-pandemic traffic patterns.
- Stage 1. COVID-19 outbreak: 03/10/2020- 08/30/2020. This period is between the first day of the traffic decline and the announcement of the Blueprint framework.
- Stage 2. Start of Blueprint: 08/31/2020 - 12/31/2020. This period is between the launch of the Blueprint framework and the start of vaccination.
- Stage 3. Start of Vaccination: 01/01/2021- 06/14/2021. This period is between the start of vaccination and the retirement of the Blueprint measurement.
- Stage 4. Fully Reopen: 06/15/2-21 - 09/25/2021. This period is between the lifting of all statewide restrictions (retirement of Blueprint) and the last day of the collected data

Figure 4.5. Daily peak AM traffic volume and COVID-19 cases



Source: StreetLight 2019- 2021, The California Department of Public Health, 2020-2021

The results discussed below are predicted values from our regression model.[3] We find that:

- Existing income and occupation disparities in commute flexibility are likely to make vulnerable populations more vulnerable to health crises.
- Although primary (farming, mining, etc.) and secondary (manufacturing, construction, etc.) industries generate fewer commutes pre-COVID-19, the commutes in those industries were most likely to continue during the pandemic, making those industries the largest commute generators during the early COVID-19 pandemic.
- Vaccination progress had more impact on increases in peak AM traffic and home-based work trips compared with the Blueprint assignments (which measured COVID prevalence by county) and COVID-19 case rate.

Income

Income affects traffic volumes both before and during the pandemic. Pre-COVID, higher-income ZIP Codes generated produced more peak AM and home-based work trips than middle and lower-income ZIP Codes (Figure 4.6). Throughout COVID, ZIP Codes in the highest income band (>$100k) had the largest traffic volume decreases, relative to the lowest income band (<$25k). In the post-vaccine period, peak AM trips in ZIP Codes with lower median household income recovered more than those with higher median household income. This suggests that there was a clear delineation by income of who was able to and/or chose to work from home and who did not or was not able to.

Occupation

A place's employment mix also has the potential to influence traffic volume trends. Figure 4.6 shows that before the COVID-19 outbreak, ZIP Codes with higher ratios of service workers had larger traffic volumes, while those with higher ratios of natural resources, construction, and maintenance had the lowest traffic volumes. Throughout COVID-19, ZIP Codes with higher ratios of natural resource / construction workers had increased traffic volumes. ZIP Codes with higher ratios of service and production / transportation workers had the largest decrease in peak AM traffic volume. In post-vaccine period, the peak AM trips of service occupations bounced back the most. These results suggest that industries labeled "essential" such as natural resource extraction or those where remote work is not feasible such as construction gained as a share of total traffic volume, relative to occupations which were not deemed essential or where remote work was more feasible such as parts of the service economy. ZIP Codes with high shares of natural resource / construction jobs thus increased traffic volume while those with high shares of service jobs decreased traffic volumes.

Focus group participants from the Bay Area strongly corroborate the joint effect of income and industry on commutes, with disparate impacts by wage or salary level and industry.

Lower-wage industries such as

agriculture, hospitality, and retail are experiencing negative impacts of migration on commute times. These industries are losing workforce or are noting longer commute times for their workforce. This may look like, for example, a construction worker whose job site is located in San Francisco who has been priced out of renting in the Bay Area and now must commute from Merced. This worker

Figure 4.6. Estimated differences in trips per day by stage by income group, relative to lowest income ($0-25k group) and by ratio of occupation share to Sales / Office occupation share

Notes: All estimates shown are statistically significant at the p<0.001 level

chooses the longer commute because the wages are higher and there is more work available in San Francisco than Merced.

Mid-wage industries such as healthcare, education, and public sector are at a "tipping point" in which some individuals are opting for supercommutes while others are choosing to leave the local workforce. These industries are experiencing issues with staff retention in the face of longer commute times.

Higher-wage industries such as the technology sector are more likely to be able to convert to a work-from-home model in which the majority of their workforce is not required to be on-site or in-office on a daily basis. This may look like, for example, an IT specialist who is able to troubleshoot and conduct work fully remote for up to 95% of their weekly work tasks. This worker chooses to purchase a home out-of-state and is able to "fly in" for work a few times a year when in-person attendance is necessary.

Supercommute trend during covid

COVID-19 caused ground-shifting adjustments to commuting and work, often reinforcing pre-existing inequality. People with bachelor's degrees and in high wage jobs were more likely to be able to telework. How did this affect supercommuting patterns? The maps below show the rate of supercommuting in the Bay Area and Central Valley, one of the regions with the highest incidence of supercommuting.

- In general, supercommuting is more common in Central Valley than in the Bay Area and is most frequent in areas outside the Sacramento catchment area.
- Up to 10% of morning commutes in many San Joaquin and Merced County ZIP Codes were supercommutes pre-COVID, and over 10% in the cities of Los Baños, French Camp, and Holt.
- Morning commute volumes dropped by over 50% in the Central Valley and Bay Area in the first 10 weeks of the COVID pandemic.
- COVID-19 reduced morning supercommutes throughout San Joaquin, Stanislaus, and Merced counties.

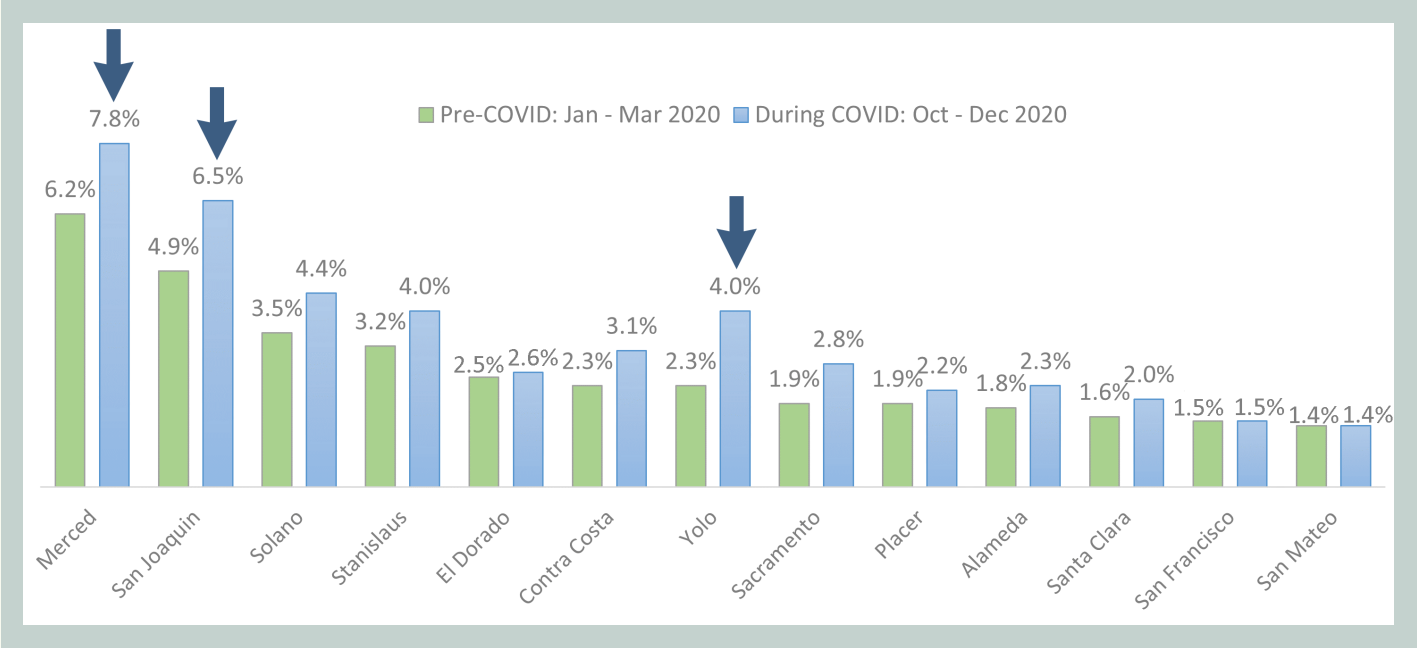
What was the impact of COVID-19 on total trip volumes and supercommute share? The average daily trip volume for morning commutes among the two regions before the COVID-19 outbreak was 8,158,828. The trip volume of the first two months of COVID-19 was 3,975,590, a 51% drop. By the end of 2020, trip volume grew back to 4,873,149. The regional share of supercommute trips remained constant before (2%) and after (3%) COVID-19 started. Figure 4.7 shows the share of supercommute as a fraction of all peak AM trips before and after COVID-19. Despite decreased traffic volume over 2020, supercommute shares did not fall during COVID. In fact, some counties saw large increases (Merced, San Joaquin, and Yolo).

Did the spatial distribution of supercommutes also change as a result of the pandemic? Figure 4.8 maps commuting flows across four time periods: Pre-COVID (between 01/01/2020-03/10/2020), COVID

outbreak (03/11/2020-05/19/2020), during COVID (10/7/2020 – 12/15/2020), and Post-COVID (07/28/2021 – 09/28/2021), using StreetLight data. The number of trips over 50 miles is estimated from a sample of phone locations collected and averaged over the entire period. We focus on Tuesdays during Peak AM hours (6AM – 10AM) as proxies for commute trips on a typical weekday.

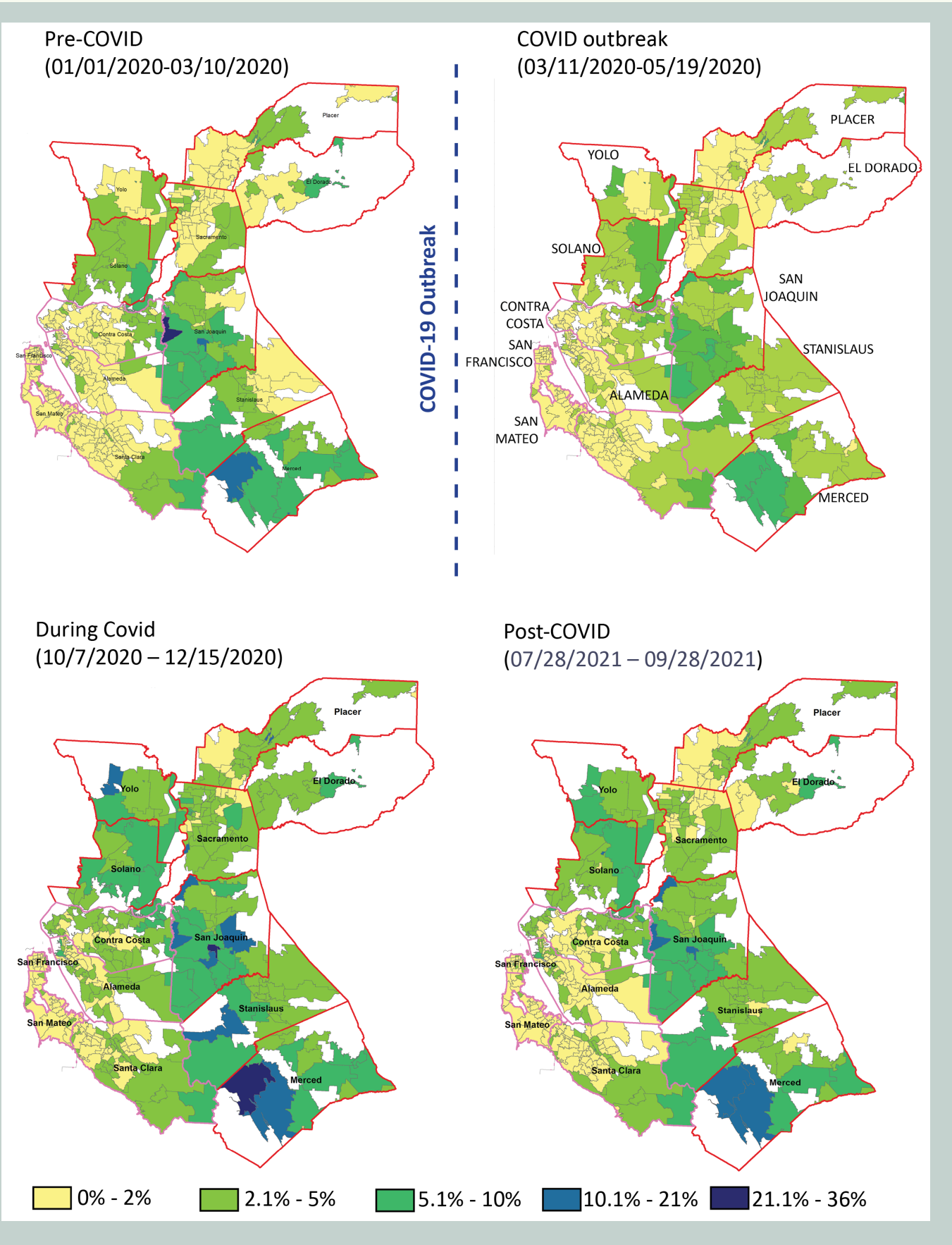
Before COVID-19, the spatial distribution of supercommuting was uneven, with highest concentrations in ZIP Codes in San Joaquin County, Merced County, and southern Santa Clara County. Though, pockets of higher supercommuting existed in ZIP Codes throughout the Central Valley and even in the outer reaches of the Bay Area. In the first two months of the pandemic, ZIP Codes in the Bay area display much lower supercommute shares, as do many of those in the Central Valley. Yet, the highest supercommute ZIP Codes remain in San Joaquin County, Merced County, and southern Santa Clara County, likely reflecting those locations as residences for essential workers. The spatial distribution of supercommuters remain similar before and after COVID.

Figure 4.7. share of supercommute as a fraction of all peak AM trips before and after COVID-19



Source: StreetLight 2020

Figure 4.8. Peak AM supercommute rates by ZIP Code before and after COVID outbreak



Source: StreetLight 2020- 2021

SHARED MOBILITY

Aim:

The Central Valley was already experiencing increased pressure from migration from the Bay Area prior to the COVID-19 shock. The region's low density and long distance to job centers limit opportunities for traditional transit but enable viability of niche transportation modes such as vanpool and app-based rideshare, which are often used by lower income workers. Our analysis aims to answer the following questions:

- Where do disadvantaged workers in mobility poor areas commute to and how?
- How do shared mobility options fill the void?
- How have these workers adapted to the pandemic?

How:

We use two kinds of survey data: (1) Survey data of vanpool and app-based rideshare users from the San Joaquin Council of Governments (SJCOG) dibs program, (2) survey data of commuters from the National Association for Commuter Transportation (ACT), to assesses the mobility trend of disadvantaged and minority workers and their experience of using alternative modes of transportation during the pandemic.

What:

Our analysis confirmed that rideshare service influences the travel behavior of service registrants. Our findings from the dibs and ACT survey suggest that:

- Registering for the SJCOG's dibs service affects travel behavior and mode choice by increasing the share of commuters who use carpool / vanpool at least some of the time and decreasing the share of those who drive alone Moreover, these gains remained sticky during the COVID-19 pandemic.
- Surveys of dibs and ACT point out that carpool / vanpool programs in this region are used by a rather narrow demographic. Namely, Government / Civil Service and Construction / Warehouse / Utilities workers, those who live far from work, those with access to vehicles, and those making below $150,000.

The Northern San Joaquin Valley has one of the highest rates of supercommuters, with many workers traveling long distances to Sacramento and Bay Area cities. In this fragmented region, alternative transportation options like carpool / vanpool fill a critical segment of the transportation needs of mobility disadvantaged workers. We partnered with the San Joaquin Council of Governments (SJCOG) who run the "dibs" vanpool and app-based rideshare programs to develop a user-friendly questionnaire via the MetroQuest survey tool. The questions focused on the joint goals of understanding dibs members' travel behaviors and dibs resource access and marketing.[4]

Table 4.2 reports how many times dibs members indicated using carpool/ vanpool before and after registering with dibs and during the pandemic, by number of days per week. We found that:

- The share of respondents using carpool / vanpool to any extent increased by 22% after joining dibs: before joining dibs, only 26% of respondents had used carpool / vanpool, while 48% reported using it after joining dibs.
- Total carpool / vanpool usage decreased from 48% to 37% during COVID-19 (March 15, 2020 – September 2021), but not to pre-dibs registration levels.
- For those who carpool/vanpool, the plurality of users pre-COVID, used carpool / vanpool 5 or more days per week (i.e., full-time). During COVID-19, among those who carpool/vanpool, the frequency of use decreased slightly.
- Note that the most common response was "Never": that just because dibs was available or the respondent was registered, did not mean they use the program.

Table 4.2. Impact of dibs registration on use of carpool/vanpool

Carpool/Vanpool	Never	1-2 days per week	3-4 days per week	5-6 days per week	Everyday	Grand Total
Before registering with dibs, how often did you carpool or vanpool?	78	5	9	9	5	106
	74%	5%	8%	8%	5%	100%
After registering with dibs, how often did you carpool or vanpool?	54	9	11	14	15	103
	52%	9%	11%	14%	15%	100%
During the COVID-19 pandemic (March 15,2020 – today), how often did you carpool or vanpool	66	8	11	10	9	104
	63%	8%	11%	10%	9%	100%

Source: dibs Survey 2021

To better evaluate the impact of dibs registration and of COVID-19 on carpool / vanpool usage, a statistical test was utilized to assess whether the differences were by chance or due to either dibs registration or COVID-19 (Table 4.3).

Results of the statistical tests suggest that 22 percentage point increase in carpool / vanpool usage is due to dibs registration and not due to random chance (statistically significant for $p<0.05$). In addition, dibs registration decreased the share of driving alone by 15 percentage points. However, dibs registration did not significantly change biking or public transit use.

For dibs registrants, the changes to carpooling/vanpooling, biking, or driving alone during the COVID-19 timeline were not significantly different than pre-COVID. This is likely due to the relatively low sample size of the dibs survey. However, COVID-19 reduced public transit use by 15% among dibs registrants. During COVID-19, among those who carpool/vanpool, the frequency of use decreased slightly.

Note again that the most common response was "Never", meaning that just because dibs was available or the respondent was registered, did not mean they use the program.

Median commute distance provides a different measure of dibs program impact. Respondents indicated that after registering with dibs, drive alone, transit, and carpool median distances changed. Median carpool distance went up by 3.5 miles and median transit distance more than doubled, while median drive alone distance fell by 3.8 miles (Table 4.4). This suggests that dibs impacted commute travel by reducing the number of miles respondents drove alone and increasing shared mobility (transit or carpool / vanpool).

Table 4.3. Impact of dibs registration on method of transportation

	Carpool/ Vanpool	Biking	Public Transit	Drive alone
Before registering with dibs, how often did you carpool or vanpool?	26%	33%	23%	78%
During the COVID-19 pandemic (March 15,2020 – today), how often did you carpool or vanpool	48%*	41%	28%	63%*
During the COVID-19 pandemic (March 15,2020 – today), how often did you carpool or vanpool	37%	33%	13%^	64%

Note: *Statistically significant ($p<0.05$) difference between After and Before dibs
^Statistically significant ($p<0.05$) difference between After and COVID
Source: dibs Survey 2021

During the pandemic, median commute distances stayed largely the same, except for transit where they dropped dramatically. This suggests that those who drove alone, carpooled, and biked generally did so for distances in line with pre-pandemic medians.

Table 4.4 reports the median distance by mode for dibs survey time periods. Our findings from the dibs survey suggest that SJCOG's dibs service influences the travel behavior of dibs registrants. It affects mode choice by increasing the share of commuters who use carpool / vanpool at least some of the time (>20 percentage point increase) and decreasing the share of those who drive alone (15 percentage point decrease). Moreover, these gains remained sticky during the COVID-19 pandemic.

