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OPENING THE DOOR: MIGRATION AND SELF-SELECTION IN A RESTRICTIVE LEGAL IMMIGRATION REGIME

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Opening the Door: Migration and Self-Selection in a Restrictive Legal Immigration Regime
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ABSTRACT

We examine how the large, one-time legalization authorized by the Immigration Reform and Control Act (IRCA) has affected the scale and character of immigration to the U.S. since the late 1980s. Exploiting cross-country variation in the magnitude of the legalization shock, we find that each IRCA admit accounts for the subsequent admission of 1 to 2 family members, mostly immediate family. There is little evidence that the legalization increased subsequent unauthorized migration; in fact, fewer temporary visa overstays have somewhat offset the additional family admissions. The marginal family-sponsored admit has not been negatively selected and has not increased fiscal burdens.

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I. Introduction

An estimated 10.5 million unauthorized immigrants reside in the United States today (Passel and Cohn, 2018). Proposed policy fixes over the past decade have ranged from programs granting selected groups temporary legal status – DACA (Deferred Action for Childhood Arrivals) and TPS (Temporary Protected Status) – to deportation and increased border enforcement. And yet, expansive legalization efforts are not without precedent. In 1986, President Ronald Reagan signed into law a comprehensive immigration reform – the Immigration Reform and Control Act (IRCA) – one pillar of which was a set of legalization programs that transitioned nearly 3 million unauthorized immigrants in the U.S. at the time to lawful permanent resident (LPR) status. Studies of these programs and others abroad have revealed that legalization is beneficial not only for the immigrant, but also for society at large.[1]

Still, a central concern surrounding mass legalization in the U.S. is how it might affect *future* immigration flows, given peculiar features of the legal immigration system. A hallmark of the current system, put in place by the Immigration and Nationality Act of 1965, has been prioritization of family reunification over other considerations. In fiscal 2018, two-thirds of the 1.1 million immigrants gaining "admission" or obtaining LPR status in the U.S. – or a so-called "Green Card" – did so through a family tie (U.S. Department of Homeland Security, 2019). An implication is that large-scale legalization policies can *in effect* legalize many more immigrants than those who are directly affected themselves: The initial wave of legalized immigrants can bring their spouses, children, parents, and siblings; siblings can bring their spouses and children; and so on. Such "chain migration" is controversial not only because of its perceived scale but

[1] Past research has used policy variation from IRCA's legalization programs to study the impacts of legalization on labor market outcomes (Phillips and Massey, 1999; Kossoudji and Cobb-Clark, 2002; Amuedo-Dorantes, Bansak, and Raphael, 2007; Pan, 2012; Steigleder and Sparber, 2017), crime (Baker, 2015; Freedman, Owens, and Bohn, 2018), and personal income tax outcomes (Cascio and Lewis, 2019).

also due to the impression that family-sponsored migrants impose a fiscal burden, given they may be less likely to be working age and are not selected on skill.

From an empirical perspective, however, we know little about the true scale of chain migration, let alone its character. Existing studies of chain migration 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 estimates of the "immigration multiplier," which this literature defines as the number of family sponsored admissions per initiating admit.[2],[3] Moreover, no existing studies exploit exogenous variation in that first admission, despite the possibility that that the same "push" and "pull" factors may be at work for them and the family members whose admissions they potentially later sponsor. Further, in the absence of a legalized relative, family-sponsored admits may come to the U.S. through other channels. Various migratory pathways to the U.S. – authorized and unauthorized alike – could be substitutes, so studying admissions in isolation may overstate the *true* immigration multiplier.

We address these limitations in existing literature by combining survey and newly-collected administrative data with cross-country variation in the magnitude of the legalization shock brought about by IRCA's legalization programs in the late 1980s. Figure 1 shows that these programs, which targeted the long-term unauthorized and seasonal agricultural workers, generated 2.7 million excess admissions over the narrow time frame from 1989 and 1991. The

[2] Though the idea that family sponsorship leads to multiplying "chains" of migrants is older, the term "immigration multiplier" as we use it seems to originate with Jasso and Rosenzweig (1986) and was clarified in their 1989 article. They also provide the first serious attempt to estimate it.

[3] Yu (2008), Carr and Tienda (2013), and Tienda (2018) assume that family admissions are sponsored by non-family admissions who came a fixed number of years prior. This approach can lead to misleadingly high estimates of the immigration multiplier. For example, Tienda (2018) estimates that every Mexican admission in the late 1990s subsequently sponsored the admission of 6.38 family members. However, this figure 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.

affected immigrants were largely from Mexico and Central America, though 37 countries across the world experienced an admissions spike. Cross-country variation in the magnitude of this spike relative to the existing legalized immigrant pool and the fact that naturalization affords the broadest family sponsorship rights are what allow us to identify the start of any "chain" in the available data. That is, our approach posits larger increases in family-sponsored admissions (and larger changes in other types of arrivals), particularly once naturalization was permitted for the IRCA cohort, for countries where the scope for family sponsorship changed more as a result of the law. Our approach also does not cap the length of time it may take family members to follow.

Our first set of estimates derive from newly compiled, detailed data on flows of Green Cards, or immigrant admissions. We find that through 2016 – or fully 25 years or more after the initial legalization event – the average immigrant awarded a Green Card through IRCA was responsible for about 1.5 additional admissions. Two-thirds of this effect is accounted for by spouses and unmarried children of a sponsor; the remaining third is split roughly evenly between a sponsor's parents and other relatives, namely siblings and married children. Sponsorship of less than one non-immediate relative means that chain migration is "non-explosive." The estimates are not sensitive to the countries considered or controls for time-varying country characteristics, and more affected countries did not see larger changes in other (e.g., employer-sponsored) admissions over time. A complementary analysis exploiting cross-city variation in the settlement patterns of Mexican immigrants also yields findings similar to those for other countries that, like Mexico, have low naturalization rates and thus less scope for citizen sponsorship.

Our second set of estimates suggests that a multiplier estimate based on admissions alone probably does not overstate the true immigration multiplier by a great deal. Using State Department data on temporary visas issued at foreign consulates, we do find that each IRCA

admission was associated with 0.75 fewer visas issued for students or exchange visitors through 2016. In addition, visas issued for short-term stays for business or pleasure over this period fell many times more, contributing to 0.25 fewer likely visa overstayers through 2016 for each IRCA admission. Thus, administrative data suggest that, if anything, the IRCAs legalizations reduced future unauthorized inflows.[4] However, data from the Decennial Census and American Community Survey (ACS) – which have the relative advantage of capturing unauthorized border crossers but lack information on legal status of recent arrivals – suggest that total arrivals have increased essentially one-for-one with family-sponsored admissions. These estimates are noisier, though, and so not inconsistent with the findings from the administrative data.

These findings suggest that though some family members would have come to the U.S. in the absence of having a legalized relative, substitution between different migratory pathways is likely limited, so that the marginal arrival induced by IRCA's legalization programs is best characterized as a family-sponsored admission. Even so, changes in the characteristics of arrivals in the Census and ACS after IRCA – even along dimensions such as age and marital status that should correlate with being a family migrant – do not strongly covary with the intensity of the IRCA legalization shock. We also find no support for the idea that the family admissions induced by IRCA have been negatively selected on education or more likely to be a fiscal burden than status quo migrants from the same origin countries.

This is the first paper to rigorously examine how legalization opportunities reverberate through the American immigration system. Our estimates suggest that in practice, the current system results in migration by nuclear families, with few bringing distant relatives:[5] Migratory

[4] Time series evidence also suggests that IRCA may have reduced unauthorized arrivals (Woodrow and Passel, 1990; Orrenius and Zavodny, 2003; Massey and Pren, 2012).

[5] The system builds in a number of barriers to chain migration. It is not easy to become a naturalized citizen, and Green Card holders from many countries naturalize at low rates despite the fact that citizenship confers the

"chains" die out. In addition, though administrative data provide some evidence of substitution between family-sponsored admission and other means of entry into the U.S., analysis of immigration flows in the Census and ACS suggest that it is limited. To our knowledge, we are the first to explore this substitution using variation from a policy change.

In addition, seminal work has considered migrant selection in the context of fixed legal immigration regimes (Borjas, 1987; Chiquiar and Hanson, 2005; Abramitsky, Boustan, and Eriksson, 2012). By contrast, we estimate the selection effects of expanding the set of countries with access to the legal immigration system.[6] The few existing studies using policy variation to explore migrant selection are situated in economic history, exploring the selection effects of the Chinese Exclusion Act (Chen, 2015), the 1917 literacy test for immigrants (Spitzer and Zimran, 2018), and the immigration quotas of the 1920s (Massey; 2016; Greenwood and Ward, 2015). [7] Our study, on the other hand, is situated in the modern U.S. policy context.

II. Background

This section provides background on the rules governing immigrant admissions since 1965, and on the IRCA legalization programs in particular. Technically, *immigrant admissions* are foreign nationals admitted to the U.S. as LPRs, or with so-called Green Cards. As alluded,

opportunity to sponsor more relatives. In addition, as we discuss in Section II, there are low annual quotas on the admissions classes that can generate "chains," as well as country-specific annual limits on the overall number of admissions. While there may thus still be relatives on a wait list, 25 years after IRCA there seems little prospect of "out-of-control" chain migration. Still, the value of this multiplier is an empirical question.

[6] Unlike prior studies, our estimates do not compare directly to the sending country population, but rather to the counterfactual under a policy in which this change in access had not occurred. Under the assumption that sending country characteristics did not change as a result of IRCA, however, these are one and the same. For most countries the population legalized by IRCA is a miniscule share of the origin country population: for the median country, it is below 0.2%, and it maxes out at 3% for a handful of countries.

[7] Chen (2015) finds that the Chinese Exclusion Act resulted in more negative selection of Chinese migrants, the opposite of the stated purpose of that law. Massey (2016) finds that the immigration quotas of the 1920s induced more positive selection of migrants, though Greenwood and Ward (2015) find, in contrast, that the quotas induced the least skilled migrants to differentially reduce their emigration rates. Spitzer and Zimran (2018) find evidence of increased positive selection of Italians after the 1917 literacy test. And while theory suggests that allowing more immigrants in induces negative selection (e.g., Bellettini and Ceroni, 2007; Lazear, 2018), these results remind us that how immigration actually responds to particular immigration restrictions in practice is an empirical question.

this is not the only way to enter the U.S. legally. In particular, *non-immigrant admissions* are foreign citizens permitted to enter the U.S. on a temporary basis, such as with student or employment visas. From here forward we refer to immigrant admissions as simply "admissions" and non-immigrant admissions as "visitors" or "temporary visas".

A. Admissions Programs

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. Both citizens and current LPRs can sponsor admission of their spouses and minor (under age 21) or unmarried children. Only citizens can sponsor their parents, married children, and siblings – what is typically thought of as "chain migration."

Citizens can sponsor their spouses, minor children, and parents in unlimited numbers. However, other family sponsorship is quota restricted. In particular, LPRs may sponsor children and spouses, but only up to an annual quota of 226,000,[8] and since the Immigration Act of 1990, citizen-sponsored admissions of adult and married children and of siblings have been capped at 46,800 and 65,000, respectively. For the most part, naturalized citizens of all countries 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 (e.g., naturalized citizens for 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. Our estimates may therefore be lower than they would be under a counterfactual of no admissions quotas.

[8] 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 expressly for the dependents of those legalized under IRCA.

There are other pathways to admission that do not rely on sponsorship. For example, refugees can become LPRs, as can winners of the diversity visa lottery, which was established in the 1990s. Special, limited-time programs have also been periodically established by law. The historically most significant of these and the programs of study in the present paper – the General Legalization Program (GLP) and the Seasonal Agricultural Workers (SAW) program – were authorized by IRCA in 1986.[9] IRCA's GLP targeted the long-term unauthorized, defined as those who at the time of application could demonstrate continuous residency in the U.S. since prior to 1982. The 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. Once a Green Card was awarded through either IRCA program, the awardee was eligible to naturalize just as any person who obtained a Green Card through the more standard, sponsorship-based channels.

B. Timing of Status Adjustment Under IRCA

Together, the GLP and the SAW program generated the spike in admissions between 1989 and 1991 shown in Figure 1. Ultimately 2.69 of approximately 3.04 million applicants were awarded Green Cards through these two IRCA programs alone (Rytina, 2002). This was the culmination of a multi-step process that began with application for temporary status (authorization for work and travel and a stay from deportation) and continued with temporary admission before the Green Card award. IRCA Green Card holders were then eligible to naturalize starting five years after the Green Card award, i.e., starting in 1994 for the earliest awardees. By the end of the 2001 fiscal year, nearly 890,000 applicants under the two programs

[9] 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. El Salvador and Guatemala also experienced large admissions spikes from IRCA, and thus appear in our sample. Our estimates are robust to incorporating controls for NACARA and to dropping these two countries.

combined – 33% of IRCA Green Card holders and 29% of the original applicant pool – had become naturalized citizens.

We show the precise timing of the last two transitions for the IRCA GLP and SAW applicant pools – to permanent residency and citizenship – in Figure 2, based on statistics from Rytina (2002). The sharp timing of IRCA and the fact that citizens enjoy broader family sponsorship rights comprise two elements of our identification strategy. That is, we expect chain migration to manifest in changes in subsequent category-specific admissions that align with IRCA applicants' transitions to sponsorship status. For example, because "family 4th preference" visas (for siblings) require citizen sponsorship, we expect to observe changes in admissions under this category only after 1994. Similarly, parents can only be sponsored by citizens, so their numbers should only rise after 1994, but spouses and minor or unmarried children, who can be sponsored by LPRs, can see their numbers rise soon after 1989.

To demonstrate these aspects of our identification strategy, Figure 3 shows admissions through IRCA's legalization programs and other admissions classes over time for Mexico, which accounted for roughly 75% of IRCA LPRs (Panel A).[10] Consistent with the intuition given above, Green Card-sponsored admissions rise after 1991, whereas citizen-sponsored admissions begin to rise in the mid-1990s (Panel B). Also consistent with visa rules, it is also only after the mid-1990s that admissions of parents and non-immediate relatives from Mexico start to rise, though arrivals of spouses and children begin after 1991 (Panel C).[11]

[10] The data are from the Legalization Application Processing System (LAPS) (for IRCA GLP and SAW admissions) and published anonymized admissions records and tables (for all other admissions). More details are provided in Section III and Appendix A.

[11] Some of the earliest arrivals were likely admitted as "legalization beneficiaries," which were 55,000 extra green-card-sponsored slots per year in fiscal 1992, 1993, and 1994 (allocated by the Immigration Act of 1990) for spouses and dependents of those legalized under IRCA.

To estimate a "long-run" immigration multiplier for Mexico – the total or cumulative family-sponsored admissions for each IRCA admission – we take post-pre differences of each normalized series (Panel B) around 1988, then multiply each of these differences by 28 (years), to accumulate the predicted change in annual admissions through 2016. This approach delivers a long-run multiplier estimate of 1.11 (0.13) – 0.456 (s.e.=0.06) of an admission through Green Card sponsorship and 0.658 (s.e.=0.10) of an admission through citizen sponsorship – for each Mexican admission through IRCA. About 75% of all of these admissions were spouses and children (coef.=0.84 (s.e.=0.11)).

C. IRCA's Country Variation

A drawback of relying only on the timing of specific sponsorship patterns, as in the exercise above, is that other factors affecting admissions could be changing over time. For example, the Mexican peso crisis unfolded in the mid-1990s, just as Mexicans obtaining Green Cards through IRCA would have been able to naturalize and sponsor the admission of a broader set of family members. Our approach therefore also uses variation across countries in the intensity of IRCA as a legalization shock. Intuitively, countries for which IRCA admissions were large relative to pre-existing stocks of LPRs should have experienced proportionally larger Green Card- (and later citizen-) sponsored admissions following the 1989 to 1991 spike in IRCA Green Card awards. Such countries experienced larger proportional increases in potential future sponsorship, due to IRCA.

Countries that are good candidates for this approach are ones where IRCA generated a spike in admissions that was larger and more concentrated than those for other admissions categories over our study time frame. Qualifying immediate family members of refugees may be admitted in the refugee category, rather than through a family-sponsored category. However,

diversity visa admissions are apt to sponsor family members. Where diversity visa admissions are substantial, we cannot assign subsequent family sponsored LPRs to the IRCA admissions.

With negligible admissions in all other categories (Figure 3 Panel A), Mexico offers the ideal scenario. Figure A1 shows similar figures for each country with any IRCA admissions, separately by world region. With some exceptions (e.g. Cuba, Venezuela), countries in the Americas appear to satisfy this requirement for being included in our sample; IRCA provided an outlet for unauthorized immigration after the 1965 Immigration and Nationality Act imposed admissions quotas on countries in the Western Hemisphere for the first time. But no African countries do: Green Cards awarded to refugees and through the diversity visa program for African countries are at least as large – and typically more sustained – than IRCA admissions. Asia and Oceania, on the other hand, offer a few countries that are suitable for our analysis.

We restrict our analysis to the 37 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. These 37 countries represent almost all (94.7%) of Green Cards awarded through IRCA. The sample is concentrated in the Americas (Table A1), but also includes most countries elsewhere that generate large numbers of unauthorized immigrants today, such as Korea and the Philippines (Passel and Cohn, 2018). In later parts of our analysis that focus on visitors and the unauthorized, we drop five of these countries due to data considerations.[12] The 32 countries remaining still represent 93.6% of IRCA LPRs.

