Opening the Door: Immigrant Legalization and Family Reunification in the United States

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Abstract

Does opening the door to U.S. citizenship cause out-of-control "chain migration"? We address this question using variation from a temporary opening of the U.S. to unauthorized immigrants – the legalization programs of the Immigration Reform and Control Act of 1986 (IRCA). Exploiting differences across metropolitan areas in the size of the admissions spike for Mexico, we find only one family member sponsored per IRCA-legalized immigrant – in total – over a 30-year period. Most induced admissions (and new arrivals) were immediate family, inconsistent with explosive chain migration. Using cross-country variation yields substantively similar estimates and suggests family sponsorship is restrained by limited demand.

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Most green cards in the United States are awarded based on an antiquated system of family ties, not skill or merit. This system of Chain Migration – whereby one immigrant can bring in their entire extended families, who can bring in their families and so on – de-skills the labor force, puts downward pressure on wages, and increases the deficit.

- White House Communication December 15, 2017[1]

Under the current broken system, a single immigrant can bring in virtually unlimited numbers of distant relatives.

- Donald Trump, State of the Union, 2018

I. Introduction

A hallmark of the U.S. immigration system since the Immigration and Nationality Act of 1965 has been prioritization of family reunification over other considerations. In fiscal 2019, more than two-thirds of the 1.03 million immigrants admitted to the U.S. – the same as becoming a lawful permanent resident (LPR) or obtaining a Green Card – did so through a family tie (U.S. Department of Homeland Security, 2020). After five years, LPRs are eligible to naturalize, opening the door to admission of not just their spouses and children, but also their parents and siblings. As the quotes illustrate, such "chain migration" is thought to be a drag on the economy, as well as highly prevalent. While the threat of it continues to block legalization of any of the estimated 10.5 million unauthorized immigrants currently living in the U.S. (Passel and Cohn, 2018),[2] claims that the U.S. system generates "explosive" or "out-of-control" chain migration are common even among proponents of a more open immigration system.[3]

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[1] https://trumpwhitehouse.archives.gov/articles/time-end-chain-migration/?utm_source=twitter&utm_medium=social&utm_campaign=wh_20171218_Chain-migration_v2 (accessed 11/26/2021)

[2] Qui, Linda. "What Is 'Chain Migration'? Here's the Controversy Behind It." *New York Times* January 26, 2018, accessed at https://www.nytimes.com/2018/01/26/us/politics/the-facts-behind-the-weaponized-phrase-chain-migration.html November 18, 2021.

[3] For example, Jasso and Rosenzweig (1986) quotes from the 1981 immigration reform commission, "Once any person enters the country under any preference…It is possible that no less than 84 persons would become eligible for visas in a relatively short period of time" due to waves of family sponsorship. Orrenius and Zavodny (2010)'s

Despite this, there are in fact no credible estimates of the "immigration multiplier" (Jasso and Rosenzweig, 1986; 1989) – the number of relatives sponsored for admission by a given "initiating" admit. Lacking data on who sponsors whom, most existing studies (Yu, 2008; Carr and Tienda, 2013; Tienda, 2018) consist of accounting exercises that make heroic assumptions about who can start a "chain" and the amount of time that can transpire between this initiating admit and subsequent family sponsorship. These assumptions can greatly affect the estimates.[4] But estimating the multiplier should be more than just an accounting exercise. *Identifying* it requires solving a simultaneity problem: sponsored relatives might have otherwise come through other channels (including without authorization), propelled by the same "push" and "pull" factors that led their sponsor to migrate.[5] In other words, it can look like family preference in immigrant admissions generates additional migration, when it would have happened anyway.

The ideal natural experiment would thus randomly shock the number of initiating admits, generating variation in the stock of potential sponsors unrelated to the broader push and pull factors underlying immigration. Any subsequent increase in family-sponsored admissions could then be traced back to the increased number of potential sponsors, not these other factors. We argue that the legalization programs of the Immigration Reform and Control Act of 1986 (IRCA) provide just such a natural experiment. Figure 1 shows IRCA's legalization programs generated 2.7 million admissions over the narrow time frame from 1989 and 1991. Countries across the world contributed to this admissions spike, but nearly three-quarters of it came from Mexico.

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novel and sensible immigration reform proposal strongly advocates for legalization but also warns of the "explosive chain migration" occurring in the wake of legalizations of the Immigration Reform and Control Act of 1986 (p. 93).

[4] For example, Tienda (2018) estimates that every Mexican admission in the late 1990s subsequently sponsored 6.38 family members. However, the paper's estimation procedure assumes that all family admissions from Mexico in the early 2000s were sponsored by a small number of employer-sponsored Mexican admissions in the late 1990s, not the much larger IRCA cohort admitted a decade before.

[5] While raising this concern about credibility, we do not wish to understate Jasso and Rosenzweig (1986, 1989)'s contribution. They coined and precisely defined the term "immigration multiplier" and were the first to attempt to estimate it, if in a descriptive rather than causal way.

Importantly, relative to existing stocks of potential sponsors across countries – and for Mexico, across U.S. metropolitan areas – the size of the IRCA admissions spike varied in ways that appear as good as randomly assigned, unrelated to other factors affecting immigration trends.

We focus on Mexico in our analysis, applying the cross-metro area variation to administrative data on immigrant admissions. We find that through 2019 – fully 30 years after the initial legalization event – the average Mexican awarded a Green Card through IRCA was responsible for just over one additional admission *in total*. Immediate relatives, namely spouses and unmarried children of a sponsor, account for 84% of this effect. The remainder owes to parents (13%) and siblings and married children (3%) – the groups that are critical to starting migratory chains and which can only be sponsored by U.S. citizens. Through year fixed effects, these estimates remove push factors, such as the Mexican peso crisis; they are also not sensitive to controls for local pull factors, like demand shocks for Mexican labor or traditional predictors of future Mexican settlement (e.g., the Bartik "ethnic enclave" instrument). Further, we cannot reject that the marginal new immigrant arrival, estimated from the Census and American Community Survey, was a family-sponsored admission, supporting our identifying assumptions.

The conclusions are broadly similar when we use variation across origin countries in the size of the legalization shock, regardless of place of residence within the U.S. These estimates are a bit larger (1.5 family-sponsored admissions per IRCA Green Card holder), and a smaller portion (two-thirds) come from spouses and children. However, the number of other relatives sponsored per IRCA admit is still economically and statistically below one. The estimates are also comparable to the first set of estimates for the subset of countries that, like Mexico, have lower naturalization rates, and thus less potential to sponsor the more distant relatives who can perpetuate migratory chains. In addition to being consistent with a causal interpretation of our

estimates, this result suggests that demand for family reunification, as revealed by naturalization, is a key driver of chain migration.

What do these estimates imply about the immigration multiplier? By allowing chain migration to play out over 30 years, we may be estimating not just the first-generation effects captured in this multiplier, m, but also second-generation effects, and so on (e.g., $m + m^2 + m^3 + \cdots$). Our estimates for other relatives being well below one could therefore be consistent with $m < 1$, or with migratory chains dying out. On the other hand, first generation impacts may have not yet been realized. Supply-side factors likely matter: Annual quotas on citizen-sponsored admissions of siblings and married children generate long wait lists for entry, and estimated effects for these relatives indeed remain statistically significant (though small) in 2019. Yet, on the demand side, low *citizen* sponsorship of quota-*un*restricted relatives (parents) and low naturalization rates suggest $m < 1$, even if first-generation impacts are not observed in full.

This is the first paper to rigorously examine how opening the door to U.S. citizenship reverberates through the American immigration system. Our estimates suggest that in practice, the current system results in migration by nuclear families, with few of the marginal legalized bringing distant relatives. This appears due to not just legal limits on the supply of slots, but also low demand for family sponsorship, insofar as that demand is reflected in naturalization. The generalizability of our estimates to present-day policy thus depends on the comparability of the naturalization rates of any newly admitted population with those of the IRCA cohort and the supply of slots relative to cohort size. Naturalization rates have not risen (Teke, 2019), and there is a much larger unauthorized population today. Quotas have however not changed since 1990. In the absence of a proportional increase in the quotas, our estimates are therefore likely an upper bound on the response per marginal admission from a similar program now.

II. Background and Data

This paper focuses on *immigrant admissions* – foreign nationals admitted to the U.S. as LPRs, or with Green Cards. Immigrant admissions are one of two major forms of authorized immigration to the U.S., and not all immigrants are authorized.[6] We return to other forms of immigration later, focusing here on the rules governing immigrant admissions since 1965 and on our sources of data on this immigrant group. (See Appendix A for more details.)

A. Admissions Programs

The primary way for an immigrant to be admitted to the U.S. (as an LPR/with a Green Card) is to be sponsored for admission. Since 1965, three major groups have been eligible to sponsor admissions – American citizens, current Green Card holders/LPRs, and employers. The first two groups can sponsor family members only; however, there are differences in which family members they can sponsor. Both citizens and current LPRs can sponsor their spouses and minor (under age 21) or unmarried children for admission – what we will call "spouses and kids" in tables and figures for the rest of the paper. But only citizens can sponsor their parents, married children, and siblings – the relatives typically thought of as "chain migrants."

Though citizens can sponsor their spouses, minor children, and parents in unlimited numbers, other family sponsorship is quota restricted. In particular, LPRs can sponsor children and spouses, but only up to an annual (worldwide) quota of 226,000,[7] and since the Immigration Act of 1990, citizen-sponsored admissions of adult or married children and of siblings have been capped at 46,800 and 65,000, respectively. For the most part, naturalized citizens of all countries

[6] *Non-immigrant admissions* are foreign citizens permitted to enter the U.S. on a temporary basis, such as with student or employment visas. Unauthorized immigrants consist of those who overstayed a temporary visa or entered the country without authorization.

[7] In theory, a larger annual admission is possible under the law if few close relatives of citizens are admitted in a year, but this does not happen. The Immigration Act of 1990 also temporarily expanded this quota by 55,000 in each of the fiscal years 1992, 1993, and 1994 expressly for the spouses and children of those legalized under IRCA.

compete equally for these slots, but large sending countries face an additional 7% cap on how much of any category-specific quota they may use annually (e.g., naturalized citizens from any given country can sponsor no more than 4,550 siblings per year). The 7% cap also applies to the quota on LPR sponsorship of their spouses and children.

There are other pathways to admission that do not rely on sponsorship. Refugees can become LPRs, as can winners of the diversity visa lottery, which was also established in 1990. Special, limited-time programs have also been periodically established by law. The historically most significant of these and our programs of study were authorized by IRCA in 1986.[8] IRCA's General Legalization Program (GLP) targeted the long-term unauthorized – those who at the time of application could demonstrate continuous residency in the U.S. since prior to 1982. The Seasonal Agricultural Worker (SAW) program, by contrast, targeted immigrants who could demonstrate 90 days of employment in seasonal agriculture (for certain USDA-defined crops) in the year running up to May 1, 1986 and required no more in the way of residency.[9] Admission under these programs – which was concentrated between 1989 and 1991 (Figures 1 and 2) – was the culmination of a multi-step process that began with application for temporary status and continued with temporary admission before Green Card application (Cascio and Lewis, 2019).

Regardless of how Green Cards are awarded, Green Card holders are eligible to naturalize five years after admission, e.g., starting in 1994 for the earliest awardees under IRCA's legalization programs, as shown Figure 2. Naturalization rates vary across countries, and in the context of IRCA, they also varied across programs even within country. SAW participants

[8] The Nicaraguan Adjustment and Central American Relief Act (NACARA), passed in 1997, did something on a much smaller scale for registered asylum seekers from Nicaragua, Cuba, El Salvador, Guatemala, and the former Soviet Union.

[9] IRCA also authorized adjustment to permanent residence under two much smaller programs with less restrictive timing: Cubans and Haitians already living in the U.S., and those who had been in the U.S. since at least 1972. These groups are also included in our analysis and in Figure 1.

naturalized at lower rates: As of 2009, 34% of those admitted under SAW had naturalized (about 28% for Mexico), compared to 53% of those admitted through the GLP (about 46% for Mexico).[10] A lower naturalization rate means less scope for sponsoring family members.

B. Data on Admissions

Our outcome variables are drawn from administrative admissions data published as anonymized Immigration and Naturalization Service (INS) microdata (fiscal years 1983 though 2004) and in tables published by the Department of Homeland Security (DHS) (more recent years).[11] The tables allow us to produce annual counts of Mexican admissions for all key admission categories (e.g., Green Card-sponsored, citizen-sponsored) from 2007 to 2019 for the top 200 receiving counties in each year. We create comparable figures for earlier years from the INS microdata, which include admission category, country of birth, age, as well as zip code of intended residence, which we map to counties. We then aggregate county counts to 1999 Primary Metropolitan Statistical Areas (PMSA) boundaries – the metro area level. While our estimation sample is limited by the published tabulations, it ultimately consists of 66 metro areas over the period 1983-2019, representing 61% of Mexican LPRs admitted through IRCA.[12]

We obtain IRCA admissions information from the Legalization Applications Processing System (LAPS), which provides anonymized data on all IRCA legalization applicants through the GLP and SAW program. The LAPS tracks application status through the end of the 1992

[10] Baker (2010) separately reports that the overall naturalization rate of IRCA admits is 41% (specifically, he says 1.1 / 2.7 million naturalized) which is lower than what is implied by the rates by program. This suggests there is some rounding error in these figures. In Figure 2, we display the overall naturalization rate implied by the rates by program (45%) rather than the 41% Baker reported.

[11] Microdata are available before 1983 but lack enough geographic information to identify metropolitan areas. No data by metro area are available for 2005 and 2006. We linearly interpolate data in those years. References vary by year and are detailed in Appendix A and Table A1. The INS microdata also include information on the two much smaller one-time legalization programs authorized by IRCA and described in footnote 7.

[12] To ensure accurate measurement of the legalization ratio, described in the next section, we also required that the area have at least 20 registered Mexican Green Card holders in 1980. This eliminated one metro area: Trenton, NJ.

fiscal year, at which point 98.2% of GLP and essentially all SAW program applicants who would become LPRs (through 2001) had received Green Cards (Rytina, 2002). The LAPS includes information on country of origin and county of U.S. residence at the time of application, which we aggregate to metro areas. Using these data, we can thus estimate the number of Mexican IRCA admissions by metro area.

As discussed below, the intensity with which IRCA's legalization programs affected the scope for family sponsorship depends on the pre-IRCA stock of Mexican immigrants in a metro area with sponsorship rights – existing LPRs and citizens. We obtain information on the number of existing Mexican LPRs by metro area using an anonymized 1980 registry of Green Card holders ("Alien Address Reports"), compiled and distributed by the INS (United States Department of Justice, 1992). Like the anonymized INS microdata, this registry gives information on country of origin and zip code of U.S. residence, which we code to metro areas. A similar registry is not available for foreign-born citizens, so we estimate the number of Mexican citizens by metro area using the 5% public use microdata sample of the 1980 Census of Population (Ruggles, et al, 2020).

III. Identification Strategy

A. Intuition

The sharp timing of IRCA comprises the first element of our identification strategy: increases in family-sponsored admissions due to IRCA should become apparent only after the IRCA cohort transitioned to sponsorship status. For example, because parent and sibling visas require citizen sponsorship, we expect IRCA-induced changes in admissions of parents and siblings to appear only after 1994 (Figure 2). However, spouses and minor or unmarried children, who can be sponsored by LPRs, could have seen their numbers rise soon after 1989. A

conservative assumption is that increases in family-sponsorship due to IRCA could appear as early as 1989.

To demonstrate, Figure 3 Panel A shows admissions under IRCA and other categories for Mexico, which accounted for roughly 75% of IRCA LPRs.[13] Consistent with expectations, Green Card-sponsored admissions rose after 1991, and citizen-sponsored admissions rose staring in the mid-1990s. (This is more easily seen in Panel B, where counts are scaled by IRCA LPRs.) Likewise, only after the mid-1990s did admissions of parents and non-immediate relatives start to rise, though admissions of spouses and children rose after 1991 (Panel C). To arrive at a preliminary estimate of the number of family-sponsored admissions induced by each Mexican IRCA admit, we take a pre-post difference around 1988 (based on our conservative assumption) and multiply this difference by 28 (years) to accumulate the predicted change in annual admissions through 2016, when detailed country-level data end. At 0.93 (s.e.=0.12), this estimate implies that, for each IRCA admission, there has been less than one Mexican family-sponsored admission *in total* between 1988 and 2016.[14]

A drawback of relying on timing alone for identification is that other factors affecting admissions could be changing over time. For example, the Mexican peso crisis unfolded in the mid-1990s, potentially encouraging *existing* (pre-IRCA) Mexican Green Card holders and naturalized citizens to sponsor *more* relatives for admission. Without an additional source of variation, it is therefore impossible to distinguish this phenomenon from family sponsorship by the IRCA cohort. Our preferred research design thus also uses variation across U.S. metro areas in the intensity of IRCA as a legalization shock. Intuitively, metro areas for which Mexican

[13] The country-by-year admissions counts for this analysis come from the INS microdata described in Section IIA (through 2004) and country (of origin)-level tables published by DHS (from 2005 through 2016). See Appendix A.
[14] Massey and Pren (2012) shows the trend for citizen-sponsored admissions from Mexico, arguing that the shock to total family-sponsored admissions from the country has been large. We return to this study later in the paper.

IRCA admissions were large relative to pre-existing stocks of Mexican legal residents (LPRs and citizens) should have experienced proportionally larger Green Card- (and citizen-) sponsored admissions following the 1989 to 1991 spike in IRCA Green Card awards. Such areas experienced larger proportional increases in potential future sponsorship, due to IRCA.

B. Specification

We measure the intensity of IRCA as a legalization shock with the "legalization ratio," $lpr_{c,IRCA}/legal_{c,1980}$, where $lpr_{c,IRCA}$ is the number of Mexicans in metro area *c* receiving Green Cards through IRCA, and $legal_{c,1980}$ is the number of pre-existing authorized Mexican residents in *c* – LPRs and citizens combined in 1980. The model of interest is then this event-study one:

$$\frac{a_{ct}}{legal_{c,1980}} = \delta_c + \gamma_t + \sum_{\tau \neq 1988} \theta_\tau D_t^\tau \left(\frac{lpr_{c,IRCA}}{legal_{c,1980}}\right) + \varepsilon_{ct}, \quad (1)$$

where a_{ct} represents Mexican admissions overall or in a specific category (e.g., citizen-sponsored) settling in metro area *c* in (fiscal) year *t*, and the D_t^τ are a set of year dummies, equal to one if $t = \tau$. The model includes a vector of metro area fixed effects, δ_c, to account for the possibility that some areas have systematically larger flows of Mexican admissions than others. It also includes a vector of year fixed effects, γ_t, to account for aggregate shocks, like the peso crisis, that pushed (or pulled) Mexicans to reunite with family members in the U.S.