At the same time, the dibs and ACT surveys point out that carpool / vanpool programs in this region are used by a rather narrow demographic. Namely, Government / Civil Service and Construction / Warehouse / Utilities workers, those who live far from work, those with access to vehicles, and those making below $150,000. It is possible that the nature of such services is more amenable to these types of work. During the pandemic, employees in these sectors were more likely to be deemed "essential" and were less likely to work remotely (nationally, and according to our survey data).

Table 4.4. Median distance by mode for dibs survey time periods

Median distance (miles)	Pre-dibs	Post-dibs	During COVID-19
Drive Alone	12.2	8.4	9.8
Transit	7.8	16.6	6.6
Carpool	17.2	20.7	20.4
Biking	4.3	4.3	3.7

Source: dibs Survey 2021

Chapter 4 notes

1 US Department of Transportation Federal Highway Administration (FHWA) (2018). Summary of Travel Trends: 2017 National Household Travel Survey. Report: FHWA-PL-18-019

2 For a discussion, see Boarnet et al. (2021) Displacement and Commuting in the San Francisco Bay Area and Beyond: An Analysis of the Relationship Between the Housing Crisis, Displacement, and Long Commutes.

3 For full methodology and regression output, see Boarnet et al. (2023) Commuting During and after COVID-19: The Impact of COVID-19 on Shared Mobility and Extreme Commuting in the Bay Area- Central Valley

4 For full methodology, questionnaire, and respondent demographics, see Boarnet et al. (2023) Commuting During and after COVID-19: The Impact of COVID-19 on Shared Mobility and Extreme Commuting in the Bay Area- Central Valley

5 Housing

MIGRATION AND ITS IMPACT ON HOUSING

Aim:

Housing affordability and availability act as push and pull factors, inspiring households to migrate. Migration patterns also affect where and what housing types are built and at what price. This section focuses on the intertwined nature of housing and migration, specifically in the relationship between the Bay Area and Central Valley communities.

How:

This section relies on publicly available housing supply and population statistics from the California Department of Finance, data on affordable housing subsidies from the National Housing Preservation Database, data on Regional Housing Needs Allocations (RHNA), and completions from California's Housing and Community Development Department, housing price data from Zillow and rent data from Apartment List. These data are used to selectively analyze trends in housing supply over space and time. Qualitative evidence from focus groups provides context for these trends.

What:

- Central Valley growth in population and housing units has been nearly twice as high as Bay Area from 1990 – 2020.
- Much of the growth in housing in both parts of the megaregions has been single-family units, with all of the Central Valley and most of the Bay Area becoming less dense over the past 30 years, despite a large renter population in both regions, for whom multifamily units may have been more relevant.
- Housing affordability is equally an issue in higher-income Bay Area and relatively lower-income Greater Sacramento and Northern San Joaquin Valley areas.
- Subsidized affordable units and other strategies to provide affordable housing (such as housing choice vouchers) do not meet the megaregion's demand.
- However, federal subsidies do represent a sizable chunk of the Central Valley's multifamily housing stock, providing much-needed density and acting as a slight deterrent to sprawl.
- Demand for housing overall outstrips supply in both regions, as manifested by home price growth above national levels.
- Bay Area home prices, in particular, have grown over 300% since 1997 and barely dipped during the Great Recession.
- Central Valley home prices have also grown (by 200%- 250%) since 1997 but have only eclipsed pre-Recession peaks during the COVID-19 pandemic boom.
- Rent growth since 2017 has been red hot in the Central Valley and generally tepid in the Bay Area.
- Overall, the push of high prices (rents and homes) in the Bay Area and the pull of relatively lower prices (rents and homes) in the Central Valley encourage Bay Area to Central Valley migration. At the same time, the migration itself pushes up home values in the Central Valley.

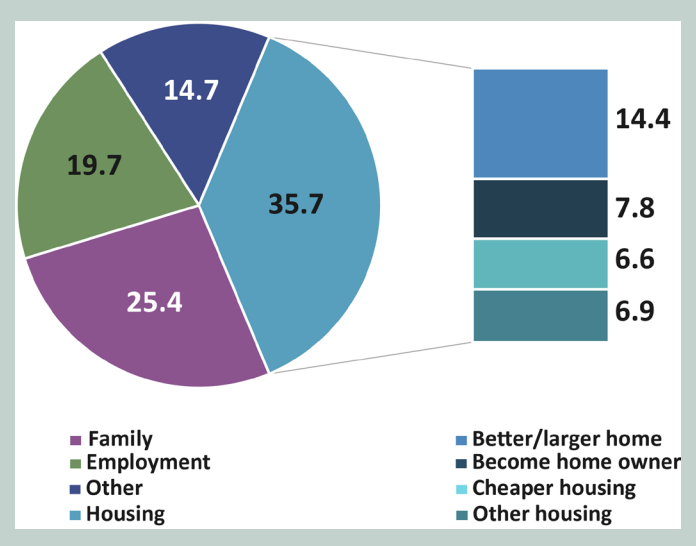
Migration and housing are intimately interrelated generally, and even more so in the Bay Area – Central Valley case. Nationally, 40% of movers cited housing as the primary move reason, making it the most common primary consideration over family-related, job-related, or other (education, health, climate, natural disaster, etc.) reasons in 2020 (CPS ASEC Table A-5). In the past, an even greater share of movers reported that housing was the primary move reason (CPS ASEC Table A-5). Of those moving for housing, one third moved to live in a larger home, one fifth moved to own rather than rent, one sixth moved to pay less for housing, and another tenth moved for a better or safer neighborhood (Figure 5.1).

While we did not survey movers from the Bay Area to the Central Valley (or vice versa), the national move reasons cited above pervade the thinking of households, local stakeholders, and the press for why people move. The relative affordability of Central Valley homes, the ability to buy rather than rent, the ability to increase living space or lot size, and the ability to change neighborhoods figure prominently in movers' minds and are in line with reports of local stakeholders, social service organizations, and community leaders.

There are numerous resources and reports on housing supply, demand, and pricing challenges in the Bay Area and some in the Central Valley. This section uses existing data to recast the debate and compare housing supply and price in the megaregion, focusing on the relationship between the Bay Area and Central Valley. Further, this section integrates insight from the analysis of migration flows by zeroing in on the housing markets of top migrant sending and receiving cities in the Bay Area and Central Valley.

The rest of this section looks at the following. First, we compare metro-level housing supply, including underlying drivers of demand such as population and job growth. Next, we compare the housing supply for top sending and receiving cities. Then, we look at the housing types (single-family versus multifamily) and how the imbalance with labor markets and population growth drive housing costs in the ownership and rental markets. Finally, we examine the impact of housing subsidies on the housing type mix and the state housing growth allocation formulas (RHNA) to assess the gap in affordability.

Figure 5.1. Reasons for moving in 2020



Source: Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC) Table A-5

Regional Housing Supply Comparison

Over the past 30 years, the Central Valley counties in this study outpaced the core Bay Area counties in population and housing unit growth by two to one (Table 5.1). Both regions have added around 1.5 million residents from 1990 to 2020, accounting for a 30% increase in the Bay Area and a whopping 55% increase in the Central Valley. Bay Area growth was fastest in suburban Contra Costa County, followed by the suburbs of Oakland (Alameda County) and San Jose and its suburbs (Santa Clara County). Central Valley grew rapidly across most of the region, including Sacramento, its suburban counties, and the Northern San Joaquin Valley. Placer County, which straddles the Sacramento suburbs and the Sierra Nevada foothills, more than doubled its population.

Both regions added housing units to house this new population– about 450,000 in the Bay Area and over 500,000 in the Central Valley (Table 5.1). Housing unit growth trailed population growth slightly but was still substantial: 23% increase in the Bay Area and 47% in the Central Valley. Housing growth patterns by county tended to mirror population growth patterns, as expected, given the need to house the population. Regardless of housing type, the Central Valley's surging housing growth represents a large-scale land use change from agricultural, industrial, recreational, and wildland to mostly single-family home residential tracts, indicative of sprawling suburban developments.

Population growth and job growth are two key ingredients that have in tandem fueled growth in the megaregion. Table 5.2 shows two measures- the ratio of job growth to housing unit growth and the ratio of population growth to housing unit growth – to better compare metropolitan areas and their housing supply outcomes. Additional comparison metropolitan areas like Outer Bay and Fresno, and Foothills are included for fuller comparison.

As reported elsewhere , job growth in the Bay Area, specifically San Francisco and Silicon Valley (San Mateo County), far outpaces those counties' ability to house that new workforce.[1] From 2002 to 2019, job growth there is over three times the housing unit growth (Table 5.2) and nearly twice the housing unit growth in Santa Clara County. The Plan Bay Area 2050 regional plan considers a 1.5 jobs per housing unit ratio balanced growth.[2] From this perspective, Alameda and Santa Clara counties' growth is more balanced, while Contra Costa trends toward a bedroom community. Necessarily – new workers who migrate from elsewhere and fill jobs in San Francisco and the Silicon Valley cannot all fit into the highest growth counties – growth has spilled over into neighboring suburban counties (Alameda and Contra Costa) whose jobs-to-housing growth ratios are much more modest (1.4 and 1.1) or to Outer Bay counties, and to Central Valley counties.

Except for Sacramento, which is a regional center and a major employment hub, the suburban counties of Greater Sacramento and the Northern San

Joaquin Valley counties all have a jobs-to-housing growth ratio of 1 or slightly less. This means the same or more housing units are created than jobs. Effectively, these are teetering between somewhat balanced growth and becoming entrenched as bedroom communities for major employment centers (San Francisco, Silicon Valley / San Jose, Oakland, Sacramento). Based on the 1.5 jobs per housing unit standard, the Central Valley counties (except Sacramento) are slipping further into becoming bedroom communities rather than self-sustaining sub-regions.

As a comparison, most Outer Bay counties follow a similar trend. Napa and Monterey counties stand out as having twice the job growth relative to housing growth mainly due to the continued expansion of agricultural and industrial sectors, without a commensurate push to house those workers. Further out, Fresno and fast-growing Madera counties are also regional employment centers and have higher than one jobs-to-housing growth ratios. The remainder of the Foothill counties is again trending toward bedroom or leisure communities rather than self-sustaining balanced regions.

Table 5.1. Housing unit and population growth 1990-2020 by county and region

	Population				Housing units			
County	**1990**	**2020**	**Growth**	**Growth %**	**1990**	**2020**	**Growth**	**Growth %**
Alameda	1,276,702	1,670,834	394,132	31%	504,109	611,752	107,643	21%
Contra Costa	803,732	1,153,561	349,829	44%	316,170	418,409	102,239	32%
San Francisco	723,959	897,806	173,847	24%	328,471	404,164	75,693	23%
San Mateo	649,623	773,244	123,621	19%	251,782	280,879	29,097	12%
Santa Clara	1,497,577	1,961,969	464,392	31%	540,240	674,558	134,318	25%
El Dorado	125,995	193,227	67,232	53%	61,451	92,508	31,057	51%
Merced	178,403	283,521	105,118	59%	58,410	87,897	29,487	50%
Placer	172,796	403,711	230,915	134%	77,879	169,526	91,647	118%
Sacramento	1,041,219	1,555,365	514,146	49%	417,574	579,115	161,541	39%
San Joaquin	480,628	773,632	293,004	61%	166,274	249,058	82,784	50%
Solano	339,471	440,224	100,753	30%	119,136	160,614	41,478	35%
Stanislaus	370,522	557,709	187,187	51%	132,027	183,068	51,041	39%
Yolo	141,210	221,705	80,495	57%	53,028	78,377	25,349	48%
Bay Area	4,951,593	6,457,414	1,505,821	30%	1,940,772	2,389,762	448,990	23%
Central Valley	2,850,244	4,429,094	1,578,850	55%	1,085,779	1,600,163	514,384	47%

Source: California Department of Finance (DOF) Tables E5 and E8

The large-scale housing construction has done little to shift the housing mix in the megaregion. The Bay Area and Central Valley remain firmly single-family. The share of multifamily versus single-family housing units is a broad and straightforward measure of density and urban spatial structure. In 2020, 40% of the Bay Area's housing units were multifamily, virtually the same as in 1990. Despite the limits its topography and existing built area impose on developable land, the Bay Area did not shift significantly toward building more multifamily units. Of the ~450,000 new units built between 1990 and 2020, 44% were multifamily, maintaining the same balance with single-family housing.

The Central Valley's explosive growth, however, was firmly a result of single-family home development, which consumes raw and redeveloped land at a much greater proportion than even smaller multifamily development. The share of multifamily units in the Central Valley in 2020 was 21%, down from 25% in 1990. Of the newly built ~515,000 units, only 14% were multifamily. Greater single-family development also precludes the development of effective public transportation systems or even service delivery for many civic, health, and retail functions. This means greater reliance on cars (and attendant environmental impact), going further for specialized services, and fewer choices as a consumer.

The differences between the Bay Area and Central Valley are magnified within metropolitan areas. Figure 5.2 tracks county-level trends in multifamily production. Multifamily growth in the Bay Area has been driven by Santa Clara County and then by San Francisco and Alameda Counties, with about half the production coming in the 2010s. Most of Central Valley's multifamily production has come from Sacramento and Placer Counties in the 1990s and the 2000s. Only Santa Clara and Placer Counties have increased their share of multifamily units over the 1990 benchmark by one percentage point or more. San Francisco and San Mateo Counties had negligible increases. The rest of the counties decreased their share of multifamily stock, meaning they were less dense in 2020 than in 1990. Merced, Solano, Stanislaus, and Yolo Counties decreased their share of multifamily housing by 3 percentage points since 1990, and San Joaquin plummeted six percentage points from its 1990 level. Even Sacramento County which added 30,000 multifamily units since 1990 still decreased its overall share by three percentage points. As with the regional picture, most places in the Central Valley are less dense than they were in 1990 and more reliant on single-family development. Even in the Bay Area, despite ardent multifamily construction, most places are less or as dense as they were thirty years ago, except for San Jose and its suburbs.

The housing type mix is important because it exacerbates issues emphasized in Chapters 3 and 4. The limited opportunities for large-scale, single-family housing development in the Bay Area, especially near areas where job growth has been the most intense, leave two options for developers and governments. Housing

Table 5.2. Job and population Growth as a ratio of housing unit growth (2000 to 2019)

Region	County	Job Growth % / Housing Unit Growth %
Bay Area	Alameda	1.4
	Contra Costa	1.1
	San Francisco	3.2
	San Mateo	3.4
	Santa Clara	1.8
Sacramento Region	El Dorado	0.9
	Placer	1.0
	Sacramento	1.9
	Solano	1.0
	Yolo	0.8
San Joaquin Valley	Merced	1.0
	San Joaquin	0.8
	Stanislaus	1.1
Outer Bay	Marin	1.1
	Monterey	2.0
	Napa	2.2
	San Benito	1.2
	Santa Cruz	1.2
	Sonoma	1.2
Foothills & Fresno	Amador	1.1
	Calaveras	0.7
	Colusa	0.6
	Fresno	1.4
	Madera	2.4
	Mariposa	0.6
	Nevada	0.2
	Sutter	1.3
	Tuolumne	0.7
	Yuba	1.1

Source: Housing- California Department of Finance (DOF) Tables E8, Jobs – LODES Workplace Area Characteristics (WAC) database

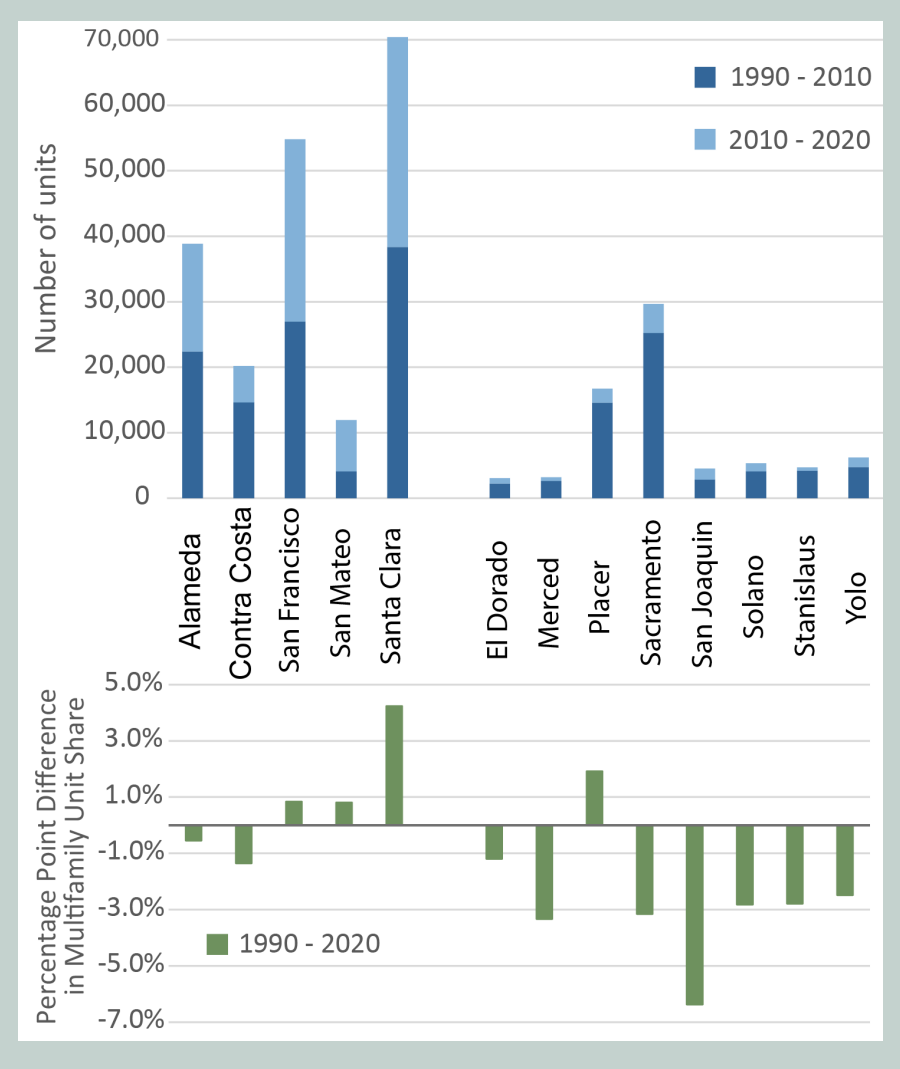
developments can either densify existing urban residential land or rely on the land supply farther away from the economic centers. The high financial costs and institutional obstacles to densification have translated to development concentrating in high land supply areas. The statistics in this section covered a period during which development opportunities for single-family housing were still relatively abundant in the Bay Area (in Eastern Contra Costa and Southern Santa Clara especially) and there was, indeed, large-scale development in these areas. These opportunities are now gone, meaning the megaregion is entering an era of greater constraints compared to the picture presented above.