Our treatment variable is the number of Green Cards awarded through IRCA relative to the pre-existing stock of Green Card holders (the "legalization ratio"). We calculate the numerator of the legalization ratio with Green Cards awarded through the GLP and SAW

[12] These data considerations include missing data from key sources (Bermuda, Grenada, and Hong Kong) and extreme outlying values of subsequent temporary visa shocks (Brazil and India).

program by origin country, as reported by the Legalization Applications Processing System (LAPS).[13],[14] We calculate the denominator using an anonymized 1980 registry of Green Card holders ("Alien Address Reports") compiled by the Immigration and Naturalization Service (INS). Table 1 Panel A lists countries with the top-ten legalization ratios in our sample, in descending order by the ratio's value. While Mexico was responsible for the largest number of Green Cards awarded under IRCA, it did not have the highest legalization ratio.

Countries from Central America nevertheless dominate the top-ten list and may be subject to common shocks. Our preferred estimates therefore allow the year fixed effects to vary across world regions. However, Table 1 Panel B shows that, even within region, countries with higher legalization ratios had lower naturalization rates for the IRCA cohort.[15] They are also lower income. The latter finding suggests higher growth in the unauthorized population for poorer countries since the 1965 Immigration and Nationality Act restricted legal immigration from the Western Hemisphere. We interact a dummy for whether a country is high or upper-middle income with year fixed effects in some follow-up specifications, to allow for poor countries to have had different outcomes trajectories in the absence of IRCA.

III. IRCA Legalizations and Subsequent Admissions

A. Data

Our analysis of admissions relies on rich administrative data on immigration to the U.S., published as either anonymized microdata (fiscal years 1983 though 2000) or in tabular form

[13] The LAPS provides anonymized data on all IRCA legalization applicants through the end of the 1992 fiscal year. See Appendix A. Only 1.1% of GLP and SAW program applicants received a Green Card after 1992 (Rytina, 2002).
[14] We add in Green Cards awarded through two much smaller one-time legalization programs authorized by IRCA – one for unauthorized Cubans or Haitians and the other for migrants who had been in the U.S. since at least 1972. Successful adjustments of status under these programs are reported in the admissions files described in Section III.
[15] Naturalization rates of IRCA applicants are not available for any individual country except Mexico (Rytina, 2002). We therefore estimate them using 2000 Census microdata, restricting attention to foreign-born arrivals between 1972 and 1987. The resulting naturalization rates compare favorably to those reported by Rytina (2002) for the same cohorts at approximately the same time based on administrative data. See Appendix A.

(fiscal years 2001 through 2016).[16] Our main outcome is a country-by-(fiscal) year count of "aliens" admitted to the U.S. as LPRs, divided by the 1980 stock of LPRs from the INS registry described above. The admissions microdata, made available by INS, include class of admission, country of birth, and age. While the microdata end in 2000, tables published by INS and later the Department of Homeland Security allow us to produce annual country-level counts of admissions for the key Green Card- and citizen-sponsored admission categories, of overall family-sponsored admissions by relative type, and of total admissions by age through 2016. We also consider employer-sponsored admissions and admissions of refugees and through diversity visas. Table A2 summarizes these data for the 37 countries in our main sample giving each country equal weight, which is our preferred approach.

B. Baseline Event-Study and Multiplier Estimates

We begin with a specification that exploits the timing of sponsorship transitions by IRCA applicants and variation across countries within the same world region in the intensity of IRCA as a legalization shock. The model is given by:

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

where a_{crt} represents admissions in a specific category (e.g., Green Card-sponsored) from country *c* from world region *r* in (fiscal) year *t*, $lpr_{c,IRCA}$ is the number of immigrants from *c* receiving Green Cards through IRCA, and $lpr_{c,1980}$ is the number of LPRs from *c* registered with the INS in 1980. Stacking data across countries, we are able to include year fixed effects. But because legalization ratios are correlated with world region – and different regions might be "pulled" to or "pushed" from the U.S. in different ways over time – our baseline specification

[16] Anonymized microdata on immigrant admissions are available for years before 1983, but early years lack enough geographic information to identify metropolitan areas. We use metropolitan areas in a robustness check (Table 3).

allows for unrestricted time trends across regions, γ_{rt}, as noted in Section II.[17] Admissions might be at very different levels across countries, so we also include a vector of country fixed effects, δ_c. ε_{crt} is an error term, capturing country-by-time varying unobservables.

The coefficients of interest in (1) are the θ_τ, or those on the interactions between the legalization ratio, $lpr_{c,IRCA}/lpr_{c,1980}$, and the D_t^τ, a set of indicator variables set to one if $t = \tau$, for $\tau \neq 1988$. 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 is equivalent to the predicted number of admissions in τ per IRCA Green Card holder, i.e., an intent-to-treat effect relating the change in LPRs in τ to an initial IRCA admission.[18],[19] Even for Green Card-sponsored visas, we do not expect much difference as early as 1989, and we do not see one in practice; we take this approach to be conservative. Moreover, omitting the 1988 interaction for all outcome variables, including citizen-sponsored admissions where we (expect to) see effects only later, allows coefficients for mutually exclusive subcategories of admissions to sum to the coefficient for the total, which simplifies our analysis going forward.

Figure 4 Panel A presents estimates of the θ_τ, along with 95% confidence intervals (with standard errors clustered on county), for each of the two main family sponsorship categories – Green Card and citizen – and for their sum, capturing total family sponsorship. Consistent with expectations, Green Card sponsored admissions rise after the spike in IRCA Green Card awards (which culminated in 1991), with the first statistically significant coefficient arising in 1994.

[17] 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.

[18] Intuitively, model (1) is a rescaled (by $lpr_{c,1980}$) version of a comparable model in levels, i.e., one where admissions (a_{ct}) are regressed on IRCA LPRs ($lpr_{c,IRCA}$) and pre-IRCA LPRs ($lpr_{c,1980}$), who are also able to sponsor the Green Card applications of family members. The coefficient on $lpr_{c,IRCA}$ is preserved in the rescaling. See Appendix B.

[19] If all did remain, however, this coefficient would also represent the effect of the treatment on the treated. Unfortunately, we do not observe the extent to which IRCA admissions remain in the U.S. but return migration of LPRs in general is low – on the order of 1% a year (Baker and Rytina, 2013).

Likewise, increases in citizen-sponsored admissions do not emerge until after 1993 (the first IRCA LPRs would have naturalized in 1994). After that, however, the trends in the coefficients look different across the two family-sponsorship categories. The maximum increase in Green Card-sponsored flows relative to 1988 emerges in 1996, with coefficients trending downward thereafter, but citizen-sponsored flows remain relatively high and significant through the end of the period. The pattern is similar to that in the time series for Mexico (Figure 3), despite the fact that Mexico is just one of 37 countries in an analysis giving each country equal weight.

Table 2 summarizes these estimates with long-run multipliers, which in this case sum the post-1988 coefficients separately for each visa category (i.e., $\sum_{\tau>1988} \widehat{\theta_\tau}$). Because θ_τ can be interpreted as the predicted IRCA-sponsored family admissions in τ for each original IRCA Green Card holder, accumulating across years we arrive at a prediction of the stock of IRCA-sponsored family admissions as of 2016 relative to the number of original IRCA LPRs, assuming no return migration or mortality. That event-study coefficients for citizen-sponsored admissions remain substantial and statistically significant in 2016 suggests that these multiplier estimates would likely continue to grow over time and so should be viewed as a lower bound.

Our baseline estimates (column 1) imply 0.35 additional Green Card-sponsored admissions (s.e.=0.15) and 1.09 additional citizen-sponsored admissions (s.e.=0.43) for every immigrant admitted through IRCA, amounting to 1.44 additional family-sponsored admissions in total (s.e.=0.37).[20] Put differently, our baseline estimates imply that the 2.69 million IRCA LPRs have been responsible for 3.87 million subsequent admissions (2.69 x long-run multiplier of 1.44) through 2016. Restricting the sample to the 32 countries used in our later analysis of other forms of immigration (column 2) barely changes the coefficients or their implications. Likewise,

[20] This estimate is similar to that from Jasso and Rosenweig (1989), who study subsequent family sponsorship among one cohort (1971) of employer-sponsored LPRs. However, their estimate is based on a shorter time horizon.

dropping the three countries in our sample for which quotas bind due to their size – India, Mexico, and the Philippines – actually lowers the estimates (column 3), not increases them as we might have expected. Though all of the multiplier estimates are likely lower than they would be under a counterfactual of no admissions quotas, this finding suggests that binding quotas for a few key countries is not biasing our estimates downward in this setting in which quotas exist.

Table 2 also presents long-run multipliers by relative type. Immediate family members – particularly spouses and children – account for most (83%) of the additional admissions (coef. (s.e.) for spouses and children=0.93 (0.21), for parents=0.27 (0.10)). Other relatives thus account for only 17% of IRCA-sponsored family admissions; by 2016, only one non-immediate family member had been admitted through IRCA sponsorship for every four IRCA admissions (coef. (s.e.) = 0.23 (0.11)). Figure A2 Panel A shows the timing: admissions of parents did not significantly rise until the mid-1990s, and admissions of other relatives, estimated less precisely, did not rise until the late-1990s. This timing is again consistent with when IRCA naturalizations began, as only citizens can sponsor family members beyond spouses and unmarried children.[21]

C. Robustness

The estimates can be interpreted causally if trends in family-sponsored admissions would have been the same in the absence of IRCA across countries in the same region, but with different legalization ratios. While this is fundamentally unknowable, it is reassuring that countries with relatively high legalization ratios for their region were not already experiencing an upward trend in family-sponsored admissions prior to IRCA (Figure 4 Panel A). Such a trend

[21] Table A3 breaks out total admissions (all categories) by age; Figure A3 shows the corresponding event-study estimates. (Tabulations by country and age are not available for 2001 and 2002, so these years are dropped.) While immigrants ages 25 to 34 accounted for 26.9% of admissions in 1988, they represented only 15% of admissions induced by IRCA. That mass shifted to older groups: 44.0% of IRCA-induced admissions through 2016 were ages 35 and over, compared to 27.9% of 1988 admissions. Nevertheless, the "prime working age" (25-54) share of both 1988 arrivals and induced family migrants is similar, at around 45%.

would likely appear if the legalization ratio were correlated with unobserved country-specific drivers of family-preference admissions. Here, we consider additional robustness checks.

Placebo outcomes. Our first robustness check is to estimate effects on other admissions categories that should not have been affected by IRCA but could subsequently sponsor family members for admission. Figure 4 Panel B shows no obvious change in diversity visa or employer-sponsored admissions for more heavily treated countries after IRCA versus before. The several positive coefficients for refugee admissions translate into a modest positive long-run multiplier (Table 2). Unlike employer-sponsored or diversity visa admissions, however, refugees are eligible to bring their families immediately, and thus do not show up in our statistics on family-sponsored LPRs. The figure also shows that the positive coefficients among refugees are concentrated in later years. Given that naturalization is only possible five years after admission, sponsorship of other relatives by these refugees would not have been possible until very late in our sample period and so is unlikely to be an important driver of our findings.

Country-by-time-varying controls. Our second approach is to add a vector of country-by-time varying controls to the baseline model. Table 2 column 4 shows that adding year dummies interacted with a dummy for whether the country is high- or upper-middle income does not have a dramatic effect, though it does slightly lower the long-run multiplier and shift the weight of the estimates toward Green-Card-sponsored admissions. Columns 5 and 6 show that the estimates also do not appear to be confounded by real exchange rate shocks (Yang, 2006; Llull 2018) or changes in origin-country population in the subset of 34 countries where these variables are available.[22]

[22] The source for these controls is PWT 9.1 (Feenstra et al., 2015), available for download at www.ggdc.net/pwt. The PWT do not contain these two variables for three countries in our sample: Guyana, Samoa, and Tonga.

Cross-metro area variation for Mexicans. Our third approach sidesteps the potential bias from country-by-time varying unobservables by exploiting variation in the legalization ratio across U.S. metropolitan areas for the one country that accounted for three-quarters of IRCA Green Card awardees – Mexico.[23] The empirical approach is the same as outlined in (1), except that *c* now represents metropolitan area, and we include (U.S.-by-) year fixed effects only. Basically, we now ask whether, just like *countries* with higher legalization ratios experienced relatively large increases in family-sponsored admissions after IRCA, *metro areas* with higher legalization ratios *for Mexicans* – or where IRCA LPRs were large relative to the pre-existing stock of Mexican LPRs – experienced relatively large proportional increases in family-sponsored admissions of Mexicans after IRCA.

The estimates (Table 3 column 2; Figure A4) are similar to what we saw in the time series for Mexico, especially when we calculate the time-series-based long-run multiplier using the same available years of data.[24] The overall long-run multiplier is thus smaller than we found at baseline – 0.77 (0.17) versus 1.14 (0.30) when applying the country-level variation to the same more limited years (Table 3 column 1). It is also more weighted toward Green Card-sponsored admissions and toward admissions of spouses and children; in fact, the latter account for 84% of the effect (coef. (s.e.)=0.65 (0.12)). By contrast, other relatives account for very little (4%) of the overall family sponsorship effect (coef. (s.e.)=0.03 (0.01)). These may be lower because of

[23] We limit attention to the 49 metro areas included in published tables after 2000. There are no published tables detailed enough to produce estimates for 1998 and 2001-06, so the long-run multiplier estimates exclude these years. See Appendix A.

[24] Excluding missing years, the simple difference in family sponsored/IRCA legalization from the pre-1989 average (Figure 3 Panel B) summed up across 1989 to 2016 implies that each legalized Mexican sponsored 0.8 relatives (s.e. = 0.09), which is similar to the cross-MSA regression estimate of 0.77 (s.e. = 0.17). The breakdown into citizen- and Green Card-sponsored categories and into relative types is also similar in the adjusted time series and in the regressions. This need not have been the case; we might have expected upward bias in the time series approach from factors such as the mid-1990s peso crisis. While not definitive, the results thus suggest that the surge in Mexican admissions in the mid-1990s was not due to the peso crisis, since similar surges in admissions occurred for other countries with high legalization ratios but no currency crises.

internal migration of IRCA LPRs after admission, due to the spread of Mexican immigrants from traditional destinations since the 1990s (Card and Lewis, 2007). On the other hand, Mexico's relatively low naturalization rate also limits citizen-sponsored admissions.

Heterogeneity by the naturalization rate. More generally, we might expect countries with lower naturalization rates to have smaller multipliers. Findings in columns 3 and 4 of Table 3 suggest this is the case: IRCA admissions from countries with higher naturalization rates have sponsored more admissions as citizens, and more admissions of parents and siblings, than their counterparts from countries with lower naturalization rates. A caveat is that immigrants with a strong desire to bring family members may be more likely to naturalize, i.e., causality may be in the opposite direction. Another caveat is that though statistically insignificant, the relationship between the naturalization rate and the legalization ratio is somewhat large (Table 1 Panel B). The estimates could therefore be biased by sample selection.

IV. IRCA Legalizations and Subsequent Immigration

A. Data

Focusing on admissions, our approach thus far has not captured how IRCA's legalization programs have affected *other* forms of immigration. To do so, we start with two administrative sources. The first are published statistics on temporary visas issued by the State Department at foreign consulates, available for most years between 1983 and 2016. These data include counts of visas issued by country and visa type, designated as a letter. We aggregate visas into three categories – short-term visitors for business or pleasure (B visas/border crossing cards), students and exchange visitors (F, M, and J visas), and all others. While the latter two groups are generally here legally for longer periods, short-term visitors contribute to the visa overstays that likely account for a sizable share of the unauthorized outside of Mexico and Central America.

Our second administrative source allows us to predict visa overstays: we multiply temporary visa counts by visa overstay rates for the three categories for 2016, the earliest fiscal year for which they are reported (U.S. Department of Homeland Security, 2017).[25] We estimate models for this outcome with and without Mexico, Guatemala, El Salvador, and Honduras included in the sample, as the unauthorized from these four countries were considerably less likely to be visa overstayers at baseline.[26]

We complement these administrative figures with public-use microdata from the Decennial Census (for 1990 and 2000) and the American Community Survey (ACS) (for 2006 to 2017), the best available data that include all long-term resident immigrants, including unlawful border crossers.[27] We include the 1982 to 2014 arrival cohorts.[28] Because the Census and ACS data are not annual, we do not have counts of total arrivals by country at the time of arrival for all cohorts. We instead estimate them, using the fact that we observe the same arrival cohort in multiple years.[29] We focus on the prediction of *total* arrivals, by country and cohort, as well as the difference between total arrivals and family-sponsored admissions ("other arrivals"). Other arrivals will include unauthorized immigrants *and* foreign citizens residing in the U.S. with temporary visas who respond to these surveys; lacking reports of legal status of non-citizens, we cannot distinguish between unauthorized and other legal immigrants in these data.