The coefficients of interest in (1) are the θ_τ, on the interactions between the legalization ratio and the D_t^τ. For any given τ, θ_τ gives the predicted difference in admissions between τ and the omitted year, 1988, for every unit increase in the legalization ratio. Under weak assumptions, θ_τ also estimates the *number* of additional admissions in τ *per IRCA Green Card holder* (see Appendix B). Intuitively, (1) is derived from a model in levels, where admissions counts, a_{ct}, are regressed on interactions between year dummies and counts of potential sponsors – each of $lpr_{c,IRCA}$ and $legal_{c,1980}$. θ_τ is the coefficient vector on the IRCA LPR interactions with D_t^τ in this

alternative model, capturing how many additional admissions are predicted in τ for each IRCA LPR.[15],[16] Accumulating across years after 1988 (again, using our conservative assumption on effect timing), $\theta = \sum_{\tau>1988} \theta_\tau$, we then arrive at a prediction of the stock of IRCA-sponsored family admissions as of 2019 relative to the number of original IRCA LPRs, assuming no return migration or mortality.[17]

For least squares estimates of the θ_τ in (1) – and thus of θ – to capture the full family-sponsorship effects of IRCA, it must be the case that sponsored family members locate in the same metro area in which their sponsors originally settled. This seems reasonable for spouses and children, but only if sponsors have low mobility within the U.S. And even with low mobility of sponsors, siblings and parents may settle elsewhere. Below, we therefore estimate a version of (1) that replaces metro areas with origin countries, thus expanding the analysis beyond Mexico and ignoring place of settlement within the U.S. We also compare our metro area estimates for Mexico to those based on the time series (Figure 3).

For our estimates to have a causal interpretation, we must also assume that areas with higher legalization ratios would not have experienced larger increases in family-sponsored admissions in the absence of IRCA's legalization programs. This assumption would be violated if metro areas with higher legalization ratios were systematically different in ways that correlated with immigrant settlement more generally, especially after IRCA. For example, if the

[15] γ_t is the coefficient vector on the interaction terms between year dummies and $legal_{c,1980}$ in the levels model (Appendix B). By including year fixed effects, (1) thus allows us to avoid confounding admissions due to IRCA with admissions due to an increasing propensity for family sponsorship among pre-IRCA LPRs and citizens.
[16] We do not estimate the levels model due to outliers from strong regional concentrations of the foreign-born population (Lewis and Peri, 2015). We also do not scale by population because the estimates would not have the preferred interpretation without additional controls (Appendix B). Appendix B shows conditions under which a feasible scaling by legal immigrants as of 1980 (instead of 1988, just before IRCA) – will lead to unbiased estimates. A sufficient condition is that the legalization ratio is uncorrelated with admissions 1981-1987 per existing legal immigrant in 1980. We provide evidence of this in Table 1 Panel B.
[17] This also allows coefficients on admissions subcategories to sum to the coefficient for the total.

legalization ratio were correlated with the location of traditional Mexican enclaves, the spread of new Mexican arrivals beyond traditional enclaves in the 1990s (Card and Lewis, 2007) could bias our estimates. The remainder of this section examines this assumption empirically.

C. Probing the Identifying Assumption

Table 1 Panel A lists the metro areas with the top legalization ratios in our estimation sample of 66 metro areas, in descending order by the ratio's value (see Table A2 for the full sample and Table A3 for descriptive statistics on all variables). While Los Angeles was home to the largest *number* of Green Cards recipients awarded under IRCA – and is a traditional destination for Mexican immigrants – it did not have anywhere near the highest legalization ratio. Indeed, metro areas in Florida, rather than California, dominate the top-ten list. Florida metro areas had relatively high SAW shares in their legalized populations, and indeed, variation in the legalization ratio is driven by those legalized under the SAW program (Table A4). Lower naturalization rates of SAWs (Figure 2) would have affected their ability to sponsor relatives.

Table 1 Panel B turns to a systematic exploration of the relationship between the legalization ratio and several correlates of Mexican settlement. The 1980 Mexican share in the local population, which was a strong predictor of the spread of Mexicans across the U.S. in the 1990s (Card and Lewis, 2007), is significantly lower in metro areas with higher legalization ratios (column 2).[18] However, the coefficient on the legalization ratio is smaller in magnitude and not significant conditioning on state fixed effects (column 3). Our preferred specification therefore allows for state-by-year fixed effects, not just year fixed effects as in (1), to remove bias from state-specific admissions shocks.[19]

[18] This is not a mechanical negative correlation: The density measure in row a of panel B includes all Mexicans, not just citizens and LPRs, and was measured using tabulations from the 20% count data (Manson et al., 2020).
[19] State-by-year fixed effects also remove bias from state-by-year heterogeneity in the relationship between existing legal immigrants and family-sponsored admissions. See Appendix B.

Conditioning on state fixed effects, the legalization ratio is also not correlated with two measures of local labor demand shocks – local job growth leading up to IRCA (calculated from County Business Patterns data) and a Bartik-style predictor of Mexican job growth through 2019 based on 1980 occupation mix (see Appendix A). These results are reassuring, since Mexican settlement patterns are particularly responsive to local economic conditions (Cadena and Kovak, 2016). All of these predictors of Mexican settlement are also jointly insignificantly related to the legalization ratio within state (column 4).[20] These findings provide confidence that larger increases after IRCA in the number of sponsored relatives in metro areas with higher legalization ratios reflect an increase in the number of potential sponsors, not other factors.

IV. Cross-Metro Area Estimates for Mexican Immigrants

A. Baseline Estimates

Figure 4 Panel A presents estimates of the θ_τ from model (1) (expanded to include state-by-year fixed effects), along with 90% confidence intervals, for the two main family sponsorship categories – Green Card and citizen – and for their sum, total family sponsorship.[21] As expected, Green Card-sponsored admissions rose after the spike in IRCA Green Card awards (which culminated in 1991), with the first statistically significant coefficient arising in 1993.[22] Increases in citizen-sponsored admissions emerged later, consistent with the lag in naturalization, and are not significant until 1999. After that, both series fluctuate for about 10 years before trending

[20] Importantly, the legalization ratio also does not predict Mexicans admitted in the years leading up to IRCA as a proportion of $legal_{c,1980}$. (See further discussion in Appendix B.) Table A4 shows that conditional on state fixed effects, the legalization ratio does not significantly predict the rate at which applications for legal status were accepted, reducing concerns about endogenous admission rates (e.g., a preference for families) driving our results.
[21] The year-by-year scatterplots underlying the estimates of the θ_τ's for overall family sponsorship (Figure A1) show that the estimates are not driven by outliers.
[22] The lag in effects is not entirely surprising given that the cross-metro variation is driven by the SAW program, and LPRs under the SAW program received their Green Cards later than those under the GLP (Figure 2).

downward, though citizen-sponsored flows remain statistically significant through the end of the period. The pattern is similar to the simple time series for Mexico (Figure 3).

Table 2 summarizes these event-study estimates with estimates of θ, which sum the post-1988 coefficients separately for each visa category (i.e., $\hat{\theta} = \sum_{\tau>1988} \widehat{\theta_\tau}$) and so estimate cumulative admissions per IRCA LPR. Intuitively, we are assigning all "excess" admissions– above and beyond what have been predicted in a given state and year – to metropolitan areas in a way proportional to the increase in potential sponsorship due to IRCA. Our baseline estimates (column 1) imply 0.48 additional Green Card-sponsored admissions (s.e.=0.09) and 0.55 additional citizen-sponsored admissions (s.e.=0.18) through 2019 for every immigrant admitted through IRCA, amounting to 1.03 additional family-sponsored Mexican admissions in total (s.e.=0.25). Weighting by 1980 population lowers these estimates and reduces precision (Solon, Haider, and Wooldridge, 2015), but the basic pattern remains unchanged (column 2).

Table 2 also presents $\hat{\theta}$'s by relative type. Spouses and children account for most of the additional admissions (column 1 coef. (s.e.)=0.87 (0.20)); parents account for most of the remainder (coef. (s.e.)=0.12 (0.05)). Figure A2 Panel A shows the timing: admissions of parents did not significantly rise until the late-1990s, consistent with when IRCA naturalizations began (recall only citizens can sponsor family members beyond spouses and unmarried children). Still, spouses and kids continue to dominate the remaining admissions, stabilizing at around 80% of the total by 2019. Other relatives (not spouses, kids, or parents) account for only 3% of IRCA-sponsored family admissions, and this estimate is not statistically significant (column 1 coef. (s.e.) = 0.03 (0.02)).

Notably, the estimates are very similar to what we obtained from the simple time series analysis for Mexico, including in narrow categories of sponsorship.[23] This result suggests that exploiting cross-metro area variation does not lead to a great deal of attenuation due to internal migration, a consideration that we explore further using cross-country variation in Section V. It also suggests that it was indeed IRCA – and not the Mexican peso crisis or any other factor – that drove the rise in Mexican family-sponsored admissions in the mid-1990s.

B. Robustness

Our estimates can be interpreted causally if trends in family-sponsored admissions would have been the same in the absence of IRCA across metro areas in the same state, but with different legalization ratios. While this is fundamentally unknowable, the fact that areas with relatively high legalization ratios for their state were not already experiencing an upward trend in family-sponsored admissions prior to IRCA (Figure 4 Panel A) suggests that the legalization ratio is not correlated with unobserved drivers of family-sponsored admissions. The timing of effects across admissions categories after IRCA also aligns with expectations. Here, we consider additional robustness checks.

Other Admissions Outcomes. If family-sponsored Mexicans admitted after IRCA were indeed sponsored by the IRCA cohort (or those whom they subsequently sponsored), our treatment variable should not predict entry under other admissions categories with family-sponsorship rights. One immediate check is thus to estimate effects on these other admissions categories – refugees, diversity visas, and employer-sponsored admissions. Figure 4 Panel B and Table 2 show no significant change in admissions under these categories for more heavily treated metro areas after IRCA versus before. Another interpretation of this result is that the family

[23] Harmonizing the sample to the same time frame in Figure 3, the estimate is 0.87 for all family-sponsored admissions, 0.45 for Green-Card sponsored, and 0.42 for citizen-sponsored (vs. 0.93, 0.43, and 0.5, respectively).

admissions generated by IRCA would not otherwise have come on any other type of Green Card, or that our identifying variation is unrelated to broader immigration trends.

Controls. Regarding broader immigration trends, our second approach is to add the vector of predictors of Mexican arrivals (Table 1 Panel B) interacted with year fixed effects to the baseline model. Consistent with these predictors being unrelated to the legalization ratio within state, Table 2 column 3 shows that adding these controls has virtually no effect on the point estimates but makes them more precise. Replacing state-by-year fixed effects with year fixed effects (not shown) also has almost no impact on the estimates (the overall estimate is 1.07 (0.22), with 82% accounted for by spouses and kids).

New immigrant arrivals. A related robustness check demonstrates that the *marginal new immigrant arrival* identified by our research design is a family-sponsored admission. If our model is identified, metro areas with higher legalization ratios should not have experienced larger increases in immigration more generally, once family-sponsored admissions are accounted for. New immigrant arrivals (including temporary visas and unauthorized entrants) can be estimated using microdata from the Census and American Community Survey (ACS). To smooth annual fluctuations in these sample data, we aggregated arrival years into bins (mostly in 5-year increments) and adjusted equation (1) accordingly, omitting interactions between the legalization ratio and the indicator for 1987-89 arrival to identify the coefficients of interest.[24]

Table A5 Panel A gives estimated responses to IRCA legalizations for all immigrant arrivals, total admissions, and their difference. Estimates for total admissions (column 2) in the binned data are very similar to the response of family-sponsored admissions in Table 2, consistent with the marginal admission being family-sponsored. The remaining columns suggest

[24] A further description of this analysis is given in Appendix A.

that the marginal new immigrant arrival was also a family-sponsored admission: the $\hat{\theta}$ for all arrivals (column 1) is slightly larger than that for overall admissions, and the coefficient on the difference is not statistically significant (column 3). Though noisy (owing to working with sample data), these estimates thus suggest that more heavily treated metro areas have not been a stronger magnet for immigration more generally over the study period.

Heterogeneity by program type. Finally, as noted, metro areas with higher legalization ratios have higher SAW shares in their legalized population than metro areas with lower legalization ratios within the same state (Table A4). At the same time, SAW admissions had lower naturalization rates (Figure 2), and thus had less ability to sponsor family members for admission. Our estimates may therefore be lower than what would be representative of Mexican IRCA admissions as a whole.

Table A6 splits the legalization ratio into two separate legalization ratios (both divided by $legal_{c,1980}$) – one based on SAW admissions only and other based on GLP and other IRCA admissions. Consistent with their low naturalization rates – and a causal interpretation – SAWs induce a smaller increase in citizen-sponsored admissions (Panel B, 0.49 vs. 0.84). However, this is entirely made up for by significantly greater Green Card-sponsored admissions (0.57 vs. 0.01). We thus fail to reject that SAWs sponsor the same number of relatives as others legalized by IRCA; in fact, the overall SAW point estimate is larger (1.06 vs. 0.85). The long-term residency requirements of the GLP may have meant that many families were already intact in the U.S. at the time of IRCA, for example, and would have been jointly eligible for legalization.

V. Cross-Country Estimates

The estimates presented thus far are specific to Mexico and do not capture family-sponsored admissions who do not settle in the same metropolitan area where their sponsor

originally resided. We have also presented limited evidence on mechanisms. Why have Mexicans in the IRCA cohort sponsored so few parents, siblings, and married children? The quotas described in Section II have likely played a role, but is this entirely a supply-side story? Could demand for family reunification also be important?

Estimates using cross-country variation in the legalization ratio, in the spirit of the cross-metro area approach, can provide some insight. The analysis to follow is based on the 29 countries where IRCA accounted for at least a third of all admissions across the IRCA, refugee, and diversity visa categories combined over our study time frame, 1983 to 2016 (Figure A3), and which have a legalization ratio of at least 0.1 (that is, IRCA increased the number of legal residents from a country by at least 10%).[25] Despite these restrictions, the 29 countries in our final sample cover over 90% of those admitted under IRCA. The variation across countries is nevertheless much lower than the cross-metro area variation for Mexico (Table A3, Panel 1), so precision is correspondingly lower in this approach.

A. Baseline Estimates

Figure 5 Panel A presents estimates of the θ_τ (90% confidence intervals) from an alternative version of equation (1) where *c* indexes country of origin.[26] Similar to Figure 4 for Mexico, family-sponsored admissions do not rise until after the spike in IRCA Green Card awards (which culminated in 1991), and citizen-sponsored admissions do not emerge until later

[25] The first restriction is important because both diversity visas and refugee flows can generate large spikes in new Green Card holders (Figure A3) – potential sponsors – that could confound our ability to attribute the post-IRCA increase in family-sponsored admissions to IRCA. In practice, most of the countries below the one-third threshold also do not meet the latter 0.1 legalization ratio threshold. For comparison, only one metro area had a legalization ratio below 0.1 (Detroit), which we dropped for consistency. Like in the metro analysis, we also required that the country have at least 20 Green Card holders in 1980. This eliminated only one country (Dominica).

[26] We include world region-by-year fixed effects in this model and cluster standard errors on origin country. Because there are so few counties in our sample outside of the Americas, we consider three groups – North America, South America, and the rest of the world. We allow the year fixed effects to vary by world region because the legalization ratios are particularly high for many Central American and Caribbean countries (Table A7 Panel A).

(and are not statistically significant until 1997). The maximum increase in Green Card-sponsored flows relative to 1988 emerges in 1993, with coefficients trending downward thereafter, but, just as in the cross-metro area analysis for Mexico, citizen-sponsored flows remain significant through the end of the period.

Table 3 summarizes with estimates of $\theta = \sum_{\tau>1988} \theta_\tau$ for each sponsorship category. Including all countries and no additional controls beyond fixed effects (column 1), the $\hat{\theta}$'s are larger than those presented in Table 2 based on cross-metro area variation for Mexico only. They imply 0.68 additional Green Card-sponsored admissions (s.e.=0.13) and 0.76 additional citizen-sponsored admissions (s.e.=0.37) for every immigrant admitted through IRCA, amounting to 1.44 additional family-sponsored admissions in total (s.e.=0.39). There are also larger estimates for all relative types, including parents and other relatives besides spouses and kids (see also Figure A2 Panel B). However, the estimates for parents (coef. (s.e.)=0.22 (0.07)) and siblings and married children (coef. (s.e.)=0.18 (0.09)) remain statistically below one.

We have subjected these estimates to a similar battery of robustness checks as the cross-metro area analysis. For example, controlling for two time-varying predictors of immigrant arrivals suggested by previous research (Yang, 2006; Llull 2018) – push factors including the real exchange rate and growth in the origin country population – has little impact on the estimates (Table 3 columns 2 and 3).[27] In addition, other admissions categories generally show no significant change (Figure 5 Panel B),[28] and other new arrivals (not admissions) are not significantly rising after IRCA for countries with higher legalization ratios (Table A5 Panel B).

[27] This finding is consistent with the balance test in Table A7 Panel B: Within world region, the legalization ratio is not correlated with trends in the real exchange rate or population growth rates.

[28] One exception is that the employer visas are significantly negatively associated with IRCA legalizations in some subsamples (columns 2 and 3 of Table 3). This suggests that absent IRCA, some IRCA-induced family-sponsored migrants would have come on an employer-sponsored visa – a result that we did not find for Mexico. This finding implies some measure of substitutability between family-sponsored admissions and admissions selected on skill.

B. Heterogeneity by Supply- and Demand-Side Factors

The estimates in the first column of Table 3 are not statistically larger than those in Table 2, but why are they larger in magnitude? Downward bias from internal migration is one potential explanation. However, our first set of estimates was for Mexico only, and there could be heterogeneous effects across countries based on differences in their demand for family sponsorship and the supply of slots available, or the quotas, relative to cohort size.

Naturalization rates may reveal demand since U.S. citizenship expands sponsorship rights. Limiting the sample to the 14 countries with naturalization rates below the median in this sample (60%) produces estimates much closer to those for Mexico alone, with the largest decline coming as expected from citizen-sponsored categories (column 4).[29] Dropping Mexico from this subsample, the estimates for parents (coef. (s.e.)=0.15 (0.05)) and other relatives (coef. (s.e.)=0.11 (0.08)) are only slightly larger than and statistically indistinguishable from what we found in the cross-metro area analysis for Mexico. Since these countries should face similar quotas as those with higher naturalization rates, this finding suggests that demand-side factors could be an important mechanism for our findings.

We have less scope to explore supply-side factors empirically, since there is so little cross-country variation in the quotas. Though Mexico is subject to more restrictive quotas due to its size (i.e., due to the 7% cap; see Section II), it also has one of the lowest naturalization rates among the subsample of low naturalization countries (Table A8). Dropping Mexico from this

[29] Naturalization rates for IRCA immigrants are not available by country. We therefore estimate them using the 5% public-use microdata sample from the 2000 Census, restricting attention to foreign-born arrivals between 1971 and 1986 – cohorts likely legal by 2000 and thus eligible to naturalize. The Census-estimated naturalization rate for Mexico (36%) is similar to the (non-IRCA) naturalization rate for Mexicans calculated with administrative data (35%, from Rytina, 2001). Across countries, Census-estimated naturalization rates are correlated with administratively measured naturalization rates reported occasionally in INS publications. For example, naturalization rates for the 1977 admission cohort (by 1992), listed in U.S. INS (1993), page 803, have a similar cross-country ranking, with Guyana near the top and Mexico at the bottom.

subsample (column 5) is therefore not informative about the contribution of quotas to the estimates. Instead, we view the quantitative similarity of this independent estimate, focused on other countries with demand-side conditions like Mexico's, as bolstering the conclusion that demand-side factors contribute to our estimates.