"Over the past decade, the migration of people coming to our town from San Jose to Los Baños is forcing growth at a rapid rate. The commuters moving in from Los Baños are now increasing the market rate. Families who have historically lived here can't afford to buy because of the high cost of housing. They are forced into the rental market because it's cheaper, while the young people are moving out towards Fresno and Madera Counties."- *CAB Meeting 12.4.20*

If growth continues, even at a more modest pace, the lack of developable land in the Bay Area will lead to further out-migration to the Central Valley and beyond. The Bay Area is not densifying

fast enough to absorb the population necessary to house its existing and growing workforce, no less the workforce needed to maintain its astronomical job growth. The Central Valley provides a housing relief valve for those willing to drive further or telecommute to Bay Area jobs or work in the local economy. However, the Central Valley growth patterns based on single-family developments suggest that, here too, space will eventually run out. The implications in the Central Valley are complicated by the priorities of a vast agricultural system already under stress from competition for water and land that may lead to migration further up and down the Central Valley, into Nevada, and out of state. Focus group participants observed increasing instances of people driving from the southern San Joaquin Valley (e.g., Bakersfield) to work in the megaregion.

Figure 5.2. Multifamily unit and share growth 1990 – 2020



Source: California Department of Finance (DOF) Tables E5 and E8

"We're seeing that in the San Joaquin Valley. Housing stock is so low, so potential buyers are being priced out. People from the Bay Area are now even coming into Fresno, Visalia, Bakersfield."

- CAB Meeting 12.4.20

Migration and Housing Supply

The migration analysis in this report (Chapter 3) identified the top sending and receiving cities for migration from the Bay Area to the Central Valley. These places provide a microcosm of the region as hotbeds of migration and mobility. This section examines these top sending (11) and receiving (13) cities in terms of population growth, housing unit growth, and multifamily share.

The top sending cities are high-growth inner and outer suburbs of the Bay Area (Table 5.3). Despite the top-sending cities' high rate of out-migration, these cities have grown quickly over the past 30 years – an average of 30% population growth, in line with the Bay Area as a whole (Table 5.1), though some have been slower-growing (Daly City, Martinez). International and domestic migration notwithstanding, the top-sending cities are part of the migration ecosystem highlighted in Chapter 3. People primarily move within the East Bay and a subset move to the Central Valley. The top sending cities are, therefore, also top receiving destinations in the Bay Area and they generally receive more people than people who leave for the Central Valley or anywhere else. The cities' geographic position at the edges of the Bay Area urbanized areas has made them the loci for housing development and precursors to the kind of explosive growth that characterize the top receiving cities in the Central Valley.

The top receiving cities (Table 5.4) are a mix of high-growth suburbs (Folsom, Elk Grove, Manteca, Tracy), established central places (Sacramento, Fresno, Stockton, Modesto, Vallejo), and booming rural areas (Los Baños, Patterson). Average growth in top receiving cities has been 48% from 1990 to 2020, mirroring Central Valley growth overall (Table 5.1). There is some variation in population growth, with the established central places growing slowest and the suburban and exurban locales growing fastest.

In addition to these top receivers, many of the formerly agricultural and non-developed areas of the Northern San Joaquin Valley (San Joaquin, Stanislaus, and Merced counties) and the outer suburbs of Sacramento leading up to the Sierra Nevada (Placer, El Dorado counties) have seen much greenfield development to accommodate new population growth. Rural areas in El Dorado and Placer Counties are facing additional challenges as their communities accept more in-migrants from the Bay Area in particular (Focus Group Interviews March- April 2021). Telecommuters who have left urban cities and have purchased homes in rural communities are changing the local culture both politically and economically. On a local level, economic trends point towards temporary inflation as wealthy incomers drive up the prices of housing in surrounding areas.

Both top sending and receiving cities have added housing units, fueled by the population growth over the past 30 years. However, there is a marked difference in magnitude: top-sending cities have added ~93K units while top-

Table 5.3. Population in 1990 and 2020 in top Bay Area sending cities to Central Valley

Top Sending Cities	1990 Population	2020 Population	Population Change 1990 to 2020	Population Growth %
Antioch	62,195	112,520	50,325	81%
Daly City	102,024	109,142	7,118	7%
Fremont	193,557	234,220	40,663	21%
Hayward	133,533	160,311	26,778	20%
Livermore	69,538	91,861	22,323	32%
Martinez	35,086	37,106	2,020	6%
Milpitas	60,360	77,961	17,601	29%
Oakley	0	42,461	42,461	
Pittsburg	53,743	74,321	20,578	38%
Richmond	96,291	111,217	14,926	16%
Union City	61,633	73,637	12,004	19%
Total	867,960	1,124,757	256,797	30%

Note: Oakley was not an incorporated city in 1990
Source: California Department of Finance (DOF) Tables E5 and E8

receiving cities have added ~310K units (Table 5.5). This large buildout of housing units in the top Central Valley receiving cities over the past three decades amounts to a new city the size of Sacramento plus Stockton's existing housing stock.

Heterogeneity persists among top senders and receivers. Housing unit growth was over 50% for Antioch, Livermore, and Milpitas, and 40% for Pittsburg, all fast-growing suburbs at the edges of the Bay Area urbanized core. Consistent with migration flows to the Central Valley converging on Greater Sacramento (see Chapter 3), the Sacramento suburbs of Roseville and Folsom more than tripled their existing housing stock since 1990. Patterson, Los Baños, Tracy, and Manteca, formerly smaller cities at the boundary between the Bay Area and Central Valley more than doubled theirs. This exceptional housing unit growth helped absorb the large migration from the Bay Area.

At 27% in 2020, multifamily share (housing unit density) is remarkably similar between top Bay Area senders and top Central Valley receivers (Table 5.5). This means that top-sending cities tend to have a lower share of multifamily units than the region overall (40%),

Table 5.4. Population in 1990 and 2020 in top Central Valley receiving cities from Bay Area

Top Receiving Cities	1990 Population	2020 Population	Population Change 1990 to 2020	Population Growth %
Davis	55,920	69,183	13,263	24%
Elk Grove	0	176,154	176,154	
Folsom	43,388	81,610	38,222	88%
Fresno	414,597	545,769	131,172	32%
Los Baños	23,002	41,923	18,921	82%
Manteca	46,516	84,800	38,284	82%
Modesto	181,674	222,335	40,661	22%
Patterson	10,292	23,074	12,782	124%
Roseville	71,571	145,163	73,592	103%
Sacramento	401,411	510,931	109,520	27%
Stockton	237,326	318,522	81,196	34%
Tracy	48,962	95,931	46,969	96%
Vallejo	112,421	119,063	6,642	6%
Total	1,647,080	2,434,458	787,378	48%

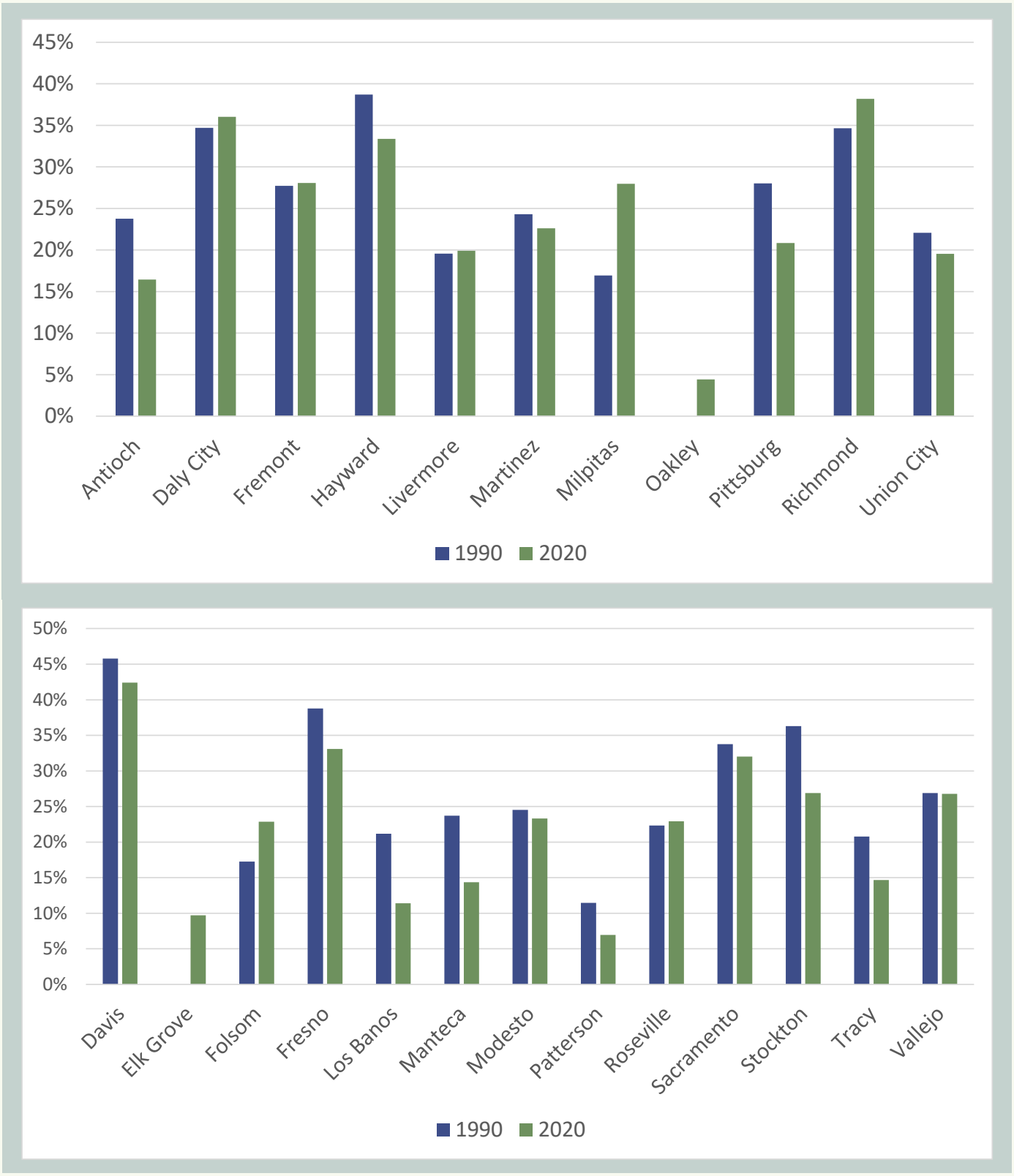
Note: Elk Grove was not an incorporated city in 1990
Source: California Department of Finance (DOF) Tables E5 and E8

while the top-receiving cities are denser than the region overall (21%). This is partially driven by the composition of the receiving cities which include larger central places with multifamily shares that are high for the region: Davis (42%), Fresno (33%), Sacramento (32%), Stockton (27%), and Vallejo (27%).

Like the megaregion, however, few senders or receivers have increased their share of multifamily units as a percent of their total housing stock, over the past 30 years (Figures 5.3). Of senders, Milpitas (which is more closely embedded within the Bay Area urbanized area) has led the way toward a denser housing supply, with an increase of over 10 percentage points from 1990 to 2020. Slight upward shifts toward density were also observed in Richmond and Daly City (both older inner-ring suburbs). Of receivers, Folsom led the way to denser housing supply (+6 percentage points) and Roseville eked out a slight gain. Fast-growing Los Baños and Manteca significantly reduced their share of multifamily units, as did Stockton. In all,

migration to top receiving communities was likely led by the availability of single-family homes (both old and new).

Figure 5.3. Multifamily share of total units – top senders (top) and receivers (bottom)



Source: California Department of Finance (DOF) Tables E5 and E8

Table 5.5. Housing supply growth, multifamily share, and subsidization proportion

Top Sending Cities	Housing Unit Growth	Multifamily Share	Affordable Units as Share of Multifamily Units	Top Receiving Cities	Housing Unit Growth	Multifamily Share	Affordable Units as Share of Multifamily Units
Year	**1990 to 2020**	**2020**	**2020**	**Year**	**1990 to 2020**	**2020**	**2020**
Antioch	13,176	16%	22%	**Davis**	8,714	42%	11%
Daly City	3,356	36%	3%	**Elk Grove**	55,438	10%	46%
Fremont	14,909	28%	10%	**Folsom**	19,471	23%	10%
Hayward	8,228	33%	12%	**Fresno**	52,620	33%	14%
Livermore	11,239	20%	14%	**Los Baños**	7,451	11%	49%
Martinez	2,285	23%	7%	**Manteca**	13,686	14%	11%
Milpitas	8,087	28%	11%	**Modesto**	15,756	23%	13%
Oakley	13,146	4%	0%	**Patterson**	3,923	7%	44%
Pittsburg	6,785	21%	35%	**Roseville**	37,931	23%	14%
Richmond	6,113	38%	20%	**Sacramento**	45,609	32%	31%
Union City	5,580	20%	15%	**Stockton**	28,710	27%	17%
				Tracy	15,669	15%	18%
				Vallejo	4,913	27%	14%
Total	92,904	27%	14%	Total	309,891	27%	20%

Source: Housing Unit and Multifamily Share- California Department of Finance (DOF)
Tables E5 and E8, Subsidized Units – National Housing Preservation Database

The housing market and the quest for affordability

Housing prices reflect the relative value of living in a particular location and a particular unit. Housing prices take into account unit characteristics (like size or layout), building characteristics (like the presence of a yard or a parking garage), neighborhood characteristics (like safety or accessibility to transit or shopping), the quality of local public services (like schools, parks, or garbage collection) versus the tax levied to support them, and metropolitan-wide considerations (like the strength of the job market), among others. The value derives from the supply of homes of various types and locations and the demand for each home by people with varying incomes. The first part of the chapter outlined the imbalance between housing production, job growth, and population growth. The Bay Area has created many more jobs than it has housing to accommodate workers. The case of San Francisco, where the housing supply has kept up with population growth illustrates that the balance of housing supply and population growth is not the only factor. People's income acts as an important variable in understanding why housing costs skyrocketed even when there seems to be enough units.

While population growth in San Francisco was not out of balance with available housing, the job market was. Many people who worked in San Francisco could not live there and the housing stock in San Francisco, which is already higher density than anywhere else in the state, does not lend itself to increasing household size as a last-resort solution. Instead, as people left the city and created openings in the housing market, higher-income prospective residents outbid competitive claims which led to higher asking prices for homes for sale and rents. As this process repeated in the rest of the region, a chain reaction was set off. Chapter 3 detailed this process in terms of migration, showing that most people stay in the same ZIP Code for six to seven years depending on their age. The higher income of people moving from outside counties means that people moving out are replaced by higher-income people and people whose income grows rapidly and can afford higher housing costs. More than the growing income of long-term residents, it is this churn of new residents that helps explain the ever-increasing housing cost in the megaregion. Table 5.6 shows how the share of families with income above $150,000 (in 2019-dollar equivalents) has increased from already high levels in the Bay Area. The more modest increases in Greater Sacramento and Northern San Joaquin Valley (and much lower job growth) point to a mechanism of price inflation driven primarily by a shortage of housing. Moreover, El Dorado and Placer counties with greater initial shares of higher-income households saw a continued concentration of households above $150,000, while the Northern San Joaquin Valley counties saw much lower concentration and growth in this demographic. This provides evidence for the process of sorting, where households sort themselves based on socioeconomic characteristics – in this case, income – which over time makes for

Table 5.6. Share of high-income families (>$150,000) by county in 2000 and 2019

Region	County	Share of High-Income Families in 2000 (%)	Share of High-Income Families in 2019 (%)
Bay Area	Alameda	27	39
	Contra Costa	32	36
	San Francisco	29	45
	San Mateo	38	48
	Santa Clara	39	47
Sacramento Region	El Dorado	21	29
	Placer	25	31
	Sacramento	15	19
	Solano	19	23
	Yolo	17	26
San Joaquin Valley	Merced	8	11
	San Joaquin	13	16
	Stanislaus	10	13
Outer Bay	Marin	44	51
	Monterey	17	19
	Napa	23	30
	San Benito	21	24
	Santa Cruz	26	31
	Sonoma	23	27
Foothills & Fresno	Amador	14	14
	Calaveras	13	17
	Colusa	8	10
	Fresno	10	13
	Madera	9	9
	Mariposa	9	9
	Nevada	16	21
	Sutter	11	13
	Tuolumne	10	16
	Yuba	6	12

Note: based on 2019- adjusted dollars.
Source: Decennial Census 2000 and American Community Survey 5-year 2015-2019

more homogenous and less diverse places.

It is instructive to compare the levels (dollar amounts) and trends (changes over time) in home prices and apartment rents to better understand housing market dynamics between in the different parts of the megaregion. This section will look at home price trends followed by rent trends.

"One of the biggest barriers to homeownership is the lack of credit, and secondarily, down-payment assistance. I am getting a lot of calls from people migrating from Livermore or Oakland but can't afford to buy. They want more space for their children. Existing residents are being outbid by higher wage homebuyers. I see more families than I do individuals. A rich techie with a million-dollar home in San Jose can buy a high-end home in Manteca for $650K with cash and have money left over. Families must have parents or siblings living with them and then maybe they can buy a home together. These families lack the cash or credit needed to outright buy."

- CAB Meeting 12.4.20

Home Price Trends

The adjacent, but very economically, sociologically, and topographically different Bay Area and Central Valley regions also differ on home price levels but are more similar on home price trends than might be otherwise expected (Figure 5.4). The Bay Area has had some of the nation's highest housing values even in the 1990s (Table 5.7). In 1997, typical housing values in San Mateo and Santa Clara Counties were around $500,000 and nearly triple those of most Central Valley counties. San Francisco, Contra Costa, and Alameda Counties also had higher prices than in the Central Valley, but within a range of $100,000- $150,000 more for the typical house. By 2021, Santa Clara and San Mateo's typical houses reached $2 million and were quadruple the typical home in the Central Valley. San Francisco reached $1.4 million and was nearly triple the Central Valley values, and Alameda and Contra Costa crossed the $1 million mark, about double the Central Valley values. Central Valley housing values also grew from 1997 to 2021 with the typical house valued at around $500,000 in most counties in 2021 (Table 5.8). Despite all the migration and due to all the housing unit growth, Central Valley homes remain lower priced by similar or even higher factors than Bay Area homes, across two and a half decades.

Housing price growth in aggregate – from 1997 to 2021 – was very high: between 250% – 380% for Bay Area Counties (Table 5.7) and 150%- 260% for Central Valley Counties (Table 5.8). Central Valley growth was similar to Outer Bay county housing growth (170%- 270%) but generally higher than Fresno and Foothill Counties (130% to 240%), outside of fast-growing Sutter County (Sacramento exurbs) and Madera County (Fresno suburbs) both of which had home price increases of over 400% over this time period. National average home price growth from 1997 to 2021 was 189%.[3] Bay Area Counties grew significantly faster than the national rate, as did 6 of 8 Central Valley Counties.