[25] While there are many more short-term visitors, overstay *rates* are higher among long-term visitors. Overstay rates might not be fixed, but this analysis will be informative if countries maintain proportional differences in overstay rates over time. Unfortunately, there are no data on unlawful border crossers by country of origin and arrival cohort.
[26] Our calculations from the LAPS imply that 12 percent of admissions through IRCA's GLP program from Mexico, Guatemala, El Salvador, and Honduras were visa overstayers, versus 64 in the remaining countries in our sample. If we assume that all SAW applicants were unlawful border crossers, the visa overstay share among all successful IRCA legalization applicants for these two groups of countries fall to 8.4 percent and 46.7 percent, respectively.
[27] The ACS was carried out between 2001 and 2005 but does not include individuals living in group quarters in those years. We drop relatively rare cases of persons born abroad to U.S. citizens.
[28] The year 1982 is as close as we can get to the 1983 start year in our other sources, and we end here in 2014 because we collapse the data into five-year blocks after 1990.
[29] Intuitively, we predict the size of a given cohort in its year of arrival through extrapolation, i.e., from the speed at which the average arrival cohort shrinks over time, due to mortality and return migration. See Appendix A.

As earlier noted, we restrict this analysis to 32 countries. We lose three countries because data are not reported in the ACS (Grenada) or by the State Department (Hong Kong and Bermuda);[30] we also drop Brazil and India, which have extreme outlying values for temporary visas. Table A3 provides descriptive statistics on key analysis variables for this sample.

B. Event-Study and Multiplier Estimates

Figure 5 Panel A shows event-study estimates for family-sponsored admissions, total arrivals, and their difference (other arrivals). To address potential heaping in reported arrival dates in the Census and ACS, as well as the fact that these data are only samples, we work with arrival cohorts defined in bins: we use the bins available in the 1990 Census (1982-84, 1985-6, 1987-89) before 1990 and five-year bins thereafter.[31] We also adjust the event-study specification, classifying countries into two groups (m=0,1) based on whether their legalization ratio is above the median for the sample, and replacing the legalization ratio in (1) with the average legalization ratio for the group, $LR_m = \frac{1}{n_{c\in m}} \sum_{c\in m} \frac{lpr_{c,IRCA}}{lpr_{c,1980}}$:

$$\frac{o_{crt}}{lpr_{c,1980}} = \tilde{\delta}_c + \tilde{\gamma}_{rt} + \sum_{\tau \neq 1987-89} \tilde{\theta}_\tau D_t^\tau LR_m + v_{crt}. \quad (2)$$

o_{crt} is now the relevant category-specific count of arrivals in year t from county c in world region r. The coefficients $\tilde{\theta}_\tau$ retain a similar interpretation as the θ_τ in (1), capturing the predicted difference in other arrivals between τ and 1987-89 for each IRCA admission. Lacking a better alternative, we set 1987-89 as the arrival cohort for the omitted interaction, and thus assume that cohorts arriving in 1990 and later, rather than 1989 and later, are treated.[32]

[30] All countries in the "West Indies" are grouped into a single code in Census data, making it impossible to observe Grenada. Hong Kong and Bermuda's immigrants are grouped with China and the UK, respectively, in State Department sources (but not in Homeland Security sources).
[31] To make the observations comparable, the intervals shorter than five years are scaled up proportionately.
[32] Conveniently, the difference in average legalization ratios across above- and below-median countries is approximately one (above-median average=1.19, below-median average=0.13), so the findings from this

Since arrival cohorts are in bins, estimates of the $\tilde{\theta}_\tau$ from model (2) are short-run versions of the multipliers shown in Table 2, calculated over the relevant period. The figure thus shows that, for every hundred IRCA admissions, there were about 30 more family-sponsored admissions in the late 1990s than in 1987-89. The coefficients are higher later in the period, for example reaching a flow of about 50 family-sponsored admissions for every hundred IRCA LPRs in 2005 and later. As shown in the first column of Table 4 Panel A, the post-1987-89 coefficients imply a long-run multiplier of 1.68 (s.e.=0.74) – similar to that reported in Table 2 column 2 for the same sample, despite the change in specification. Also similar to before, the long-run multiplier for other admissions is close to zero (-0.07 (0.65), not shown in table). The remaining columns show that these basic results still hold when we add more controls to (2).

Panel A of Figure 5 and Table 4 also show the event study and long-run multipliers, respectively, for total arrivals measured from the Census/ACS. The table shows that the multiplier estimates for total arrivals in the Census/ACS are generally larger than those for family admissions based on the administrative data, but this difference is never statistically significant. Indeed, the difference between the two, shown in the figure as other arrivals, is near zero except for 2000-04. Thus, relative to 1987-89, post-1990 total arrivals in the Census/ACS closely track family admissions in official data.

Given the size of the standard errors, however, we can rule out neither large positive nor large negative values for other arrivals. Estimates based on the administrative data are more informative. Figure 5 Panel B suggests that both short- and long-term visitors declined as family-sponsored admissions increased. While the post-1987-89 coefficients are at best marginally significant for long-term visitors, they move downward in almost fixed proportion to their

specification are similar to those obtained from substituting a dummy for being above-median for LR_m. Letting 1989 be a pre-treatment year does not change the conclusions of our earlier analysis.

counterparts in Panel A for family-sponsored admissions. The coefficients for short-term visitors (divided by five to be presented on the same scale) also exhibit a similar hump-shaped pattern as the coefficients for other arrivals in Panel A.

Table 4 Panel B gives the long-run multipliers for temporary visas. While the multiplier for long-term visitors is not statistically significant (-0.93 (0.67)), examination of its subcomponents reveals that a large share of it is accounted for by a significant negative multiplier for students and other exchange visitors (-0.76 (0.37)); the addition of all remaining long-term visitors thus serves mainly to generate noise. The multiplier for short-term visitors is negative and slightly more precisely estimated at baseline, though still not significant at conventional levels (-6.56 (4.34)). The addition of unrestricted trends by country income (column 2) attenuates these multipliers somewhat, but conclusions are otherwise strengthened in moving across the columns of the table.

Table 4 Panel C then gives long-run multipliers for predicted visa overstayers, both overall and by visa category; Figure 5 Panel B includes the plot for the total. We lack the power to obtain a statistically significant multiplier in the full sample of 32 countries (-0.21 (0.14)). However, the multiplier is marginally significant dropping the four countries on the southern border of the U.S. for which visa overstayers make up an exceptionally low share of unauthorized immigrants (-0.25 (0.13)). This coefficient is explained by a dramatic drop in short-term visas from these countries and suggests that unauthorized immigration from non-Central American countries may have declined a bit as a result of IRCA's opening.

V. IRCA Legalization and Characteristics of Subsequent Immigrants

The findings thus far suggest that nearly all subsequent immigration induced by the IRCA legalizations came in the form of family-sponsored admissions. The marginal arrival

identified by our empirical approach was therefore a family-sponsored admission. By applying our research design to the characteristics of recent arrivals as observed in the Census/ACS, we can therefore learn about the characteristics of this group relative to status quo immigrants – something that would not normally be possible, since administrative data do not contain characteristics, and survey data do not identify visa type. If family members sponsored by IRCA admits were more negatively selected than status quo arrivals, for example, countries more affected by IRCA should have seen a relative erosion in immigrant human capital upon arrival.

We test for this possibility using data from the 1990 and 2000 Census and the 2006-17 ACS.[33] Our main measure of human capital is (adult) educational attainment, but we also consider the share of adults with any public assistance income. We also consider characteristics that should most distinguish family-sponsored admissions from status quo arrivals. Because most of the long-run multiplier for family admissions is accounted for by spouses and minor children (Table 2), for example, family admissions as a whole may be more likely to be children, and adult family admissions should be highly likely to be married. We therefore also consider as outcomes the share of adult migrants who are married or who have any resident children. Because family migrants might also be more likely to establish families in the U.S., we also consider the share of migrants with citizen children under age six.[34]

We estimate a modified difference-in-differences model relating changes in characteristics of arrival cohorts, y_{crt}, to group averages (above- or below-median) of the legalization ratio, LR_m:

$$y_{crt} = \alpha_c + \kappa_{rt} + \beta_{90-94} D_t^{90-94} LR_m + \beta_{95-04} D_t^{95-04} LR_m + \beta_{05-14} D_t^{05-14} LR_m + \omega_{crt}. \qquad (3)$$

[33] We adjust the mean characteristics in the same manner as the ACS/Census counts of arrivals – linearly in years in U.S. – except we now evaluate characteristics at three years in the U.S. (in part to see U.S.-born children).
[34] This is possible because we look at characteristics three years after arrival, see previous note.

We thus focus on changes in characteristics between pre-IRCA cohorts (1982-1989) and three groups of post-IRCA cohorts: 1990 to 1994, 1995 to 2004, and 2005 to 2014; differential effects by the legalization ratio are captured in the coefficients β_{90-94}, β_{95-04}, and β_{05-14}, respectively. Our rationale for this specification is twofold. First, there is little impact of IRCA admits on family-sponsored admissions – and on most other forms of immigration – until 1995 or later. Second, there are two periods of IRCA-induced changes in immigration: arrivals of parents and children are relatively more important in 2005 and later (Figure A3 Panel B).

Table 5 gives estimates of β_{95-04} and β_{05-14} for the collection of variables described above. The regression coefficients for the educational attainment outcomes are neither statistically significant nor statistically different from one another, despite the change in the composition of family arrivals across the two periods. That is, trends in the educational attainment of recent arrivals are not correlated with the legalization ratio. A similar finding holds for receipt of public assistance income. There is thus little evidence that the marginal family admit is more negatively selected or increases fiscal burdens over other immigrants of the same origin.[35] The only outcome that does change in countries with larger legalization ratios is the probability of having citizen children under the age of six, between the 1982-89 and 1995-2004 cohorts. This finding provides evidence that the research design is capable of picking up effects where we expect to see them.

VI. Discussion and Conclusion

This paper provides the first estimates of how U.S. family reunification preference works in practice when we temporarily open the door to migrants from countries that otherwise have

[35] Contrary to commonly held beliefs, the major "fiscal burden" of immigration is not from use of public income support programs, but rather use of public schools by the children of immigrants. Thus, the slight increase in U.S.-born children may pose some short-run local fiscal burden; however, the long-run fiscal impact of U.S. born children of immigrants is positive (e.g., National Academy of Sciences, 2016).

little access to the system. Our estimates speak to both the scale of chain migration and to the selection it induces – two popular objections to the system.

On the first issue, we find that the magnitude of family sponsorship is relatively modest, and largely concentrated among immediate family. Even 25 years after IRCA, only 1.5 family members have been sponsored per IRCA admission, and only 0.5 of these are parents or other relatives. For countries whose immigrants tend to naturalize at low rates – including much of Central America – there have been essentially no non-immediate family members sponsored by the IRCA admissions, suggesting little prospect of additional chain migration. Moreover, our estimates suggest that family migrants may have displaced some unauthorized migrants outside of Central America.

On the second issue, the opening provided by IRCA appears to have resulted in no change in the selection of migrants, compared to the counterfactual. While the rise in admissions after IRCA resulted in a modest increase in the number of families with U.S. born children, U.S.-born children of immigrants are a demographic group for whom long-run fiscal consequences are very favorable (National Academy of Sciences, 2016). In addition, neither the average education of nor the average use of public programs by new arrivals has changed differentially since the late 1980s for countries whose stock of potential sponsors rose more as a result of IRCA.

Our variation does not necessarily speak to the impact of larger changes to the immigration system, such as the impact of moving to an entirely "merit" based system or of dramatically reducing the number of visas. However, our findings do speak to the consequences of other proposed openings, such as the recently House-passed Farm Workforce Modernization Act, which includes a farmworker amnesty structured similarly to IRCA's SAW program, or of other, broader amnesties proposed in the past decade, which would effect a country mix similar

to IRCA's GLP. Arguably a major impediment to these bills is fear of the consequences. Our estimates find little to substantiate these fears. Indeed, they suggest opening a legal pathway for the unauthorized does not lead to increased unauthorized immigration and may even reduce the tendency of some to migrate to the U.S. by overstaying tourist or student visas.

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, forthcoming). 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.

References

Allen, Treb, Caue Dobbin, and Melanie Morten. 2019. "Border Walls." Mimeo, Dartmouth College, November 2019.

Abramitsky, Ran, Philipp Ager, Leah Platt Boustan, Elior Cohen and Casper Worm Hansen. 2019. "The Effects of Immigration on the Economy: Lessons from the 1920s Border Closure." National Bureau of Economic Research Working Paper #26536, December 2019.

Abramitsky, Ran, Leah Platt Boustan, and Katherine Eriksson. 2012. "Europe's Tired, Poor, Huddled Masses: Self-Selection and Economic Outcomes in the Age of Mass Migration." *American Economic Review* 102(5): 1832-1856.

Amuedo-Dorantes, Catalina, Cynthia Bansak, and Steven Raphael. 2007. "Gender Differences in the Labor Market: Impact of IRCA's Amnesty Provisions." *American Economic Review, Papers & Proceedings* 97(2): 412-416.

Baker, Bryan and Nancy Rytina. 2013. "Estimates of the Unauthorized Immigrant Population Residing in the United States: January 2012." *Population Estimates*. U.S. Department of Homeland Security, Office of Immigration Statistic, March.

Baker, Scott R. 2015. "Effects of Immigrant Legalization on Crime." *American Economic Review, Papers & Proceedings* 105(5): 210-213.

Bellettini, Giorgio and Carlotta B. Ceroni. 2007. "Immigration Policy, Self-selection, and the Quality of Immigrants." *Review of International Economics* 15(5): 869–877.

Borjas, George. 1987. "Self-Selection and the Earnings of Immigrants." *American Economic Review* 77(4): 531-553.

Card, David and Ethan Lewis. 2007. "The Diffusion of Mexican Immigrants During the 1990s: Explanations and Impacts." In George J. Borjas, Ed., *Mexican Immigration to the United States*. Chicago: University of Chicago Press, p. 193-227.

Carr, Stacie and Marta Tienda. 2013. "Family Sponsorship and Late-Age Immigration in Aging America: Revised and Expanded Estimates of Chained Migration." *Population Research Policy Review* 32: 825-849.

Cascio, Elizabeth U. and Ethan G. Lewis. 2019. "Distributing the Green (Cards): Permanent Residency and Personal Income Taxes After the Immigration Reform and Control Act of 1986." *Journal of Public Economics* 172: 135-150.

Chen, Joyce J. 2015. "The Impact of Skill-Based Immigration Restrictions: The Chinese Exclusion Act of 1882." *Journal of Human Capital* 9(3): September, pp. 298-328.

Chiquiar, Daniel and Gordon H. Hanson. 2005. "International Migration, Self-Selection, and the Distribution of Wages: Evidence from Mexico and the United States." *Journal of Political Economy* 113(2): 239-281.

Clemens, Michael A., Ethan G. Lewis, and Hannah M. Postel. 2018. "Immigration Restrictions as Active Labor Market Policy: Evidence from the Mexican Bracero Exclusion." *American Economic Review* 108(6): June, pp. 1468-87.

Dustmann, Christian, Uta Schönberg and Jan Stuhler. 2017. "Labor Supply Shocks, Native Wages, and the Adjustment of Local Employment." *Quarterly Journal of Economics* 132(1): pp. 435-483.

Feenstra, Robert C., Robert Inklaar and Marcel P. Timmer. 2015. "The Next Generation of the Penn World Table." *American Economic Review* 105(10): October, pp. 3150-3182.

Foged, Mette, and Giovanni Peri. 2016. "Immigrants' Effect on Native Workers: New Analysis on Longitudinal Data." *American Economic Journal: Applied Economics* 8(2): pp. 1-34.

Freedman, Matthew, Emily Owens, and Sarah Bohn. 2018. "Immigration, Employment Opportunities, and Criminal Behavior." *American Economic Journal: Economic Policy* 10(2): 117-151.

Greenwood, Michael J. and Zachary Ward. 2015. "Immigration quotas, World War I, and emigrant flows from the United States in the early 20th century." *Explorations in Economic History* 55: 76–96.

Kossoudji, Sherrie A., and Cobb-Clark, Deborah A. 2002. "Coming Out of the Shadows: Learning about Legal Status and Wages from the Legalized Population." *Journal of Labor Economics*, 20(3): 598-628.

Lazear, Edward P. 2018. "Why Are Some Immigrant Groups More Successful than Others?" NBER Working Paper No. 23548, November.

Llull, Joan. 2018. "The Effect of Immigration on Wages: Exploiting Exogenous Variation at the National Level." *Journal of Human Resources* 53(3): 608-662.

Massey, Catherine. 2016. "Immigration Quotas and Immigrant Selection." *Explorations in Economic History* 60: 21-40.

Massey, Douglas S. and Karen A. Pren. 2012. "Unintended Consequences of US Immigration Policy: Explaining the Post-1965 Surge from Latin America." *Population and Development Review* 38(1): March, pp. 1-29.

National Academies of Sciences, Engineering, and Medicine; Division of Behavioral and Social Sciences and Education; Committee on National Statistics; Panel on the Economic and Fiscal Consequences of Immigration. 2016. *The Economic and Fiscal Consequences of Immigration*. Francine D. Blau and Christopher Mackie, Editors.

Orrenius, Pia, and Madeline Zavodny. 2003. "Do Amnesty Programs Reduce Undocumented Immigration? Evidence from IRCA." *Demography*, 40(3): 437-450.