VI. Discussion

The estimand in this paper is related to, but distinct from, the immigration multiplier, m. The immigration multiplier is *generational* in nature, capturing the number of family sponsored admissions generated over the initiating admit's lifetime. If $m < 1$, then the geometric sequence $\sum_{n=1}^{\infty} m^n$ converges to the value of $\frac{m}{1-m}$, i.e., it is "non-explosive," or migratory chains die out. By contrast, the $\hat{\theta}$ in this paper estimate $\sum_{n=1}^{N} m^n$, where both m and N are unknown. That is, our concept of a multiplier is *time* based, rather than generation based. The longer time horizon over which we calculate $\hat{\theta}$, the higher N might be. Still, rejecting that $\theta \geq 1$ for other relatives, as we do (strongly) in both Table 2 and Table 3, does not necessarily prove that $m < 1$ because, even after 30 years, the first-generation "link" in the chain ($N = 1$) – where the sequence begins – might not be complete.

Why might this be the case? Even though we cannot empirically examine the contribution of quotas to our estimates, it is clear they extend the time to sponsorship. This is particularly the case for Mexico: the siblings and married children of Mexican citizens most recently granted Green Cards submitted their applications in 2000 and 1997, respectively, or only shortly after the IRCA cohort began to naturalize.[30] The long wait owes to low category-specific worldwide quotas in combination with the 7% cap on what Mexico can represent in all

[30] https://travel.state.gov/content/travel/en/legal/visa-law0/visa-bulletin/2022/visa-bulletin-for-august-2022.html, accessed 8/3/2022.

worldwide admissions in any category (Section II). An even longer horizon for the analysis than 30 years would allow time to work through this large backlog of admissions, clearing waitlists of first-generation relatives of the IRCA cohort, and raising $\hat{\theta}$.

This would seem to make it impossible for us to rule out that $m \geq 1$ – that chain migration is explosive, or that the geometric sequence in m never converges. However, wait lists as long as Mexico's are unlikely to clear in the lifetime of IRCA immigrants, most of whom are now in their 60s or older. In other words, the IRCA cohort – and the potential family members sponsored – will likely die off before they reach the front of the queue.

The constellation of demand-side evidence presented in this paper is also consistent with $m < 1$. For example, wait lists for siblings and married children for low-naturalization counties besides Mexico are not as long, and, at 0.11 (0.08), the $\hat{\theta}$ for these relatives is also significantly less than one, and not even significantly different from zero (Table 3, column 5). In addition, even though citizens can sponsor parents *without* quota restriction, the $\hat{\theta}$ for parents in the cross-country analysis for Mexico, at 0.12 (0.05) (Table 2, column 1), is only marginally significantly greater than the estimate for other relatives; in the cross-country analysis, it is statistically indistinguishable, at 0.22 (0.07) (Table 3, column 1). Even scaling by the number naturalized in the IRCA cohort, rather than the entire cohort legalized, the sponsorship rate of parents is not overwhelming: 37% of naturalized IRCA LPRs sponsored the admission of one parent. [31] Potential sponsors may have fewer living parents than siblings, but this finding could also suggest they do not have strong demand for bringing extended family members to the U.S.

[31] We make this calculation by dividing the $\hat{\theta}$ for parents in Table 3 column 1 (0.22) by the predicted naturalization rate, 0.60. We arrive at this prediction by extrapolating the trend in naturalization rates of IRCA admissions between 2001 (33%, from Rytina (2002)) and 2009 (45%, from Baker (2010)) to 2019. The assumption that annual changes in the naturalization rate did not diminish between 2009 and 2019 is probably a generous one, making this calculation a likely lower bound. A comparable calculation yields a similar parental sponsorship among Mexican IRCA naturalized citizens

The fact that naturalization rates are not 100% – or anywhere near that – then suggests that a significant share of the legalized population is not willing to bear the costs of naturalizing to start new or perpetuate existing migratory chains. Or at least that appears the case in the present policy environment, where some relatives may not have the patience to wait 20 years to be admitted. Even though becoming a U.S. citizen affords certain sponsorship rights, the current system of strict quotas and long wait lists in some admissions categories, like that for siblings, makes those rights more difficult to exercise.

VII. Conclusion

This paper provides the first causal estimates how the U.S. immigration system's preference for family reunification works in practice when the U.S. temporarily opens the door to countries that otherwise have little access to authorized immigration. We exploit variation from IRCA's legalization programs, which allowed a cohort of 2.7 million unauthorized immigrants – 2.02 million from Mexico alone – to obtain Green Cards over a narrow time frame starting in the late 1980s. We estimate both family sponsorship rates of the IRCA cohort over a 30-year period and the mechanisms that underlie them.

Our preferred approach, exploiting cross-metro area variation for Mexico, estimates about one additional admission in total per Mexican IRCA LPR across three decades. Taking this estimate at face value, we conclude that IRCA induced about 2.08 million (2.02 x 1.03) subsequent admissions from Mexico through 2019 by way of family sponsorship. It is true that this number is substantial: indeed, our estimates imply that IRCA can account for 53% of family-sponsored Green Cards from Mexico since 1989.[32] However, most sponsored family members

[32] Our estimates also support Massey and Pren's (2012) claim that IRCA led to an increase in Mexican admissions categories not subject to quotas.

(1.76 million) have been spouses and minor or unmarried children – not the relatives typically thought of as chain migrants.

Cross-country variation delivers similar conclusions and highlights the potential importance of demand-side factors. Naturalization rates among IRCA arrivals are low (Rytina, 2002; Baker, 2010) even though DHS explicitly promotes naturalization as a way to facilitate family sponsorship (e.g., DHS, 2016, p. 3). When IRCA admits have naturalized, moreover, they do not appear to bring quota-unrestricted relatives (parents) at particularly high rates. In addition, IRCA admits from countries that share Mexico's low naturalization rate but not its long wait lists have not sponsored any more relatives than Mexicans have, reinforcing that demand for sponsorship may be limited in low naturalization countries.

However, supply-forces are also likely important. The fact that the family sponsorship response to IRCA legalization remains above zero in 2019 – and wait lists for sponsorship of relatives remain long – suggests that the quotas are binding constraints on sponsoring siblings and adult children. This is particularly true for Mexico, whose wait lists still include those who applied around the year 2000. The size of quotas relative to the size of a newly admitted population thus seems a central predictor of the rate at which a group will sponsor relatives.

From this understanding, we believe our findings speak to the consequences of recently proposed openings, such as the U.S. Citizenship Act of 2021 proposed by the Biden administration, which contains provisions similar to IRCA's SAW and GLP provisions, or the U.S. House-passed Farm Workforce Modernization Act, which has a SAW-like provision. The unauthorized population in the U.S. is now more than triple the size of the IRCA cohort, while the quotas for family-sponsored admissions have not changed. This suggests rates of family

sponsorship would not be any higher now than for those admitted under IRCA.[33] Biden's proposal does include provisions to help clear wait lists, and it expands quotas, but the changes will far less than triple the number of family-sponsored admissions allowed annually. And while the mix of countries estimated to make up the unauthorized population has been shifting away from Mexico (Lopez et al., 2021; Baker, 2014), it remains dominated by countries with low naturalization rates, and naturalization rates show little trend (Teke, 2019). The design of future legalization proposals might benefit from direct consideration of the demand for family sponsorship that they will induce.[34]

This paper is part of a broader push to evaluate the impacts of immigration *policy* – not just of the much better studied immigration *flows* – for the host country (e.g., Chen, 2015; Foged and Peri 2016; Dustmann, Schönberg, and Stuhler, 2017; Clemens, Lewis, and Postel, 2018; Allen, Dobbin, and Morten, 2019; Abramitsky et al. 2019; Tabellini, 2020). This literature includes studies of IRCA itself (Baker, 2015; Freedman, Owens, and Bohn 2018; Cascio and Lewis, 2019), to which we add. A hope is that this will lead to better informed debates over immigration policy.

[33] Also, Latin American fertility rates have declined, so family sizes in today's unauthorized population are likely smaller than when IRCA passed (see https://data.worldbank.org/indicator/SP.DYN.TFRT.IN?locations=ZJ, accessed 7/9/2021).

[34] For example, through a temporary expansion of quotas for immediate family members, which, in the case of IRCA, was only accomplished with separate legislation years after IRCA. The Biden proposal goes further and removes quotas for immediate family members of LPRs.

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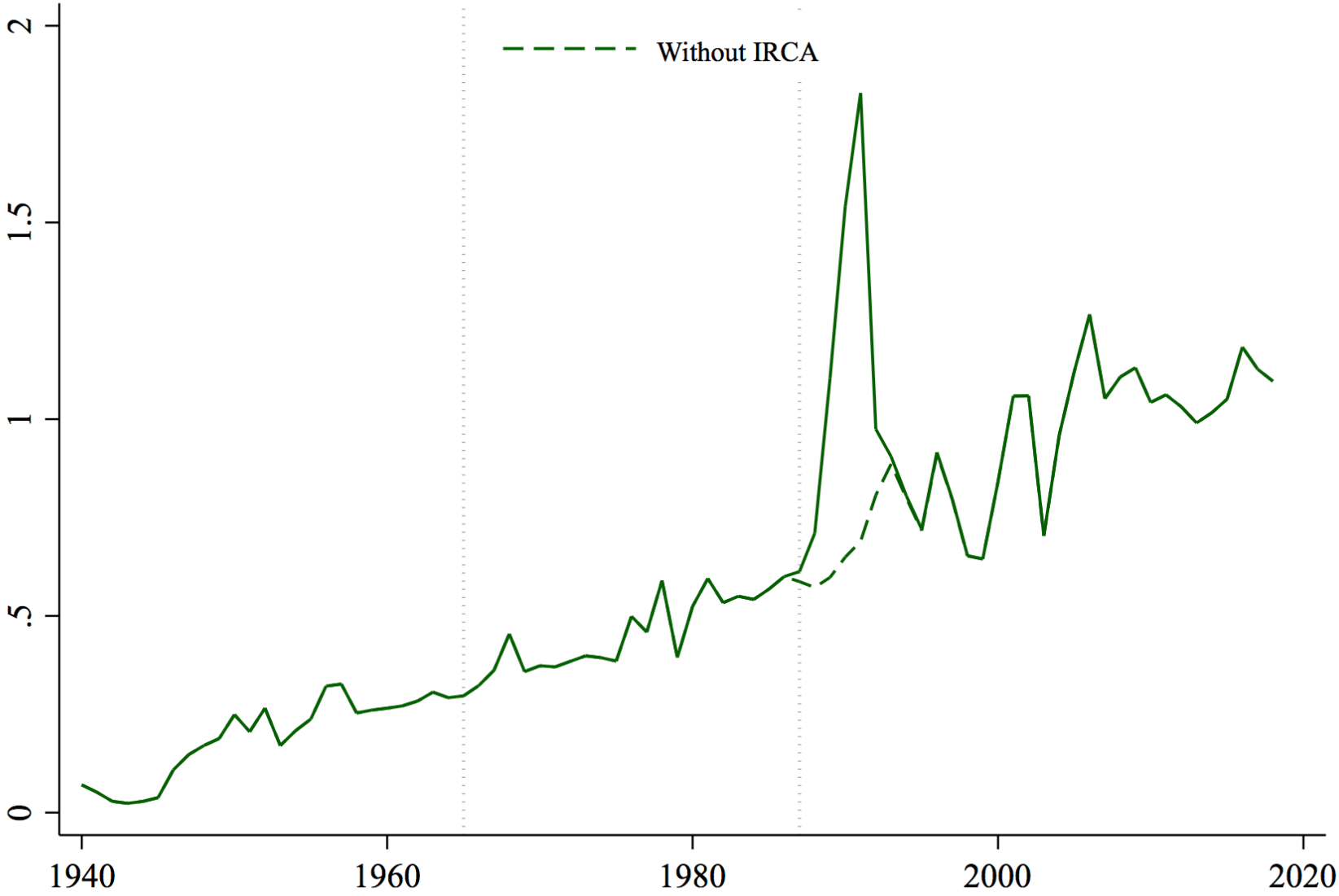
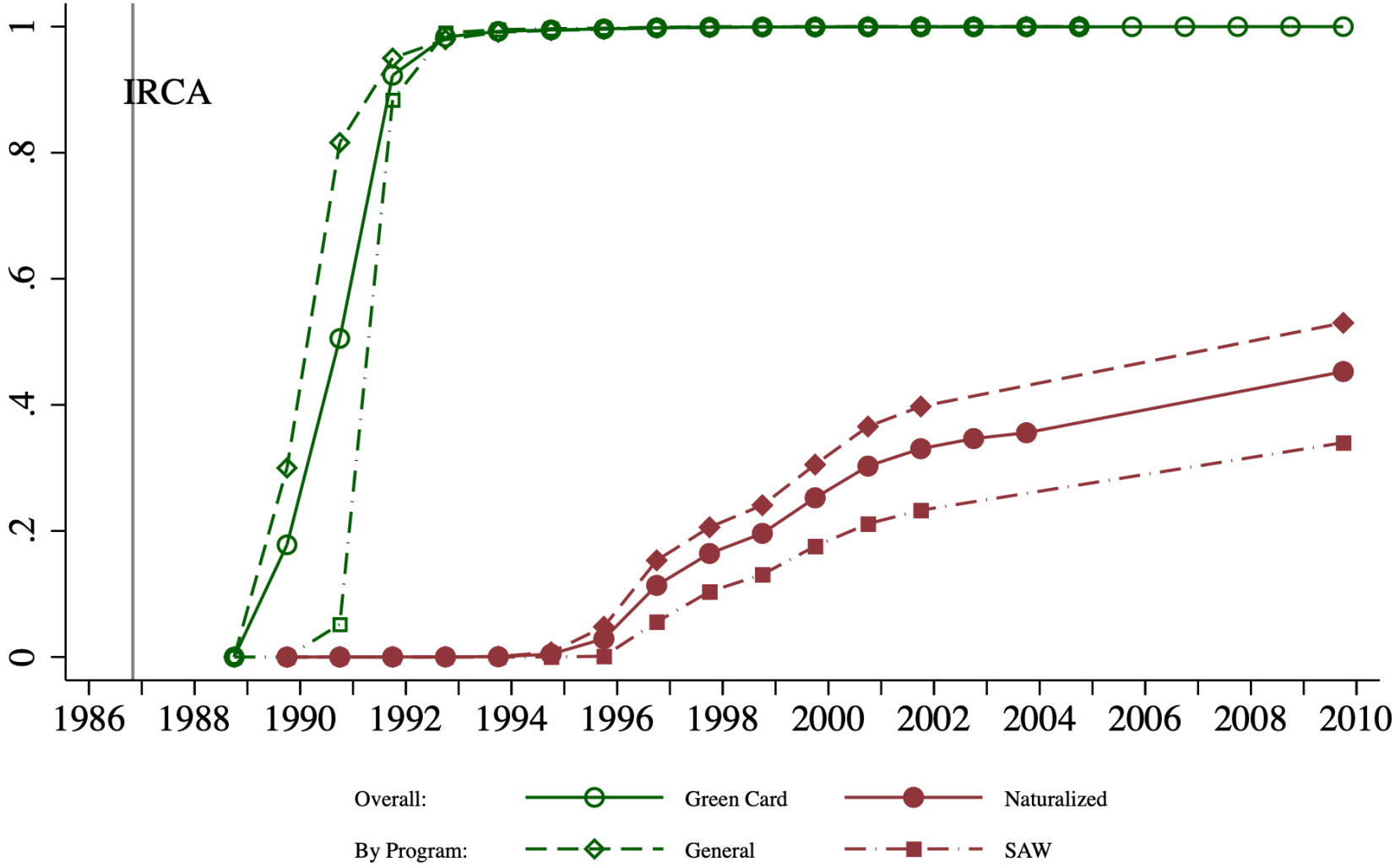
Figure 1. U.S. Admissions: Green Cards Issued (Millions) by Year



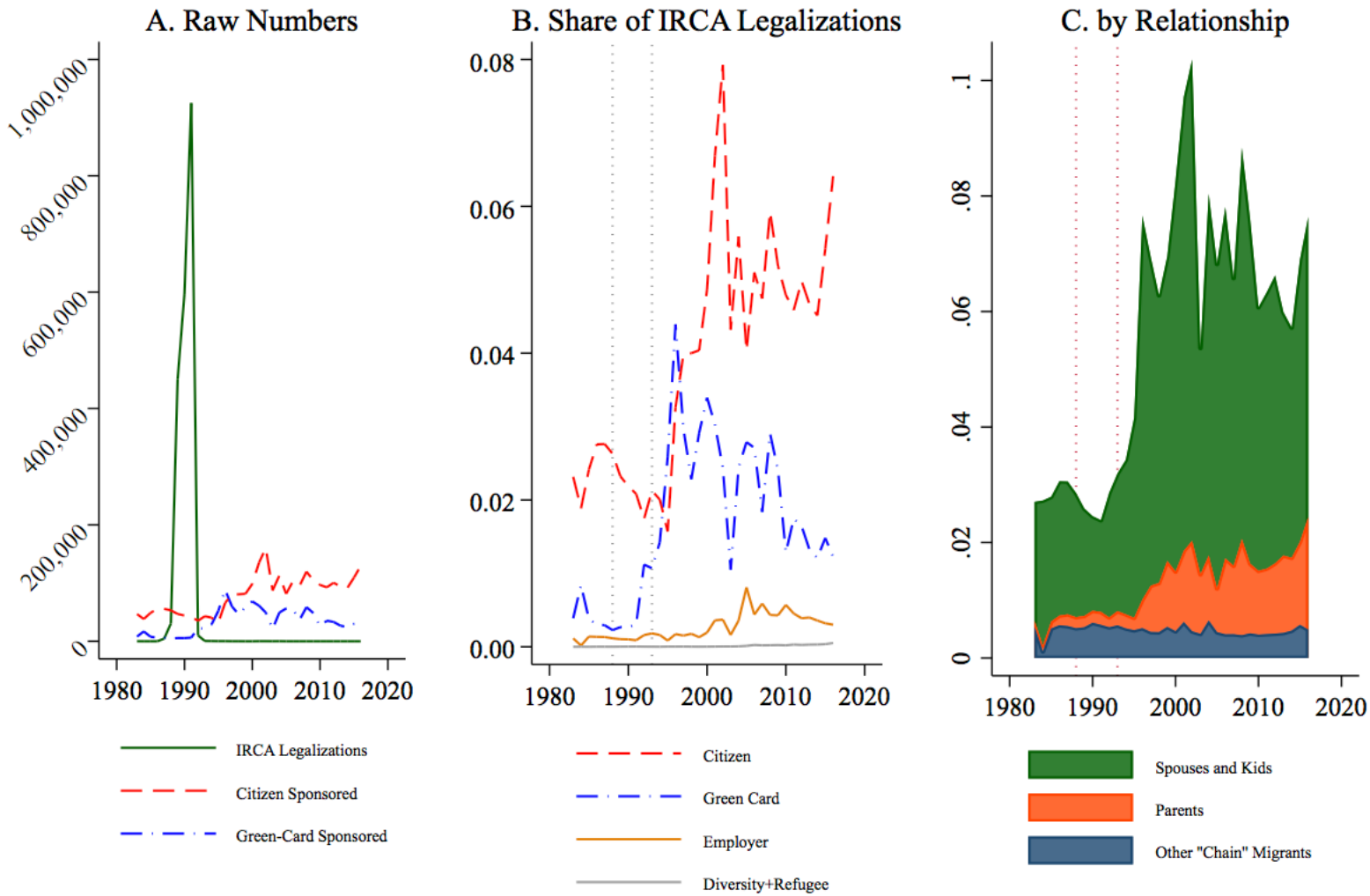
Notes: Authors' calculations using data on overall admissions from Table 1 of the *2018 Yearbook of Immigration Statistics* (https://www.dhs.gov/immigration-statistics/yearbook/2018/table1) and data on IRCA admissions from Rytina (2002) (for the SAW program and the GLP) and *Immigrants Admitted to the United States* (FY 1987-2004) (for two smaller IRCA programs).