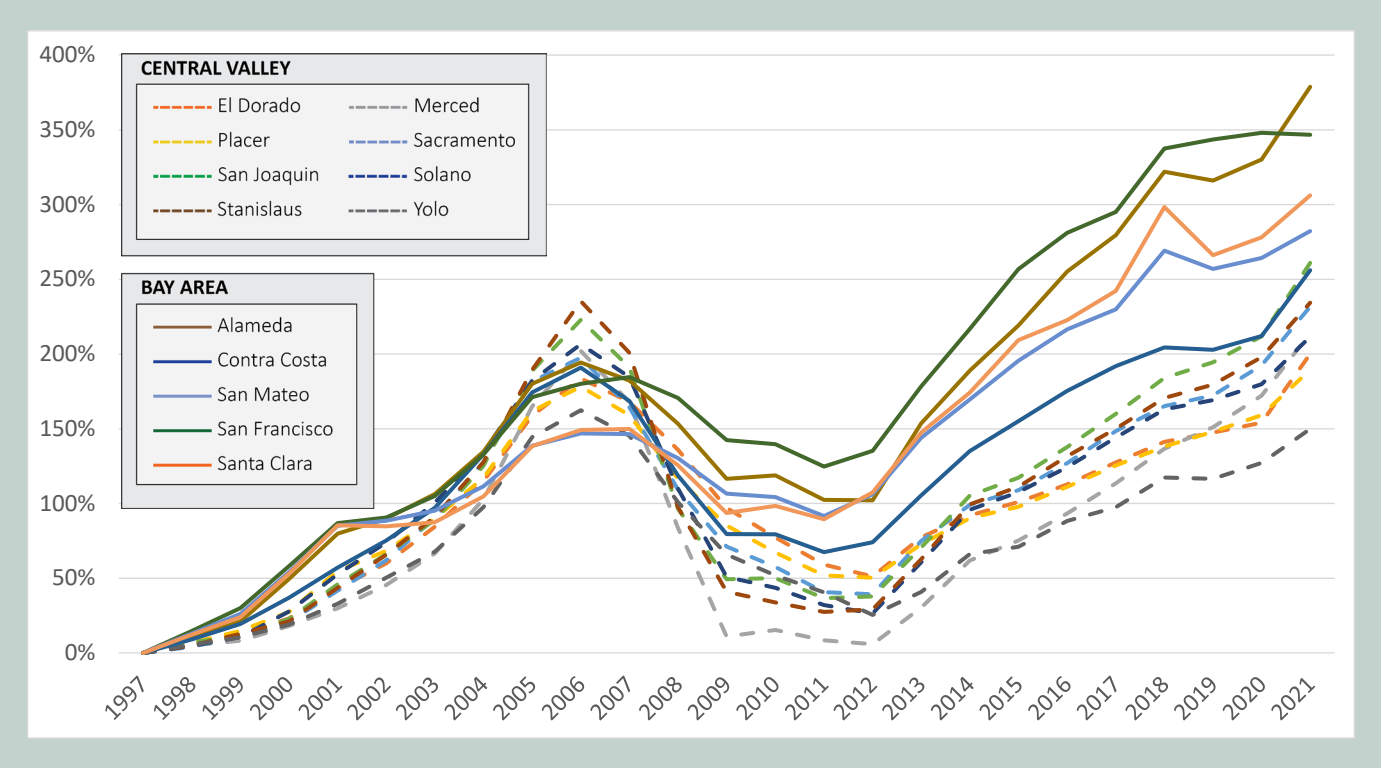
Housing price growth has not been uniform over time in these regions. In fact, it has very clearly followed the business cycle, peaking in 2006 before the Great Recession, crashing during the Great Recession from about 2008 to 2012, and then showing varying degrees of recovery. Bay Area Counties had a much softer housing price crash, relative to Central Valley Counties. And, Bay Area Counties began their home price recovery quicker attaining pre-Recession price peaks, and growing past them, by 2013/14. The COVID-19 boom in home prices further buoyed this surge. Central Valley Counties' housing markets crashed harder, with many counties seeing housing prices down to pre-2000 levels. No Central Valley county reached pre-Recession peaks until the COVID-19 home price boom.

COVID-19 has provided potentially a needed boost to Central Valley home prices but has many middle and lower-income local renters out of the market. Local homeowners who sell have nowhere to buy in the region. Stakeholders suggested several trends in the Central Valley housing market during the pandemic:

- COVID-19 has amplified an already-present and "chronic" shift of CV communities turning into a seller's market. This trend was happening already at least a decade prior to the start of this study. Communities in the Central Valley such as Manteca and Lathrop in San Joaquin County, are increasingly a destination for Bay Area transfers (Focus Group Interviews Feb. 16-23 2021)
- Housing development and investment in the Central Valley- most notably, Sacramento, is catered to a higher-income audience. Meanwhile, prices for recently developed housing units exceed the median income for the Sacramento region. (CAB Exec. Overview Dec. 4, 2020)
- While housing prices have increasingly exceeded average incomes in the Sacramento region before COVID, participants have noted an acceleration of in-migration from high-cost areas like the Bay Area during COVID. (CAB Exec. Overview Dec. 4, 2020)
- New housing being built in the Central Valley is not accommodating to lower-income residents and has not kept up with the pace of Bay Area out-migration. The housing market prices have thus inflated during the pandemic. Meanwhile, local government investment in affordable housing units has not kept pace with demand. (Focus Group Interviews March- April 2021)
- High-income workers who can and may be encouraged to work remotely are driving the surge in accelerated demand and housing prices. (CAB Exec. Overview Dec. 4, 2020)
- Sacramento and Placer Counties have seen lots of cash buyers leaving the Bay Area amid the pandemic. These cash buyers are pricing out local homebuyers and pushing the outskirts of receiving communities within the Central Valley, particularly in Placer County suburbs and rural areas. One stakeholder reported that for the housing market "the bottom line is accessibility and affordability". (Focus Group Interviews March- April 2021)
- El Dorado area stakeholders noted that South Lake Tahoe housing prices began to soar, creating inflation and a rise in rental prices felt as far away as Reno and Carson Valley, Nevada. (Focus Group Interviews March- April 2021)
- This was a particularly timely issue as of 2021 when the region was also experiencing devastating wildfires in which many individuals and families lost their homes and were forced to find a place to rent.
- This created a new term that stakeholders in El Dorado used: "climate and equity refugees", to describe the rural residents who emigrated out of California in search of affordable living arrangements after the wildfire season of 2021.

Top-sending city housing price levels and growth trends largely mirrored those of the county in which they are located. Housing markets function at larger scales than individual cities. While local variation between cities factors into average home values, the attractiveness of the Bay Area does more to dictate home prices than individual cities. This means that it was not the particular city's

Figure 5.4. Home price growth trends normalized to 1997 for typical housing values in the Central Valley and Bay Area



Source: Zillow Home Value Index (ZHVI)

housing prices that acted as a push/pull factor for migration but the overall county or even metropolitan area.

Top senders in Alameda, San Mateo, and Santa Clara Counties all grew at above 300% and upwards of 400%, while in Contra Costa County growth was a bit slower with top senders growing at 200% to 285% (Table 5.9). The lone exception is Antioch in Contra Costa County which has seen much lower home price growth over the time period, well below the regional and national averages and lower even than smaller and slower-growing Sierra Foothills Counties. The top sending cities of Pittsburg and Oakley, which are located near Antioch grew at much faster rates (209% and 227% respectively). Antioch points to the importance of local variation. The city's location (in the far northeast corner of the county) and working-class population have insulated it somewhat from the broader Bay Area trends. It also implies a greater balance between out- and in-migration than in other cities.

Growth in top-receiving city home prices was also in line with their surrounding counties, generally hovering between 200%- 250% (Table H15). Price levels in the larger, legacy Central Valley cities of Sacramento, Stockton, and Modesto tend to be lower even in 2021 compared to the surrounding county averages, the same is true of Fresno. This suggests that fast-growing suburban locations and newbuild developments like Folsom, Tracy, and Elk Grove, while growing at similar rates to legacy city home prices,

Table 5.7. Home price levels for typical housing values in the Bay Area

County	1997	2021	Growth % (1997 to 2021)	Homeownership Rate in 2021
Alameda	$236,691	$1,133,256	379%	57%
Contra Costa	$300,181	$1,068,864	256%	68%
San Francisco	$322,600	$1,441,204	347%	44%
San Mateo	$534,125	$2,041,580	282%	62%
Santa Clara	$469,374	$1,906,707	306%	58%

Source: Zillow Home Value Index, Homeownership rates from ACS 2016-2021 from St. Louis FRED

Table 5.8. Home price levels for typical housing values in the Central Valley

County	1997	2021	Growth % (1997 to 2021)	Homeownership Rate in 2021
El Dorado	$165,527	$496,771	200%	78%
Merced	$108,066	$339,185	214%	51%
Placer	$215,453	$623,601	189%	75%
Sacramento	$148,767	$493,476	232%	59%
San Joaquin	$137,473	$496,153	261%	59%
Solano	$168,662	$525,553	212%	63%
Stanislaus	$133,983	$447,926	234%	60%
Yolo	$210,072	$524,938	150%	52%

Source: Zillow Home Value Index, Homeownership rates from ACS 2016-2021 from St. Louis FRED

command price premiums throughout the Central Valley. The City of Davis is an exception, growing at nearly double Yolo County's rate. Possibly demand for the relatively urban college town significantly outweighed the demand for housing in the rest of a mostly agricultural county.

Table 5.9. Mean typical housing price (Zillow) and growth (1997 to 2021) for top sending cities

Top Sending City	1997	2021	Growth %	Home County	Ratio to County Home Value Growth
Antioch	$264,538	$592,284	124%	Contra Costa	0.5
Daly City	$253,565	$1,144,975	352%	San Mateo	1.2
Fremont	$252,419	$1,251,180	396%	Alameda	1.0
Hayward	$180,769	$787,717	336%	Alameda	0.9
Livermore	$227,992	$928,713	307%	Alameda	0.8
Martinez	$181,385	$697,285	284%	Contra Costa	1.1
Milpitas	$276,225	$1,183,128	328%	Santa Clara	1.1
Oakley	$207,448	$679,321	227%	Contra Costa	0.9
Pittsburg	$215,447	$665,339	209%	Contra Costa	0.8
Richmond	$201,944	$689,159	241%	Contra Costa	0.9
Union City	$219,000	$1,070,528	389%	Alameda	1.0

Source: Zillow Home Value Index, Homeownership rates from ACS 2016-2021 from St. Louis FRED

Rent Trends

Understanding rental market trends may be as important as home price trends in understanding the impact of migration on these regions. Renters constitute about 55% of San Francisco's population and about 40% of the other Bay Area Counties. Renters similarly make up about 40% of Sacramento, San Joaquin, Stanislaus, Solano, and Outer Bay Counties, but Placer and El Dorado Counties have only about 25% renters, while Merced, Yolo, and Fresno Counties have about 50% renters (Table 5.11).

Compared to home prices, adequate data on recent rents is more difficult to obtain. Here, we present data on the median monthly rents of recently leased units (Table 5.11), but only from 2017 onwards. Rent levels in 2017 were highest in San Francisco, followed by San Mateo and Santa Clara Counties, and then Marin County, with median rents over $2,000 per unit per month. Central Valley rents in 2017 hovered between $1,100 and $1,600. By the end of 2022, taking the pandemic into account, rents in Alameda and Contra Costa County crossed the $2,000 threshold. In the Central Valley, median rents increased by about $500 per month over the nearly 6-year period.

Table 5.10. Mean typical housing price (Zillow) and growth (1997 to 2021) for top receiving cities

Top Receiving City	1997	2021	Growth %	Home County	Ratio to County Home Value Growth
Davis	$204,587	$762,942	273%	Yolo	1.8
Elk Grove	$166,517	$538,073	223%	Sacramento	1.0
Folsom	$202,148	$660,919	227%	Sacramento	1.0
Fresno	$99,023	$297,891	201%	Fresno	0.8
Los Baños	$112,288	$376,074	235%	Merced	1.1
Manteca	$154,742	$495,109	220%	San Joaquin	0.8
Modesto	$119,187	$371,292	212%	Stanislaus	0.9
Patterson	$142,901	$426,408	198%	Stanislaus	0.8
Roseville	$189,175	$551,463	192%	Placer	1.0
Sacramento	$115,886	$416,095	259%	Sacramento	1.1
Stockton	$109,594	$365,906	234%	San Joaquin	0.9
Tracy	$187,394	$618,365	230%	San Joaquin	0.9
Vallejo	$153,444	$488,713	218%	Solano	1.0

Source: Zillow Home Value Index, Homeownership rates from ACS 2016-2021 from St. Louis FRED

Growth trends over time are divided into two time periods, pre-COVID-19 (before March 2020) and during COVID-19. In both time periods, rent growth is much higher in Central Valley Counties than in the Bay Area (Figure 5.5). The pandemic period, in particular, saw a bifurcation in the rental market, with Bay Area newly leased rents decreasing relative to pre-pandemic levels, and then staying stagnant or increasing slightly in 2021/22. In contrast, Central Valley rents grew even faster during the period. This pandemic-era rent growth was matched only by Fresno County. Napa and Sonoma Counties in the Outer Bay also saw fast rent growth, but a bit slower than the Central Valley. Central Valley and Fresno County rents grew at 5-8% annually from 2017 to 2022, Outer Bay rents grew from 2-5% per year, and Bay Area rents grew from 1-2% per year, while decreasing in San Francisco by 2%.

When looking at just the 2017 – 2022 period, newly leased median rents outgrew the typical home price in parts of the Central Valley by about 12 percentage points in Sacramento, Placer, and Yolo Counties, and had the same growth in San Joaquin and Solano Counties. Rent growth was 17 percentage points higher

than home growth in Fresno County and 7 percentage points in Sonoma County. In contrast, Bay Area and Marin County home prices grew faster than rent levels during this time. This suggests several things about the pandemic-era housing market. First, the pandemic further stoked red-hot rent growth in the Central Valley, likely buttressed by out-migration from the Bay Area. Second, consumers valued homeownership in the Bay Area much more than renting during the pandemic. Third, the huge rent growth in the Central Valley also suggests a deep undersupply of rental units. This corroborates the housing supply findings above, which showed that the Central Valley has underproduced multifamily units, which are more likely to be rental units than single-family units.

The astronomical rent growth is hitting the Central Valley's low-income population hardest. Social services are

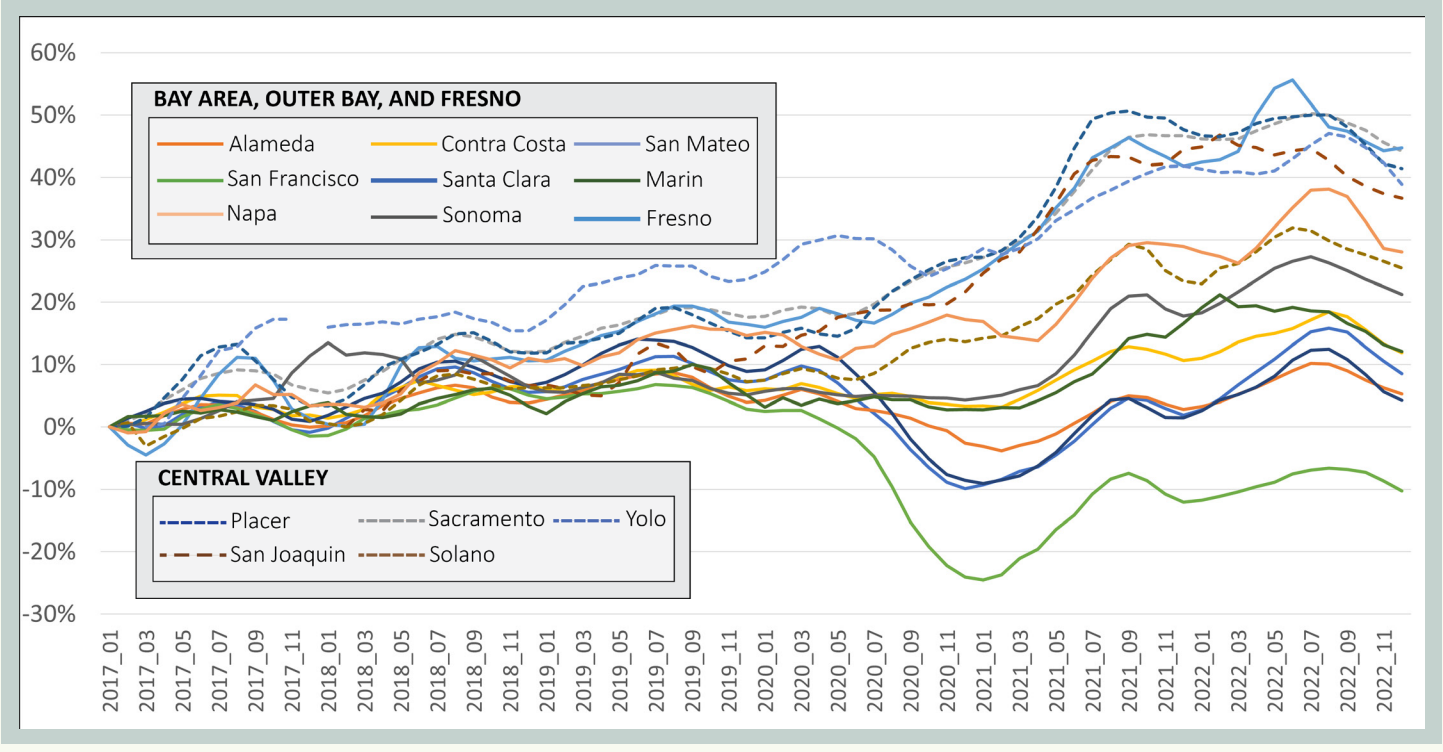
Table 5.11. Monthly median rent for newly leased units and rent growth rates from 2017 to 2022

Region	County	Rent in Jan 2017	Rent in Dec 2022	Rent Growth %	Compound Annual Growth Rate
Bay Area	San Francisco	$2447	$2196	-10%	-2.1%
	San Mateo	$2288	$2385	4%	0.8%
	Alameda	$1960	$2064	5%	1.0%
	Santa Clara	$2265	$2458	9%	1.6%
	Contra Costa	$1794	$2007	12%	2.3%
Central Valley	Solano	$1570	$1970	25%	4.6%
	Yolo	$1164	$1617	39%	6.8%
	Placer	$1472	$2082	41%	7.2%
	Sacramento	$1144	$1650	44%	7.6%
	San Joaquin	$1145	$1565	37%	8.1%
Outer Bay	Napa	$1892	$2423	28%	5.1%
	Sonoma	$1601	$1941	21%	3.9%
	Marin	$2047	$2295	12%	2.3%
Fresno	Fresno	$888	$1285	45%	7.7%

Note: data for Yolo County starts in March 2017 and for San Joaquin County starts in February 2018, growth rate calculations reflect these differences.
Source: Apartment List Rent Estimates

limited in their ability to keep up with the demand for affordable housing and services for homeless individuals (CAB Exec. Overview Dec. 4, 2020). A focus group participant shared that for lower-income populations and those at risk of displacement who are currently served by social service organizations in a place like Concord, moving further east often means losing this support network. Once people move out of the catchment area, organizations lose track of them and often lack the mission or mandate to serve them. Issues tied to maintaining services are exacerbated by crosstalk between NGOs and government agencies that is at times siloed (CAB Exec. Overview Dec. 4, 2020). In addition to better policy and service cooperation to address homelessness, protections for tenants and renters are a concern for stakeholders (Focus Group Interviews Feb. 16-23 2021). Renters who are new to the area or are unaware of local policies that protect renters are more likely to face eviction, issues with landlords, or experience substandard and/or hazardous housing conditions. Stakeholders also cited concerns about the efficacy of tenant protections, including whether tenants are protected and if these protections have unintended consequences on property owners (e.g., mom & pop and nonprofit housing). Issues with property management may include the lack of preservation of existing affordable housing and laws and policies not being followed such as protections against rent increases and eviction.

Figure 5.5. Monthly median rent growth for newly leased units, normalized to January 2017



Source: Apartment List Rent Estimates

Policy approaches to housing affordability

California generally is a very high cost of living state and also the state with the highest poverty rate, when factoring in the cost of living.[4] In 2017, 2 of every 5 California households was cost burdened, meaning they paid at least 30% of their income toward housing, and 1 of every 5 was severely cost burdened, meaning they paid 50% or more of their income toward housing.[5] Two thirds of cost-burdened people were persons of color. The housing cost burden and severe housing cost burden in 2017 were nearly identical in the Bay Area (37%, 17%), Sacramento Region (39%, 18%), and Central Valley (39%, 19%), despite very different income levels and income distributions between the regions. Post-pandemic, these statistics have only gotten more dire. Housing cost burdens remain incredibly high for all households with incomes below 50% of the regional median.[6] This is especially true for renter households. The National Low Income Housing Coalition (NLIHC) estimates a statewide gap of 1.5 million housing units affordable and available for renter households making half or less the regional median in 2021.[7] Once again, renter housing cost burdens are comparable between high-cost, high-income San Francisco-Oakland and San Jose metropolitan areas and the medium-cost, medium-income Sacramento metropolitan area.