Pan, Ying. 2012. "The Impact of Legal Status on Immigrants' Earnings and Human Capital: Evidence from the IRCA 1986." *Journal of Labor Research* 33: 119-142.

Phillips, Julie A., and Douglas S. Massey. 1999. "The New Labor Market: Immigrants and Wages after IRCA." *Demography* 36(2): 233-246.

Passel, Jeffrey S. and D'Vera Cohn. 2018. "U.S. Unauthorized Immigrant Total Dips to Lowest Level in a Decade" Pew Research Center post dated November 27, 2018. https://www.pewresearch.org/hispanic/2018/11/27/u-s-unauthorized-immigrant-total-dips-to-lowest-level-in-a-decade/, accessed 20 December 2019.

Ruggles, Steven, Sarah Flood, Ronald Goeken, Josiah Grover, Erin Meyer, Jose Pacas and Matthew Sobek. 2019. *Integrated Public Use Microdata Series: Version 9.0*. Minneapolis: University of Minnesota.

Rytina, Nancy. 2002. "IRCA Legalization Effects: Lawful Permanent Residence and

Naturalization through 2001." Mimeo, Office of Policy and Planning Statistics Division, U.S. Immigration and Naturalization Service.

Spitzer, Yannay and Ariell Zimran. 2018. "Migrant self-selection: Anthropometric evidence from the mass migration of Italians to the United States, 1907–1925." *Journal of Development Economics* 134: pp. 226–247.

Steigleder, Quinn and Chad Sparber. 2017. "The effect of legal status on immigrant wages and occupational skills." *Applied Economics Letters* 24(2): 80-84.

Tienda, Marta. 2018. "Multiplying Diversity: Family Unification and the Regional Origins of Late-Age US Immigrants." *International Migration Review* 51(3) 727-756.

Tabellini, Marco. Forthcoming. "Gifts of the Immigrants, Woes of the Natives: Lessons from the Age of Mass Migration." *Review of Economic Studies*.

United States Department of Homeland Security. 2017. "Entry and Exit Overstay Report, Fiscal Year 2016." Washington, DC: U.S. Department of Homeland Security, Office of Immigration Statistics.

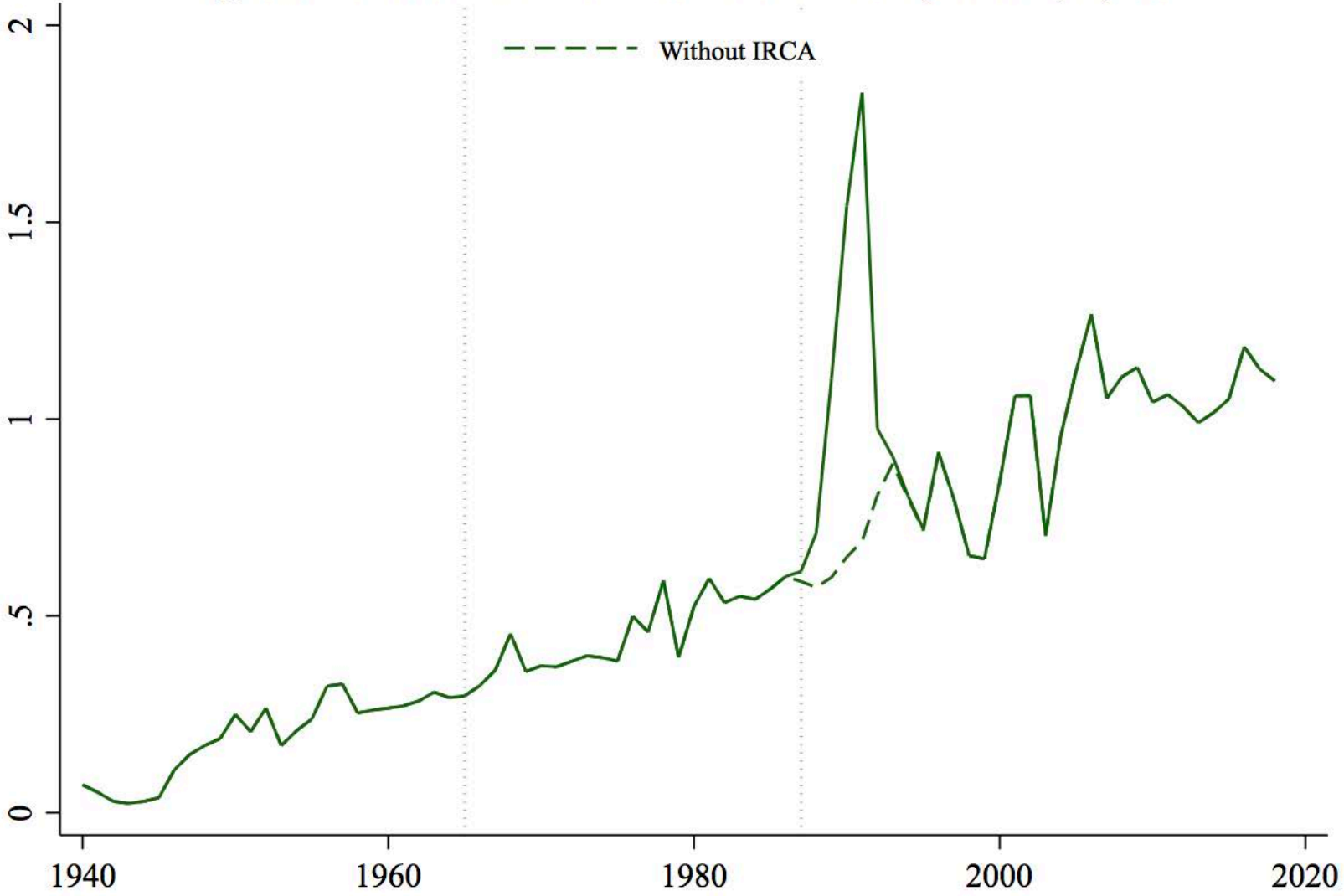
United States Department of Homeland Security. 2019. *Yearbook of Immigration Statistics: 2018*. Washington, D.C.: U.S. Department of Homeland Security, Office of Immigration Statistics.

Woodrow, Karen A. and Jeffrey S. Passel. 1990. "Post-IRCA Undocumented Immigration to the United States: An Assessment Based on the June 1988 CPS." In F.D. Bean, B. Edmonston, and J.S. Passel Eds. *Undocumented Migration to the United States: IRCA and the Experience of the 1980s*. Washington, DC: Urban Institute Press.

Yang, Dean. 2006. "Why Do Migrants Return to Poor Countries? Evidence from Philippine Migrants' Response to Exchange Rate Shocks." *Review of Economics and Statistics* 88(4): 715-735.

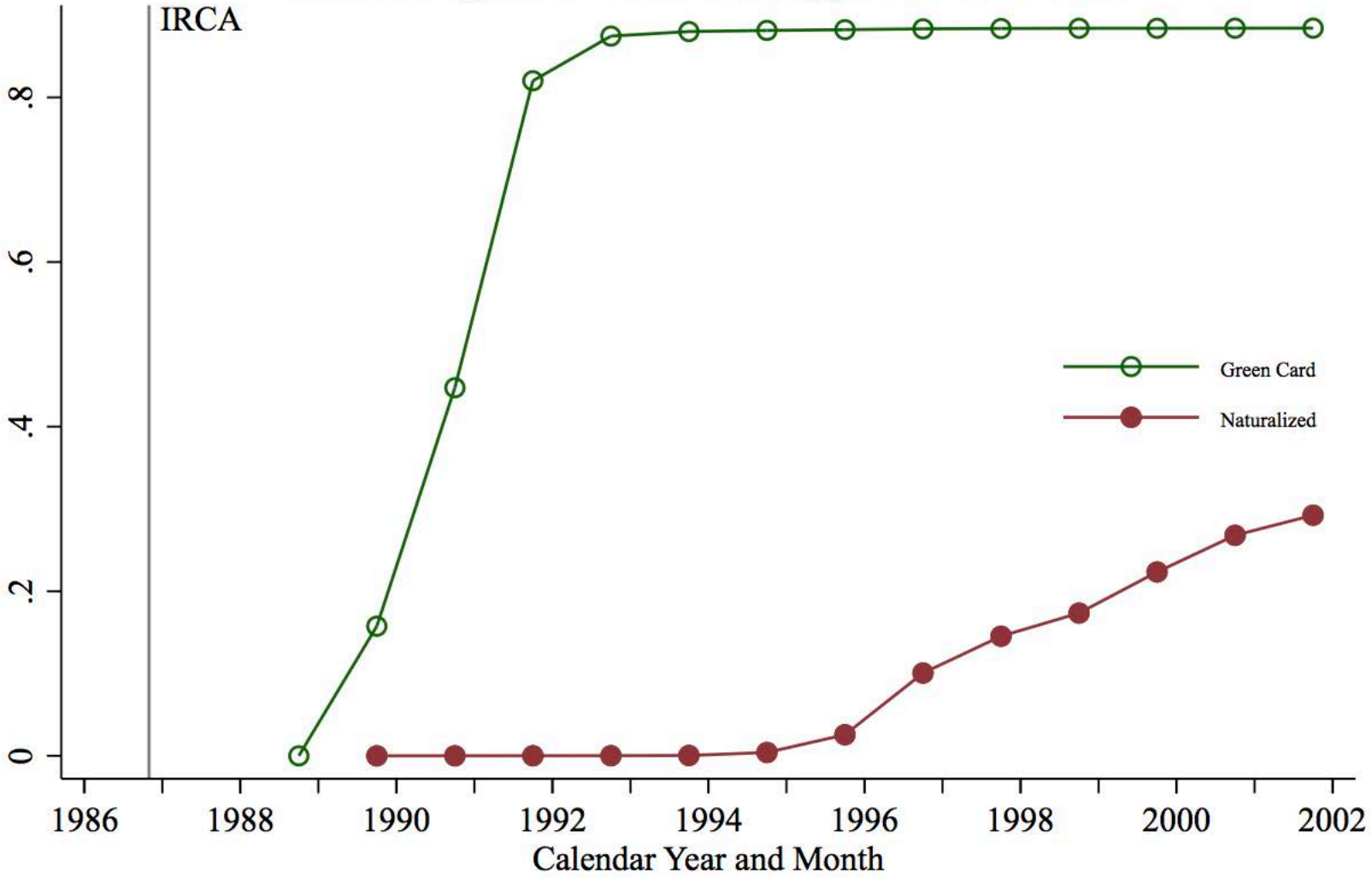
Yu, Bin. 2008. *Chain Migration Explained: The Power of the Immigration Multiplier*. New York: LFP Scholarly Publishing.

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



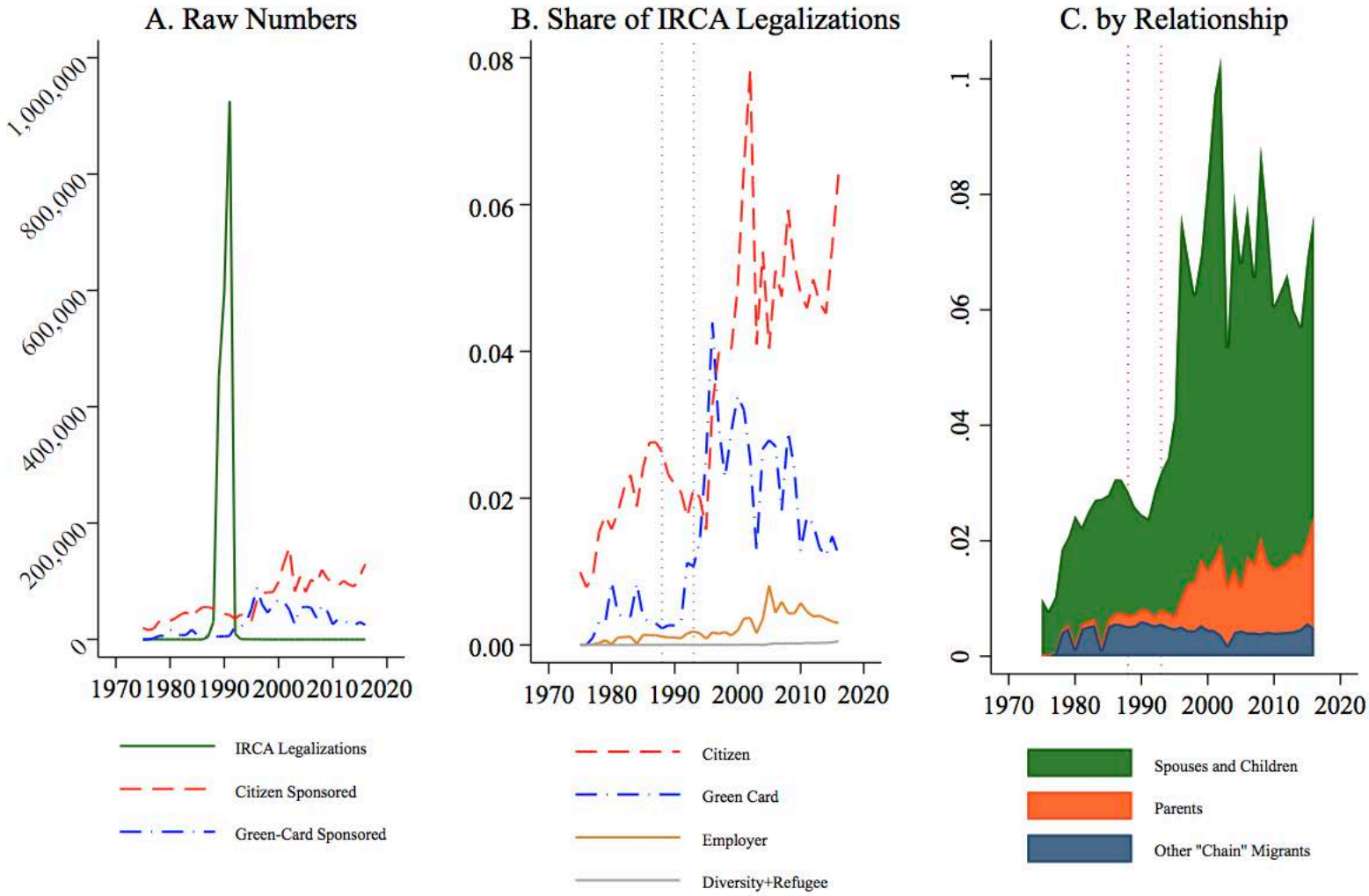
Source: Table 1 of the *2018 Yearbook of Immigration Statistics* (https://www.dhs.gov/immigration-statistics/yearbook/2018/table1).

Figure 2. Cumulative Legal Status of IRCA
General Legalization and SAW Applicants Over Time



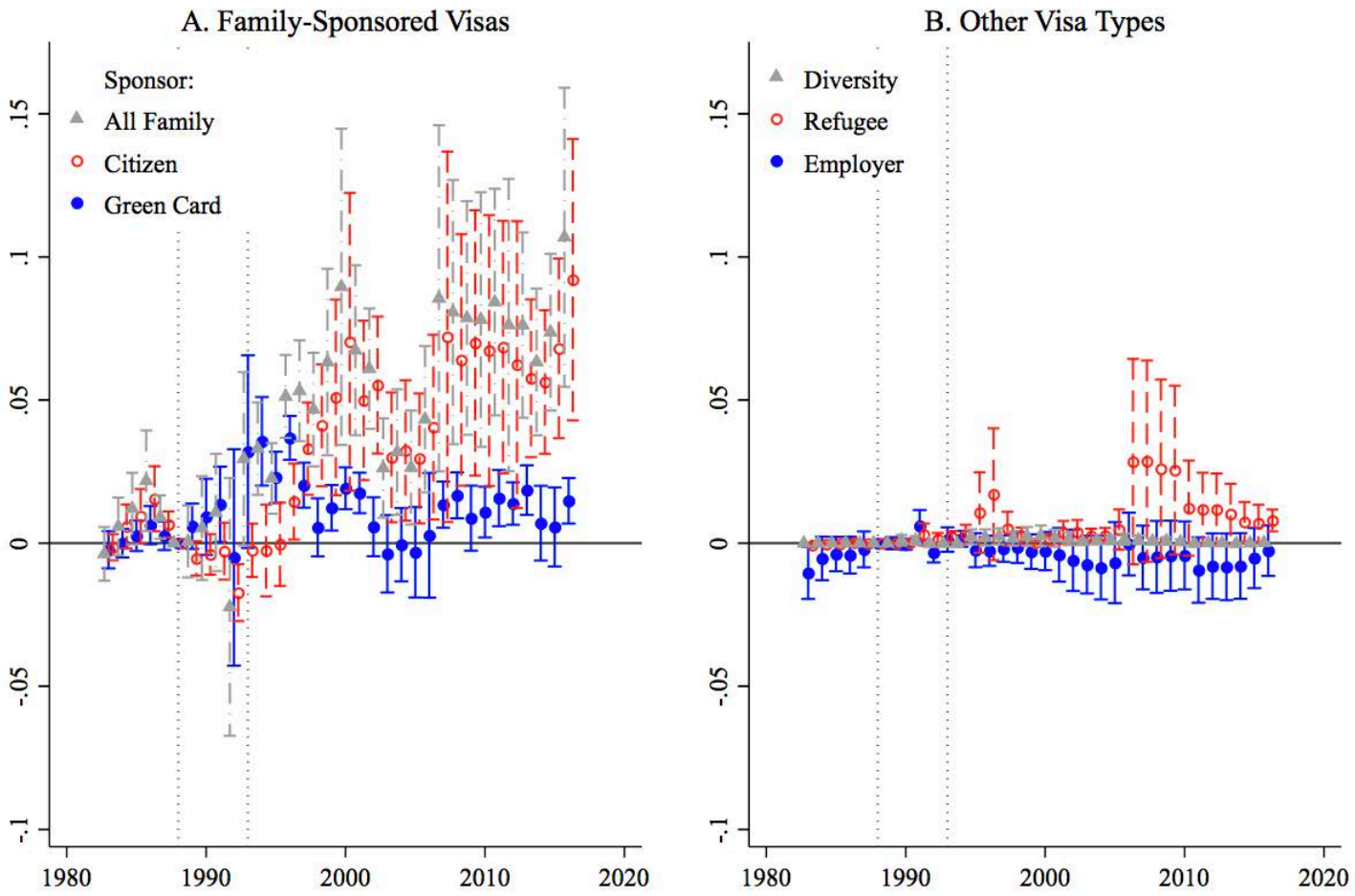
Source: Rytina (2002). Data on Green Cards and naturalizations are available for fiscal years.