Figure 2. Fraction of IRCA General Legalization and SAW Admits Receiving Green Card and Naturalized Over Time



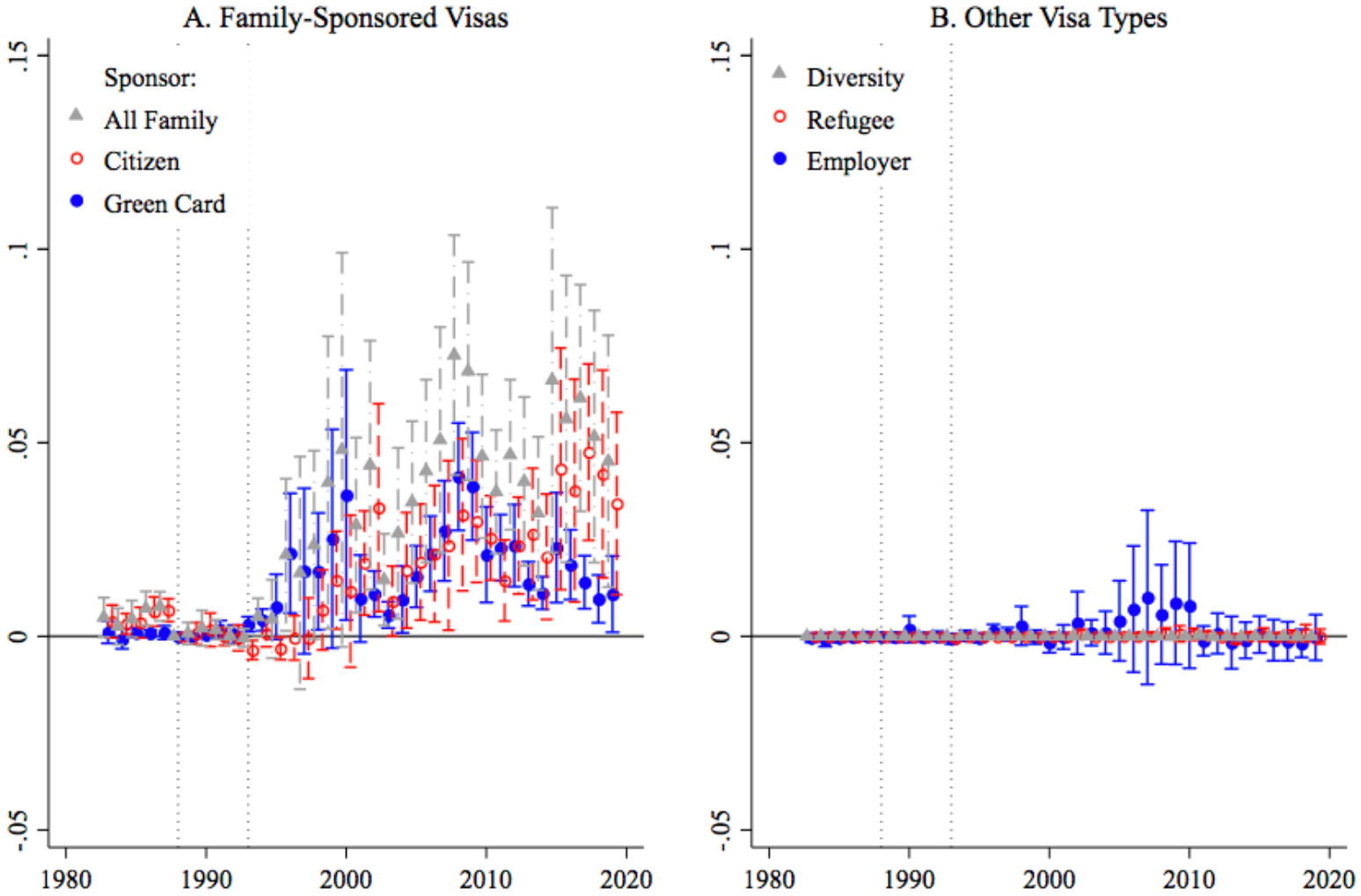
Notes: Points plotted at the end of the relevant fiscal year (FY). For IRCA admissions (Green Cards), data are from the *Yearbook of Immigration Statistics* (YIS); data by program (GLP, SAW) were last reported in FY 2004. For IRCA naturalizations, data are from Rytina (2002) through FY 2001, YIS for FY 2002 and 2003, and Baker (2010) for FY 2009.

Figure 3. Selected Mexican Admission Classes Over Time



Notes: Authors' tabulations using data on Mexican IRCA admissions from the Legalization Applications Processing System (for the SAW program and the GLP) and ~~I~~*mmigrants Admitted to the United States* (FY 1987-2004) (for two smaller IRCA programs) and data on other admissions from *Immigrants Admitted to the United States* (FY 1983-2004) and https://www.dhs.gov/immigration-statistics/readingroom/LPR/LPR-by-major-class-and-country (for FY 2005-2016). See Appendix A.

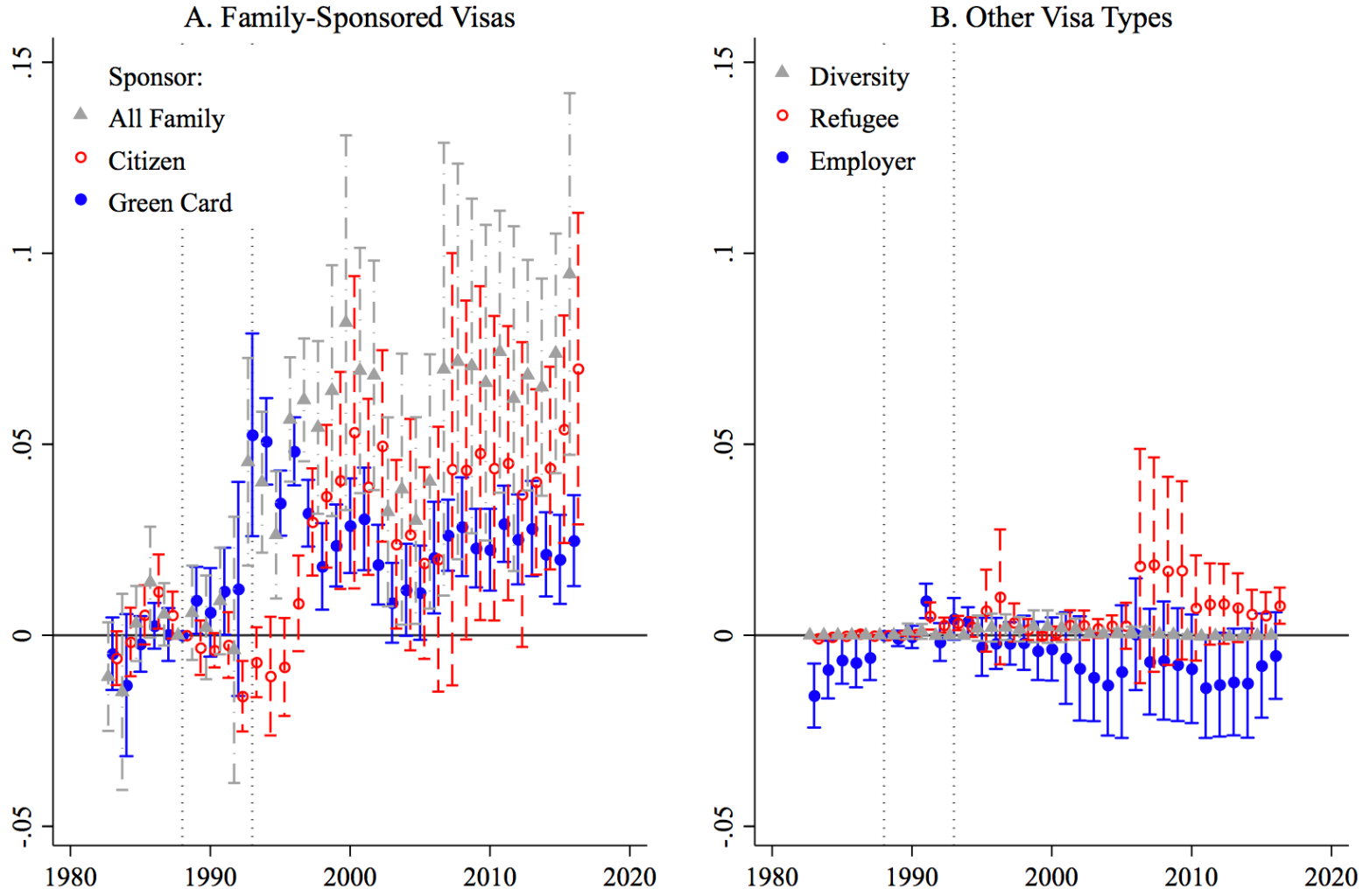
Figure 4. Response to Mexican IRCA Legalizations, by Visa Type and Year



Sources: See Table 1 Panel A source notes for legalization ratio. Data for admissions by type from *Immigrants Admitted to the United States* (FY 1983-2004) and https://www.dhs.gov/immigration-statistics/readingroom/LPR/LPRcounty (FY 2007-2019). Admissions for FY 2005 and 2006 are linearly interpolated. See Appendix A.

Notes: Figures plot coefficients (with 90% confidence intervals) on the Mexican legalization ratio ($lpr_{c,IRCA}/legal_{c,1980}$) interacted with year dummies from a regression that also includes metro area and year-by-state fixed effects; the interaction between the legalization ratio and the dummy for 1988 is omitted to identify the model (equation 1). Regressions give each metro area equal weight, and standard errors are clustered on metro area. Estimation sample includes the 66 metro areas listed in Table A2.

Figure 5. Response to IRCA Legalizations Across Countries, by Visa Type and Year



Sources: See Table 1 Panel A source notes for legalization ratio. Data for admissions by type from *Immigrants Admitted to the United States* (FY 1983-2004) and https://www.dhs.gov/immigration-statistics/readingroom/LPR/LPR-by-major-class-and-country (for FY 2005-2016). See Appendix A.

Notes: Figures plot coefficients (with 90% confidence intervals) on the legalization ratio ($lpr_{c,IRCA}/legal_{c,1980}$) interacted with year dummies from a regression that also includes country and year-by-world region fixed effects; the interaction between the legalization ratio and the dummy for 1988 is omitted to identify the model (equation 1). Regressions give each country area equal weight, and standard errors are clustered on country. Estimation sample includes the 29 countries listed in Table A8.

Table 1. Cross-Metro Area Variation in IRCA Legalizations among Mexicans

Panel A. Top MSAs on Mexican Legalization Ratio

	Metro Area	Legalization Ratio: (2)/(3)	Legalized by IRCA	Legal Immigrants, 1980	% of Legalizations
		(1)	(2)	(3)	(4)
1	Lakeland-Winter Haven, FL	8.4	4,162	495	0.21
2	Fort Myers-Cape Coral, FL	6.9	1,958	282	0.10
3	Fort Pierce-Port St. Lucie, FL	5.7	898	157	0.04
4	Reno, NV	5.0	3,377	676	0.17
5	Naples, FL	4.4	5,428	1,241	0.27
6	West Palm Beach-Boca Raton, FL	3.8	4,103	1,077	0.20
7	Sarasota-Bradenton, FL	3.6	1,286	362	0.06
8	Fort Lauderdale, FL	3.4	1,462	432	0.07
9	Santa Rosa, CA	3.1	8,362	2,675	0.41
10	Monmouth-Ocean, NJ	2.7	300	110	0.01
16	Los Angeles-Long Beach, CA	1.7	560,289	329,865	27.8

Panel B. Balance Test: Correlates of the Legalization Ratio

	Characteristic	Mean	Regressions on Leg. Ratio		Reverse
		(1)	(2)	(3)	(4)
(a)	Mexicans/Population, 1980	0.0290	-0.00465	0.00106	1.719
			(0.00211)	(0.00157)	(2.297)
(b)	Mexicans Admitted, 1983-87	3.844	0.0149	0.649	0.0124
	/Legal Mexicans, 1980		(0.488)	(0.488)	(0.0196)
(c)	Employment Growth, 1980-87	0.258	0.0412	-0.0109	-1.013
			(0.0188)	(0.0230)	(2.164)
(d)	Mex Emp Growth, 1980-2019	5.452	-0.195	0.441	0.0151
	predicted from 1980 Occ Mix		(0.492)	(0.755)	(0.0330)
State Effects?			No	Yes	Yes
F-stat					0.578

Sources: Panel A columns 2 and 4: Legalization Applications Processing System (LAPS) (for the SAW program and the GLP) and *Immigrants Admitted to the United States* (FY 1987-2004) (for two smaller IRCA programs). Panel A column 3: *Alien Address Reports, [United States], 1980 Public Use File* (for LPRs) and 1980 Census PUMS (Ruggles et al., 2020) (for citizens). Panel B row a: 1980 Census tabulations (Manson et al., 2020). Panel B row b: *Immigrants Admitted to the United States*, FY 1983-87 (numerator) and Panel A column 3 sources (denominator). Panel B row c: County Business Patterns. Panel B row d: 1980 Census PUMS and 2018-19 American Community Surveys (Ruggles et all, 2020). See Appendix A.

Notes: The unit of observation is a metro area. The legalization ratio in Panel A is the number of Mexican immigrants granted permanent residence by IRCA who listed that metro area as their intended residence, divided by the number of Mexican citizens and LPRs in that metro area in 1980. Columns 2 and 3 of Panel B show the coefficient from a regression of the variable listed on the legalization ratio; the regression in column 3 also includes dummies for the state in which the majority of the metro area's population resided in 1986. Column 4 of Panel B shows the slope coefficients from a multivariate regression of the legalization ratio on the variables listed plus state dummies; the F-stat is on the joint significance of the variables listed.

Table 2. Long-Run Response to IRCA Legalizations of Mexicans: Metro Area Evidence

	Baseline	Weighted	Adding controls
	(1)	(2)	(3)
Overall Family Sponsored	1.03	0.88	1.01
	(0.25)	(0.37)	(0.20)
By Family Sponsorship Type			
Green-Card Sponsored	0.48	0.39	0.49
	(0.09)	(0.13)	(0.08)
Citizen-Sponsored	0.55	0.50	0.52
	(0.18)	(0.26)	(0.15)
By Relative Type			
Spouses and Kids[a]	0.87	0.76	0.84
	(0.20)	(0.30)	(0.16)
Parents[c]	0.12	0.12	0.13
	(0.05)	(0.06)	(0.04)
Other relatives[c]	0.03	0.01	0.03
	(0.02)	(0.02)	(0.01)
Other Major Categories			
Employer Sponsored	0.05	0.20	0.02
	(0.09)	(0.19)	(0.05)
Refugees	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)
Diversity	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)
Weights:	None	1980 Pop	None
Controls			
State x Year	Yes	Yes	Yes
Other Controls[b]	No	No	Yes

Sources: See Table 1 Panel A source notes for legalization ratio and other controls. Data on admissions by type from *Immigrants Admitted to the United States* (FY 1983-2004) and https://www.dhs.gov/immigration-statistics/readingroom/LPR/LPRcounty (FY 2007-2019). Admissions for FY 2005 and 2006 are linearly interpolated. See Appendix A.

Notes: The cross-section unit of analysis is a metro area. Baseline regression (column 1, based on equation 1) includes metro area fixed effects, state-by-year fixed effects, and interactions between the legalization ratio ($lpr_{c,IRCA}/legal_{c,1980}$) and year indicators. Table entries report the sum of the post-1988 interaction coefficients for the variable listed (divided by $legal_{c,1980}$), based on data for 66 metropolitan areas across 37 years (1983-2019). Unless otherwise noted (column 2), regressions give each metro area equal weight. Standard errors in the underlying regressions are clustered on metro area, and standard errors in parentheses are calculated using the delta method.

[a] Sum of citizen-sponsored spouses and minor children and Green Card-sponsored spouses and unmarried children.

[b] Interactions between year dummies and the variables listed in Table 1 Panel B.

[c] Relatives who would typically be considered "chain migrants."

Table 3. Long-Run Response to IRCA Legalizations: Country Evidence

	Baseline	Nonmissing Controls	With Controls	<60% Citizens by 2000	Dropping Mexico
	(1)	(2)	(3)	(4)	(5)
Overall Family Sponsored	1.44	1.52	1.39	0.91	0.93
	(0.39)	(0.40)	(0.34)	(0.19)	(0.20)
By Family Sponsorship Type					
Green-Card Sponsored	0.68	0.71	0.69	0.46	0.44
	(0.13)	(0.14)	(0.05)	(0.09)	(0.07)
Citizen-Sponsored	0.76	0.81	0.70	0.46	0.50
	(0.37)	(0.37)	(0.33)	(0.21)	(0.21)
By Relative Type					
Spouses and Kids[a]	1.03	1.08	1.01	0.67	0.67
	(0.28)	(0.30)	(0.24)	(0.18)	(0.19)
Parents[d]	0.22	0.23	0.20	0.15	0.15
	(0.07)	(0.07)	(0.06)	(0.05)	(0.05)
Other relatives[d]	0.18	0.21	0.18	0.10	0.11
	(0.09)	(0.08)	(0.07)	(0.09)	(0.08)
Other Major Categories					
Employer Sponsored	-0.15	-0.14	-0.19	-0.30	-0.31
	(0.16)	(0.13)	(0.10)	(0.11)	(0.10)
Refugees	0.17	0.17	0.16	0.05	0.06
	(0.13)	(0.13)	(0.13)	(0.04)	(0.04)
Diversity	0.02	0.02	0.02	0.00	0.00
	(0.02)	(0.02)	(0.02)	(0.00)	(0.00)
Countries:	29	27	27	14	13
Fixed Effects					
Country	Yes	Yes	Yes	Yes	Yes
Region x Year	Yes	Yes	Yes	Yes	Yes
Baseline Controls x Year[b]	No	No	Yes	No	No
Time-Varying Controls[c]	No	No	Yes	No	No

Sources: See Table 1 Panel A source notes for legalization ratio. Data on admissions by type from *Immigrants Admitted to the United States* (FY 1983-2004) and https://www.dhs.gov/immigration-statistics/readingroom/LPR/LPR-by-major-class-and-country (for FY 2005-2016). See Appendix A for more details and sources for controls.

Notes: The cross-section unit of analysis is a country. Baseline regression (column 1, based on equation 1) includes country fixed effects, world region-by-year fixed effects, and interactions between the legalization ratio ($lpr_{c,IRCA}/legal_{c,1980}$) and year indicators. Table entries report the sum of the post-1988 interaction coefficients for the variable listed (divided by $legal_{c,1980}$) based on data for 29 countries across 34 years (1983-2016). Regressions give each country equal weight. Standard errors in the underlying regressions are clustered on country, and standard errors in parentheses are calculated using the delta method.