Since the Great Recession, and particularly over the last decade (2010-2020), stakeholders identified housing insecurity and unaffordability as two of the biggest challenges facing the Central Valley. (CAB Exec. Overview Dec. 4, 2020). Migration out of the Bay Area and into the Central Valley is attributed to individual (micro-level) and community-level (macro-level) patterns. Rising rental prices and housing costs throughout the megaregion (the Central Valley and the Bay Area) are the effect of this shift in migration alongside rising traffic congestion and limited availability of social services (CAB Exec. Overview Dec. 4, 2020).

Four policy broad policy types have been tried in these regions to provide housing affordable to relatively lower-income renters:

1. subsidizing affordable housing development or redevelopment (Subsidy),
2. adding regulatory requirements for local agencies to produce a set level of housing units to accommodate population growth and delineating a portion to be affordable at certain levels (Regional Housing Needs Assessment – RHNA),
3. Providing vouchers to subsidize all or part of rent payments for existing units (Housing Choice Vouchers- HCV), and
4. Removing local regulatory restrictions to building multifamily and/or affordable housing (Removing local restrictions).

This section will focus on the first two (subsidies and the RHNA program) and their effect on housing supply.

Briefly, the other two options are not without merit. Housing choice vouchers which are federally funded but locally

administered through Public Housing Agencies (PHA) give money directly to households to rent on the open market. While this works for many households, some are unable to use their vouchers because of a lack of available units even with the value of the voucher and/or because of source of income discrimination. Also, the demand for these vouchers always outstrips the supply and the federal government has never fully funded the demand.[8] This leads to long, multi-year waiting lists, effectively rendering housing choice vouchers as only a partial solution for a portion of the population.

Removing regulatory restrictions to building denser housing generally and various types of affordable housing specifically should expand the number of units available for lower-income households and improve affordability. However, both policy establishment and implementation make this less straightforward. A positive example is California's recent success with accessory dwelling units (ADUs). For example, since 2017, California has passed numerous laws to allow ADUs on nearly every type of residential property, greatly increasing the potential for adding extra units.[9] As a result, more and more ADUs have been built in California each year, with about 24,000 completed in 2021 and closer to 50,000 in 2022.[10] While ADUs have certainly added to the overall housing supply, many more permit applications are filed than ADUs are completed, and it remains to be seen whether the ADU growth trend continues at its current growth rate. Several other pieces of state legislation attempt to bypass local zoning and building regulations to build slightly more housing in residentially zoned areas and to convert other uses like office, retail, or parking to housing. The California HOME Act (SB 9) of 2022, for example, enabled property owners to split their single-family home lot and built up to 4 units on a single parcel, by right. Early evaluations suggest that there has been little take-up of this option so far, despite its broad potential toward densification, whether in urban or suburban areas.[11]

The Impact of Subsidies on Housing Supply

Subsidizing the construction or redevelopment of housing units in exchange for affordable rents is a cornerstone of the US federal affordable housing policy and has been so for the past several decades. A variety of programs through the federal Housing and Urban Development, Treasury, and Agriculture departments provide funds to build and maintain affordable units throughout the country. Locally, according to the National Housing Preservation Database's aggregation of all federal housing subsidies, the Bay Area currently has 1156 properties with an active federal subsidy, amounting to ~103,000 units; the Central Valley has 664 properties with ~58,500 units. Out of all housing units, the Bay Area has slightly more subsidized units as a share of total units (4.3%) than any other region in California (Figure 5.6).

Subsidized properties are often multifamily properties since it is often more

cost efficient to subsidize one building or project with multiple units. As such, the share of actively subsidized units among California's multifamily units is much higher, often by three times or more, than the share of all units, in each region (Figure 5.6). More pertinently, multifamily properties are almost twice as likely to be subsidized in the Central Valley (17%) as in the Bay Area (11%) or other heavily urban parts of California (Los Angeles and San Diego regions at 8%). This means that the Central Valley and remaining less urban California regions are much more reliant on federal subsidies to densify their housing stock. In essence, subsidies are a sprawl deterrent and a diversifier of the housing stock, which benefits not just lower-income households, but also those with demand for less housing or more amenities.

Federally-subsidized affordable housing units play a significant role in the multifamily housing supply in both sending and receiving cities (Table 5.5). The share of multifamily units actively covered by a federal housing subsidy was 14% of top sending and 20% of top receiving cities' multifamily housing stock. In the receiving communities, however, two patterns emerge:

- High-growth, new-build areas rely on subsidized housing for over 40% of their multifamily stock, in places like Los Baños, Patterson, and Elk Grove
- The remaining top receivers hover between 10-20% of the affordable multifamily stock. Sacramento is the exception: an older, more established, and larger city with a high multifamily share (31%) of affordable units

It may be tempting to see these subsidy trends as supporting a large, deeded affordable housing stock. The reality is that there is in fact very little deeded affordable housing stock in the Central Valley, and the trend toward lower density and lower multifamily shares in most locales means lower naturally-occurring affordability as well.

Focus group participants and local stakeholders reinforced these data findings:

- Inventory for low-income affordable housing is chronically low. Rent prices continue to rise while wages in the Central Valley have not kept pace with housing costs. Moreover, potential renters that are priced out of the local markets still make too much to be considered for affordable subsidized housing. (Focus Group Interviews Feb. 16-23, 2021)
- Stakeholders report an emerging trend of "unconventional housing alternatives" for individuals and families, creating unsuitable or unsafe housing conditions, overcrowding, housing instability, and homelessness. (CAB Exec. Overview Dec. 4, 2020)

The COVID-19 pandemic further exacerbated the existing affordability and supply challenges. During the pandemic, local stakeholders noted that the demand for affordable housing development and investment is crucial in the wake of COVID-19 (CAB Exec. Overview Dec. 4, 2020). Based on stakeholder responses in CAB meetings, California has not invested

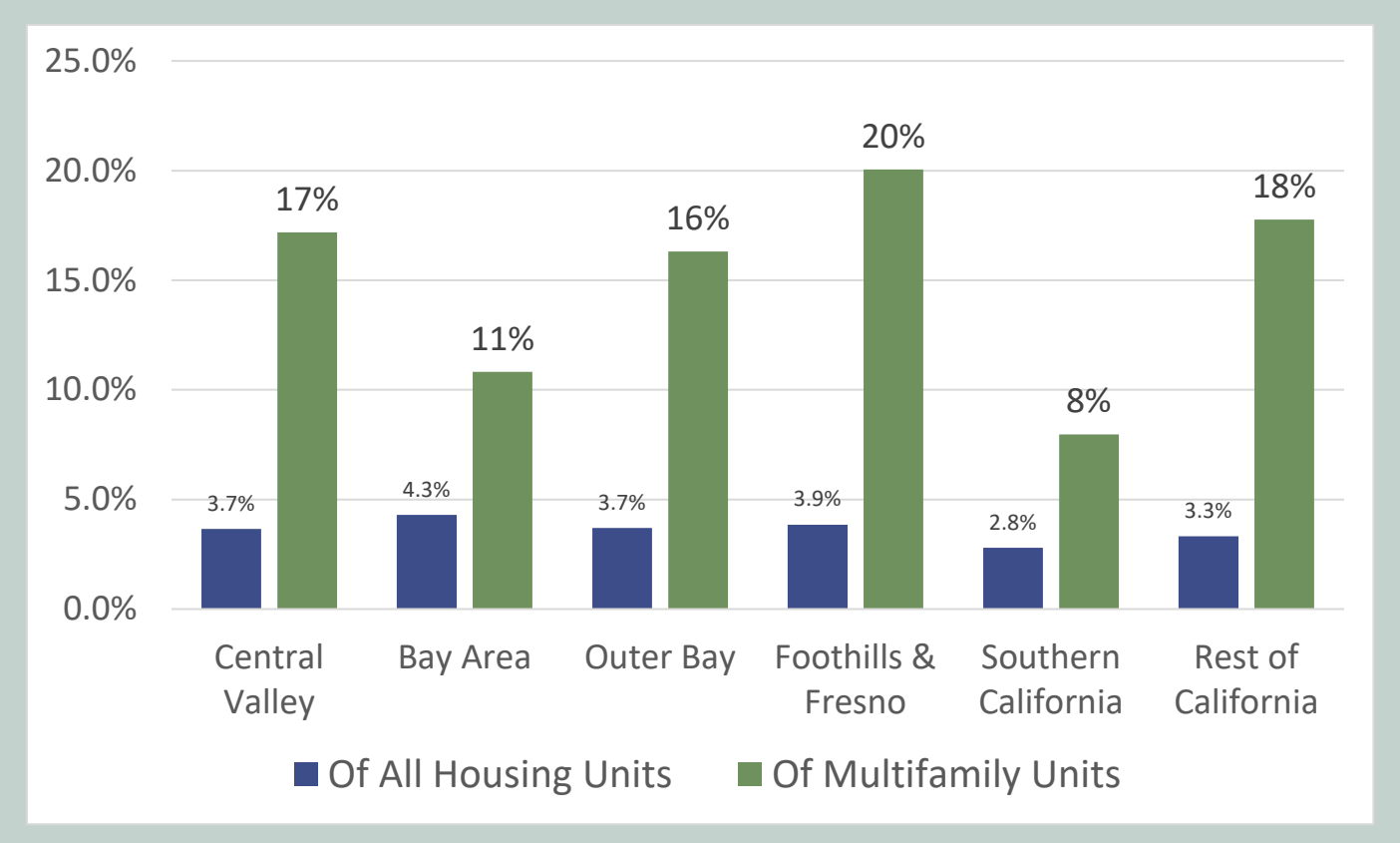
in affordable housing enough to keep up with the demand for several decades. During COVID-19, a state-level eviction moratorium was set in place in 2020. Focus group participants raised serious concerns about increased levels of homelessness should this moratorium be lifted. For example, in Sacramento County, as many as 100,000 residents were behind on rent and could face eviction. Participants also raised concerns that an unintended consequence of code enforcement would include fear of retaliation for reporting substandard conditions and/or displacement due to rising rents.

RHNA and Housing Supply

Over the past several decades, California has engaged in a sophisticated statewide process to attempt to better align housing supply to where people need housing and at a level affordable to them. This Regional Housing Needs Assessment (RHNA), housed at the state's Housing and Community Development (HCD) Department, attempts to spatially manage the housing growth process in response to actual and projected population growth at the regional government level.[12]

The allocations are made for each regional government entity at the municipal

Figure 5.6. Actively subsidized unit share by region in 2020



Source: Housing Units and Multifamily Units- California Department of Finance (DOF) Tables E5 and E8, Subsidized Units – National Housing Preservation Database

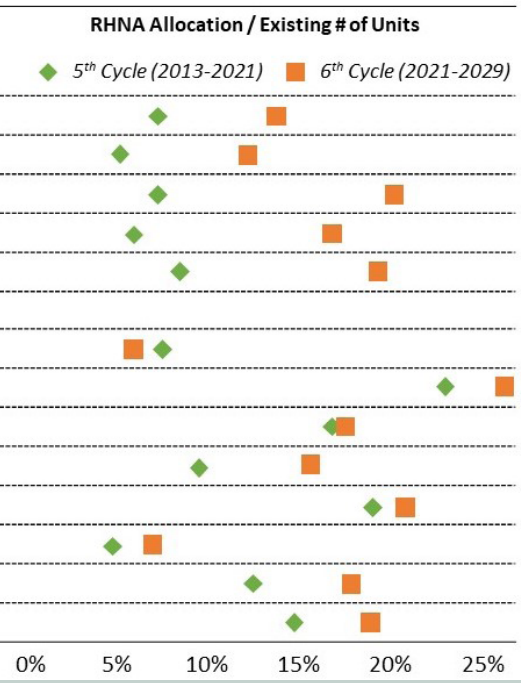
and county levels, often in consultation with these local jurisdictions. As a result, each California city and the balance of unincorporated counties has an allocation for each RHNA cycle. The allocations also detail whether the housing should be market-rate or some degree of affordability based on area median incomes.

This project occurred as the 5th cycle RHNA (2010s) neared completion and the 6th cycle RHNA (2020s) was allocated. The allocations and subsequent completions are publicly available on the HCD website's data dashboard and annual progress reports.[13]

The 5th cycle (roughly the 2010s) saw relatively higher allocations throughout the Central Valley, compared to more tepid housing unit growth expectations throughout the Bay Area (green dots in Figure 5.7). In some ways, this may reflect a policy toward more housing in the Central Valley, to either pull additional population to this part of the state and/or to accommodate the already established migration pattern.

Figure 5.7. RHNA allocations by cycle and by share of existing units by region

		5th Cycle Allocation (2013-21)	6th Cycle Allocation (2021-2029)	RHNA Allocation Growth: 6th to 5th Cycle
Bay Area	Alameda	44,036	88,997	2x
	Contra Costa	20,630	49,043	2.4x
	San Francisco	28,869	82,069	2.8x
	San Mateo	16,418	47,687	2.9x
	Santa Clara	58,836	129,577	2.2x
Central Valley	El Dorado	5,136	5,901	1.1x
	Merced	15,850	22,620	1.4x
	Placer	21,625	31,460	1.5x
	Sacramento	58,386	93,196	1.6x
	San Joaquin	40,360	52,719	1.3x
	Solano	6,977	10,992	1.6x
	Stanislaus	21,330	34,344	1.6x
	Yolo	11,129	15,242	1.4x

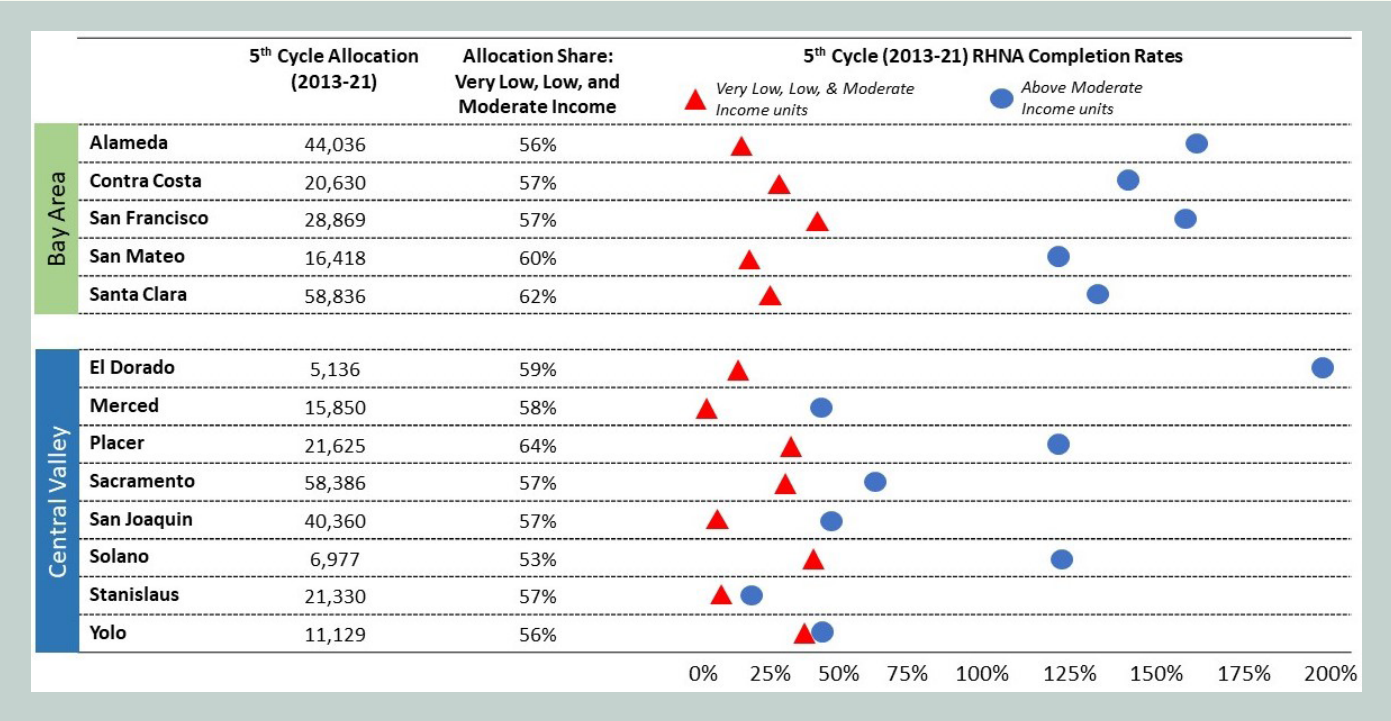


Source: California Housing and Community Development Department (HCD), US Census 2020, ACS 2013-2017, Final 6th Cycle RHNA plans for San Joaquin, Merced, and Stanislaus counties

Reviewing allocation differences between the 5th cycle and the 6th cycle (2020s) suggests that the 6th cycle doubled and, in some cases, almost tripled allocations for Bay Area Counties (orange blocks in Figure 5.7). Allocations also increased in the Central Valley but by closer to 1.5x the 5th cycle allocation. This hints potentially at the RHNA process aiming to rebalance population and housing unit growth back toward the Bay Area, despite explosive growth in the Central Valley since 1990.

From an overall urbanization and settlement perspective, RHNA growth targets in the 5th cycle amounted to adding about 5% to the Bay Area's housing stock, but more likely 15-20% of high-growing Central Valley locations (Figure 5.7). The 6th cycle implies anywhere from 10-20% increases in overall housing stock in the Bay Area and upwards of 15-25% in the Central Valley over these eight-year periods.

Figure 5.8. RHNA 5th Cycle completion rates by affordability level by region



California Housing and Community Development Department (HCD), US Census 2020, ACS 2013-2017, Final 6th Cycle RHNA plans for San Joaquin, Merced, and Stanislaus counties

The last 30 years of growth (roughly corresponding to RHNA's first 5 cycles) has seen housing unit growth of 23% and 47% in the Bay Area and Central Valley respectively (Table 5.1). In light of this, RHNA allocations as a share of existing units for each 8-year cycle seem relatively high. If housing units were developed in these regions at full RHNA level, growth and development would have occurred even faster, and likely more densely, than even the very fast growth experienced in actuality.

RHNA allocations take unit affordability into account, prescribing specific unit counts for different levels of below-market-rate housing. In the 5th cycle, below-market-rate units amount to about 55% of both the Bay Area and Central Valley's RHNA allocation (Figure 5.8). Analyzing 5th cycle completion rates by unit affordability paints a different picture (Figure 5.8). First, every county in both regions has struggled with reaching affordable unit goals, with none completing more than 50% of its 5th cycle goal. The Northern San Joaquin Valley region (San Joaquin, Merced, and Stanislaus counties) has especially struggled with this. These counties have struggled even with market rate completions, relative to other parts of the Central Valley and Bay Area. In the Bay Area, most counties have overperformed their above-moderate unit goals in the 5th cycle.

Chapter 5 notes

1 San Francisco Bay Area Jobs-Housing Imbalance Grows. Building Industry Association- Bay Area, Helper, Lauren. "San Francisco's Jobs-to-Housing Ratio is Disturbing." San Francisco Chronicle.