Figure 3. Selected Mexican Admission Classes Over Time



Sources: Legalization Applications Processing System (LAPS) for IRCA legalizations and *Immigrants Admitted to the United States* (FY 1983-2000), *Yearbook of Immigration Statistics*, and https://www.dhs.gov/profiles-lawful-permanent-residents (FY 2001-2016) for all remaining variables. See Appendix A.

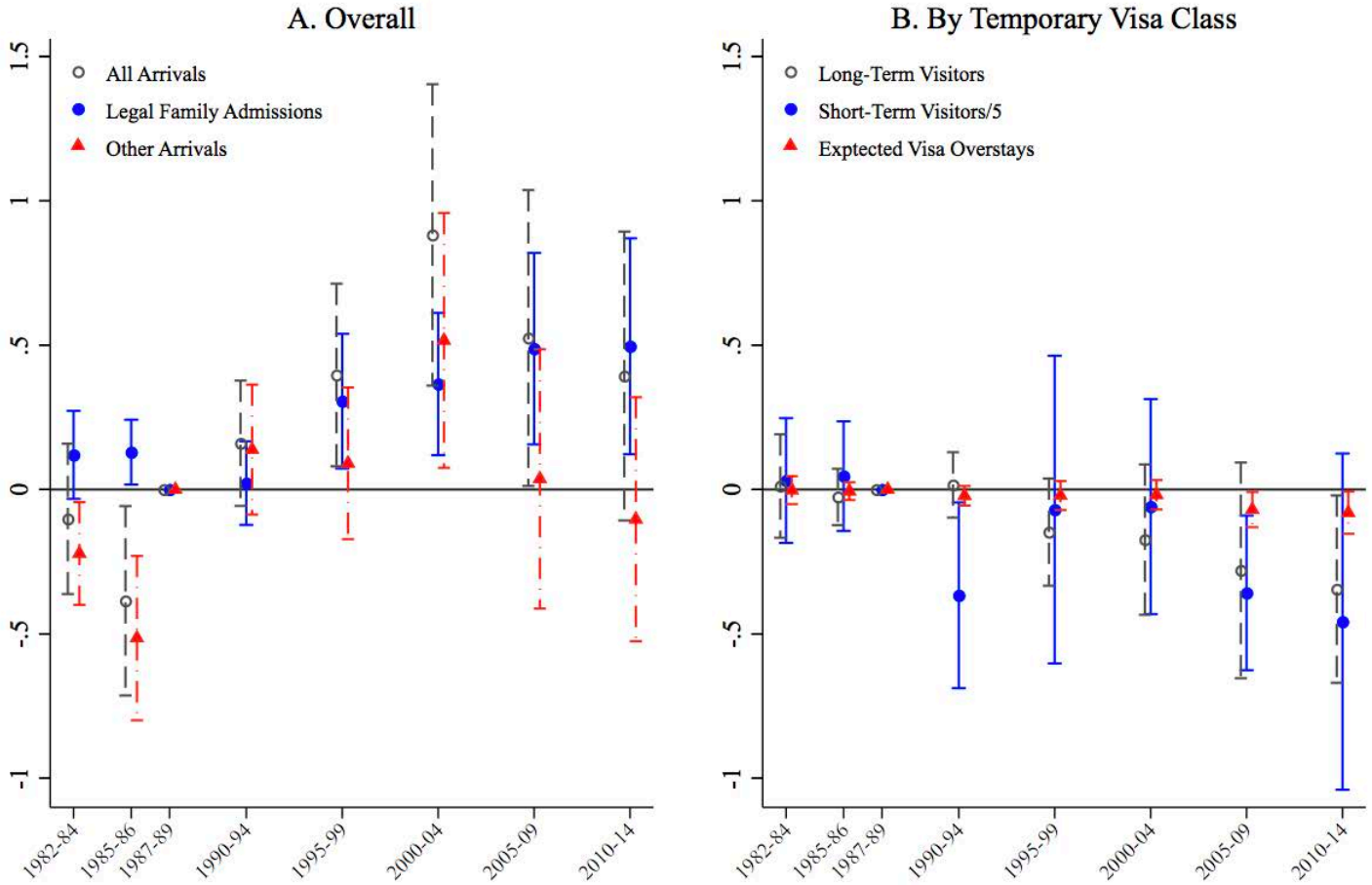
Figure 4. Response to IRCA Legalizations, by Visa Type and Year



Sources: Source list in notes to Figure 3 and *Alien Address Reports, [United States], 1980 Public Use File* for the denominator of the legalization ratio. See Appendix A.

Notes: Figures plot coefficients (with 95% confidence intervals) on the legalization ratio ($lpr_{c,IRCA}/lpr_{c,1980}$) 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 (model (1)). Regressions give each country equal weight, and standard errors are clustered on country. Estimation sample includes the 37 countries listed in Table A1.

Figure 5. Response to IRCA Legalizations, by Legal Status



Sources: Source list in notes to Figure 4; microdata from the Census and American Community Survey (Ruggles, et al., 2019) for all and other arrivals; and *Report of the Visa Office* (1983-1996) and https://travel.state.gov/content/travel/en/legal/visa-law0/visa-statistics/nonimmigrant-visa-statistics.html (1997-2014) for temporary visitors. See Appendix A.

Notes: Figures plot coefficients (with 95% confidence intervals) on the mean of the legalization ratio for the group to which the country belongs (above or below median) interacted with year group dummies from a regression that also includes country and year group-by-world region fixed effects; the interaction between the legalization ratio and the dummy for 1987-89 is omitted to identify the model (model (2)). Regressions give each country equal weight, and standard errors are clustered on country. Estimation sample includes 32 of the original 37 countries.

Table 1. Treatment variation

Panel A: Top Countries on Legalization Ratio

Country	**Treatment:** Legalization Ratio: (2)/(3)	Number Legalized by IRCA	Existing Green Card Holders, 1980	% of IRCA Legaliza-tions
	(1)	(2)	(3)	(4)
Mexico	**1.84**	**2,018,941**	**1,098,410**	73.9
Other 36 countries in our sample		*569,919*	*1,799,058*	20.8
El Salvador	4.09	151,879	37,129	5.6
Haiti	3.82	88,271	23,115	3.2
Guatemala	2.15	63,657	29,564	2.3
Tonga	1.88	3,185	1,694	0.1
Belize	1.15	6,023	5,223	0.2
Pakistan	1.01	17,009	16,787	0.6
Honduras	0.79	16,053	20,342	0.6
Samoa	0.76	994	1,314	0.0
Bolivia	0.72	4,333	6,006	0.2

Panel B: Correlates of the Legalization Ratio

Characteristic	Mean	Regressed on Leg. Ratio	
	(1)	(2)	(3)
Estimated Naturali-zation Rate	0.585	-0.0513	-0.0474
		(0.0211)	(0.0233)
Above Median Naturalization	0.514	-0.113	-0.117
		(0.0953)	(0.104)
Missing Real Exchange Rate	0.0811	0.0261	0.0468
		(0.0447)	(0.0405)
ln(Real Exchange Rate)	0.880	0.0159	-0.0736
		(0.331)	(0.243)
Upper Income Country	0.459	-0.198	-0.228
		(0.0553)	(0.0542)
Dummy Controls:			
North America		No	Yes
South America		No	Yes

Notes: We calculate the number legalized by IRCA by country from the LAPS microdata and the number of 1980 Green Card holders from *Alien Address Reports, 1980 Public Use File*. We estimate the naturalization rate by country from 2000 Census public-use microdata (Ruggles et al., 2019). Real exchange rates are from PWT 9.1 (Feenstra et al., 2015). The income bins are from the U.N.'s World Development Indicators.

Table 2. Long-Run Immigration Multipliers, 1989-2016, By Visa Type

	Baseline	Temporary Visa Sub-Sample[a]	Drop countries w/ binding waitlists[b]	Trends in "upper income"	Subsample with Country Controls[c]	(4) + Country Controls
	(1)	(2)	(3)	(4)	(5)	(6)
Overall Family Sponsored	1.44	1.42	1.39	1.32	1.69	1.49
	(0.37)	(0.37)	(0.94)	(0.38)	(0.39)	(0.29)
By Family Sponsorship Type						
Green-Card Sponsored	0.35	0.35	0.05	0.44	0.41	0.41
	(0.15)	(0.15)	(0.35)	(0.16)	(0.15)	(0.15)
Citizen-Sponsored	1.09	1.07	1.34	0.88	1.28	1.08
	(0.43)	(0.44)	(0.84)	(0.45)	(0.48)	(0.40)
By Relative Type						
Spouses and Children	0.93	0.91	1.09	0.94	1.07	0.95
	(0.21)	(0.20)	(0.68)	(0.23)	(0.22)	(0.16)
Parents	0.27	0.28	0.13	0.23	0.31	0.28
	(0.10)	(0.10)	(0.13)	(0.10)	(0.09)	(0.09)
Other ("Chain" Migrants)	0.23	0.23	0.15	0.14	0.32	0.27
	(0.11)	(0.10)	(0.26)	(0.10)	(0.11)	(0.08)
Other Major Categories						
Employer Sponsored	-0.10	-0.10	0.48	-0.15	-0.04	-0.13
	(0.13)	(0.12)	(0.35)	(0.16)	(0.14)	(0.10)
Refugees	0.24	0.24	-0.01	0.23	0.27	0.26
	(0.16)	(0.16)	(0.12)	(0.17)	(0.17)	(0.17)
Diversity	0.02	0.02	0.08	0.02	0.02	0.02
	(0.02)	(0.02)	(0.05)	(0.02)	(0.02)	(0.03)
Countries:	37	32	34	37	34	34
Years:[d]	1989-2016	1989-2016	1989-2016	1989-2016	1989-2016	1989-2016
Fixed Effects						
Country	Yes	Yes	Yes	Yes	Yes	Yes
Region x Year	Yes	Yes	Yes	Yes	Yes	Yes
Income bin x Year	No	No	No	Yes	No	No
Time-Varying Country[c]	No	No	No	No	No	Yes

Notes: Each cell gives long-run "multiplier" (sum of post-1988 arrival year-specific coefficients) from a regression of a country's admissions in the specified admissions category per 1980 legal permanent resident (LPR) on year-specific effects of the legalization ratio ($lpr_{c,IRCA}/lpr_{c,1980}$). Standard errors, in parentheses, are clustered on country. See text and Appendix A for data sources.

[a] Temporary visa data are unavailable for three countries: Bermuda, Grenada and Hong Kong. Two others - India and Brazil - are outliers in trends in temporary visa data.

[b] The countries with binding waitlists are India, Philippines and Mexico.

[c] Real exchange rate and population controls unavailable for Guyana, Samoa, and Tonga.

[d] Regressions are based on 1983-2016 annual data; multiplier calculated over the "post" period 1989-2016.

Table 3. Long-Run Immigration Multipliers, By Visa Type: Alternative Sources of Variation

	All Countries	Mexico by MSA	All Countries Naturalization Rate >.59	All Countries Naturalization Rate <.59
	(1)	(2)	(3)	(4)
Overall Family Sponsored	1.14	0.77	2.41	0.85
	(0.30)	(0.17)	(0.62)	(0.21)
By Family Sponsorship Type				
Green-Card Sponsored	0.33	0.36	0.26	0.30
	(0.10)	(0.03)	(0.09)	(0.12)
Citizen-Sponsored	0.81	0.41	2.15	0.55
	(0.34)	(0.14)	(0.58)	(0.20)
By Relative Type				
Spouses and Children	0.72	0.65	1.36	0.63
	(0.17)	(0.12)	(0.33)	(0.16)
Parents	0.21	0.09	0.51	0.14
	(0.08)	(0.04)	(0.06)	(0.05)
Other "Chain" Migrants	0.20	0.03	0.54	0.07
	(0.08)	(0.01)	(0.23)	(0.09)
Other Major Categories				
Employer Sponsored	-0.07	0.02	0.10	-0.26
	(0.09)	(0.04)	(0.15)	(0.12)
Refugees	0.19	0.01	0.57	0.05
	(0.12)	(0.01)	(0.02)	(0.03)
Diversity	0.02	0.00	0.04	0.02
	(0.01)	(0.00)	(0.05)	(0.02)
Sample:	37 Count.	49 MSAs	37 Countries	
Years:[a]	(No 1998, 2001-2006)		1989-2016	
Fixed Effects				
Country	Yes	Yes	Yes	Yes
Region x Year	Yes	Yes	Yes	Yes
Country x Year	No	Yes	No	No

Notes: Each cell gives long-run "multiplier" (sum of post-1988 arrival year-specific coefficients) from a regression of the specified immigration variable per 1980 legal permanent resident (LPR) on year-specific effects of the legalization ratio (IRCA legalized immigrants/1980 LPR). Standard errors, in parentheses, are clustered on country in columns 1, 3 and 4 and on MSA in column 2. See text and Appendix A for data sources.

[a] Regressions are based on 1983-2016 annual data; multiplier calculated over the "post" period 1989-2016. Columns 1 and 2 do not use the years 1998 or 2001-2006 due to lack of data.

Table 4. Response to Legalization Ratio, Other Arrivals and Temporary Visas

	Baseline	Trends in "upper income"	Subsample with Country Controls[d]	(4) + Country Controls	No Upper Central America[e]
	(1)	(2)	(3)	(4)	(5)
A. Immigration Totals					
Overall Family Sponsored	1.68	1.38	1.94	1.48	1.50
(Green cards)	(0.74)	(0.78)	(0.85)	(0.62)	(0.94)
Total Arrivals (Census/ACS)	2.36	2.14	2.78	2.41	1.57
	(1.08)	(0.94)	(1.20)	(1.10)	(0.99)
p-value on difference	0.44	0.24	0.40	0.37	0.88
B. By Temporary Visa Type					
Short-Term Visitors[a]	-6.56	-5.61	-6.92	-7.70	-10.29
	(4.34)	(5.17)	(4.37)	(4.51)	(4.82)
Long-Term Visitors	-0.93	-0.79	-1.34	-1.45	-0.83
	(0.67)	(0.87)	(0.64)	(0.70)	(0.65)
Student/Exchange[b]	-0.76	-0.60	-0.81	-0.78	-0.78
	(0.37)	(0.38)	(0.30)	(0.29)	(0.43)
Other	-0.17	-0.19	-0.53	-0.67	-0.05
	(0.52)	(0.62)	(0.53)	(0.55)	(0.45)
C. Expected Visa Overstayers					
Total	-0.21	-0.22	-0.17	-0.18	-0.25
	(0.14)	(0.17)	(0.13)	(0.13)	(0.13)
On Short-Term Visas[a]	-0.12	-0.11	-0.07	-0.08	-0.21
	(0.10)	(0.10)	(0.09)	(0.09)	(0.10)
On Student/Exchange[b]	-0.04	-0.03	-0.03	-0.03	-0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
On Another Visa	-0.05	-0.08	-0.08	-0.07	-0.01
	(0.09)	(0.09)	(0.09)	(0.09)	(0.06)
Countries:	32	32	29	29	28
Years:[c]	1990-2014	1990-2014	1990-2014	1990-2014	1990-2014
Fixed Effects					
Country	Yes	Yes	Yes	Yes	Yes
Region x Year	Yes	Yes	Yes	Yes	Yes
Income bin x Year	No	Yes	No	No	No
Time-Varying Country[d]	No	No	No	Yes	No

Notes: Each cell gives long-run "multiplier" (sum of post-1987/89 arrival year-group coefficients) from a regression of the specified immigration variable per 1980 legal permanent resident (LPR) on a vector of year bin dummies interacted with a dummy for above median legalization ratio (IRCA legalized immigrants/1980 LPR), scaled by the mean difference in legalization ratios above/below median. Standard errors, in parentheses, are clustered on country. See text and Appendix A for data sources.

[a] B-visas and border crossing cards.

[b] F-, J-, and M-visas. Expected overstays are the product of visa counts with the country-specific fiscal 2016 overstay rate for each visa category (U.S. Department of Homeland Security, 2017).