[a] Sum of citizen-sponsored spouses and minor children and Green Card-sponsored spouses and unmarried children.

[b] Interactions between year dummies and each of 1983-87 LPR admissions per 1980 legal immigrant and a dummy for upper income country.

[c] Annually varying real exchange rate and population (divided by $legal_{c,1980}$), lagged one year.

[d] Relatives who would typically be considered "chain migrants."

Online Appendices (Not for Publication)

Opening the Door: Immigrant Legalization and Family Reunification in the United States

Appendix A. Data

I. Treatment Variable: the Legalization Ratio

A. Legalization Applications Processing System (LAPS) data

The SAW and GLP admissions that enter the numerator of the legalization ratio were taken from the Legalization Applications Processing System (LAPS), available from the National Archives. These public-use microdata consist of selected fields from anonymized records from all forms I-687 (application for temporary legal status under IRCA's general legalization program, spilt across two files) and forms I-700 (application for temporary legal status under IRCA's SAW program) received by the Immigration and Naturalization Service (INS), consisting of 3,040,948 records in total.

These fields describe some outcomes of the application process, including whether and when a Green Card was awarded, through the end of the 1992 fiscal year.[1] This is critical to establishing the timing for our event-study model, as outlined in Figure 2. These fields also include the applicant's country of birth and state and county of intended residence within the U.S. (current U.S. address) at the time of application. In these and all other administrative data, we code counties to metropolitan areas using 1999 Primary Metropolitan Statistical Areas (PMSA) boundaries.[2] For the metro area-level analysis for Mexican admissions, we focus on 66 metropolitan areas that are observable in admissions statistics published by Department of Homeland Security (DHS) for years 2007 and later.[3] For the country-level analysis, we focus on 29 countries where IRCA admissions represented at least a third of total admissions also

[1] Statistics on IRCA admissions through fiscal year 2001, reported in Rytina (2002), show that nearly all IRCA admissions had occurred by the end of the 1992 fiscal year.
[2] For New England, we use New England County Metropolitan Areas (NECMAs). See June 30, 1999 definition at https://www.census.gov/geographies/reference-files/time-series/demo/metro-micro/historical-delineation-files.html.
[3] Because these metro areas are relatively large, the estimates are unaffected by the fact that county information is suppressed in the LAPS for applicants in counties with under 100,000 population (as of the 1990 census) or with fewer than 25 applications.

including refugees and the diversity visa, over 1983 to 2016. Section II.A of this Appendix describes these other admissions data in more detail.

Note that in forming these samples, we also restrict attention to metro areas with at least 20 registered Mexican LPRs in 1980 or countries with at least 20 registered LPRs (see Section I.C) and a legalization ratio of at least 0.1.

B. Immigrants Admitted to the United States

For the two much smaller legalization programs authorized by IRCA – the Cuban-Haitian Adjustment and Pre-1972 Arrivals programs – we obtain total admissions by country (29 sample countries) and metro area (for Mexicans only) across the 1987 to 2004 fiscal years from several sources: (1) for 1987 to 1997 from *Immigrants Admitted to the United States* microdata, available on ICPSR (all United States Department of Justice, Immigration and Naturalization Service, various years); and for 1998 and 2001-04 from the *Lawful Immigrants Files* version provided by the National Archives (Department of Homeland Security. Management Directorate. Office of Immigration Statistics, various years).[4] In table source notes, we refer to these files collectively as *Immigrants Admitted to the United States*. Like the LAPS, these data provide selected fields from anonymized records for Green Card admissions under all programs except the GLP and the SAW program. Because these data include detailed class of admission (identifying the relevant program), country of birth, and location within the U.S. at the time of admission, we are able to adjust the numerator of the legalization ratio for these two smaller legalization programs. We describe these data further in Section II of this Appendix.

C. Alien Address Reports

[4] These visa categories are not separately identified in the 1999 and 2000 files, but their numbers are very small in 1998 and 2001.

We obtain part of the denominator of the legalization ratio from *Alien Address Reports, [United States], 1980 Public Use File*, available at ICPSR. These public-use microdata consist of selected fields from anonymized records of registered aliens in the U.S. in 1980. LPRs are separately identified. These data were collected as part of the INS's alien address reporting program for 1980 and were used at the time to estimate unauthorized immigration in conjunction with the 1980 Census. The fields include country of birth and state and zip code of residence within the U.S., which we use to map to counties, and then to metro areas (see Section I.A of this Appendix).

D. Citizen Count

The denominator of the legalization ratio is the sum of the LPR count from I.C plus a count of citizens estimated from the 1980 Census PUMS (Ruggles et al., 2020). County groups in these data were matched to metro areas according to their 1999 definitions.

E. Descriptive Statistics

Table A2 shows how we arrived at the legalization ratio for each sampled metro area, by state. We show both the numerator (from sources I.A and I.B; column 2) and the denominator (from sources I.C, I.D; column 3) in addition to the ratio itself (column 1). We also show the share of IRCA admissions accounted for by that area (column 4). Table A8 shows how we arrived at the legalization ratio for each sampled country, by world region. We show both the numerator (from sources I.A and I.B; column 2) and the denominator (from sources I.C and I.D; column 3) in addition to the ratio itself (column 1). We also show the share of IRCA admissions accounted for by each country (column 4).

II. Outcomes Data: Immigrant Admissions

A. Immigrants Admitted to the United States

We calculate the first half of our country and metro-area panel on admissions by sponsor, relative type, and age from two sources: (1) *Immigrants Admitted to the United States* microdata, available on ICPSR, for fiscal years 1983-1997 and 1999-2000 (United States Department of Justice, Immigration and Naturalization Service, various years); (2) the National Archives version of this file for fiscal years 1998 and 2001-2004, the *Lawful Immigrant Files* (Department of Homeland Security. Management Directorate. Office of Immigration Statistics, various years). In table source notes, we refer to these files collectively as *Immigrants Admitted to the United States* (1983-2004). These data provide selected fields from anonymized records for Green Card admissions under all programs except the GLP and the SAW program. These fields include detailed class of admission (identifying the relevant program), country of birth, and age and location within the U.S. at the time of admission.[5] In addition to identifying admissions under the Cuban-Haitian Adjustment and Pre-1972 Arrivals programs (see Section I.B of this Appendix), these data identify a variety of family-sponsorship visas, employer visas, diversity visas, and refugee visas.

We are constrained in what we can do with these data by the published tables that provide our main data source for fiscal years 2007 to 2019 for the metro-level analysis and 2005 to 2016 for the country-level analysis (see section II.B). We categorize the family-sponsorship visas into two broad groups that align with what is available in later published data – e.g., a Green Card-sponsored category and a citizen-sponsored category. Likewise, among family-sponsored admissions overall, we are able to separate relatives into three categories – spouses and unmarried children of the sponsor, parents of the sponsor, and other relatives of the sponsor.

[5] Location is recorded in different ways over time, e.g., initially and in 2001-04 as zip code and state and in 1999 and 2000 as metropolitan area. We convert all location information to metro areas (see Section I.A of this Appendix).

B. Office of Immigration Statistics Tables

Unfortunately for our study, publication of anonymized admissions microdata ceased after 2004. For the country-level analysis, we have collected tables for 2005 to 2016 from an online DHS database.[6] For the Mexican metro analysis, we relied on another online DHS database which is tabulated at the county level (for the largest immigrant destinations) from 2007 to 2019, which we further aggregate to the metropolitan area level.[7] So in addition to the constraints on these data noted in Section II.A, we lack data on Mexican admissions by metropolitan area for 2005-06, and at the country level beyond 2016. We interpolate Mexican admissions for 2005-06 but stop the country series in 2016.

III. Outcomes Data: Total Arrivals

We estimated counts of recent immigrant arrivals by country from the 5% public-use microdata samples of the 1990 and 2000 Decennial Censuses (Ruggles, et al., 2020) and the public-use microdata samples of the 2006-2019 American Community Surveys. We focus on persons born in one of the 29 sample countries.[8] In calculating both the counts and the characteristics, we used survey-provided sampling weights.

Because the Census is not annual, we do not observe the size of all arrival cohorts at the time of arrival. We instead approximate it through extrapolation, taking advantage of the fact that we observe each cohort at multiple points in time. Specifically, to create the data for the cross-metro Mexican analysis, we begin by estimating U.S. resident population counts of

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[6] https://www.dhs.gov/immigration-statistics/readingroom/LPR/LPR-by-major-class-and-country. Unfortunately, this is the only database which details admissions by country and the legal status of the sponsor (Green Card/citizen) for the U.S. as a whole, and it has not been updated since the publication of the FY 2016 statistics. Less detailed statistics by country are available more recently (giving, for example, total admissions by country).

[7] https://www.dhs.gov/immigration-statistics/readingroom/LPR/LPRcounty. Unlike the U.S. wide statistics (previous note) the county-level statistics are updated every fiscal year. Unfortunately, it is not possible to "recreate" the U.S. wide statistics from the county-level ones, because the statistics only cover the largest immigrant destinations.

[8] We exclude a small number of individuals born to U.S. citizens abroad.

immigrant arrivals by survey year y, arrival year (or cohort) t, and metro area c, N_{cyt}. We normalize these counts by $legal_{c,1980}$ – the same denominator as is used for the legalization ratio. We then regress these normalized counts on a vector of area-by-arrival cohort fixed effects and a survey-specific effect of years in the U.S., $y - t$:

$$\frac{N_{cyt}}{legal_{c,1980}} = \eta_{ct} + \beta_1(y-t) + \beta_2(y-t) \times D(CENS) + v_{cyt}.$$

$D(CENS)$ is a dummy which indicates data are from 1990 or 2000 Census (rather than the American Community surveys). β_1 (or $\beta_1 + \beta_2$) is anticipated to be less than 1 to the extent that return migration or other forms of attrition shrink cohort sizes over time. To predict (normalized) cohort size at entry, we then evaluate the fit of this model at zero years in the U.S., i.e., $\frac{\widehat{N_{cyt}}}{legal_{c,1980}} = \hat{\eta}_{ct}$ when $y - t = 0$.

Arrival cohorts are not identified in single years in the 1990 Census: the available groupings are 1982-84, 1985-86, and 1987-90. We therefore also group 1980s arrivals in the 2000 Census and ACS 2006-2019 (where cohorts are reported in single arrival years) similarly: 1982-84, 1985-86, and 1987-89.[9] For these categories, we define "t" at the midpoint (that is, 1983, 1985.5, and 1988, respectively).

For the purposes of estimating the adjustment regression above, we drop those who arrived during the survey year (since full coverage of the year's arrival cohort will not be possible in a survey that takes place partway through the year) and only include cohorts within 18 years of the survey (so $1 \leq (y-t) \leq 18$). The latter restriction, for example, means only the 1990 and 2000 Censuses and the 2006 ACS give us observations on cohorts that arrived in the

[9] To be clear, 1990 Census defines the cohort as 1987-90, while later years we define the bin as 1987-89. We do this because the 1990 Census is taken in April, so most 1990 arrivals would not actually have been covered by the 1990 Census.

1980s. We also can consider only cohorts up to t=2018. (For the country-level analysis, we stop at t=2016, the last year available in the admissions data, but nevertheless include ACSs through y=2019.)

Self-reported arrival cohorts are measured with a lot of error (e.g., Lubotsky 2007). To reduce noise, after the adjustment we further aggregated post-1990 arrivals into five-year intervals (1990-1994, 1995-1999, 2000-2004, 2005-2009, 2010-2014, 2015-2018) by summing up the relevant $\hat{\eta}_{ct}$'s. We further inflated the counts to "five-year equivalent" intervals by scaling up each $\hat{\eta}_{ct}$ by 5/number of years in the interval (for example, 5/3 for 1982-4, 5/2 for 1985-86 and 5/4 for 2015-2018).

We also aggregate admissions A_{ct} – Mexican LPRs in area *c* in arrival cohort *t* – in the same way. That is, we aggregate A_{ct} into the same year intervals as the Census arrivals and adjust those to five-year equivalents as well. (Because of the missing 2005 and 2006 data, in particular, we adjust the 2005-2009 interval upwards by a factor of 5/3; we also have only 1983-1984 for the 1982-4 interval, so we adjust that upward by 5/2.)

Finally, the difference $\hat{\eta}_{ct} - \frac{A_{ct}}{legal_{c,1980}}$ captures arrivals in all other immigrant categories ("other arrivals"). We also follow the same procedure outlined to estimate adjusted data from the cross-country analysis substituting country for metro area for the "c" index.

IV. Other Data: Other Characteristics

A. Metro Area-Level Characteristics

We use tabulations of the 1980 Census 20% sample (Manson et al., 2020) to calculate the 1980 percent of a metro area's population who were Mexican. To calculate Mexicans admitted between 1983 and 1987 per legal Mexican in 1980, we use sources already described in I.B, I.C, and I.D above. Employment between 1980 and 1987 is calculated using *County Business*

Patterns data (United States. Bureau of the Census). We calculate the "Bartik" instrument for Mexican employment growth between 1980 and 2019 as follows:

$$\frac{\sum_o \frac{\Delta E_{o,-c}}{E_{o,-c,1980}} \widehat{Mex}_{oc,1980}}{Mex_{c,1980}},$$

where $\frac{\Delta E_{o,-c}}{E_{o,-c,1980}}$ is employment growth in occupation o in areas besides area c between 1980 and 2019 and $Mex_{c,1980}$ is the number of Mexicans in area c in 1980, and $\widehat{Mex}_{oc,1980} \equiv E_{oc,1980} \frac{Mex_{o,-c,1980}}{E_{o,-c,1980}}$ is the predicted number of Mexicans working in occupation o in area c in 1980 based on the Mexican share of that occupation outside the area, $\frac{Mex_{o,-c,1980}}{E_{o,-c,1980}}$, and the 1980 size of the occupation in that area, $E_{oc,1980}$. The idea of this measure is to leverage a combination of the local occupation mix and which occupations are growing fastest to predict which areas will become most attractive to Mexicans over the period of our study. All figures were computed using 1980 Census and 2019 ACS data from Ruggles et al. (2020).

B. Country-Level Characteristics

We used the 2000 Decennial Census (Ruggles et al., 2020) to approximate the naturalization rates of the IRCA cohort (entering 1971 to 1986) by country. For Mexicans in this cohort, we arrive at a naturalization rate of 35.6% – similar to Green Card holders entering the U.S. between 1979 and 1982 (35%), based on internal INS data through 2001. Like Rytina (2002), we also find a considerably higher naturalization rate for non-Mexicans – 55% in the Census versus 52% in the administrative data.

To calculate admissions between 1983 and 1987 per legal immigrant in 1980, we use sources already described in I.B, I.C, and I.D above. Upper income countries were identified using the United Nations World Development Indicators. Real exchange rates and population were computed using the Penn World Tables, version 10.0 (Feenstra et al., 2018). The

population figures were normalized by the number of legal immigrants in 1980, previously described.

V. Tables

The data sources used in this project and their role in and use in this project are also summarized in Table A1.[10] Tables A2 and A8 report the raw data for the main cross-sectional variables used in the analysis (including the treatment) for the cross-metro area and -country analysis, respectively. Table A3 reports summary statistics for all of the variables used in the analysis. The remaining appendix tables are robustness checks for main analysis tables.

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E. County Business Patterns

United States. Bureau of the Census. *County Business Patterns, 1980 [United States]: U.S. Summary, State, and County Data*. [distributor], 2006-01-12. https://doi.org/10.3886/ICPSR08142.v1

----. *County Business Patterns, 1987 [United States]: U.S. Summary, State, and County Data*. [distributor], 2006-01-12. https://doi.org/10.3886/ICPSR09381.v1

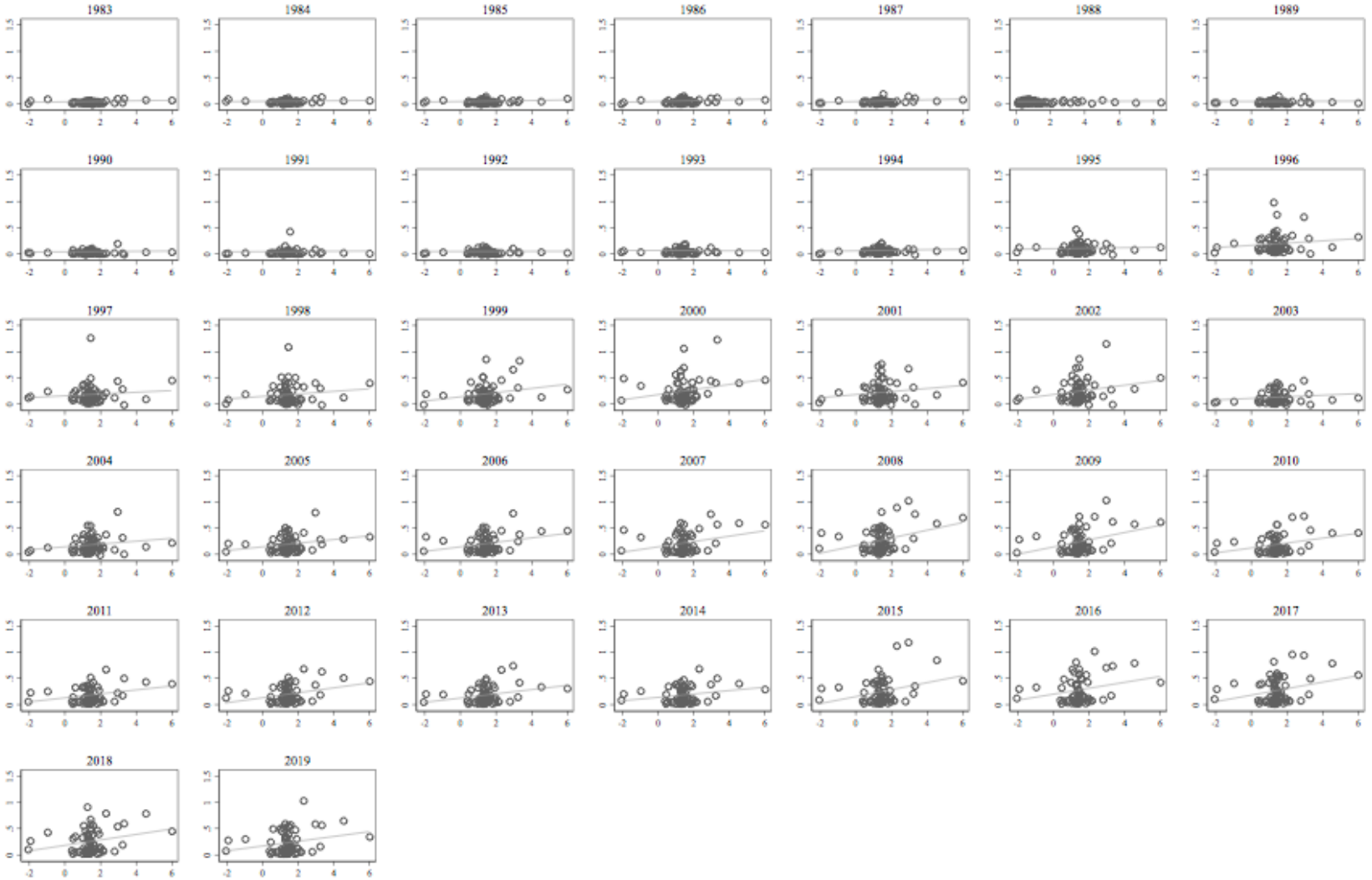
F. Penn World Tables

Feenstra, Robert C., Robert Inklaar and Marcel P. Timmer (2015), "The Next Generation of the Penn World Table" American Economic Review, 105(10), 3150-3182, available for download at www.ggdc.net/pwt

G. Other

Lubotsky, Darren. 2007. “Chutes or Ladders? A Longitudinal Analysis of Immigrant Earnings.” *Journal of Political Economy* 115(5): 820-867.