2 Plan Bay Area 2050

3 Calculation off of data from https://fred.stlouisfed.org/series/ASPUS

4 According to the Supplementary Poverty Measure which measures poverty which accounting for differences among states in the cost of living. Sara Kimberlin and Esi Hutchful, New Census Figures Show That California Has 7.5 Million Residents Living in Poverty – More Than Any Other State (California Budget & Policy Center: September 2018)

5 Kimberlin, Sara. (2019). "California's Housing Affordability Crisis Hits Renters and Households With the Lowest Incomes the Hardest"

6 https://nlihc.org/gap/state/ca

7 https://nlihc.org/gap/state/ca

8 https://www.hud.gov/topics/housing_choice_voucher_program_section_8#hcv04

9 https://www.pooleshaffery.com/news/2020/september/the-state-of-california-moves-to-allow-accessory/

10 Terner Center. (December, 2022). Missing Middle Research Brief. Figure 6

11 Terner Center. (January 2023). California's HOME Act Turns One: Data and Insights from the First Year of Senate Bill 9

12 HCD Regional Housing Needs Allocation

13 HCD Housing Element Implementation Dashboard

6 Fiscal

LOCAL GOVERNMENT FISCAL HEALTH

Aim:

Originally, we imagined looking at the fiscal impacts of migration. The onset of this research, however, coincided with the onset of the COVID-19 pandemic - a particularly large fiscal stressor for local and regional governments. As a result, we doubled down on understanding the fiscal stress levels and perceptions of budget managers in the study regions and across the state.

How:

To effectively measure fiscal stress as borne and perceived by local budget managers, we designed and carried out the COVID-19 Fiscal Impact Survey of California Local Governments. The survey collected responses from city and county governments and school districts at three time periods: Fall 2020 (6 months into the pandemic), Spring 2021 (1 year into the pandemic), and Spring 2022 (2 years into the pandemic). Qualitative evidence from focus groups provides context for the fiscal survey data. Chapter 2 provides details on both survey and focus groups.

What:

The COVID-19 pandemic majorly impacted local agency finances in California. Six months into the pandemic, 40% of agencies were unlikely or uncertain to balance budgets, with many indicating revenue declines in sales, occupancy, and parcel taxes, and some seeing increases in demand for health and public safety services. To cope, many agencies reduced, restructured, or eliminated services, deferred capital projects and maintenance expenses, laid off / furloughed staff or reduced staff salaries or benefits, used reserve funds, and relied on stimulus payments from state and federal governments. As a result, two years into the pandemic (Spring 2022), fewer than 10% of agencies are unlikely to balance budgets, and many are entering a new era of growth and reinvestment, including adding new positions and services, and restoring previously eliminated services.

Local Budgets and COVID-19

California local governments were substantially fiscally affected by COVID-19 as a result of higher service demand, lower revenues, an unclear intergovernmental transfer situation, a health crisis, economic slowdowns and shutdowns, and work from home mandates, as well as reductions in activity, travel, and tourism ensuing from the pandemic. While not every local agency felt these forces equally or at the same time, few were spared at least some fiscal discomfort.

Local governments reported that some of the resulting issues resolved within 6 months or half a year of the pandemic's onset, while others lingered for a whole two years. Nevertheless, most cities and school districts that took part in our surveys found that two years later, their situation had drastically improved, with many resuming previously shuttered activities and some actively expanding hiring and the services they provided once again.

The rest of this chapter showcases results from key questions from the COVID-19 Fiscal Impact Survey of California Local Governments (see Chapter 2 for details). First, the fiscal challenges from the pandemic are explored; next, strategies local governments used to address the fiscal challenges are displayed.

Fiscal Condition

6 months into the pandemic, 40% of respondents indicated that they would not, or may not, balance their budget (Figure 6.1). This is a very high share indicating a lack of confidence in their agency's ability to balance the budget, relative to a non-crisis year. This suggests that COVID-19 was indeed perceived as a very serious budget issues by local budget directors.

As the pandemic progresses, respondents surveyed in Spring 2021 and 2022 expressed a notably higher rate of confidence than in Fall 2020, a trend that continued over time. The share unlikely to balance their budget was cut in half by Spring 2021 and in half again by Spring 2022, coming closer to status quo budget balancing rates.

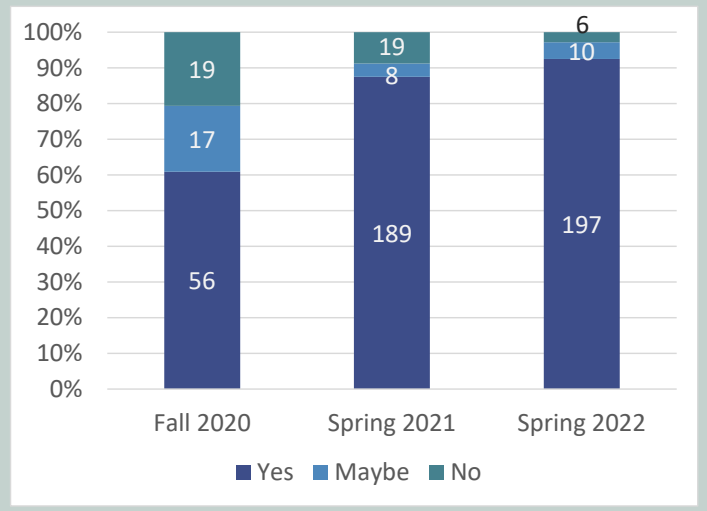
In Fall 2020, most respondents indicated that their agency's fiscal position was declining, though some had stable, and a few had improving conditions. By Spring 2021 and 2022, most agency's conditions were improving or stable, with many fewer declining.

Service demand was seen as increasing generally, and especially for health and public safety services. Respondents indicated that despite the rosier fiscal situation by Spring 2021 and 2022, the increased strain on service demand continued.

There was a regional component to the perception of local government's fiscal situations.

Initial conditions, pre-pandemic varied greatly. In focus groups, local stakeholders identified that since the Great Recession of 2008 the Central Valley has never fully recovered. Stakeholders identified economic insecurity as one of the top concerns facing the region.

Figure 6.1. Do you expect your agency to be able to balance its budget in the next fiscal year?

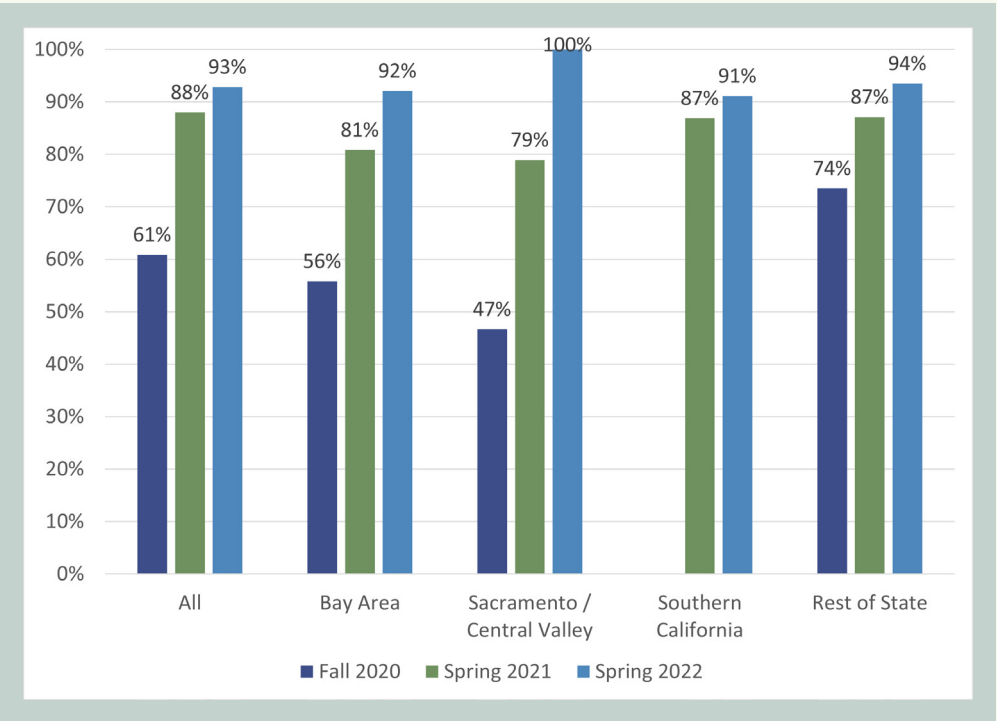


"The pandemic exacerbated everything that's already happening." (CAB, March 16, 2021)

Ripple effects of the housing market crash are still felt over a decade later as communities like Stockton are hit hard. (CAB Exec. Summary December 4, 2020). As a result, local jurisdictions varied widely in their capacity to take advantage of federal recovery funds including smaller, rural, and less resourced jurisdictions.

Survey respondents in the Bay Area and Sacramento / Central Valley were less confident about their abilities to balance the budget in Fall 2020 than those in the Rest of State (Figure 6.2). Each region showed greater confidence in the likelihood of balancing the budget over time. However, Bay Area and San Diego County jurisdictions remained less confident, throughout the survey periods.

Figure 6.2. Share of "YES" Responses to "Do you expect your agency to be able to balance its budget in the next fiscal year?" by region



"We will still have a deficit general fund budget, but we are not in jeopardy of being insolvent at the current time." – CA School District (Spring 2021)

Government Revenues

COVID-19 and the resulting economic downturn affected all of the main local government revenue streams but did not do so equally (Table 6.1). In Fall 2020, the following were most affected: fees, parcel, sales, and occupancy taxes. In Spring 2021, fees, sales, and occupancy were mentioned most. In Spring 2022, occupancy, sales, and fees were brought up most. Overall, respondents indicated that Sales, Occupancy, and Other were top ranked in terms of most impacted revenue sources. This makes sense given the restrictions on

Table 6.1. Which areas of government revenue have been most affected by the economic downturn in FY 2020-2021? Rank sources by revenue loss. (Share of revenue sources ranked 1st and 2nd in terms of revenue loss)

Region	Wave (# of Responding)	Property Taxes	Sales Taxes	Occupancy Taxes	Service Fees and Other Charges	Parcel	Other
Bay Area	Fall 2020 (43)	9%	35%	26%	40%	30%	19%
	Spring 2021 (47)	9%	23%	23%	34%	15%	21%
	Spring 2022 (38)	11%	21%	42%	18%	13%	
Sacramento / Central Valley	Fall 2020 (15)	7%	33%	33%	33%	13%	13%
	Spring 2021 (14)	7%	7%	21%	21%	7%	21%
	Spring 2022 (12)	8%	25%	42%	25%	0%	
Rest of State	Fall 2020 (34)	3%	24%	24%	15%	26%	18%
	Spring 2021 (94)	10%	17%	17%	13%	9%	17%
	Spring 2022 (81)	11%	15%	15%	19%	11%	
Southern California	Spring 2021 (62)	6%	26%	24%	19%	8%	11%
	Spring 2022 (79)	3%	15%	27%	23%	4%	
STATEWIDE	Fall 2020 (92)	7%	30%	26%	29%	26%	
	Spring 2021 (217)	8%	20%	21%	20%	10%	
	Spring 2022 (210)	8%	17%	26%	20%	18%	

travel and activity from pandemic-related policies. As fewer people visited stores or stayed at hotels, sales and occupancy tax revenues declined. Many respondents indicated that service fees were down, especially the first year of the pandemic. These finding parallels other responses in terms of decreases in demand for fee-based services. In contrast, property taxes were much less affected by the pandemic.

Regionally, the Bay Area and Sacramento / Central Valley respondents persisted in ranking decreases in occupancy taxes well into 2022, while these were less of a concern in other parts of the state. Bay Area respondents shared that service fees were much less of an issue by 2022, while Sacramento / Central Valley and Southern California saw persistent revenue declines from service fees even into 2022.

- "We are a California public school district, and our revenue was greatly affected by the pandemic in 2020-21. Since the recovery of the economy, we anticipate rebounding in 2021-22, however, demands to our staff and students for services related to learning loss have increased." - CA school district (Spring 2021)

Budgetary Strategies

California local governments utilized 18+ different budgetary strategies to deal with the fiscal issues arising from the COVID-19 pandemic from 2020 to Spring 2022, with the typical agency using an average of 3 different strategies. Strategies ranged from personnel decisions, investment decisions, service provision changes, and revenue recovery attempts (Figure 6.3).

By far, the most common strategies were to change service provision. Six months into the pandemic, 40% of agencies reduced services, 30% of agencies restructured service delivery, and 20% eliminated services. These strategies were again common in Spring 2021. By Spring 2022, however, service growth was the new tactic, as agencies were expanding after pandemic dormancy, including adding new services (70%) and restoring prior services (30%).

Changes in investment decisions were another common ways to deal with pandemic fiscal issues. Specifically, in Fall 2020, over 40% of agencies deferred capital expenses and 35% deferred maintenance expenditures. These actions continued to be popular with 10-20% of agencies engaging in them in Spring 2021 and 2022. Other types of investment changes including raising money through debt (~10% of respondents) and deferring debt payments (~4% in Fall 2020) were less popular.

Personnel-related decisions were also a common feature of response to fiscal issues. In Fall 2020, 17% of agencies reported layoffs, 13% furloughs, 10% staff salary reductions, 5% staff benefit reductions, and 3% retirement contribution reduction. Other than layoffs, these strategies decreased in popularity by Spring 2021. By Spring 2022, they all but disappeared from the strategy suite of local budget managers.

Despite the large revenue decreases

noted above (Table 6.1), revenue recovery decisions were not very common among responding agencies. Only 8% increased user fee rates, 5% increased taxes, and 4% adopted new user fees in Fall 2020, and similar in Spring 2021. Spring 2022 saw a greater share of increasing user fee rates and adopting new user fees.

Budget strategies varied by agency, but this variation did not have a visible regional component. However, Bay Area agencies were least likely to report adding services or increasing staff in Spring 2022 suggesting a more tepid recovery than in Sacramento / Central Valley or Southern California.

- "We kept all our employees and someone of them did other jobs rather than their normal job." – CA School District (Fall 2020)
- "Some services just could not be provided due to facility closures and cancelled programs and events. This created a fair amount of budget savings but also resulted in reduced revenues from services charges".- CA Municipality
- "Our district faced a serious budget shortfall for 20-21 based on the State's original estimate of funding to schools. At the last minute, the State restored the proposed cuts and also provide one-time revenues for COVID expenses. They are able to do this by deferring payments to us later in the year; that is, they are borrowing from schools to say that they funded schools. We will have to borrow to cover the cash shortfall, with an IOU from the State to eventually pay the cash".- CA Municipality

Reserve Funds

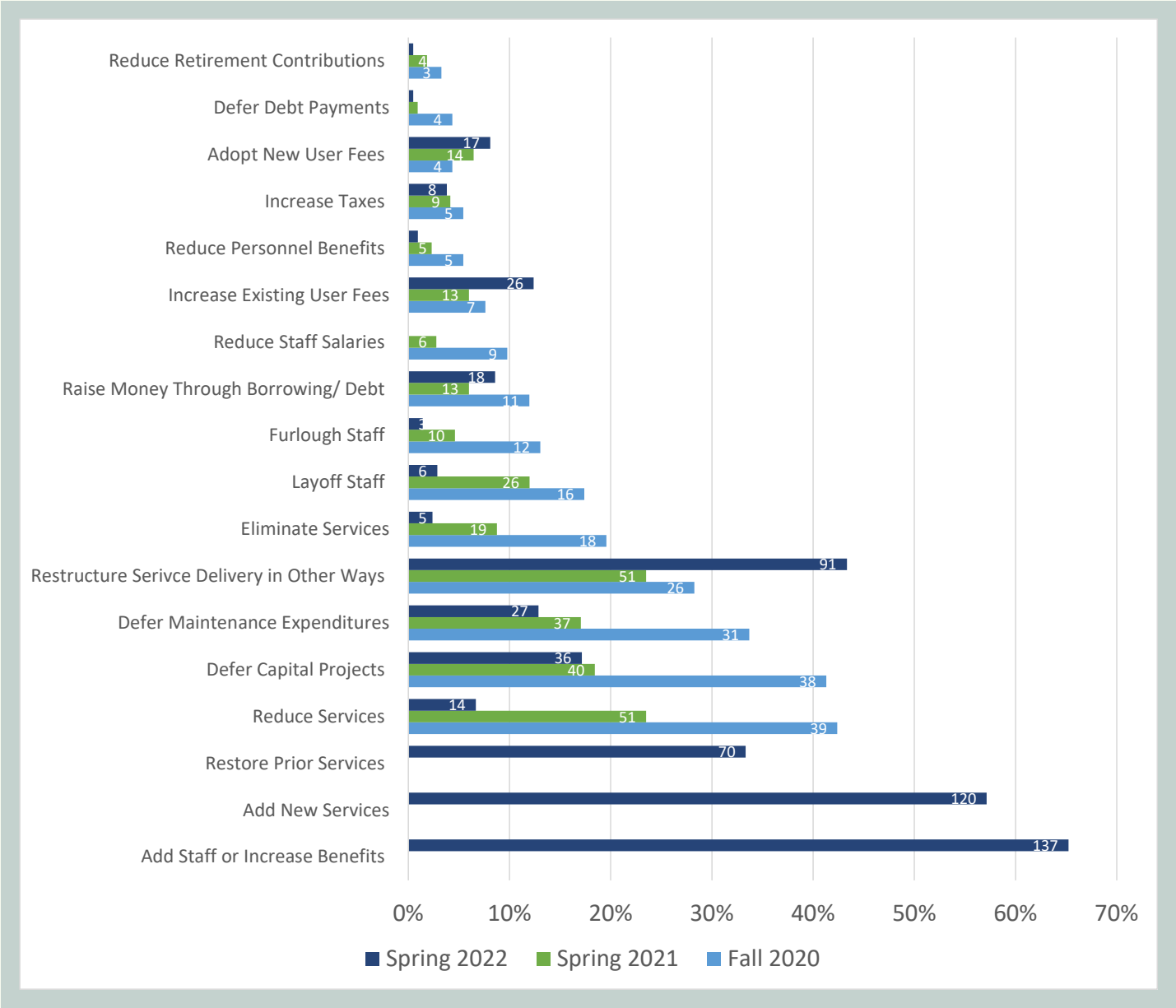
Rainy day funds or reserve funds are another bucket of funds that local agencies can use in a time of crisis. Because data on such funds or their use is difficult to compile and not generally tracked by the state government, our survey represents a glimpse onto this potentially important tool.

While it varied by the survey time period, at least 60% of responding agencies reported having a reserve fund (Table 6.2). This was highest in Spring 2022. Bay Area agencies were most likely to have a reserve fund.

The size of the reserve varied greatly (Table 6.3). As a share of total budgets, few agencies had a reserve fund of more than 20% of total budget (11% in Fall 2020, 16% in Spring 2021, 22% in Spring 2022). Shares of 10 – 20% of total budget were most common, followed by very small reserves of less than 10% of total budget. This is in line with past findings on reserve levels in California cities.[1]

About one quarter of those who had rainy day funds indicated using them during the pandemic (Table 6.4). Bay Area agencies were much more likely to indicate using reserve funds (nearly half) while Sacramento / Central Valley agencies were least likely to use them. While reserve use occurred throughout the pandemic and across our survey times, agencies showed less need for reserves by Spring 2022, in line with the brightening fiscal expectations. In Sacramento / Central Valley, Rest of State, and Southern California especially,

Figure 6.3. Did your agency make any of the following changes to its budgets for fiscal years 2019-2020 and 2020- 2021 in response to COVID-19?



over half (and at times more) agencies said they did not plan to use reserves, even if they had access to them.