[c] Regressions are based on 1982-2014 data in five-year bins except for 1982-84, 1985-86, 1987-89 (arrival bins in the 1990 Census); multiplier calculated over the "post" period 1990-2014.

[d] Real exchange rate and population controls unavailable for Guyana, Samoa, and Tonga.

[e] Drops Mexico, El Salvador, Guatemala, and Honduras.

Table 5. Relationship Between Legalization Ratio and the Characteristics of Recent Arrivals

	High School Graduate	>9 Years Schooling	Years of Education	Any Public Income	Married, Spouse Present	Kids < 6 (incl. US Born)
	(1)	(2)	(3)	(4)	(5)	(6)
Legalization Ratio						
x 1995-2004	0.0039	-0.0005	-0.0086	0.0012	-0.0011	0.0263***
	(0.0209)	(0.0184)	(0.1739)	(0.0057)	(0.0203)	(0.0076)
x 2005-2014	0.0168	0.0001	-0.2095	0.0058	0.0366	0.0089
	(0.0296)	(0.0295)	(0.2893)	(0.0084)	(0.0441)	(0.0208)
P-value: 1995-2004 = 2005-2014	0.39	0.96	0.34	0.27	0.38	0.38
Fixed Effects						
Country	Yes	Yes	Yes	Yes	Yes	Yes
Region x Year	Yes	Yes	Yes	Yes	Yes	Yes
Income bin x Year	Yes	Yes	Yes	Yes	Yes	Yes
1987-89 Mean	0.640	0.841	11.561	0.0160	0.450	0.255

Notes: Each column shows the year-varying coefficients from a regression of the characteristic specified in the column header on a dummy for above median legalization ratio (IRCA legalized immigrants/1980 LPR), scaled by the mean difference in legalization ratios above/below median. Standard errors, in parentheses, are clustered on country. Data are 18-65 year-olds in stacked 1990, 2000 Census and 2006-2017 ACS with mean characteristics linearly adjusted to three years in the U.S. See Appendix A for a description of the adjustment.

Appendix A. Data

I. Treatment Variable: Legalization Ratios

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) 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 when a Green Card was awarded, through the end of the 1992 fiscal year.[36] 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 (imputed from zip code of intended residence). For the metro area-level analysis for Mexican admissions, we focus on 49 metropolitan areas (by 1999 definitions) that are observable in admissions statistics published by DHS for years 2001 and later.[37] For the country-level analysis, we focus on 37 countries where IRCA admissions represented at least a third of total admissions also including refugees and the diversity visa, over 1983 to 2016. Section II describes these other admissions data in more detail.

The LAPS fields also include the applicant's reported year of arrival in the U.S. and (for GLP applicants) whether the unauthorized status was the result of a visa overstay. We use this information to inform the analysis of visa overstays in Section IV.

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 (37 sample countries) and metro area (for Mexicans only) across the 1987 to 1997 fiscal years from the 1987 to 1997 *Immigrants Admitted to the United States* microdata, available on ICPSR. 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.

[36] 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.

[37] Because we focus on these 49 relatively large metro areas, the estimates are unaffected by the fact that county 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.

C. Alien Address Reports

We obtain 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 LPRs resident in the U.S. in 1980. These data were collected as part of the Immigration and Naturalization Service'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 (1999 definitions).

D. Descriptive Statistics

Table A1 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 source I.C; 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).

The first row of Table A2 shows the (unweighted or country-weighted) mean and standard deviation of the legalization ratio, both in the overall sample of 37 countries and subsamples defined by whether the country's naturalization rate is above the sample median (0.59). The average value of the legalization ratio in the sample overall is 0.65, and the standard deviation is nearly one (0.95) (column 1). Countries with lower naturalization rates have higher legalization ratios. This result continues to hold, albeit not with a great deal of precision, when we adjust for world region (Table 1 Panel B).

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 *Immigrants Admitted to the United States* microdata, available on ICPSR, for fiscal years 1983 through 2000. 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.[38] 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 2001 and 2016 (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 –

[38] Location is recorded in different ways over time, e.g., initially as zip code and state and later as metropolitan area. We convert all location information to metro areas (by 1999 definitions). Location information is missing in 1998.

spouses and children of the sponsor, parents of the sponsor, and other relatives of the sponsor. Admissions by age are not available by class of admission in the published data, so we consider all admissions in the age groups reported there – under 18, 18-24, 25-34, 35-44, 45-54, 55-64, and 65 plus.

B. Office of Immigration Statistics Tables

Unfortunately for our study, when responsibility for the dissemination immigration statistics shifted to the Department of Homeland Security, publication of anonymized admissions microdata ceased. We have collected tables for 2001 to 2016 from the *Yearbook of Immigration Statistics* and an online DHS database.[39] In addition to the constraints on these data noted in Section II.A, we lack information on total admissions by age for 2001 and 2002 and on Mexican admissions by metropolitan area for 2001-2006.

C. Descriptive Statistics

Table A2 provides (unweighted or country-weighted) means and standard deviations of country-level admissions by sponsor/admissions type and relative type (for family-sponsored admissions), normalized by the number of LPRs from the country resident in the U.S. in 1980 (from the source described in Section I.B). Statistics pool across all years. Family-sponsored admissions have the highest mean of all categories. This mean is mainly accounted for by citizen-sponsored admissions and admissions (by Green Card holders and citizens combined) of spouses and children. With the exception of spouses and children, countries with higher naturalization rates have higher means (and variances) on all family-sponsored categories.

III. Outcomes Data: Non-immigrant Admissions (Visitors)

A. State Department Data

Through 1996, we use the State Department's annual publication *Report of the Visa Office* to obtain statistics on new temporary visas issued each year at foreign consulates by visa class and nationality. This generally appears in the report's Table XVII. Post-1996, these statistics appear in a spreadsheet that is available on-line at the State Department website (as of 9/6/2020 at https://travel.state.gov/content/travel/en/legal/visa-law0/visa-statistics/nonimmigrant-visa-statistics.html). We are currently missing the following years: 1982, 1988, 1991, 1994, 1995, and 1996, and so we scaled up the counts to match the number of years in each interval in our data (1982-84 counts are multiplied by 3/2; 1987-89 counts are multiplied by 3/2; 1991-1994 counts are multiplied by 5/4; 1995-1999 counts are multiplied by 5/3.)

B. Descriptive Statistics

Unweighted descriptive statistics on the sample used to analyze the temporary visa data are shown in Table A4.

[39] https://www.dhs.gov/profiles-lawful-permanent-residents

IV. Outcomes Data: Total Arrivals

We estimated counts and characteristics of recent immigrant arrivals by country from the 5% public-use microdata samples of the 1990 and 2000 Decennial Censuses (Ruggles, et al., 2019) and the public-use microdata samples of the 2006-2017 American Community Surveys. We focus on persons born in one of the 37 sample countries.[40] 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, we begin by estimating U.S. resident population counts of immigrant arrivals by survey year *y*, arrival year (or cohort) *t*, and country of birth *c*, N_{cyt}, for the countries in our sample. We normalize these counts by $lpr_{c,1980}$ to account for differences in scale across countries, then regress these normalized counts on a vector of country-by-arrival cohort fixed effects and a country-specific effect of years in the U.S., $y - t$:

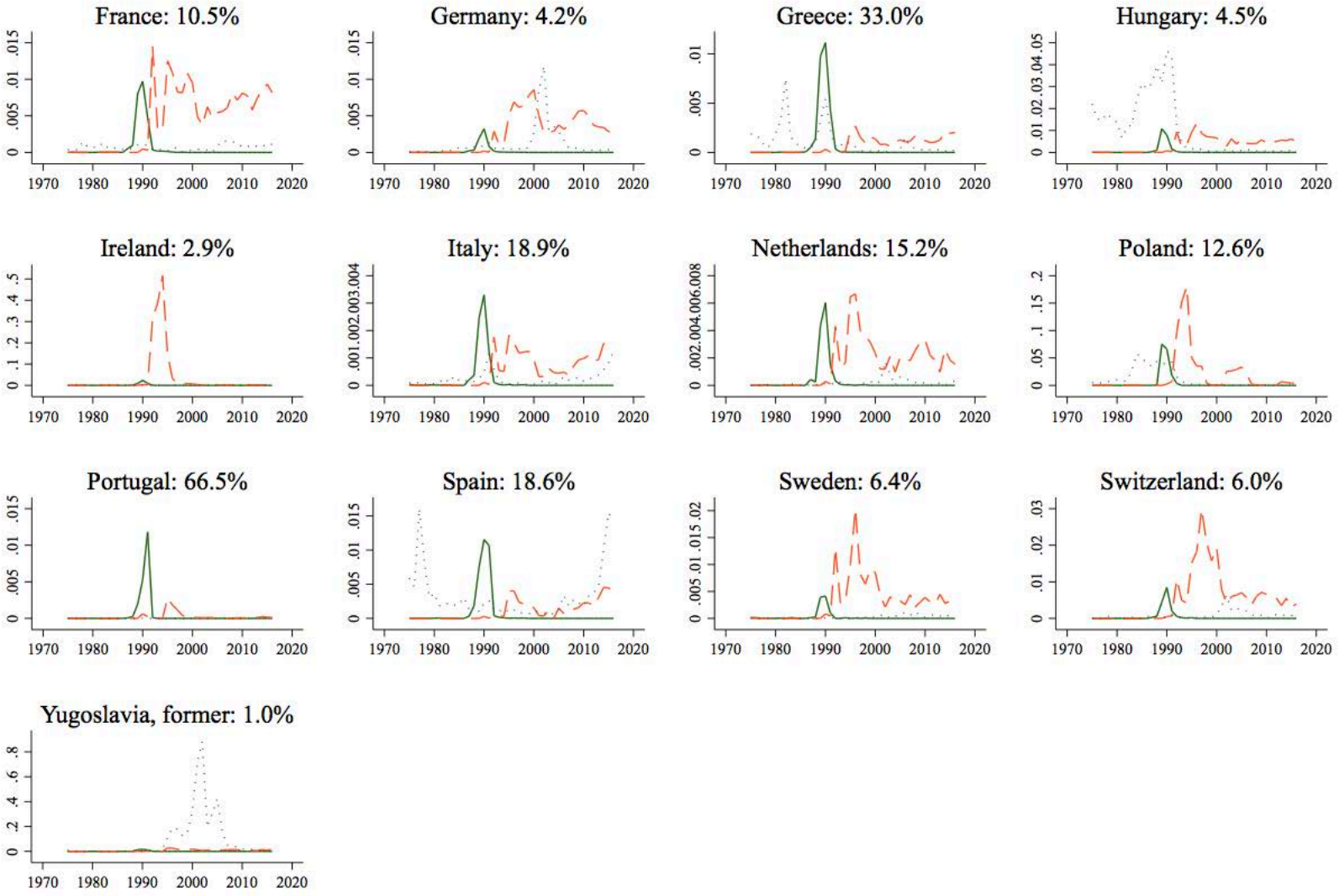
$$\frac{N_{cyt}}{lpr_{c,1980}} = \eta_{ct} + \beta_c(y - t) + v_{cyt}.$$

To predict (normalized) cohort size at entry, we then evaluate the fit of this model at zero years in the U.S., i.e., $\frac{\widehat{N_{cyt}}}{lpr_{c,1980}} = \hat{\eta}_{ct}$ when $y - t = 0$. The difference $\hat{\eta}_{ct} - \frac{A_{ct}}{lpr_{c,1980}}$, where A_{ct} is total family-sponsored LPRs from country *c* in arrival cohort *t*, then captures arrivals in all other immigrant categories ("other arrivals"). When examining changes in immigrant characteristics in Section V (Table 5), we do a similar adjustment, but evaluate the fitted model at three years in the U.S. ($y - t = 3$).

We also used the 2000 Decennial Census to approximate the naturalization rates of the IRCA cohort (entering 1972 to 1987) by country. For Mexicans in this cohort, we arrive at a naturalization rate of 34% – between the rates reported by Rytina (2002) for Mexican IRCA Green Card holders (27%) and Mexican non-IRCA 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-Mexican IRCA Green Card holders as a group – 55% in the Census versus 52% in the administrative data. For non-Mexicans, naturalization rates of IRCA LPRs were also 7 percentage points below those of LPRs from roughly the same arrival cohort (1979-82) who received Green Cards through other channels.

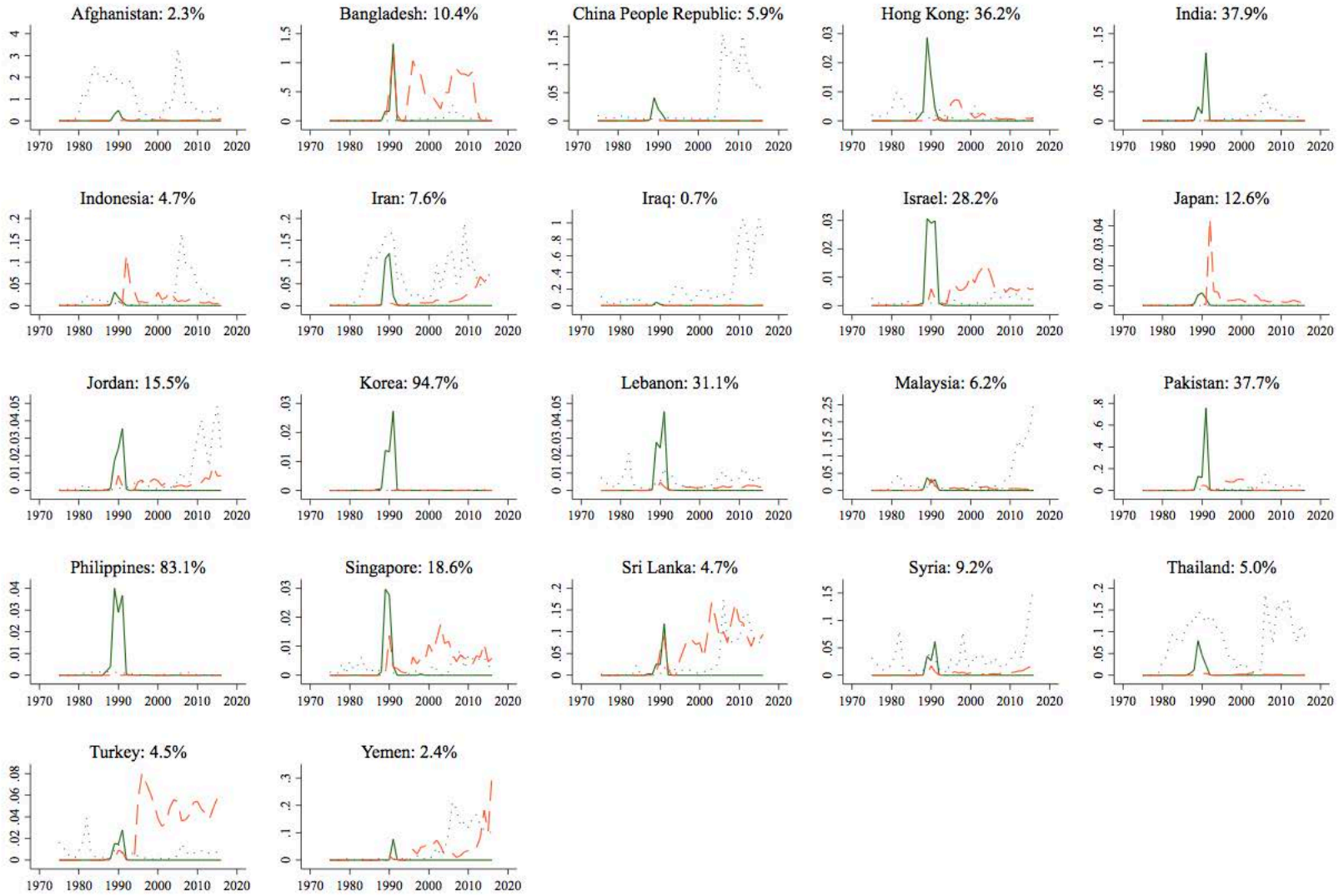
[40] We exclude a small number of individuals born to U.S. citizens abroad.