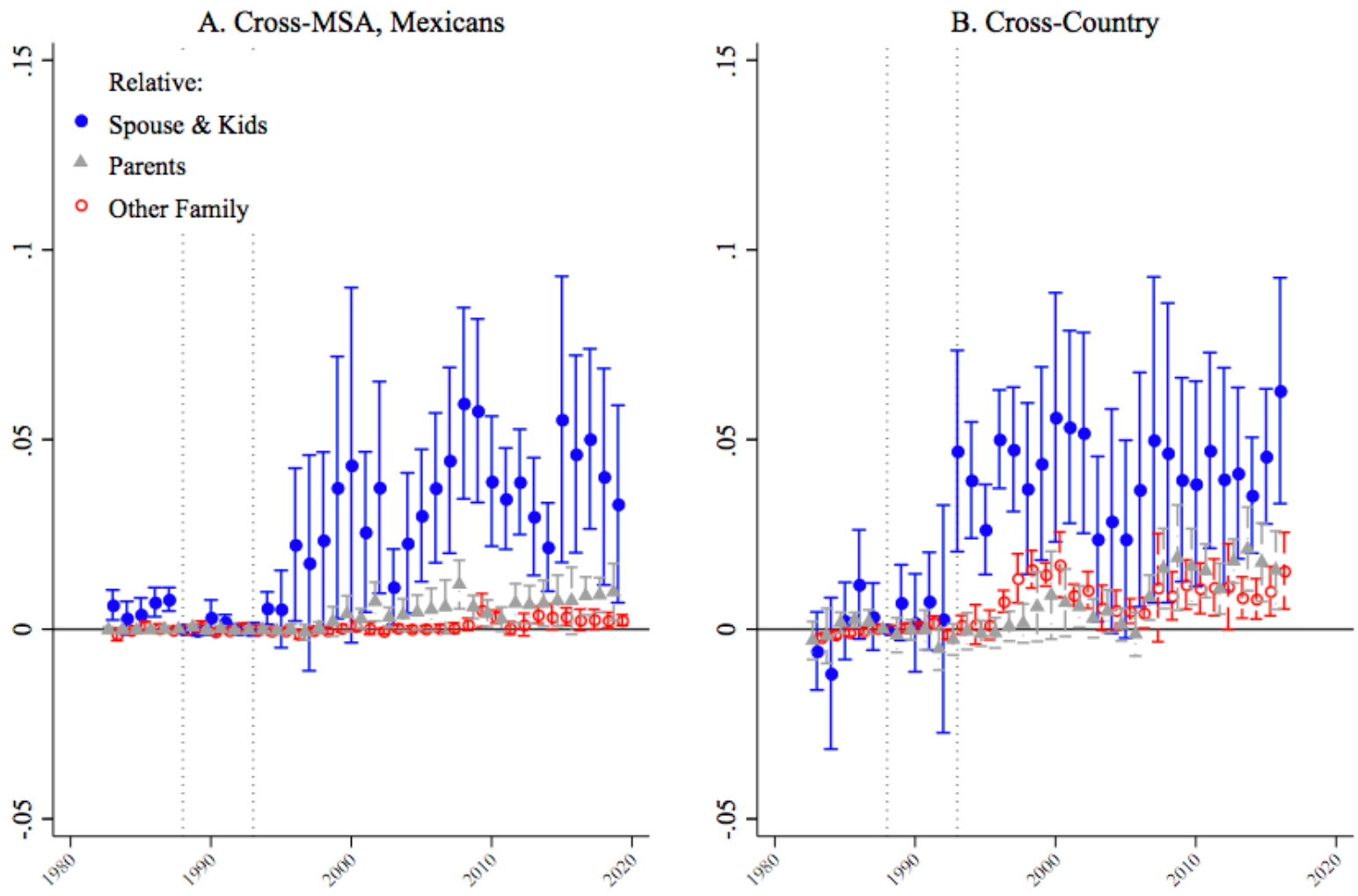
Figure A1. Cross-MSA Relationship between Mexican Family Admissions and Mexican Legalization Ratio, by Year



Sources: See Table 1 Panel A source notes for legalization ratio. Data for overall family admissions from *Immigrants Admitted to the United States* (FY 1983-2004) and https://www.dhs.gov/immigration-statistics/readingroom/LPR/LPRcounty (FY 2007-2019). Admissions for FY 2005 and 2006 are linearly interpolated. See Appendix A.

Notes: Thumbnail graphs are scatterplots between overall family admissions (y-axis) and the residual legalization ratio (x-axis). Residuals are from a regression of the legalization ratio on state fixed effects, to match our baseline specification. The slopes of the lines plotted thus match the points plotted for all family admissions in Figure 4 Panel A.

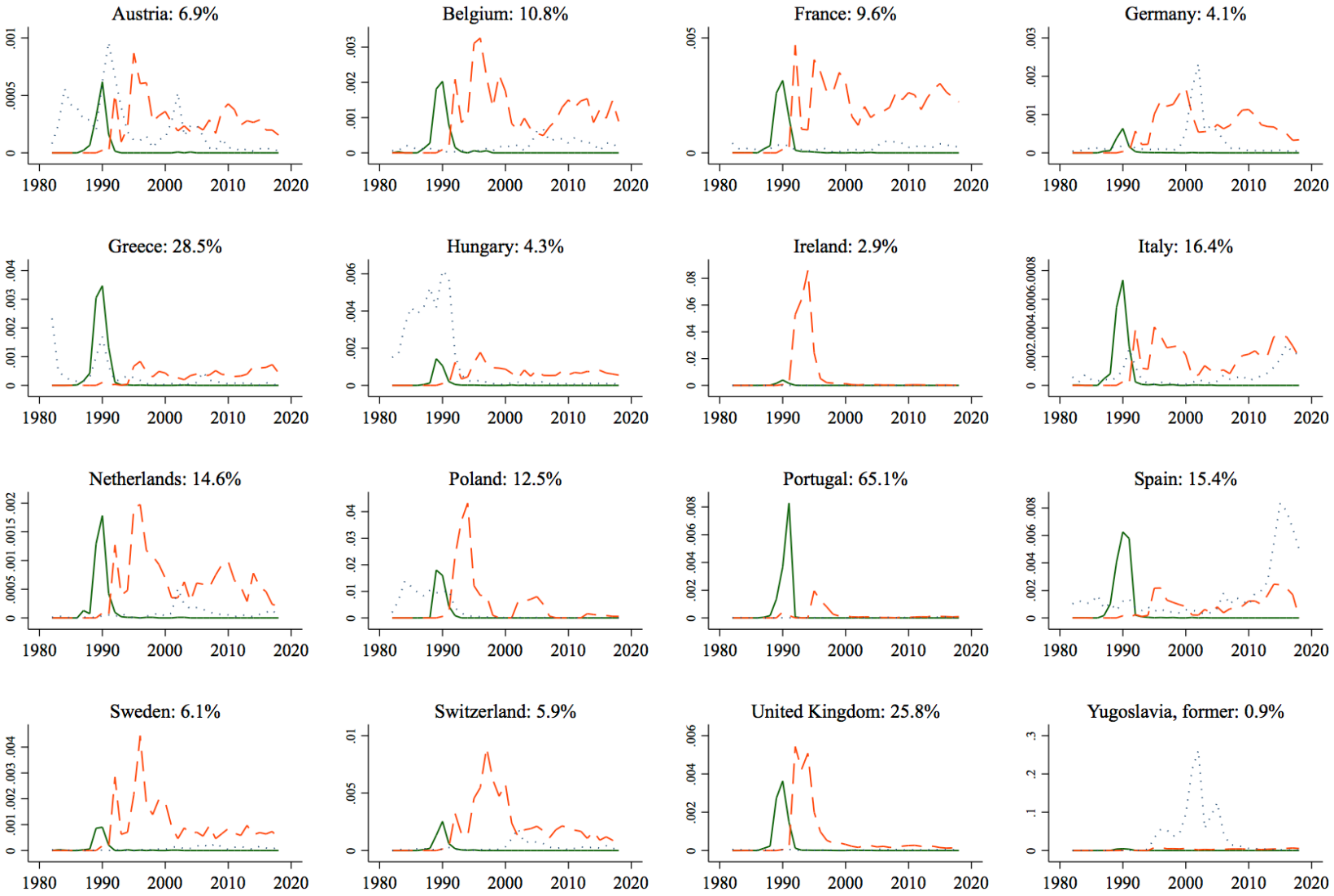
Figure A2. Response to IRCA Legalizations, by Family Relationship



Sources: See Table 1 Panel A source notes for legalization ratio. Data on admissions by relative type are from *Immigrants Admitted to the United States* (FY 1983-2004) and https://www.dhs.gov/immigration-statistics/readingroom/LPR/LPRcounty for metro areas (FY 2007-2019) and https://www.dhs.gov/immigration-statistics/readingroom/LPR/LPR-by-major-class-and-country for countries (for FY 2005-2016). Admissions for FY 2005 and 2006 are linearly interpolated in the metro area analysis.

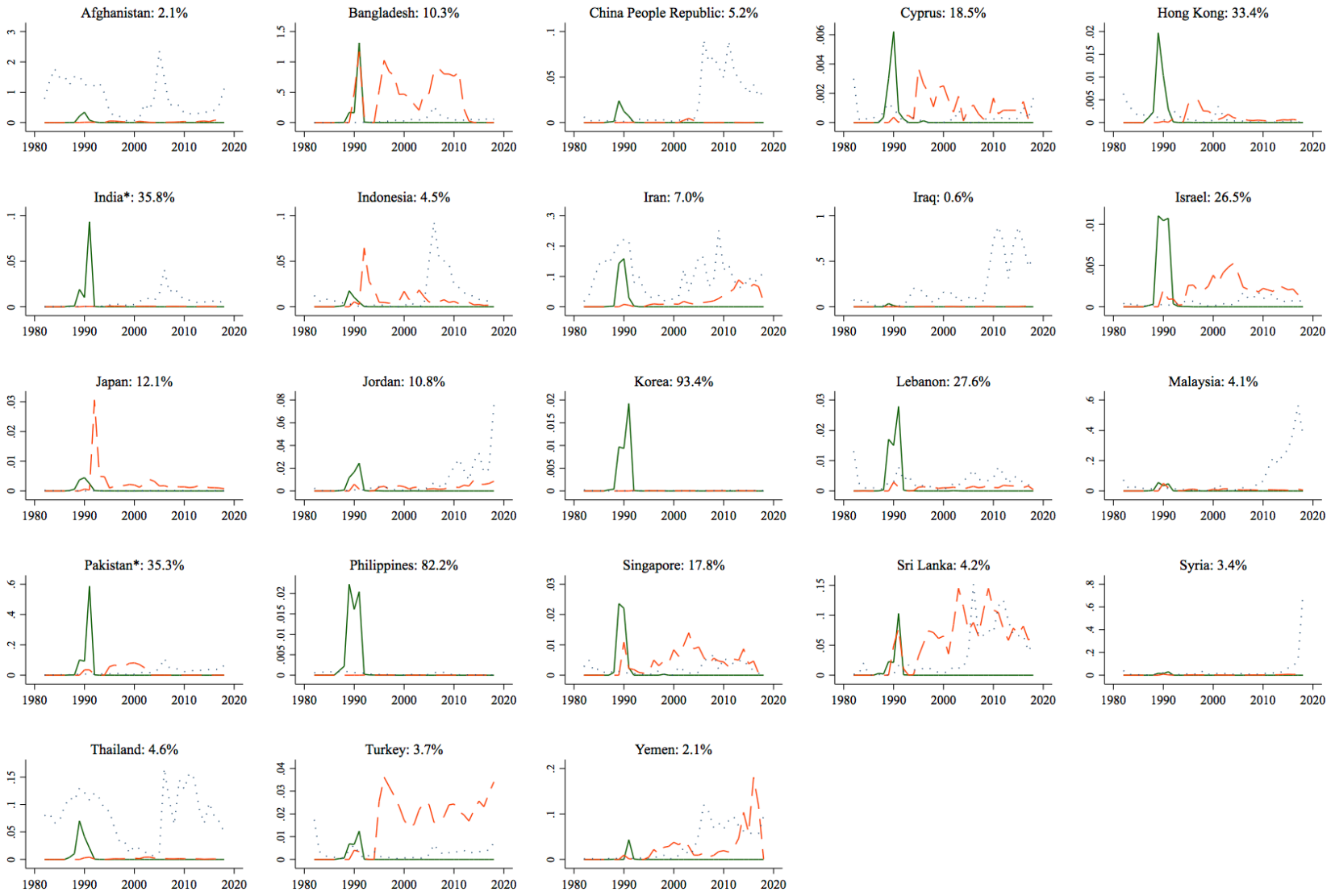
Notes: Panel A plots coefficients (with 90% confidence intervals) on the Mexican legalization ratio interacted with year dummies from a regression that also includes metro area and year-by-state fixed effects; the interaction between the legalization ratio and the dummy for 1988 is omitted. Estimation sample includes the 66 metro areas listed in Table A2. Regressions give each metro area equal weight, and standard errors are clustered on metro area. Panel B plots coefficients (with 90% confidence intervals) on the legalization ratio interacted with year dummies from a regression that also includes country and year-by-world region fixed effects; the interaction between the legalization ratio and the dummy for 1988 is omitted. Estimation sample includes the 29 countries listed in Table A8. Regressions give each country equal weight, and standard errors are clustered on country.

Figure A3a. Europe. IRCA Legalizations, Diversity, Refugees (w/IRCA's %)



Sources: Legalization Applications Processing System (LAPS) for IRCA legalizations and *Immigrants Admitted to the United States* (FY 1983-2004) and *Yearbook of Immigration Statistics* (FY 2005-2019) for remaining variables. See Appendix A.
Notes: Solid green = IRCA legalizations, dashed orange = diversity visas, dotted blue = refugees, per 1980 legal immigrant of that origin. *Country in sample.

Figure A3b. Asia. IRCA Legalizations, Diversity, Refugees (w/IRCA's %)

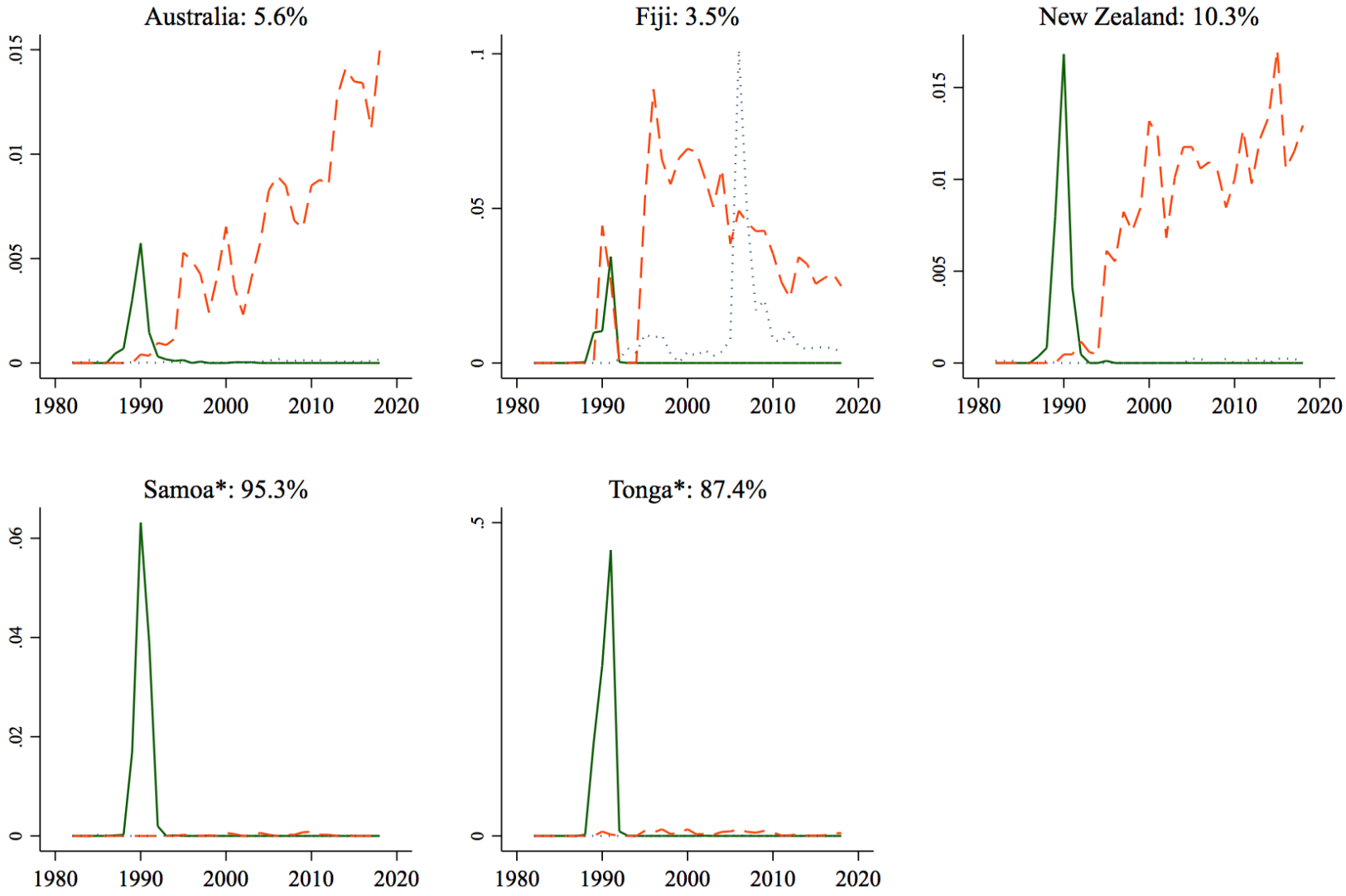


Sources: See Figure A3a.
Notes: Solid green = IRCA legalizations, dashed orange = diversity visas, dotted blue = refugees, per 1980 legal immigrant of that origin. *Country in sample.