- "We have two "reserves" for general funds. Emergency Reserve Fund which is targeted at 25% of operating expenses and due to our dependency on TOT we have a Revenue Stabilization Fund which is 25% of projected TOT."- CA Municipality
- "[Our reserve level is] currently 17%- However we are a small District with enrollment around 350. Districts of our size have a hard time have tight budgets and a 17% reserve hardly carries us through 3 months of payroll".- CA School District

Stimulus Funds and their Impact on Local Government Fiscal Stress

Federal and state government support is an important feature of

Table 6.2. Does your agency have rainy day funds?

Wave (total # responding)	STATEWIDE	Bay Area	Sacramento / Central Valley	Rest of State	Southern California
Fall 2020 (92)	62%	72%	53%	53%	Not surveyed
Spring 2021 (217)	69%	72%	64%	70%	66%
Spring 2022 (210)	88%	92%	100%	88%	87%

Table 6.3. In non-crisis times, approximately what is the ratio of the balance in your reserve/ "rainy day" fund to the total annual agency budget?

Ratio	Fall 2020	Spring 2021	Spring 2022
0%-5%	8%	10%	10%
6%-10%	16%	14%	10%
11%-15%	8%	8%	23%
16%-20%	12%	15%	20%
21%-25%	3%	6%	7%
26%-30%	4%	1%	4%
31%-40%	2%	3%	4%
41%-50%	2%	3%	3%
51% or more	0%	3%	4%
No answer	7%	6%	7%
No reserve fund	38%	31%	8%

local government budgets at any time. These intergovernmental transfers pay for both ongoing and novel programs and are often a stopgap when other revenue sources are decreased.

Several key policy interventions by the federal government were instrumental in offsetting fiscal stress in municipal governments and school districts, including the Coronavirus Aid, Relief, and Economic Security (CARES) Act's Coronavirus Relief Fund in March 2020, the Municipal Liquidity Facility in April 2020, the Coronavirus Response and Relief Supplemental Appropriations (CRRSA) Act in December 2020, the Consolidated Appropriations Act of 2021, and the American Rescue Plan's (ARP) State and Local Fiscal Recovery Funds (SLFRF) in March 2021. School districts specifically had access to the Elementary and Secondary School Emergency Relief Fund (ESSER) and the Governor's Emergency Education Relief Fund (GEER), both of which were funded in various parts from the federal stimulus provisions listed above.

Each policy provided temporary relief in different ways. The CARES Act's

Table 6.4. Since March 2020, has your agency used your rainy day funds?

"Yes, have used reserves"	STATEWIDE	Bay Area	Sacramento / Central Valley	Rest of State	Southern California
Fall 2020	24%	48%	13%	29%	Not Surveyed
Spring 2021	21%	44%	22%	33%	22%
Spring 2022	20%	29%	25%	20%	14%
"No, do not plan to use reserves"	**STATEWIDE**	**Bay Area**	**Sacramento / Central Valley**	**Rest of State**	**Southern California**
Fall 2020	21%	26%	63%	33%	Not Surveyed
Spring 2021	35%	35%	56%	56%	56%
Spring 2022	49%	24%	75%	51%	58%

Coronavirus Relief Fund were used for direct health care and public health expenditures stemming from the pandemic emergency. Aid to local governments was limited to jurisdictions with a combined population of at least 500,000, meaning that smaller jurisdictions either did not receive federal aid from this program or received it from allocations from a larger county government. This was echoed by our community advisory board, who brought up the fact that particularly the first wave of federal relief funding was less equitably distributed to smaller towns compared to larger cities. (Focus Group Interview March 16, 2021). Cities accessed the CARES Act funds to meet administrative and operational spending, but were restricted from using them to meet retirement, and benefit payments.

The Federal Reserve's Municipal Liquidity Facility (MLF) was a fiscal stabilization program for short—term municipal borrowing, and it was similarly limited to larger local governments: counties with populations over 500,000 and cities with population over 250,000. Municipalities rely heavily on the municipal debt market to raise revenues during recessions and to meet lumpsum capital spending requirements. These instruments are traded in municipal money market funds and debt servicing costs are a major share of municipal spending. Consumer panic after the onset of COVID-19 resulted in a nearly $12 billion loss to municipal money market funds in one week beginning April 16, 2020.[2] Through its federal municipal stabilization program, the federal government entered into a municipal bond buyback thereby mitigating possible cost outruns in local budgets. Evidence suggests that the MLF

had a significant impact on reducing the debt service costs that local governments would have incurred in its absence.[3]

The American Rescue Plan's (ARP) State and Local Fiscal Recovery Funds provided federal aid to the full range of local governments including cities and counties, allocated according to preexisting Community Development Block Grants (CDBG) formulas. Cities and counties were able to use these ARP funds in much broader ways, including making up lost revenues, raising pay for essential workers, invest in water, sewer, and broadband infrastructure, in addition to responding to pandemic-related health and economic impacts.

Aid to school districts was relayed through $190 billion of ESSER funds and about $7 billion in GEER funds, through the various Congressional stimulus packages in 2020 and 2021. Overall, these represent about three times the annual federal Department of Education spending on K-12 school and districts. These funds enabled relatively broad application for both pandemic and non-pandemic related activities by school districts.[4] These included cleaning and sanitization, summer and enrichment learning for courses missed, mental health and wellness services, technology purchases and maintenance, meal provision for eligible students, improving pandemic and disaster response, training of staff on pandemic procedures including sanitization, and a variety of other programmatic needs. Note that many of these programs and funds had specific expiration timelines and needed to be allocated and used within one or two years.

Our surveys were timed to capture different perceptions and actualities regarding federal and state aid to local agencies. In Fall 2020, respondents indicated very little confidence that any time of stimulus funding would help their fiscal situation, despite the passage of the Cares Act, Municipal Lending Facility, and several components of K-12 relief. By Spring 2021, and the advent of the ARP, the situation reversed, with most respondents expecting a stimulus payout and believing it would ease their situation. Perhaps because of its direct allocation formulas for local agencies, the passage of ARP decidedly shifted perception of stimulus effectiveness among survey respondents.

Not all stimulus programs aided agencies equally. (Focus Group Interviews Feb. 16-23, 2021)

- Local businesses receiving loans through the Payment Protection Program (PPP) have had a positive impact on local government. (Focus Group Interviews Feb. 16-23, 2021)
- Economic stimulus programs through the federal government have supported local governments and cities. In some cases, federal funds made it possible for local-level government agencies to balance their budgets without dipping into reserves. However, jurisdictions varied in capacity to access this funding. CAB members reported that jurisdictions already struggling with reduced capacity faced additional disadvantages compared

to other, similar jurisdictions.

Some stimulus payments offset one-time payments for new, pandemic-related resources or services, but do not provide ongoing support.

- "The COVID relief funds provided by the federal government have offset the costs of increasing classified staff supports for the 2020-2021 school year. However, there is no projected relief funds for next year which will decrease the district's ability to maintain current staffing levels and, therefore, staff layoffs will occur for the 2021-2022 school year." – CA School District
- "Our district faced a serious budget shortfall for 20-21 based on the State's original estimate of funding to schools. At the last minute, the State restored the proposed cuts and provide one-time revenues for COVID expenses...We will have to borrow to cover the cash shortfall, with an IOU from the State to eventually pay the cash." – CA school district

Chapter 6 notes

1 Ho, J. (2022). "City Savings: An Empirical Study of the Level and Impact of Fiscal Reserves in California Cities"

2 Gordon, N., & Reber, S. (2020). Federal aid to school districts during the COVID-19 recession. National Tax Journal, 73(3), 781-804. Gordon, T., Dadayan, L., & Rueben, K. (2020). State and local government finances in the COVID-19 era. National Tax Journal, 73(3), 733-758.

3 Pew (October, 21 2020). The Municipal Liquidity Facility: How It Works. Federal Reserve program created in April is a new financing source for state and local governments.

4 For details on ESSER and GEER spending and fund use, see the program FAQs

7 Policy Recommendations

Aim:

Our goal in this research was to lay the foundation for policy analysis and recommendations in the Northern California Megaregion. The combined Bay Area – Central Valley Megaregion is the location in the state that most clearly spans existing metropolitan planning organizations and multiple county and local governments. The megaregion is a location of a still new, but growing, tradition of collaboration. The purpose of this work is to highlight how a detailed quantitative and qualitative analysis of the megaregion can illuminate policy solutions.

How:

The policy recommendations in this section were developed based on key facts that flow from the research. Those key facts were summarized in relation to two distinct policy areas – a combined migration-housing-transportation policy nexus (flowing from data in Chapters 3, 4, and 5), and recommendations for local fiscal health based on the survey of municipalities described in Chapter 6.

What:

We develop a range of policy recommendations, focused on streamlining housing permitting near transportation corridors in the megaregion, providing near-term renter relief, and supporting or even requiring megaregion planning in ways that go beyond the geographic scale of existing state policy. A unifying theme in the policy recommendations is the need for the state government to support integrated housing and transportation planning at a scale that spans the many municipalities, counties, and metropolitan planning organizations in the Northern California Megaregion. We also suggest that the state should implement regular fiscal "stress tests" to evaluate the sufficiency of local government rainy day funds, which are clearly an important tool, but which have yet to face the kind of test that an economic recession without large federal/state pandemic relief funds would pose.

Migration-Housing-Transportation Policy Recommendations

Migration, Population, and Employment Growth

From 2000 to 2019, 564,000 households moved from the Bay Area to the Central Valley, while 335,000 households moved from the Central Valley to the Bay Area (Figure 1.6). During that same time period, the Central Valley's population grew by approximately 910,000 persons, while the Bay Area's population grew by approximately 810,000 persons. The Central Valley, which as of 2000 had approximately 40 percent of the megaregion's population, had more than half of the megaregion's population growth during the past two decades. In short, household and population growth has importantly shifted from the Bay Area to the Central Valley portion of the Northern California Megaregion (Table 1.1).

Employment growth, on the other hand, remains concentrated in the Bay Area. From 2000 to 2019, the Bay Area added approximately 760,000 jobs, while the Central Valley added 400,000 jobs. These trends of suburban population growth and more centralized employment growth are not uncommon elsewhere, but in Northern California the growth patterns are happening at an unusually large and dispersed geographic scale. As urban areas decentralize, households and populations typically move to outlying areas first, and job growth often remains in the more central locations for years or decades. Given the presence of the world's preeminent high technology region in the Bay Area, which provides a locational advantage for high-wage technology jobs that will be difficult to reproduce or move elsewhere, it is reasonable to expect that the pattern of residential mobility exceeding firm movements from the Bay Area into the Central Valley will persist for years to come.

The question, then, is twofold. First, has the production of housing stock and integrated transportation links kept pace with the growing need to move commuters from Central Valley residences to Bay Area jobs? Second, has housing production in the Bay Area been sufficient to alleviate supercommuting pressures that would otherwise arise as persons move to the Central Valley but retain jobs in the Bay Area? The answer to both questions, over the past few decades, has been "no."

Housing Production and Housing Supply Shortfalls

The data in Chapters 3 and 5 of this report allow a rough calculation of the housing supply backlog in the megaregion, calculated below in two ways. The first method compares the megaregion's housing unit production to its employment growth, and the second method compares the megaregion's housing unit production to its population growth.

Table 7.1 shows the Bay Area's employment growth, from 2000 to 2019. From Table 5.2, the Bay Area has added approximately 3 jobs for every new housing unit in that time period – employment

growth that well exceeds the recommended rate of 1.5 jobs per new housing unit. Equivalently, the Bay Area has produced too few houses to keep pace with the job growth experienced from 2000 to 2019.

Table 7.1. Estimated housing supply gap, Bay Area, 2000-2019 (estimated from employment growth)

Job Growth (a)	Estimated Housing Units Constructed (b)	Recommended Housing Units (at 1.5 job per housing unit) (c)	Housing Unit Supply Gap (c) – (b)
760,000	253,000	506,000	253,000

Sources: Job Growth from Table 1.1.
Notes: Estimated Housing Units Constructed based on Table 5.2 which indicates an approximate 3 jobs per housing unit in the Bay Area, 2000-2019. Chapter 5 cites the planning goal of 1.5 jobs per housing unit.

Table 7.1 shows that the gap between estimated and recommended housing unit production in the Bay Area during that time period is a shortfall of 253,000 units. In essence, this would have meant doubling the number of units actually constructed in the Bay Area over the 2000 – 2019 period to keep up with job growth.

Table 7.2 shows a similar calculation, comparing housing unit growth to population growth, for both the Bay Area and the Central Valley. A difficulty in comparing housing unit growth to population growth is that if housing is undersupplied, persons will crowd into available units, increasing household sizes. Hence comparing housing units to population growth without trying to account for changes in household size can mask housing supply shortfalls.

Table 7.2. Estimated housing supply gap, Bay Area, 1990-2020 (estimated from population growth)

	Housing Units Produced (a)	Population Growth (persons) (b)	Estimated Units Needed at 2.9 persons per household (California average) (c)	Gap, at 2.9 persons per household (c) – (a)	Estimated Units needed at 2.6 persons per household (national average) (d)	Gap, at 2.6 persons per household (d) – (a)
Bay Area	449,000	1,505,000	518,966	69,966	578,846	129,846
Central Valley	515,000	1,578,000	544,138	29,138	606,923	91,923

Sources and notes: Housing unit and population growth actual data rounded to nearest thousand.
Housing units from Table 5.1.
Population growth from Table 1.1.
Household size is from US Census American Community Survey, 2017-2021.

Table 7.2 shows the new housing units produced in the Bay Area and Central Valley from 1990 to 2020, and the population growth in those two regions. An assumption about household size can give an estimate of the number of households that can be accommodated by the new units, and the remaining shortfall or housing supply gap. The US Census American Community Survey (2017-2021) gives an average household size of 2.9 persons in California, and 2.6 persons per household in the nation. The higher California household size likely reflects, in part, larger households that are due to house price and rent pressure, i.e., crowding. Hence the 2.6 person household size – the national average – may be a better approximation for what a slack housing market would allow. Assuming that California household size would be at the national average, the Bay Area and Central Valley had housing production shortfalls of approximately 130,000 and 92,000 units respectively over the past three decades.

While the two methods for estimating supply gaps give different estimates, both estimates are large. Note that the Bay Area's supply gap ranges from 29 percent to 50 percent of that region's housing production over a 30-year period. The megaregion, both the Bay Area and the Central Valley, have a housing supply shortfall that would take from one to two decades to close at historically average housing production rates seen from 1990 to 2020.

That housing supply gap is an important part of the housing price pressure that is linked to household moves from the Bay Area to the Central Valley. Hence increasing housing production should be a top priority for state, megaregional, and local policy – something we cover in more detail in the policy recommendations that follow. For now, note that the issue is not simply the number of units, but the nature and location of those housing units. Multi-family housing supply production has lagged, and while the most recent round of RHNA has increased allocations in the Bay Area, housing production has often been far from employment growth centers and in some cases far from transportation links that could allow easier commuting into the job centers.

The qualitative interviews, with experts and members of our community advisory board, emphasized that the housing affordability crisis is a pressing concern now. There was a strong sense in these focus groups that persons cannot wait for new housing supply to provide relief. The focus group and advisory board participants emphasized the need for eviction protections and other support for renters

Transportation and Supercommuting

The movement of persons to the Central Valley exceeds the movement of jobs, creating a need for long commutes. Before COVID-19, the best estimate is that in Merced County six percent of all morning commutes were longer than 50 miles one-way, and in San Joaquin County

5 percent of all commutes were longer than 50 miles one-way (Figure 4.7). That supercommute fraction, as a share of all commutes, grew during COVID (Figure 4.7). Transit riders are over-represented among these supercommuters, even though transit serves a small share of the commutes in the Central Valley. Vanpools, such as dibs run by the San Joaquin Council of Governments (SJCOG), serve a role but in a limited niche. The dibs service subscribers are more commonly in government or construction/warehousing/utilities jobs compared to the general population, suggesting that industries with regular work schedules and with concentrations of employment locations are more suited to vanpool commuting.

Working from home was more likely to occur in service and business/science/arts industries, while production and construction industries were less able to work from home. Similarly, persons with higher income were more able to work from home. These facts suggest that essential workers – concentrated in industries where in-person work remained necessary – were both less likely to work from home during COVID and likely less able to benefit from home-based work going forward. Working from home, as a safety valve to relieve the stress of long commutes, is more available to upper-income workers in service and knowledge-based industries.

Housing and Transportation Policy Recommendations

The trends in migration flows and population and employment growth in the megaregion require coordinated and long-term policy responses. The geographic scale of the problem is larger than the metropolitan planning organizations (MPOs) in the region. The MPOs are meeting and working to coordinate, including in an effort called the megaregion working group. Those efforts at coordination across the megaregion will benefit from assistance from the state government. With that context in mind, our recommendations are listed below.

Speed housing permitting and construction: The megaregion has a housing production shortfall that has accumulated over 30 years. Closing the shortfall in housing supply, which has not met growth needs, will require one to two decades if permitting and construction follow historic (past 30 years) rates. We suggest a focus on policies that will dramatically speed construction of new housing.

- We recommend a focus on permit streamlining. The permitting process in California is often subject to time consuming and costly judicial review, particularly under the California Environmental Quality Act (CEQA). California should pursue approaches that streamline housing approval. One example would be ministerial approval, with clear and short timeframes for administrative review of challenges outside

of the judicial system. We suggest that such streamlined, ministerial approval focus on locations in the eastern Bay Area and western Central Valley that are close to transportation infrastructure. This would be an approach similar to the currently proposed Assembly Bill 68 (Ward, Housing and Climate Solutions Act). We suggest state legislation that would identify areas near transportation corridors, including in the Bay Area and Central Valley, that should be prioritized for streamlined, ministerial housing approval.

- Such a streamlined permitting approach should focus on locations near both transit and highways. More than 90 percent of all trips in the Central Valley are by private vehicle (from the authors' analysis of the 2017 National Household Travel Survey). Automobile travel is dominant, not only in the Central Valley but throughout the megaregion. For that reason, transportation access should include access to highways, in addition to access to transit. Streamlined permitting should focus on locations that support shorter commutes, and those locations – near highways and transit – will allow shorter trips which will reduce stress and provide more sustainable travel, even when that travel is by car. Streamlined permitting in these locations will also encourage greater carpooling activity and improve transit ridership, partially mitigating the environmental effects of additional commutes to and from these locations.

Provide relief for cost-burdened renters now, while being cautious to avoid reducing the supply of rental housing: Efforts to build more housing near transportation corridors, while essential, will take years to provide relief from affordability pressures. In the meantime, many local officials noted a pressing need for relief for households experiencing extreme rent burdens now. While increasing housing supply is vital, it is not sufficient to address current affordability needs. Our community advisory board often mentioned eviction protections and, less often, rent controls. Taking a position on the details of those suggestions would require analysis that goes beyond this research, but we suggest that efforts to protect renters be coupled with careful analysis to ensure that renter protections do not, in the long run, reduce the supply of rental housing. Approaches that meet financial needs might prove more fruitful.