Figure A1a. Europe. IRCA Legalizations, Diversity, Refugees (w/IRCA's %)



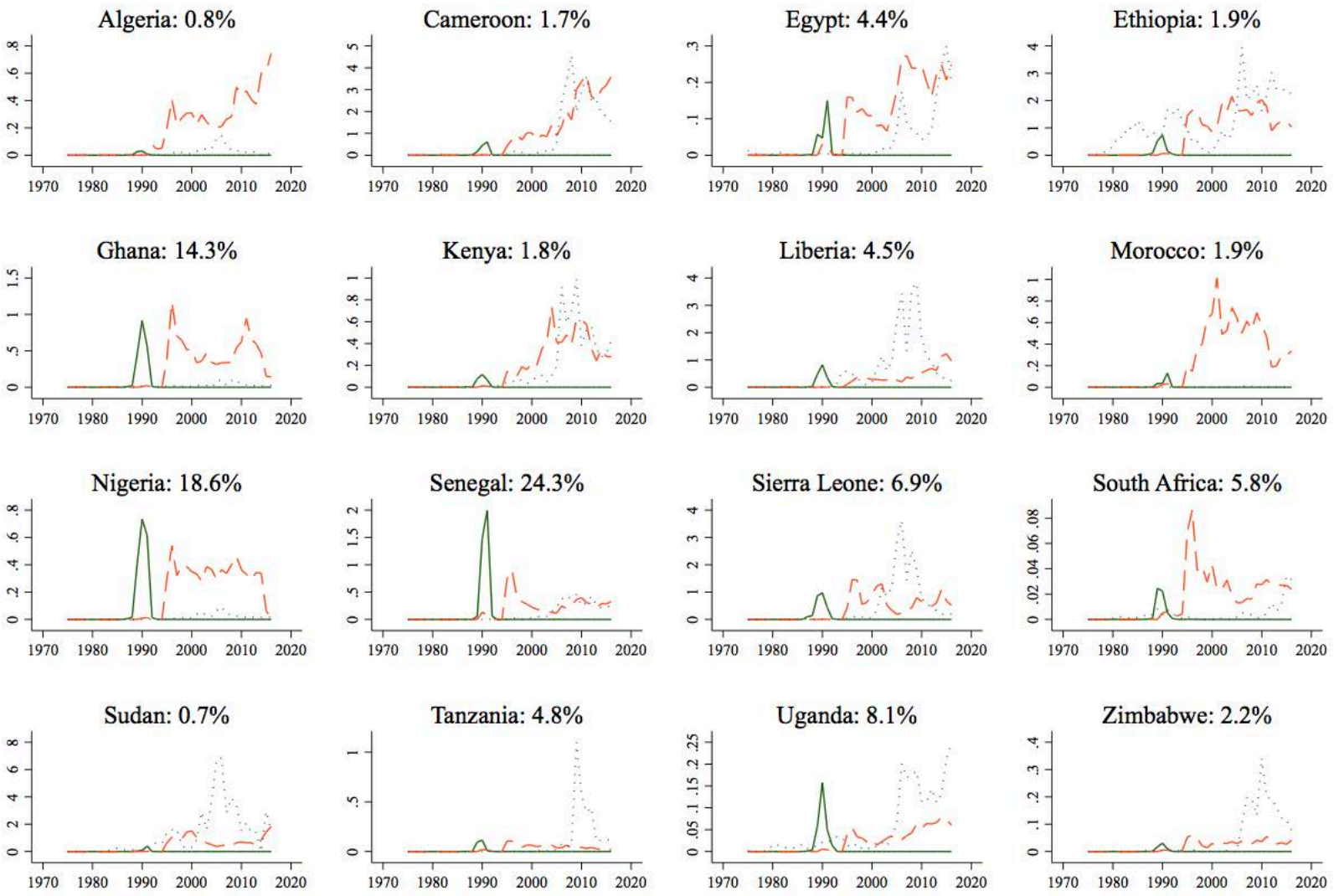
Sources: Legalization Applications Processing System (LAPS) for IRCA legalizations and *Immigrants Admitted to the United States* (FY 1983-2000), *Yearbook of Immigration Statistics*, and https://www.dhs.gov/profiles-lawful-permanent-residents (FY 2001-2016) for all remaining variables. See Appendix A.
Notes: Solid green = IRCA legalizations, dashed orange = diversity visas, dotted blue = refugees.

Figure A1b. Asia. IRCA Legalizations, Diversity, Refugees (w/IRCA's %)



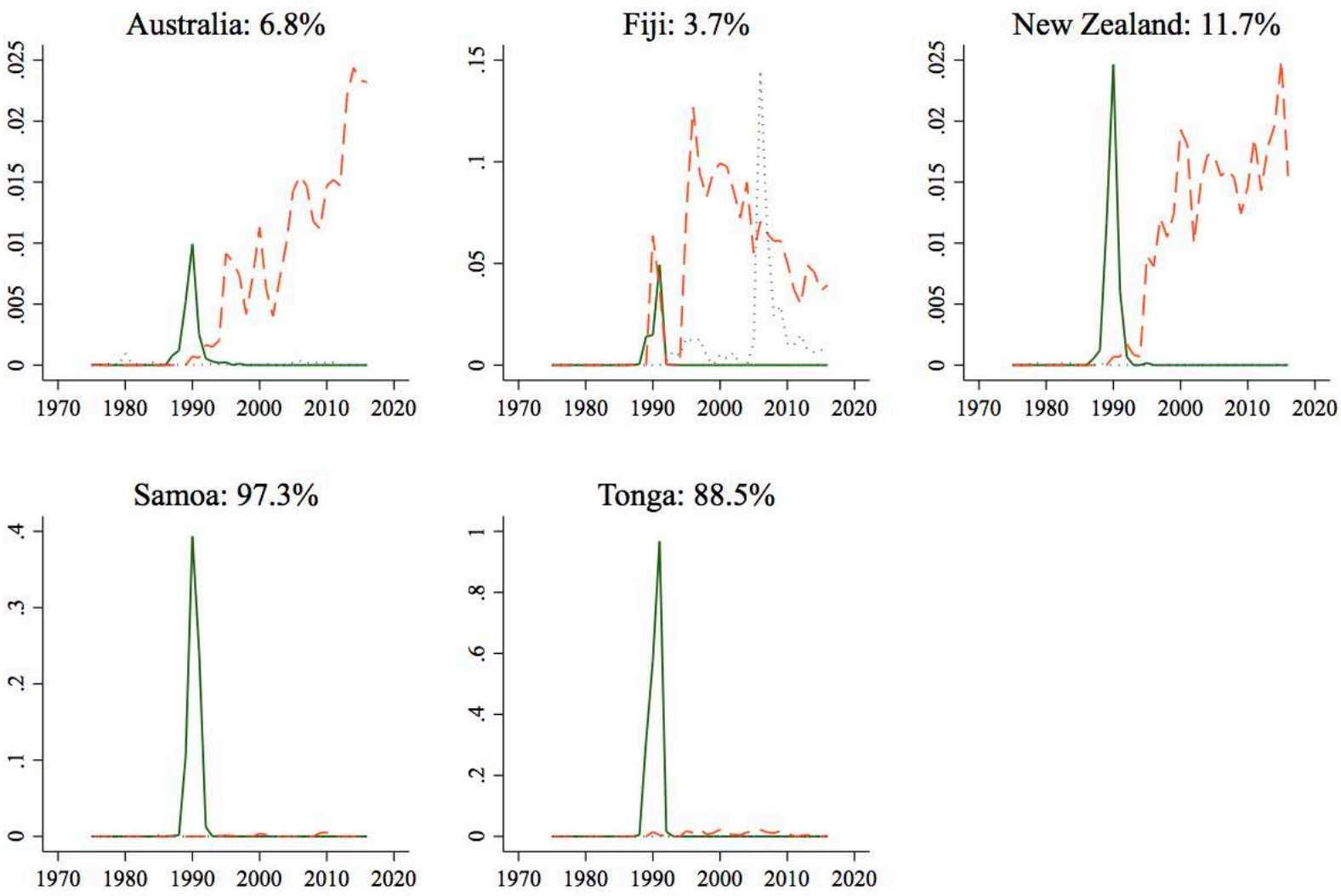
Sources and notes: See Figure A1a.

Figure A1c. Africa. IRCA Legalizations, Diversity, Refugees (w/IRCA's %)



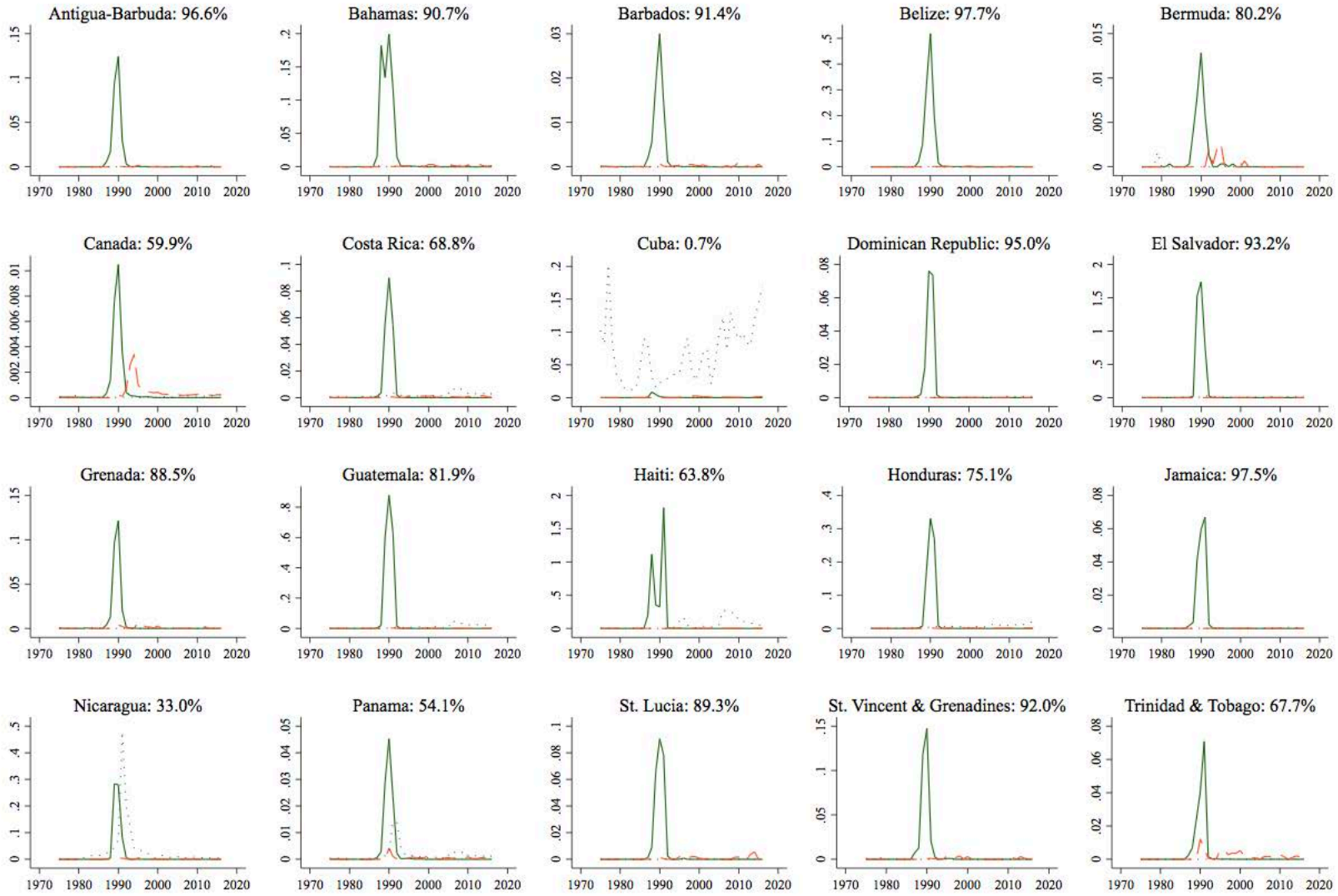
Sources and notes: See Figure A1a.

Figure A1d. Oceania. IRCA Legalizations, Diversity, Refugees (w/IRCA's %)



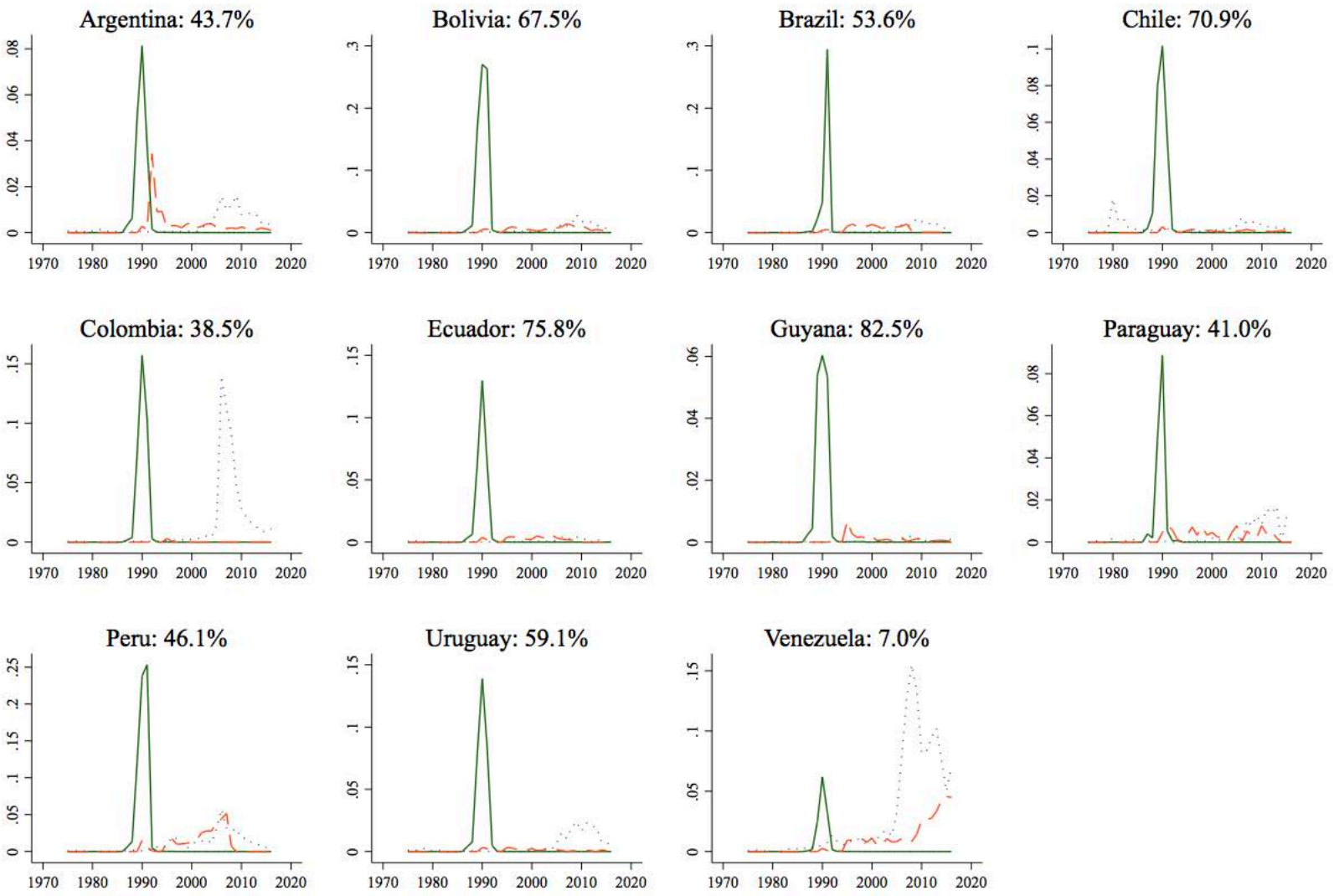
Sources and notes: See Figure A1a.

Figure A1e. Central/North America. IRCA Legalizations, Diversity, Refugees (w/IRCA's %)



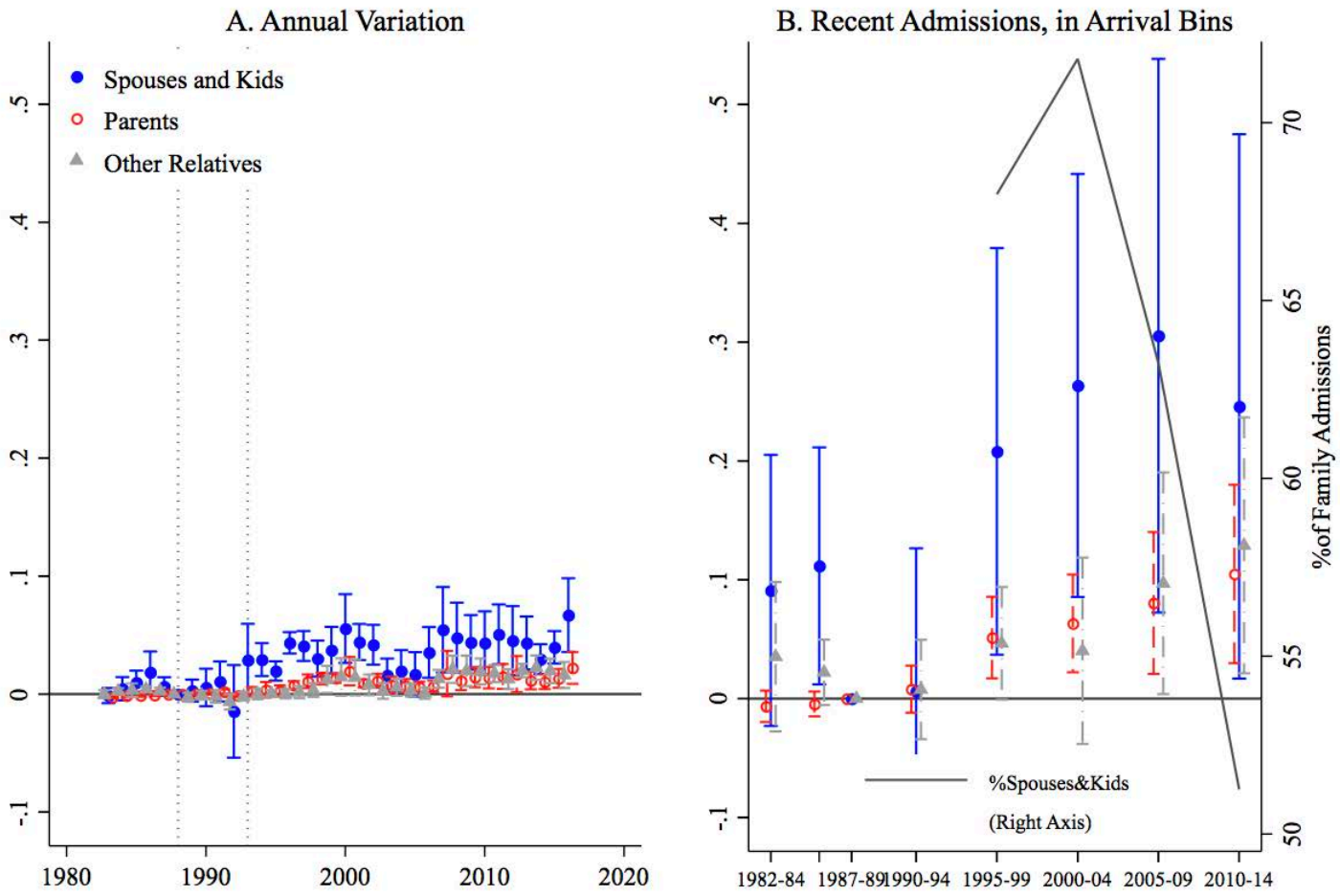
Sources and notes: See Figure A1a.