Figure A3c. Africa. IRCA Legalizations, Diversity, Refugees (w/IRCA's %)

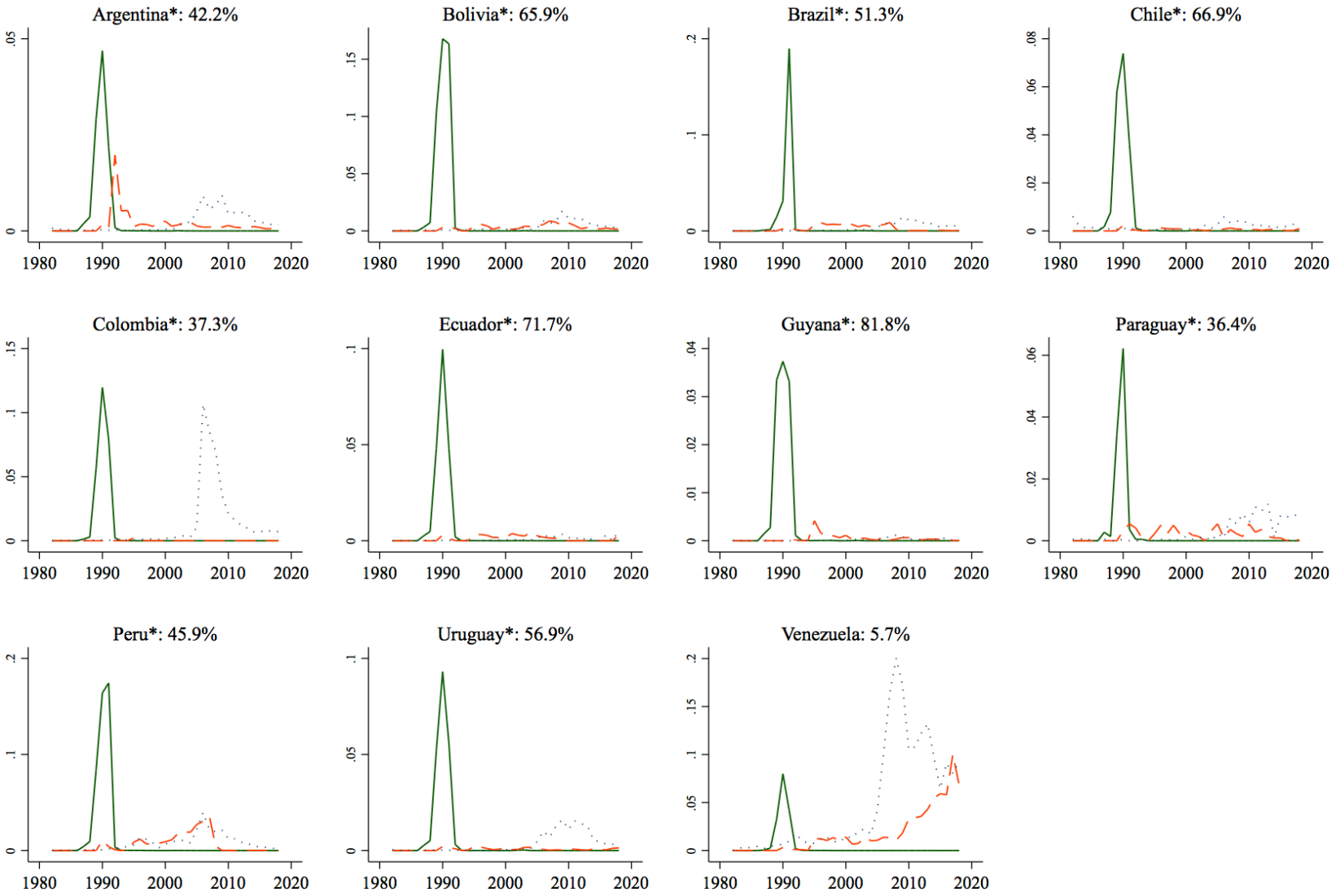
Sources: See Figure A3a.
Notes: Solid green = IRCA legalizations, dashed orange = diversity visas, dotted blue = refugees, per 1980 legal immigrant of that origin. *Country in sample.

Figure A3d. Oceania. IRCA Legalizations, Diversity, Refugees (w/IRCA's %)



Sources: See Figure A3a.
Notes: Solid green = IRCA legalizations, dashed orange = diversity visas, dotted blue = refugees, per 1980 legal immigrant of that origin. *Country in sample.

Figure A3f. South America. IRCA Legalizations, Diversity, Refugees (w/IRCA's %)



Sources: See Figure A3a.
Notes: Solid green = IRCA legalizations, dashed orange = diversity visas, dotted blue = refugees, per 1980 legal immigrant of that origin. *Country in sample.

Table A1. Summary of Data Sources

Type of Data and Source	Variable Description	Years covered	Analysis	Imputations
Legal Admissions to the U.S.				
Immigrants Admitted to the United States	Immigrant admissions	FY1983 - 2004	Metro, Country	
DHS statistics tables	LPR by State, County, Country of Birth, and Major Class of Admission (Top 200 Counties)	FY2007 - 2019	Metro	Interpolate 2005-6 combined w/previous
DHS statistics tables	LPRs by Citizenship and Major Classes of Admission	FY2005 - 2016	Country	
Yearbook of Immigration Statistics	Immigrant admissions (Figure 1)	FY1940 - 2019	TS	
Legalized under IRCA				
Legalization Application Processing System data (LAPS)	IRCA applicant information	FY1988 - 1992	Metro, Country, TS	
Immigrants Admitted to the United States	Cuban-Haitian programs and pre-1972 arrivals	FY1988 - 1992	Metro, Country	
Rytina (2002)	Legal status of IRCA applicants	FY1989 - 2002	TS	
Stock of all Legal U.S. Residents in 1980				
Alien Address Reports (INS)	Legalized immigrant population data (used in legalization ratio estimation)	1980	Metro, Country	
5% Public Use 1980 Decennial Census	Naturalized immigrant population	1980	Metro, Country	
Legal and unauthorized arrivals				
Decennial Census	Total Immigrant arrivals (authorized and not)	1990, 2000	Metro, Country	Extrapolation to recent arrivals bins by year
American Community Survey	Total immigrant arrivals (authorized and not)	2006 - 2019	Metro, Country	"
Controls				
Public Use Decennial Census / American Community Survey	Bartik-style predicted Mexican employment growth	1980 - 2019 (Based on 1980)	Metro	
Tabulations of 20% count 1980 Decennial Census	Mexicans/Population	1980	Metro	
County Business Patterns	Employment growth 1983-1987	1983 - 1987	Metro	
Public Use 2000 Decennial Census	Share Naturalized among 1971-1986 arrivcals	2000, for 1971-1986 arrivals	Country	
Penn World Tables	Real exchange rate, growth in origin country population	1987 - 2018	Country	
UN World Development Indicators	Upper income country		Country	

Notes: TS = Used in time series shown in some figures). See Appendix A text for further description of these sources.

Table A2. Treatment Variation and Characteristics of Mexicans: All Metro Areas, by State

State and Metro Area	**Treatment:** Legalization Ratio: (2)/(3)	Number Legalized by IRCA	Existing Legal Immi-grants, 1980	% of IRCA Legalizations	Characteristics Mexicans/Pop, %, 1980	Characteristics Emp Growth, %, 1980-87
	(1)	(2)	(3)	(4)	(5)	(6)
Arizona						
Phoenix-Mesa, AZ	0.78	18,248	23,519	0.90	1.81	44.5
Tucson, AZ	0.53	8,618	16,109	0.43	3.00	36.7
Yuma, AZ	0.98	9,737	9,929	0.48	12.11	36.7
California						
Bakersfield, CA	1.47	24,485	16,682	1.21	5.19	17.7
Los Angeles-Long Beach, CA	1.70	560,289	329,865	27.75	9.33	11.4
Merced, CA	2.02	12,593	6,228	0.62	7.83	20.4
Modesto, CA	1.35	12,423	9,183	0.62	4.35	27.1
Oakland, CA	0.44	10,142	23,232	0.50	1.69	28.4
Orange County, CA	2.68	108,593	40,546	5.38	4.50	35.2
Riverside-San Bernardino, CA	0.95	44,102	46,329	2.18	3.39	47.3
Sacramento, CA	0.28	2,725	9,862	0.13	1.10	40.0
Salinas, CA	1.35	21,841	16,171	1.08	8.87	19.9
San Diego, CA	1.22	83,744	68,912	4.15	4.67	37.9
San Francisco, CA	0.34	6,343	18,543	0.31	1.76	9.3
San Jose, CA	1.11	30,462	27,426	1.51	2.78	20.9
Santa Barbara-Santa Maria-Lompoc, CA	1.84	19,538	10,642	0.97	4.36	21.0
Santa Rosa, CA	3.13	8,362	2,675	0.41	1.43	46.1
Stockton-Lodi, CA	1.18	15,402	13,083	0.76	3.97	29.0
Vallejo-Fairfield-Napa, CA	0.71	3,130	4,426	0.16	1.68	38.8
Ventura, CA	0.91	25,347	27,948	1.26	6.55	50.8
Visalia-Tulare-Porterville, CA	2.04	25,424	12,467	1.26	7.60	14.4
Yolo, CA	0.69	3,148	4,558	0.16	4.39	52.2
Colorado						
Colorado Springs, CO	0.60	197	326	0.01	0.14	44.9
Denver, CO	0.34	2,105	6,215	0.10	0.67	11.7

Table A2. Treatment Variation and Characteristics of Mexicans: All Metro Areas, by State (continued)

Region and Country	**Treatment:** Legalization Ratio: (2)/(3)	Number Legalized by IRCA	Existing Legal Immi-grants, 1980	% of IRCA Legalizations	Characteristics Mexican Pop %, 1980	Characteristics Emp Growth, %, 1980-87
	(1)	(2)	(3)	(4)	(5)	(6)
Connecticut						
New Haven, CT	0.69	233	338	0.01	0.03	15.8
Florida						
Fort Lauderdale, FL	3.38	1,462	432	0.07	0.05	30.6
Fort Myers-Cape Coral, FL	6.94	1,958	282	0.10	0.15	56.5
Fort Pierce-Port St. Lucie, FL	5.72	898	157	0.04	0.51	65.0
Lakeland-Winter Haven, FL	8.41	4,162	495	0.21	0.19	16.4
Melbourne, FL	0.34	70	208	0.00	0.03	47.1
Naples, FL	4.37	5,428	1,241	0.27	1.32	66.8
Orlando, FL	0.47	423	909	0.02	0.19	63.5
Sarasota-Bradenton, FL	3.55	1,286	362	0.06	0.15	46.6
Tampa-St. Petersburg, FL	1.43	1,820	1,272	0.09	0.08	44.5
West Palm Beach, FL	3.81	4,103	1,077	0.20	0.12	58.3
Hawaii						
Honolulu, HI	0.27	126	472	0.01	0.08	12.7
Illinois						
Chicago, IL	0.20	20,695	101,396	1.03	2.23	2.8
Massachusetts						
Boston, MA	0.11	95	854	0.00	0.02	22.0
Springfield, MA	0.30	8	25	0.00	0.02	9.8
Nevada						
Reno, NV	5.00	3,377	676	0.17	0.71	20.3

Table A2. Treatment Variation and Characteristics of Mexicans: All Metro Areas, by State (continued)

Region and Country	**Treatment:** Legalization Ratio: (2)/(3)	Number Legalized by IRCA	Existing Legal Immi-grants, 1980	% of IRCA Legalizations	Characteristics: Mexican Pop %, 1980	Characteristics: Emp Growth, %, 1980-87
	(1)	(2)	(3)	(4)	(5)	(6)
New Jersey						
Bergen-Passaic, NJ	1.04	654	629	0.03	0.08	17.7
Jersey City, NJ	1.03	331	320	0.02	0.06	10.6
Middlesex-Somerset, NJ	1.03	192	187	0.01	0.04	35.8
Monmouth-Ocean, NJ	2.72	300	110	0.01	0.02	45.4
Newark, NJ	0.22	89	406	0.00	0.03	13.6
New York						
Buffalo-Niagara Falls, NY	0.15	31	207	0.00	0.02	-0.8
Nassau-Suffolk, NY	0.45	343	758	0.02	0.03	31.7
New York, NY	0.32	1,729	5,400	0.09	0.10	9.0
Oregon						
Portland, OR	1.22	1,911	1,572	0.09	0.20	6.1
Pennsylvania						
Allentown, PA	0.27	37	139	0.00	0.02	3.0
Lancaster, PA	1.03	65	63	0.00	0.03	17.7
Philadelphia, PA	0.39	380	969	0.02	0.03	15.0
Texas						
Brazoria, TX	0.91	2,315	2,555	0.11	1.87	-14.4
Brownsville, TX	0.34	12,909	37,900	0.64	16.70	9.5
El Paso, TX	0.33	27,884	84,284	1.38	17.31	11.5
Houston, TX	0.42	28,352	67,082	1.40	3.29	-0.4
Laredo, TX	0.18	4,569	25,867	0.23	18.83	4.2
McAllen, TX	0.43	24,858	57,874	1.23	18.01	27.7

Table A2. Treatment Variation and Characteristics of Mexicans: All Metro Areas, by State (continued)

Region and Country	**Treatment:** Legalization Ratio: (2)/(3)	Number Legalized by IRCA	Existing Legal Immi-grants, 1980	% of IRCA Legalizations	Characteristics Mexican Pop %, 1980	Characteristics Emp Growth, %, 1980-87
	(1)	(2)	(3)	(4)	(5)	(6)
Texas (continued)						
San Antonio, TX	0.35	16,835	48,547	0.83	4.62	27.4
Utah						
Provo-Orem, UT	2.17	721	332	0.04	0.32	3.9
Salt Lake City-Ogden, UT	0.46	782	1719	0.04	0.28	14.7
Washington						
Seattle-Bellevue-Everett, WA	0.86	1,169	1367	0.06	0.10	19.3
Tacoma, WA	1.64	498	304	0.02	0.10	17.5
Wisconsin						
Madison, WI	0.73	119	164	0.01	0.09	21.9

Sources: Columns 2 and 4: Legalization Applications Processing System (LAPS) (for the SAW program and the GLP) and *Immigrants Admitted to the United States* (FY 1987-2004) (for two smaller IRCA programs). Column 3: *Alien Address Reports, [United States], 1980 Public Use File* (for LPRs) and 1980 Census PUMS (Ruggles et al., 2020) (for citizens). Column 5: 1980 Census tabulations (Manson et al., 2020). Column 6: County Business Patterns. See Appendix A text.

Table A3. Descriptive Statistics of Key Variables

	Metro Area	Country		Metro Area	Country
	(1)	(2)		(3)	(4)
1. Treatment			*Other Major Categories (Continued)*		
Legalization Ratio	1.406	0.525	Refugees	0.001	0.004
Ratio (treatment)	(1.643)	(0.681)		(0.004)	(0.013)
			Diversity	0.000	0.002
2. Mexican Legal Admissions (all per 1980 Mexican Citizens+Permanent Residents)				(0.000)	(0.007)
Overall Family Sponsored	0.156	0.146	3. Controls		
	(0.177)	(0.106)	Mexicans/Population, 1980	0.029	
By Family Sponsorship Type				(0.046)	
Green-Card Sponsored	0.039	0.031	Mexicans Admitted, 1983-87	3.845	
	(0.061)	(0.037)	/Legal Mexicans, 1980	(9.331)	
Citizen-Sponsored	0.117	0.114	Employment Growth, 1980-87	0.258	
	(0.139)	(0.091)		(0.179)	
By Relative Type			Mex Emp Growth, 1980-2019	5.452	
Spouses and Kids[a]	0.125	0.099	predicted from 1980 Occ Mix	(8.824)	
	(0.143)	(0.069)	Admissions 1983-87/1980		0.980
Parents	0.022	0.017	Legal Immigrants		(0.571)
	(0.035)	(0.018)	Upper Income Country		0.310
Other ("Chain" Migrants)	0.008	0.029			(0.463)
	(0.011)	(0.033)	Real Exchange Rate		2.367
Other Major Categories					(3.666)
Employer Sponsored	0.018	0.022	Origin Country Population		0.944
	(0.051)	(0.035)	/1K Legal Imms, 1980		(1.929)
Observations (cells)	2,310	986		2,310	986
Countries[b]	Mexico Only	29		Mexico Only	29
Metro Areas	66	(national)		66	(national)
Years	37	34		37	34

Notes: Table shows mean of referenced variable, with standard deviation in parentheses underneath. Year range: columns 1 and 3: 1983-2019; columns 2 and 4: 1983-2016.

[a] Sum of citizen-sponsored spouses and minor children and Green Card-sponsored spouses and unmarried children.

[b] In Panel 3, only 27 of the 29 total countries have the controls available.

Table A4. Cross-Metro Area Treatment Variation, Additional Correlates

Panel A. Top MSAs on Mexican Legalization Ratio

	Metro Area	Legalization Ratio	% Legalized Under SAW	% of Apps Accepted
		(1)	(2)	(3)
1	Lakeland-Winter Haven, FL	8.4	86.8	93.0
2	Fort Myers-Cape Coral, FL	6.9	88.4	94.1
3	Fort Pierce-Port St. Lucie, FL	5.7	93.0	94.3
4	Reno, NV	5.0	45.5	84.3
5	Naples, FL	4.4	91.0	95.5
6	West Palm Beach-Boca Raton, FL	3.8	81.9	93.1
7	Sarasota-Bradenton, FL	3.6	87.1	95.4
8	Fort Lauderdale, FL	3.4	67.0	89.9
9	Santa Rosa, CA	3.1	73.8	91.4
10	Monmouth-Ocean, NJ	2.7	66.4	79.3
16	Los Angeles-Long Beach, CA	1.7	21.7	87.0

Panel B. Correlations with the Legalization Ratio

Characteristic	Mean	Regressions on Leg. Ratio	
	(1)	(2)	(3)
% Legalized under SAW	58.61	5.714	2.691
		(1.202)	(1.172)
% of Applications Accepted.	85.70	1.506	0.188
		(0.335)	(0.248)
State Effects?		No	Yes

Sources: Panel A column 1 numerator: Legalization Applications Processing System (LAPS) (for the SAW program and the GLP) and *Immigrants Admitted to the United States* (FY 1987-2004) (for two smaller IRCA programs). Panel A column 1 denominator: *Alien Address Reports, [United States], 1980 Public Use File* (for LPRs) and 1980 Census PUMS (Ruggles et al., 2020) (for citizens). Panel A columns 2 and 3 and Panel B: LAPS microdata.

Notes: Unit of observation is a metro area. The legalization ratio in Panel A gives the number of Mexican immigrants granted permanent residence by IRCA who listed that metro area as their intended residence, divided by the number of Mexican citizens and LPRs in that metro area in 1980. Columns 2 and 3 of Panel B show the coefficient from a regression of the variable listed on the legalization ratio; the regression in column 3 also includes dummies for the state in which the majority of the metro area's population resided in 1986.

Table A5. Long-Run Response to IRCA Legalizations by Arrival Mode

	All Arrivals[b]	Overall Admissions	Other Arrivals, (1) – (2)
	(1)	(2)	(3)
A. Across Metropolitan Areas (Mexico only)			
Cumulative Response	1.23	1.04	0.20
	(0.98)	(0.32)	(0.82)
MSAs	63	63	63
Controls			
State x Year?	Yes	Yes	Yes
Other Controls?[a]	Yes	Yes	Yes
A. Across Countries			
Cumulative Response	1.24	1.80	-0.57
	(1.00)	(0.67)	(1.14)
Countries	29	29	29
Controls			
Region x Year?	Yes	Yes	Yes

Sources: See Table 1 Panel A source notes for legalization ratio and for the other controls in the metro area analysis (Panel A). Sources for other controls in the country analysis (Panel B) are in Appendix A. Data on all arrivals (column 1) are from the 1990 and 2000 Census and 2016-19 ACS (Ruggles et al., 2020) and are linearly adjusted for years in the U.S. as described in Appendix A. Data on overall admissions (column 2) are from *Immigrants Admitted to the United States* (FY 1983-2004) for both metro areas (Panel A) and countries (Panel B) and https://www.dhs.gov/immigration-statistics/readingroom/LPR/LPRcounty for metro areas (FY 2007-2019) and https://www.dhs.gov/immigration-statistics/readingroom/LPR/LPR-by-major-class-and-country for countries (for FY 2005-2016). Admissions for FY 2005 and 2006 are linearly interpolated in the metro area analysis.