- We recommend that governments at both the state and local level explore emergency revolving loan funds, designed to provide short-term relief when households are unable to pay rent. Short-term changes in household income can create difficult circumstances, particularly in tight housing markets. Such loan funds might provide assistance for a small number of months, offered at below-market interest rates, and administered by local entities who can work with clients to facilitate repayment once their housing situation has stabilized.
- We also recommend actions that will increase affordable rental options. In the long-term, this requires building substantially more housing units, and substantially more multi-family and

rental units, than has been done in the past in the megaregion. In the more immediate timeframe, the state government might consider funding for vouchers for rental housing similar to federal Section 8 vouchers.

Change state law to require coordinated megaregion housing and transportation planning: California's platform for linking metropolitan housing and transportation planning, SB 375 (Steinberg, 2008), should be expanded to require coordinated transportation and housing planning across the borders of metropolitan planning organizations (MPOs). This is a particularly pressing issue in the Northern California Megaregion, where flows of persons, commutes, and jobs span across MPOs.

- Transportation planning should be focused to support projects and policies that can improve access from the Central Valley into the Bay Area. The MPOs in the Bay Area and Central Valley have formed a megaregion working group which has identified twelve projects – called the "megaregion dozen" – which will improved connections from the Central Valley to the Bay Area. Those projects and that process are a good model for transportation planning that prioritizes Central Valley to Bay Area connections.
- The state's regional planning framework, developed as part of SB 375, should be expanded to require coordination across regions on housing, transportation, and climate goals. A start would be to identify transportation corridors linking the Central Valley and Bay Area and require or incentivize increased housing production along those corridors, reducing driving and supercommuting relative to alternatives that facilitate sprawl.
- The state's housing planning process – the Regional Housing Needs Assessment (RHNA) should adopt the megaregion as a planning level, to coordinate housing growth determinations and allocations across MPO boundaries.

Explore incentives and policies that can deliver work-from-home benefits to a broader range of workers: Our analysis showed that workers in service, production, and manufacturing industries lacked the flexibility to work from home during the COVID-19 pandemic and still bear disproportionate burdens of supercommuting. The state government should explore policies that could expand work-from-home flexibility to occupations that are now typically in-person.

- State policies might incentivize firms to offer flex-time or four-day work weeks to workers in these industries, which would help spread the benefits of work-from-home beyond its current concentration in white collar occupations.
- Additionally, the state or local governments might offer extended-hours services – including day care, education, or medical services – at central locations near commute origins, reducing the need for additional trips that would otherwise be combined with already long commutes.
- Members of our community advisory board mentioned "future of work hubs" – locations that facilitate remote work with

high-speed internet, business services, and flexible office space. It is an open question whether such hubs can expand work-from-home benefits to persons whose jobs traditionally require in-person work (e.g., service, construction, or manufacturing employees). Yet such hubs might be combined with services and located near transit and transportation nodes in ways that can serve both work-from-home and in-person workforces.

- Invest in high-speed, reliable internet service throughout the state, especially in fast growing regions like the Central Valley. Reliable, high-speed internet service is a prerequisite for successful work-from-home capability across the spectrum of job types. Certain regions with underdeveloped communication grids may be eligible for federal subsidies to build this out.

Fiscal Policy Recommendations

The early months of the pandemic were a time of uncertainty and fiscal stress for municipal and county governments and school districts. The survey of local governments showed that, in Fall of 2020, 40 percent of local governments surveyed anticipated not being able to balance their budget. Yet the rapid economic recovery and substantial federal and state support to local governments soon changed that situation. By Spring of 2022, 90 percent of local governments surveyed anticipated being able to balance their budgets (Figure 6.1).

Local government rainy day (or reserve funds) were an important early-pandemic fiscal tool. In Fall of 2020, 62 percent of surveyed municipalities had a rainy day fund. That figure grew to 88 percent of surveyed municipalities by Spring of 2002 (Table 6.2). Among survey respondents, the most common rainy day fund size was between 11 and 20 percent of a normal (non-emergency) annual budget (Table 6.3). In the early days of the pandemic (Fall of 2020), 24 percent of surveyed municipalities reported using their rainy day fund (Table 6.4).

The existence of a rainy day fund clearly provided a measure of cushion, although the rapid recovery and funding assistance from state and the federal government quickly reduced the need to use those reserves. The unusual nature of the pandemic did not provide much insight into how well local rainy day funds would shield municipal budgets in a more typical economic recession. Currently, the California State Auditor maintains a local government high risk program that takes into account debt burdens, liquidity, revenue trends, pensions, and general fund reserves – which are an informal type of reserve, they do not account for formal reserve or rainy day funds. In fact, very little data exists on rainy day funds at all.[1] For these reasons, we suggest that the State Auditor focus on stress-testing municipal reserve funds and the State Comptroller collect information on formal reserve funds. Such data collection and resulting stress tests would be a public information tool.

- The state should gather data on municipal rainy day funds and regularly conduct simulated stress tests to examine how sufficient those funds are to cover

reductions in revenues and increases in costs associated with typical recessions.

- Those tests would be based on surveys that would assess and incorporate other municipal responses, including the service reductions and deferred capital expenditures that we documented in our survey of local governments.
- Overall, the state should build an ability to simulate tight municipal fiscal circumstances before those circumstances become reality, to allow local governments to understand and plan for contingencies.

Overall, the Northern California Megaregion is a vibrant economic region with strong and growing links spanning the Bay Area and Central Valley. The geography of the region's housing and transportation needs does not match any existing government or planning entity. The state government should take the lead, focusing on coordinated planning along transportation corridors in the region. Yet planning will not be enough to ease supercommuting stress or to produce more environmentally sustainable development patterns. The state should streamline housing permitting in ways that move challenges from the judicial to a more rapid ministerial approval, focused on areas along transportation corridors that provide opportunities for increased density and multi-family housing. Such policies should be coupled with renter protections that do not reduce the supply of rental units and evaluations of municipal rainy day funds. The Northern California Megaregion is increasingly a unified economic and social geography, and the state should support reforms that will allow that region and its residents to continue to thrive.

Chapter 7 notes

1 California State Auditor's Office local high-risk program information: https://www.auditor.ca.gov/local_high_risk/process_methodology

8 Conclusion

This project focuses on investigating the impact of migration from the San Francisco Bay Area to the Central Valley region in Northern California to inform policy and engage policymakers at the megaregional level. The effects examined in this study include changes in population, transportation, municipal finance, and housing. We employ multiple sources of data to show how migration, commuting, and housing are transforming the Northern California Megaregion and the relationships between its parts.

The COVID-19 pandemic has compounded the challenges facing the region, with remote work accelerating migration to communities farther away from urban centers and disrupting commuting patterns. The crisis has also led to never-before-seen home values, while rising rents have put many Californians at risk of eviction or indebtedness. While our data does not allow for a systematic examination of COVID-19's impact, we have expanded the scope of some parts of the report to include newer data sources. Additionally, our focus shifted to tracking the fiscal health of local and municipal governments in light of the pandemic's impact.

Migration

This chapter delves into two major questions. First, how the migration of people can drastically alter the spatial structure of regions and communities. It explores the impacts of the movement between the Bay Area and Central Valley, with a focus on the most affected areas. Second, how mobility intersects with equity by analyzing the types of ZIP Codes that lower-income individuals move to, the economic outcomes of those who relocate, and the socioeconomic trajectory of ZIP Codes. The analysis primarily draws from census data at the ZIP Code level, paired with tax record data from the Franchise Tax Board.

We find that migration flow is bi-directional, with many more people moving from the Bay Area to the Central Valley than the other way around. We observe distinct geographical patterns in migration, with people moving away from communities in the East Bay and East San Jose to towns along main freeway corridors in the Central Valley and to Sacramento and its suburbs. The ZIP codes in the Bay Area that send the most migrants have significantly lower home values, but they are comparably diverse and of comparable income as the rest of the Bay Area. Top destination cities in the Central Valley have higher housing costs than other areas in the region, but they are still substantially lower than those in the Bay Area. Moreover, those who move from the Bay Area to the Central Valley tend to reside in ZIP codes with a higher relative socioeconomic status.

Transportation

This chapter focuses on how residents cope with the challenges of living in the vast, fragmented megaregion spanning from the San Francisco Bay Area to California's Central Valley. Many are forced and some choose to commute long distances – at least 50 miles or 90 minutes

in one direction – a phenomenon we call supercommuting. To assess the prevalence and implications of supercommuting in the Central Valley, we examined data from five different sources and evaluated each of their respective strengths and shortcomings. Additionally, we investigated the correlation between residential migration from the Bay Area to Central Valley and the share of supercommuters over time. The COVID-19 pandemic has exposed inequitable disparities built into commute patterns. We explored the impact of the pandemic on ZIP Code-level socioeconomic composition to gain a better understanding of differences across income and industry categories. Lower-income workers, many of whom lack reliable transportation options, are among the most mobility-disadvantaged, and we examined how vanpool and app-based rideshare programs could meet their needs. Finally, we analyzed the commuting patterns of mobility-disadvantaged workers before and after the pandemic to understand how and what affects their transportation options.

We find that despite the COVID-19 pandemic, supercommuting remains at an average of 2% in the Bay Area and Central Valley, with Central Valley to Bay Area commuters having a higher prevalence of supercommuting, especially among those who use carpool or public transit. However, public transit mode shares are generally low in the region, and the burden of long commutes falls heavily on lower-income transit commuters. Certain counties, though, like Merced, Stanislaus, and San Joaquin have supercommute rates reaching 5% to 10%, suggesting differences in transporation networks and employment types within the region. Migration from the Bay Area to the Central Valley is associated with increased rates of supercommuting in Central Valley neighborhoods. To manage and potentially decrease supercommuting, transportation planning should consider a "megaregional" approach that involves intergovernmental coordination and resource sharing across various Northern California regions.

Traffic volume decreased by 40% on average compared to pre-pandemic levels and had not fully returned to pre-pandemic levels as of September 2021. There are income and occupation disparities in commute flexibility that could potentially make already vulnerable populations more vulnerable to contracting COVID. Although primary and secondary industries generated fewer commutes before the pandemic, these commutes were more likely to continue during the pandemic. Progress in vaccination is particularly influential in reinstating peak AM traffic and for home-based work trips. The pandemic has resulted in the evolution of remote working, making it more complex to analyze commute trends and allowing some professions to have more flexibility in terms of where their employees work and live.

The SJCOG's dibs service has an impact on travel behavior and mode choice to dibs registrants, as it increases the proportion of commuters who use carpooling or vanpooling, while reducing the proportion of those who drive alone. These positive effects persisted during

the COVID-19 pandemic. However, carpooling and vanpooling programs in this region are used mainly by a specific demographic, including government and civil service workers, those in construction, warehouse and utility industries, people living far from work, those with access to vehicles, and those with an annual salary below $150,000.

Housing

This chapter examines the intertwined nature between housing and migration. We analyze publicly available data on housing supply, population, affordable housing subsidies, and Regional Housing Needs Allocations (RHNA) from the California Department of Finance, National Housing Preservation Database, and California's Housing and Community Development Department to identify trends in housing supply and housing prices over time and across different regions.

We find that Central Valley growth in population and housing units has been nearly twice as high as Bay Area from 1990 – 2020. Much of the growth in housing in both parts of the megaregion has been single-family units, with each county in the Central Valley and most counties in the Bay Area becoming less dense over the past 30 years, despite a large renter population in both regions, for whom multifamily units may have been more relevant.

Demand for housing overall outstrips supply in both regions, as manifested by home price growth above national levels. Bay Area home prices, in particular, have grown over 300% since 1997 and barely dipped during the Great Recession. Central Valley home prices have also grown (by 200%- 250%) since 1997 but have only eclipsed pre-Recession peaks during the Covid-19 pandemic boom. Rent growth since 2017 has been red hot in the Central Valley and generally tepid in the Bay Area.

Housing affordability is equally an issue in higher-income Bay Area and relatively lower-income Greater Sacramento and San Joaquin Valley areas. Subsidized affordable units and other strategies to provide affordable housing (such as housing choice vouchers) do not meet the megaregion's demand. However, federal subsidies play an important role not just for the tenants receiving the housing benefits. Federally subsidized units represent a sizable chunk of the Central Valley's multifamily housing stock, providing much-needed density and acting as a slight deterrent to sprawl.

Overall, the push of high prices (rents and homes) in the Bay Area and the pull of relatively lower prices (rents and homes) in the Central Valley encourage Bay Area to Central Valley migration. At the same time, the migration itself pushes up home values in the Central Valley.

Fiscal

This chapter focuses on understanding how the pandemic has affected the fiscal health and decision-making of local and regional governments in relation to migration. Given the fiscal disruption of Covid-19 early on during this project, we pivoted to understanding the impact of the pandemic on local

government finances and perceptions of fiscal stress. We conducted a survey to assess the levels of fiscal stress and budget perceptions among local budget managers in the study regions and across the state, at three different points in time: Fall 2020 (6 months into the pandemic), Spring 2021 (1 year into the pandemic), and Spring 2022 (2 years into the pandemic). In addition to the survey, we gathered qualitative evidence from focus groups and publicly available budget data to provide additional context for the fiscal survey outcomes.

We find that, throughout the COVID-19 pandemic, the fiscal health of California's local governments has been in flux. Six months after the pandemic began, local governments reported being fiscally strained, but one year after the onset, they reported lower fiscal stress, likely due to receiving or expecting stimulus payments. As of two years after the pandemic began, nearly all agencies expect to balance their budgets, and many are even adding staff and expanding service delivery. However, some agencies are still deferring capital or maintenance expenditures. To cope with the fiscal impacts of the pandemic, many local municipalities have had to reduce or restructure services, defer capital and maintenance expenditures, and in some cases, lay off or furlough employees. In addition, over 60% of state agencies had to dip into their reserve funds within the first year of the pandemic. The pandemic has also magnified economic disparities, revealing a wealth gap between the "haves" and "have-nots." Not all jurisdictions were equally equipped to access federal relief funding, jurisdictions already struggling with reduced capacity faced additional disadvantages compared to other similar jurisdictions.

What's Next

This report summarizes this project's effort to develop an understanding of how long-term trends change a region and build a fact base for effective, forward thinking policy change. By focusing across regions, over long time periods, and across multiple layers of urban development, this report transcends the hyperlocal view taken by many practitioners in their job or the research tendency to home in on a particular problem..

As the Northern California Megaregion continues to grow and expand, we see continued need both for work like this and for more localized efforts. To ensure this report's findings don't live in a time capsule, we suggest recurrent megaregion-level research sponsored and carried out by key stakeholders in each megaregion. This would further reform policy and regulation at state (or at times even federal levels) such that outcomes serve the people and are not hindered by, often arbitrary, political boundaries. At the same time, more localized work on how migration influences particular locations is necessary too, since it is localities that absorb new populations, build housing units, and provide services.

State agencies in California should engage with the megaregional planning process, including encouraging research for issues such as the environment, housing,

or transportation that span across existing planning bodies (cities, counties, councils of government, and metropolitan planning organizations). Whether Housing and Community Development (HCD), Caltrans, or others – there are improvements to both process and outcomes when thinking outside of prescribed political boundaries. The flow of funding should evolve as the planning process evolves, both for cross-regional infrastructure projects like the "megaregion dozen" in Northern California, but also for housing subsidies, climate change adaptation and natural disaster mitigation work, to name just a few examples. Federal agencies which often provide a significant portion of the funds for transportation investment, housing subsidy, and care for the homeless should also lean on allocation and decision-making approaches that transcend political borders.

Final Thoughts

Migration across the Northern California Megaregion is not a new concept. For decades, Greater Sacramento, the Bay Area, and the San Joaquin Central Valley have developed an interconnectedness in terms of population, travel, and culture. As this project and its findings demonstrate, this interconnectedness prompts a need for planners and decision makers in Northern California to think with a megaregional lens, from local government to state agencies, philanthropy to nonprofits, public to private sectors alike.

This research project demonstrates that the workforce, transportation corridors, and housing market operate as an ecosystem in the megaregion. The contradictions and conflicts that can arise from local jurisdictions' frequently "siloed" plans and actions have long defined metropolitan politics. As boundaries between metropolitan areas blur, similar issues are bound to pervade at the megaregional level. Policymakers and planners should address the regional restructuring of the population across the megaregion and a growing disconnect between job hubs and housing centers, particularly as California enters a "post-pandemic" world. Moreover, a lot of energy and investments are flowing into "hot spot" communities. It should be noted how this investment impacts other regions that may also be simultaneously divested.

Megaregional cooperation between municipalities is happening. Over the course of conducting this study, the research team and engaged local stakeholders have participated in new megaregional planning committee meetings. Plans for shared funding, access to resources, and project leadership and planning should also bolster this new energy for a communal conversation.

The Northern California Megaregion has a chance to uplift itself as a model and leader of equitable prosperity for the nation. The megaregion is rich with diversity and financial opportunity; its residents are proud and resilient. In 2023 and beyond, reckoning with a "new normal" post-pandemic is an opportunity to re-imagine, reexamine, and redistribute.

Glossary

- *Community Advisory Board (CAB)*: a qualitative primary data source collected via semi-annual meetings, focus groups, and ad hoc interviews with expert stakeholders representing the Central Valley and the Bay Area. The CAB contributed to this project in two major fashions: as a feedback arm along the quantitative process, and a ground-truthing mechanism to validate or refute data as it related back to their individual and organizational experiences.
- *Household*: the primary source of data is the Franchise Tax Board records of income taxes. The records correspond to annual filings, which can be individual or on behalf of a family or household. While there is not enough information in the data to reliably code records as being part of a household, we use this terminology as the one that comes closest to what the data represents and that is familiar.
- *Megaregion*: There is no single definition of megaregion and the extent of the Northern California Megaregion is informed primarily by the distance from the urban core in the Bay Area.
- *Metropolitan area*: Metropolitan areas are conventionally defined as groups of counties with substantial labor and housing market integration. Metropolitan areas, in this study, are the constitutive parts of the megaregion. Their definitions differ from that of the US Census Bureau and, instead, focus on the counties that highlight important differences within the megaregion.
- *Migration*: Migration refers to moves between metropolitan areas. These are moves that are usually associated with a change in employment because the distance is too great to maintain employment in the previous area of residence.
- *Northern California Megaregion*: the Northern California Megaregion is a term developed for the purpose of this report to discuss distinction between the megaregion found in Southern California already and the forming megaregion in Northern California between metropolitan areas in the Bay Area, Greater Sacramento, the northern San Joaquin / Central Valley and communities in the Sierra Mountain Ranges.
- *Residential mobility*: In contrast to migration, residential mobility refers to moves within the same metropolitan areas. The primary reason for these moves are changes in housing.
- *Supercommuting*: Commutes that are longer than 50 miles or 90 minutes in duration one way. Such commutes are associated with working and living in different metropolitan areas within the same megaregion.
- *Urbanized area*: the US Census defined urbanized areas based on contiguous areas that meet a density threshold. Urbanized areas are not nested within city boundaries.
- *ZIP Code*: The ZIP Code is the main small-scale geographic unit used in this report. ZIP Codes serve as an approximation of community.

Photo credits:
Front page: Albee K on Pexels
Chapter 1: Photo by Lily Popper on Unsplash
Chapter 2: Photo by Abraham Barrera on Unsplash
Chapter 4: Photo by Ahmed on Pexels
Chapter 5: Photo by Paul Hanaokaon on Unsplash
Chapter 6: Photo by Karolina Grabowska on Pexels
Chapter 7: Photo by Josh Hild on Unsplash
Chapter 8: Photo by Josh Hild on Unsplash
Back cover: Northern California at Night NASA Earth Observatory


San
Francisco
SAN
JOSE
Diablo
Range
SACRAMENTO
STOCKTON
MODESTO