Notes: The cross-section unit of observation is metro area (Mexicans only) in Panel A and country in Panel B. Underlying regressions in Panel A include metro area fixed effects, state-by-arrival year bin fixed effects, and interactions between the legalization ratio ($lpr_{c,IRCA}/legal_{c,1980}$) and arrival year bin indicators. Underlying regressions in Panel B include country fixed effects, world region-by-arrival year bin fixed effects, and interactions between the legalization ratio and arrival year bin indicators. Arrival bins are 1982-84, 1985-86, 1987-89, and five-year intervals thereafter (except for the last bin, 2015-2018), to accommodate reporting of arrival year in the 1990 Census; interactions with 1987-89 are omitted to identify the model. Table entries report the sum of the post-1987-89 interaction coefficients for the variable listed (divided by $legal_{c,1980}$) Regressions in Panel A are based on data for 66 metro areas across 36 years (1983-2018); regressions in Panel B are based on for 29 countries across 32 years (1983-2016). Standard errors in the underlying regressions are clustered on metro area (Panel A) or country (Panel B), and standard errors in parentheses are calculated using the delta method.
[a] Interactions between arrival year bin dummies and the variables listed in Table 1 Panel B.

Table A6. Impact of Mexican IRCA Legalizations by IRCA Program

Panel A: Balance Test

	SAW	GLP + Other	P-value on joint sig.
	(1)	(2)	(3)
Mexicans/Population, 1980	0.00	-0.01	0.579
	(0.00)	(0.02)	
Mexicans Admitted, 1983-87	0.57	1.07	0.384
/Legal Mexicans, 1980	(0.58)	(1.48)	
Employment Growth, 1980-87	0.00	-0.10	0.517
	(0.03)	(0.09)	
Mex Emp Growth, 1980-2019	0.06	2.61	0.649
predicted from 1980 Occ Mix	(0.75)	(2.81)	

Panel B: Long-Run Responses

	SAW	GL+Other	P-value on difference
	(1)	(2)	(3)
Overall Family Sponsored	1.06	0.85	0.856
	(0.30)	(1.03)	
By Family Sponsorship Type			
Green-Card Sponsored	0.57	0.01	0.046
	(0.11)	(0.25)	
Citizen-Sponsored	0.49	0.84	0.712
	(0.22)	(0.83)	
By Relative Type			
Spouses and Kids[a]	0.90	0.72	0.846
	(0.24)	(0.84)	
Parents	0.11	0.19	0.700
	(0.06)	(0.17)	
Other ("Chain" Migrants)	0.05	-0.06	0.138
	(0.02)	(0.06)	
Other Major Categories			
Employer Sponsored	-0.09	0.80	0.258
	(0.14)	(0.67)	
Refugees	-0.01	0.05	0.381
	(0.02)	(0.06)	
Diversity	0.00	0.00	0.273
	(0.00)	(0.00)	

Sources: See notes to Table 1 for Panel A sources. Data on admissions by type (Panel B) from *Immigrants Admitted to the United States* (FY 1983-2004) and https://www.dhs.gov/immigration-statistics/readingroom/LPR/LPRcounty (FY 2007-2019). Admissions for FY 2005 and 2006 are linearly interpolated. See Appendix A.

Notes: Panel A shows coefficients and standard errors from a regression of the variable listed on the number of Mexican-born immigrants legalized under IRCA's SAW program (column 1) and under other IRCA legalization programs (column 2), each divided by $legal_{c,1980}$. Panel B gives the sum of post-1988 coefficients on the same two SAW and GLP variables interacted with dummies for year from a regression that also includes controls for metro area and state x year fixed effects. Standard errors in these regressions are clustered on metro area, and standard errors in parentheses are calculated using the delta method.

[a] Citizen-sponsored spouses and minor kids + Green Card-sponsored spouses and unmarried kids.

Table A7. Cross-Country Treatment Variation

Panel A. Top Countries on Legalization Ratio

	Country	Legalization Ratio: (2)/(3)	Legalized by IRCA	Legal Immigrants, 1980	% of all Legalizations
		(1)	(2)	(3)	(4)
4	**Mexico**	**1.30**	**2,019,353**	**1,548,438**	72.2
	Other 28 countries in sample		*512,056*	*1,156,230*	18.3
1	**El Salvador**	3.17	151,880	47,913	5.4
2	Haiti	1.95	88,284	45,209	3.2
3	**Guatemala**	1.64	63,663	38,742	2.3
5	**Tonga**	0.89	3,186	3,593	0.1
6	Pakistan	0.79	17,009	21,654	0.6
7	**Belize**	0.66	6,035	9,155	0.2
8	**Honduras**	0.51	16,055	31,422	0.6
9	**Bolivia**	0.45	4,337	9,666	0.2
10	Peru	0.44	18,264	41,522	0.7

Panel B. Balance Test: Correlates of the Legalization Ratio

	Characteristic	Mean	Regressed on Leg. Ratio		Reverse
		(1)	(2)	(3)	(4)
(a)	<60% of 1971-1986 Arrivals Naturalized by 2000	0.483	0.190	0.202	
			(0.108)	(0.120)	
(b)	Admissions 1983-87/ 1980 Legal Immigrants	0.980	0.126	0.0162	-0.0428
			(0.102)	(0.127)	(0.231)
(c)	Upper Income Country	0.310	-0.137	-0.143	-0.337
			(0.0783)	(0.0874)	(0.264)
(d)	Missing Country Controls (in (e) and (f))	0.0690	-0.00315	0.00412	
			(0.0428)	(0.0325)	
(e)	Δln(Real Exchange Rate), 1987-2018	2.930	-0.874	0.238	0.0085
			(0.554)	(0.357)	(0.0200)
(f)	Δ Country Pop, 1987-2018 /1K Legal Imms, 1980	0.537	-0.0828	0.0811	0.127
			(0.166)	(0.0689)	(0.117)
	Dummy Controls:				
	North and South America		No	Yes	Yes
	F-stat				0.934

Sources: Panel A columns 2 and 4: Legalization Applications Processing System (LAPS) (for the SAW program and the GLP) and *Immigrants Admitted to the United States* (FY 1987-2004) (for two smaller IRVA programs). Panel A column 3: *Alien Address Reports, [United States], 1980 Public Use File* (for LPRs) and 1980 Census PUMS (Ruggles et al., 2020) (for citizens). Panel B row a: 2000 Census PUMS (Ruggles et al, 2020). (Countries that fit this criterion appear in **bold** in panel A.) Panel B row b: *Immigrants Admitted to the United States*, FY 1983-87 (numerator) and Panel A column 3 sources (denominator). Panel B row c: UN World Development Indicators. Panel B rows d, e, and f: Penn World Tables 10.0 (Feenstra et al., 2018). See Appendix A.
Notes: Unit of observation is an origin country. The legalization ratio in Panel A gives the number of immigrants from the country granted permanent residence by IRCA, divided by the number of citizens and LPRs from that country in 1980. Columns 2 and 3 of Panel B show the coefficient from a regression of the variable listed on the legalization ratio; the regression in column 3 also includes dummies for world region. Column 4 of Panel B shows the slope coefficients from a multivariate regression of the legalization ratio on the variables listed plus world region dummies; the F-stat is on the joint significance of the variables listed.

Table A8. Treatment Variation and Characteristics: All Countries, by Region

Region and Country	**Treatment:** Legalization Ratio: (2)/(3)	Number Legalized by IRCA	Existing Legal Immi-grants, 1980	% of IRCA Legalizations	Characteristics: Estimated % naturalized	Characteristics: Upper Income Country?
	(1)	(2)	(3)	(4)	(5)	(6)
1. Europe						
(none)						
2. Asia						
India	0.13	20,906	167,896	0.75	72.59	0
Pakistan	0.79	17,009	21,654	0.61	75.57	0
3. Africa						
(none)						
4. Pacific						
Samoa	0.12	994	8,186	0.04	65.46	0
Tonga	0.89	3,186	3,593	0.11	45.79	0
5. North America and Caribbean						
Antigua and Barbuda	0.26	1,268	4,808	0.05	68.34	1
The Bahamas	0.27	2,897	10,712	0.10	48.42	0
Belize	0.66	6,035	9,155	0.22	57.39	0
Costa Rica	0.14	3,363	23,882	0.12	59.08	1
Dominican Republic	0.14	23,982	169,257	0.86	50.33	0
El Salvador	3.17	151,880	47,913	5.43	41.14	0
Grenada	0.17	921	5,300	0.03	70.43	1
Guatemala	1.64	63,663	38,742	2.28	41.89	0
Haiti	1.95	88,284	45,209	3.16	59.83	0
Honduras	0.51	16,055	31,422	0.57	48.83	0
Jamaica	0.11	17,257	158,284	0.62	66.51	0
Mexico	1.30	2,019,353	1,548,438	72.20	35.61	1

Table A8. Treatment Variation and Characteristics: All Countries, by Region (continued)

Region and Country	**Treatment:** Legalization Ratio: (2)/(3)	Number Legalized by IRCA	Existing Legal Immi-grants, 1980	% of IRCA Legalizations	Characteristics Estimated % naturalized	Characteristics Upper Income Country?
	(1)	(2)	(3)	(4)	(5)	(6)
5. North America and Caribbean (cont'd)						
St. Kitts and Nevis	0.18	629	3,554	0.02	61.81	0
St. Lucia	0.27	619	2,309	0.02	67.65	1
St. Vincent & Grenadines	0.22	716	3,219	0.03	67.61	0
6. South America						
Argentina	0.10	5,619	53,804	0.20	60.27	1
Bolivia	0.45	4,337	9,666	0.16	57.83	0
Brazil	0.24	6,956	29,027	0.25	46.87	1
Chile	0.18	4,647	25,891	0.17	57.91	1
Colombia	0.26	30,941	118,215	1.11	61.44	0
Ecuador	0.21	15,274	74,392	0.55	52.26	0
Guyana	0.11	3,990	36,391	0.14	76.84	0
Paraguay	0.11	230	2,188	0.01	54.53	0
Peru	0.44	18,264	41,522	0.65	59.73	0
Uruguay	0.21	2,134	10,039	0.08	63.44	1

Sources: Columns 2 and 4: Legalization Applications Processing System (LAPS) (for the SAW program and the GLP) and *Immigrants Admitted to the United States* (FY 1987-2004) (for two smaller IRCA programs). Column 3: *Alien Address Reports, [United States], 1980 Public Use File* (for LPRs) and 1980 Census PUMS (Ruggles et al., 2020) (for citizens). Column 5: 2000 Census PUMS (Ruggles et al., 2020). Column 6: United Nations World Development Indicators. See Appendix A text.
Notes: The naturalization rate is the percent of 1971-86 arrivals how were citizens as of the 2000 Census.

Appendix B: Derivation of the Main Estimation Equation

As discussed, our empirical approach exploits variation in the timing of IRCA and variation across metropolitan areas in the intensity of IRCA as a legalization shock. To understand the specifications we ultimately estimate, it is helpful to outline a stylized model.

I. Baseline model

Let a_{cst} represent immigrants from Mexico admitted (with a Green Card) to metro area c in state s in year t.[1] We begin by modeling a_{cst} as a function of a metro area fixed effect, $\tilde{\delta}_c$, with deviations subsequent to IRCA (after 1988) proportional to the number of IRCA Green Cards issued to Mexicans in c, $lpr_{c,IRCA}$. That is,

$$a_{cst} = \tilde{\delta}_c + \sum_{\tau>1988} \theta_\tau D_t^\tau lpr_{c,IRCA} + u_{cst}, \quad \text{(B.0)}$$

where the D_t^τ represent an exhaustive set of indicator variables for all years after 1988 and u_{cst} is an error term, capturing other area-by-time varying determinants of Mexican admissions, including various "push" and "pull" factors. The coefficients of interest are the θ_τ's. With annual data, for example, θ_{2000} would be the difference in Mexican admissions to c between 1988 and 2000, on average, for every Mexican IRCA Green Card recipient in c.

II. Modifications

While this model is intuitively appealing, we think it necessary to modify in several ways to produce credible estimates of the θ_τ's.

A. Modification 1: Other Sources of Sponsorship

First, IRCA Green Card holders were not the only immigrants capable of sponsoring new LPRs through family linkages in the 1990s and beyond; pre-existing LPRs and citizens were capable of sponsoring family members as well. Though it may not be the case either that these

[1] a_{cst} could also be immigrants from country c admitted in year t, where country c is within world region s.

other legal immigrants accelerated their sponsorship in the 1990s, or that these stocks of other legal immigrants are even all that correlated with $lpr_{c,IRCA}$, let's allow for this possibility:

(B.1) $$a_{cst} = \widetilde{\delta_c} + \sum_{\tau>1988}\left(\theta_\tau D_t^\tau lpr_{c,IRCA} + \gamma_\tau D_t^\tau legal_{c,1988}\right) + \tilde{e}_{cst},$$

where $legal_{c,1988}$ represents the stock of LPRs and citizens (combined) from country *c* in 1988. Model (B.1) thus adjusts $lpr_{c,IRCA}$ and a_{cst} for other ways in which a_{cst} may change over time.

B. Modification 2: Scaling

Even with modification 1, the model is susceptible to influence from outliers due to regional concentrations of immigrants (e.g., areas, like Los Angeles, with large numbers of admissions). Our second modification therefore scales (B.1) by $legal_{c,1988}$:

(B.2) $$\frac{a_{ct}}{legal_{c,1988}} = \delta_c + \gamma_t + \sum_{\tau>1988}\theta_\tau D_t^\tau\left(\frac{lpr_{c,IRCA}}{legal_{c,1988}}\right) + e_{cst}.$$

The year effects in this model, the γ_t, thus represent the impacts of pre-existing LPRs on new arrivals, and the θ_τ continue to capture the differential impacts of IRCA LPRs on new arrivals. Intuitively, the coefficients of interest ask whether deviations of new arrivals from prior country-specific trends correlate with the "intensity" of IRCA as a legalization shock.

C. Modification 3: State-by-year effects

Our third modification to the stylized framework accounts for the possibility that the intensity of IRCA as a legalization shock, or $\frac{ircalpr_c}{legal_{c,1988}}$, may correlate with other, unobserved state-by-time varying determinants of admissions, e_{cst}. The modification is to include a full set of state-by-year effects in (B.2):

(B.3) $$\frac{a_{cst}}{legal_{c,1980}} = \delta_c + \gamma_{st} + \sum_{\tau>1988}\theta_\tau D_t^\tau\left(\frac{lpr_{c,IRCA}}{legal_{c,1988}}\right) + e_{cst}$$

Returning to the derivation of (B.2), one can see that this modification allows the existing stock of legal immigrants in c, $legal_{c,1988}$, to have effects on admissions that are not only time-varying, as in (B.1), but also state varying.

D. Modification 4: Using $legal_{c,1980}$ instead of $legal_{c,1988}$

Our next modification deals with a practical data challenge: we do not observe $legal_{c,1988}$ and use $legal_{c,1980}$ as a proxy. The year 1980 is last possible pre-IRCA year we can reliably measure the stock of legal residents: it is the last year that the U.S. maintained an alien registry, and it also coincides with a census year in which we can get a count of citizens. One might instead attempt to impute a stock as of 1988 by adding up arriving new Green Card admissions between 1980 and 1988 (perhaps somewhat discounted for return migration.). But notice that this can be construed as just another small group of potential sponsors that might confound our estimates.

To see this more formally, suppose this other group of potential sponsors who came between 1980 and IRCA's legalizations were denoted $legal_{c,1981-87}$, in other words, $legal_{c,1988}$ = $legal_{c,1980} + legal_{c,1981-87}$. Substituting into (B.1) *and* allowing for separate coefficient vectors on each set of resulting interaction terms yields:

$$a_{cst} = \widetilde{\delta_c} + \sum_{\tau>1988}\left(\theta_\tau D_t^\tau lpr_{c,IRCA} + \gamma_\tau D_t^\tau legal_{c,1980} + \lambda_\tau D_t^\tau legal_{c,1981-1987}\right) + \tilde{e}_{cst},$$

Now, when we divide through by $legal_{c,1980}$ (instead of $legal_{c,1988}$) and make modifications 1 to 3, we have an "extra" term in the estimation equation:

$$\frac{a_{cst}}{legal_{c,1980}} = \delta_c + \gamma_{st} + \sum_{\tau>1988}\theta_\tau D_t^\tau\left(\frac{lpr_{c,IRCA}}{legal_{c,1980}}\right) + \sum_{\tau>1988}\lambda_\tau D_t^\tau\left(\frac{legal_{c,1981-1987}}{legal_{c,1980}}\right) + e_{cst}$$

However, letting $\varepsilon_{cst} \equiv \sum_{\tau>1988}\lambda_\tau D_t^\tau\left(\frac{legal_{c,1981-1987}}{legal_{c,1980}}\right) + e_{cst}$, one can obtain:

(B.4) $$\frac{a_{cst}}{legal_{c,1980}} = \delta_c + \gamma_{st} + \sum_{\tau>1988}\theta_\tau D_t^\tau\left(\frac{lpr_{c,IRCA}}{legal_{c,1980}}\right) + \varepsilon_{cst}.$$

Thus it becomes clear that dividing by the 1980 stock rather than the 1988 stock will only be an issue if the omitted terms $\sum_{\tau>1988} \lambda_\tau D_t^\tau \left(\frac{legal_{c,1981-1987}}{legal_{c,1980}}\right)$ are correlated with the legalization ratio, $\left(\frac{lpr_{c,IRCA}}{legal_{c,1980}}\right)$. Table 1 Panel B shows that there is not such a correlation for the cross-metro analysis, supporting the use of the 1980 proxy for our estimates. (Table A7 Panel B presents comparable evidence for the cross-country analysis). In addition, Figures 4, 5, and A2 show no evidence of pre-trends in any admissions class (starting in 1983 due to data constraints), which is a sufficient condition for this result.

E. Modification 5: Additional interactions to test for pre-trends

Our final modification is to allow for such a test (for pre-trends) by expanding the model to include interactions between the legalization ratio and dummies for years prior to 1988:

(B.5) $$\frac{a_{cst}}{legal_{c,1980}} = \delta_c + \gamma_{st} + \sum_{\tau\neq1988} \theta_\tau D_t^\tau \left(\frac{lpr_{c,IRCA}}{legal_{c,1980}}\right) + \varepsilon_{cst}$$

This is the estimating equation in column 1 of Tables 2 and 3 for the cross-metro and cross-country analyses, respectively.

III. Comment on Alternative Scaling

Suppose that modification 2 had scaled by, for example, 1980 population, pop_c. The ultimate estimating equation would then have to be:

(B.6) $$\frac{a_{cst}}{pop_c} = \delta_c + \sum_{\tau>1988} \left(\theta_\tau D_t^\tau \frac{lpr_{c,IRCA}}{pop_c} + \gamma_\tau D_t^\tau \frac{legal_{c,1980}}{pop_c} + \lambda_\tau D_t^\tau \frac{legal_{c,1981-1987}}{pop_c}\right) + e_{cst}$$

Thus, to identify the coefficient vector of interest, θ_τ, would require multiple additional controls. Our preferred estimating equation is simpler and delivers the desired parameter estimates.