Figure A1f. South America. IRCA Legalizations, Diversity, Refugees (w/IRCA's %)



Sources and notes: See Figure A1a.

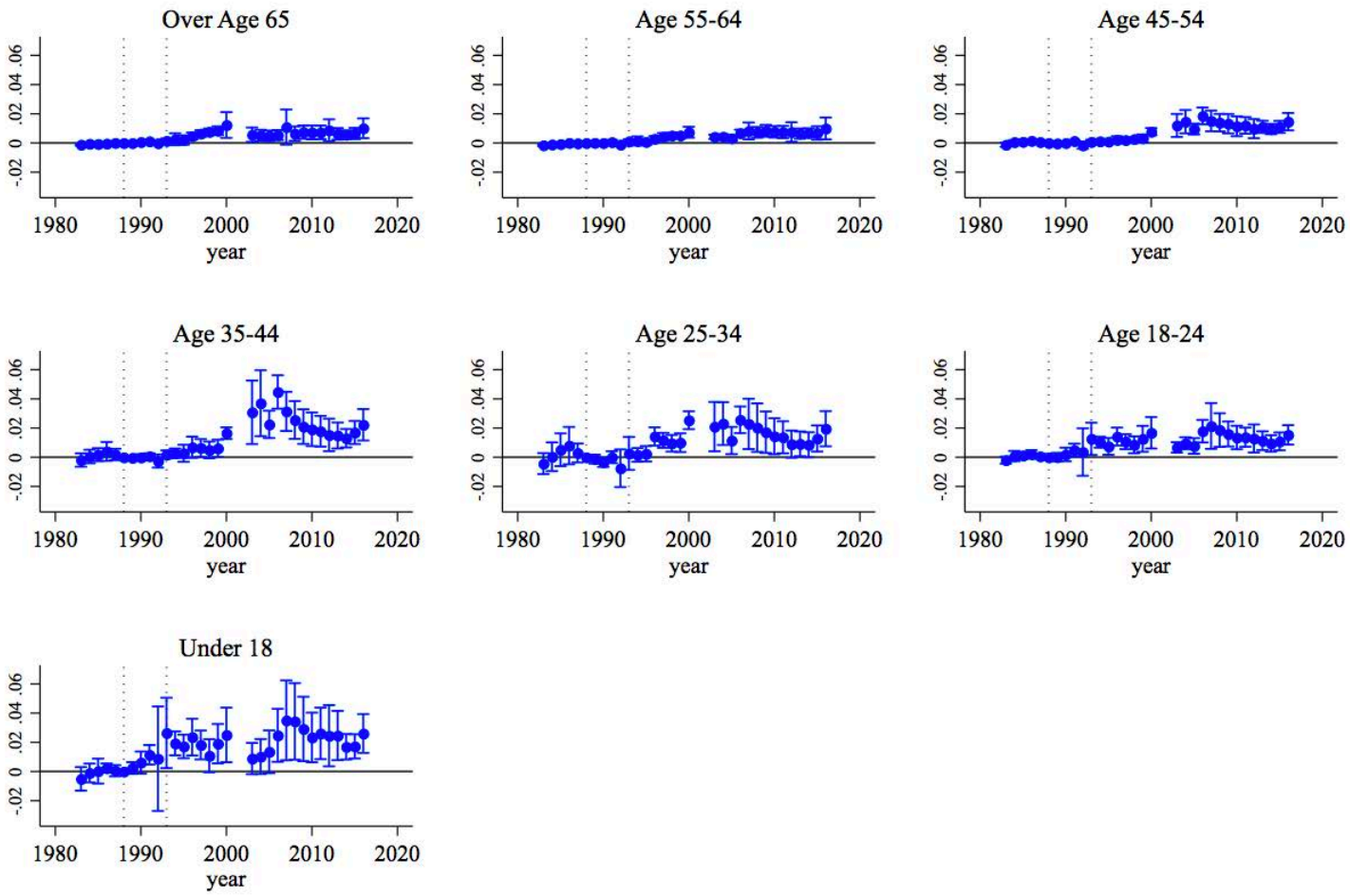
Figure A2. Response to IRCA Legalizations, by Relationship



Sources: Legalization Applications Processing System (LAPS) and *Alien Address Reports, [United States], 1980 Public Use File* for the legalization ratio and *Immigrants Admitted to the United States* (FY 1983-2000), *Yearbook of Immigration Statistics*, and https://www.dhs.gov/profiles-lawful-permanent-residents (FY 2001-2016) for all remaining variables. See Appendix A.

Notes: Panel A plots coefficients (with 95% confidence intervals) on the legalization ratio ($lpr_{c,IRCA}/lpr_{c,1980}$) 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 (model (1)). Estimation sample includes the 37 countries listed in Table A1. Panel B plots coefficients (with 95% confidence intervals) on the mean of the legalization ratio for the group to which the country belongs (above or below median) interacted with year group dummies from a regression that also includes country and year group-by-world region fixed effects; the interaction between the legalization ratio and the dummy for 1987-89 is omitted to identify the model (model (2)). Estimation sample includes 32 of the original 37 countries. Regressions give each country equal weight, and standard errors are clustered on country.

Figure A3. Admissions Response to IRCA Legalizations, by Year and Age



Sources: Legalization Applications Processing System (LAPS) and *Alien Address Reports, [United States], 1980 Public Use File* for the legalization ratio and *Immigrants Admitted to the United States* (FY 1983-2000), *Yearbook of Immigration Statistics*, and https://www.dhs.gov/profiles-lawful-permanent-residents (FY 2001-2016) for all remaining variables. See Appendix A.

Notes: Figures plot coefficients (with 95% confidence intervals) on the legalization ratio ($lpr_{c,IRCA}/lpr_{c,1980}$) 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 (model (1)). Regressions give each country equal weight, and standard errors are clustered on country. Estimation sample includes the 37 countries listed in Table A1.

Table A1. Treatment variation and Characteristics, All Countries by Region

Region and Country	**Treatment:** Legalization Ratio: (2)/(3)	Number Legalized by IRCA	Existing Green Card Holders, 1980	% of IRCA Legaliza-tions	Characteristics Estimated % who naturalize	Characteristics Upper Income Country?
	(1)	(2)	(3)	(4)	(5)	(6)
1. Europe						
Portugal	0.02	2,550	131,327	0.09	54.68	1
2. Asia						
Hong Kong SAR, China	0.05	2,546	48,059	0.09	84.21	1
India	0.16	20,900	133,792	0.76	71.04	0
Korea, Rep.	0.06	10,203	183,809	0.37	71.77	1
Pakistan	1.01	17,009	16,787	0.62	74.84	0
Philippines	0.11	28,039	249,160	1.03	79.92	0
3. Africa						
(none)						
4. Pacific						
Samoa	0.76	994	1,314	0.04	64.31	0
Tonga	1.88	3,185	1,694	0.12	44.66	0
5. North America and Caribbean						
Antigua and Barbuda	0.28	1,266	4,590	0.05	66.09	1
Bahamas, The	0.67	2,894	4,315	0.11	48.43	0
Barbados	0.07	1,114	15,426	0.04	67.43	1
Belize	1.15	6,022	5,223	0.22	56.51	0
Bermuda	0.03	101	3,031	0.00	43.04	1
Canada	0.02	7,200	295,403	0.26	38.43	1
Costa Rica	0.21	3,361	16,235	0.12	58.09	1
Dominican Republic	0.17	23,973	139,302	0.88	49.32	0
El Salvador	4.09	151,877	37,129	5.56	39.74	0
Grenada	0.26	921	3,575	0.03	69.71	1
Guatemala	2.15	63,657	29,564	2.33	40.16	0
Haiti	3.82	88,271	23,115	3.23	59.23	0

Table A1. Treatment variation and Characteristics, All Countries by Region (cont'd)

Region and Country	**Treatment:** Legalization Ratio: (2)/(3)	Number Legalized by IRCA	Existing Green Card Holders, 1980	% of IRCA Legaliza-tions	Characteristics Estimated % who naturalize	Characteristics Upper Income Country?
	(1)	(2)	(3)	(4)	(5)	(6)
5. North America and Caribbean (cont'd)						
Honduras	0.79	16,053	20,342	0.59	46.93	0
Jamaica	0.18	17,244	98,073	0.63	65.38	0
Mexico	1.84	2,018,879	1,098,410	73.86	34.47	1
Panama	0.10	1,833	17,552	0.07	68.88	1
St. Lucia	0.25	617	2,488	0.02	65.63	1
St. Vincent and the Grenadines	0.31	715	2,308	0.03	66.27	0
Trinidad and Tobago	0.15	5,015	34,344	0.18	60.71	1
6. South America						
Argentina	0.18	5,613	31,033	0.21	59.13	1
Bolivia	0.72	4,333	6,006	0.16	55.43	0
Brazil	0.37	6,934	18,714	0.25	44.29	1
Chile	0.25	4,639	18,823	0.17	56.63	1
Colombia	0.34	30,934	90,050	1.13	59.93	0
Ecuador	0.27	15,265	57,102	0.56	50.91	0
Guyana	0.18	3,987	22,527	0.15	75.97	0
Paraguay	0.15	230	1,533	0.01	51.67	0
Peru	0.64	18,255	28,594	0.67	58.86	0
Uruguay	0.32	2,129	6,719	0.08	62.24	1

Notes: We calculate the number legalized by IRCA by country from the LAPS microdata and the number of 1980 Green Card holders from *Alien Address Reports, 1980 Public Use File*. We estimate the naturalization rate by country from 2000 Census public-use microdata (Ruggles et al., 2019). Income bins are from the United Nations' World Development Indicators.

Table A2. Descriptive Statistics

	All Countries	By Naturalization Rate >.59	By Naturalization Rate <.59
	(1)	(2)	(3)
Legalization Ratio	0.65	0.45	0.86
	(0.95)	(0.83)	(1.02)
Per 1980 Green Card Holder:			
All Family Sponored	0.18	0.19	0.17
	(0.15)	(0.17)	(0.12)
Citizen-Sponsored	0.14	0.16	0.13
	(0.12)	(0.13)	(0.10)
Green-Card Sponsored	0.04	0.04	0.03
	(0.05)	(0.06)	(0.04)
Spouses, Kids	0.12	0.12	0.13
	(0.10)	(0.10)	(0.09)
Parents	0.02	0.02	0.02
	(0.02)	(0.03)	(0.02)
Other Family	0.04	0.05	0.02
	(0.04)	(0.05)	(0.02)
Diversity	0.00	0.00	0.00
	(0.01)	(0.01)	(0.00)
Refugees	0.01	0.01	0.00
	(0.02)	(0.03)	(0.01)
Employer-Sponsored	0.03	0.03	0.03
	(0.04)	(0.05)	(0.04)
Country X Years	1258	646	612

Notes: Reports means and standard deviations (in parentheses) of row-labeled variable per 1980 LPR. Naturalization rates are estimated using data from the 2000 Census (Ruggles et al., 2019). See text and Appendix A for data sources.

Table A3. Long-Run Immigration Multipliers, By Age, With 1988 Admissions as Comparison

	Raw 1988 Admissions	Baseline	Temporary Visa Sub-Sample[a]	Drop countries w/ binding waitlists[b]	Trends in "upper income"	Subsample with Country Controls[c]	(4) + Country Controls
		(1)	(2)	(3)	(4)	(5)	(6)
Under 18		0.50	0.49	0.60	0.49	0.59	0.55
		(0.15)	(0.15)	(0.42)	(0.16)	(0.17)	(0.15)
%Under 18	*27.4*	*25.9*	*25.7*	*37.3*	*27.7*	*26.0*	*27.4*
18-24		0.29	0.29	0.12	0.28	0.35	0.32
		(0.07)	(0.07)	(0.18)	(0.08)	(0.06)	(0.05)
% 18-24	*17.8*	*15.0*	*15.2*	*7.5*	*15.8*	*15.4*	*15.9*
25-34		0.29	0.29	0.38	0.27	0.37	0.29
		(0.09)	(0.08)	(0.32)	(0.11)	(0.08)	(0.03)
% 25-34	*26.9*	*15.0*	*15.2*	*23.6*	*15.3*	*16.3*	*14.4*
35-44		0.38	0.38	0.21	0.34	0.43	0.38
		(0.07)	(0.06)	(0.20)	(0.08)	(0.07)	(0.04)
%35-44	*12.1*	*19.7*	*19.9*	*13.0*	*19.2*	*18.9*	*18.9*
45-54		0.20	0.19	0.17	0.16	0.22	0.19
		(0.04)	(0.03)	(0.11)	(0.04)	(0.04)	(0.02)
%45-54	*6.5*	*10.4*	*9.9*	*10.6*	*9.0*	*9.7*	*9.5*
55-64		0.12	0.12	0.13	0.10	0.15	0.13
		(0.04)	(0.04)	(0.08)	(0.04)	(0.04)	(0.03)
%55-64	*5.6*	*6.2*	*6.3*	*8.1*	*5.6*	*6.6*	*6.5*

Table A3. Long-Run Immigration Multipliers, By Age (cont'd)
With 1988 Admissions as Comparison

	Raw 1988 Admissions	Baseline	Temporary Visa Sub-Sample[a]	Drop countries w/ binding waitlists[b]	Trends in "upper income"	Subsample with Country Controls[c]	(4) + Country Controls
		(1)	(2)	(3)	(4)	(5)	(6)
65+		0.15	0.15	0.00	0.13	0.16	0.15
		(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
%65+	*3.7*	*7.8*	*7.9*	*0.0*	*7.3*	*7.0*	*7.5*
Countries:		37	32	34	37	34	34
Years:[d]		1989-2016	1989-2016	1989-2016	1989-2016	1989-2016	1989-2016
Fixed Effects							
Country		Yes	Yes	Yes	Yes	Yes	Yes
Region x Year		Yes	Yes	Yes	Yes	Yes	Yes
Income bin x Year		No	No	No	Yes	No	No
Time-Varying Country[c]		No	No	No	No	No	Yes

Notes: Each cell gives long-run "multiplier" (sum of post-1990 arrival year-specific coefficients) from a regression of a country's admissions in the specified age range per 1980 legal permanent resident (LPR) on year-specific effects of the legalization ratio (IRCA legalized immigrants/1980 LPRs). Standard errors, in parentheses, clustered on country. See text and Appendix A for data sources.

[a] Temporary visa data are unavailable for three countries: Bermuda, Grenada and Hong Kong. Two others - India and Brazil - are outliers in trends in temporary visa data.

[b] The countries with binding waitlists are India, Philippines, and Mexico.

[c] Real exchange rate and population controls unavailable for Guyana, Samoa, and Tonga.

[d] Regressions based on 1983-2016 annual data; multiplier calculated over the "post" period 1989-2016.

Table A4. Descriptive Statistics in Other Arrivals Sample

	All Countries	By Legalization Ratio	
		High	Low
	(1)	(2)	(3)
High Legalization Ratio	0.70	1.19	0.14
	(0.53)		
A. Immigration Totals			
Overall Family Sponsored	0.89	1.09	0.67
(Green cards)	(0.66)	(0.74)	(0.48)
Total Arrivals (ACS)	1.33	1.84	0.75
	(1.17)	(1.36)	(0.47)
Difference	0.43	0.74	0.08
	(0.93)	(1.13)	(0.40)
B. By Temporary Visa Type			
Short-Term Visitors[a]	6.36	7.05	5.58
	(4.98)	(4.18)	(5.68)
Long-Term Visitors	1.05	1.11	0.99
	(0.89)	(0.77)	(1.00)
Student/Exchange[b]	0.34	0.36	0.33
	(0.41)	(0.39)	(0.42)
Other	0.71	0.75	0.66
	(0.58)	(0.51)	(0.66)
C. Expected Visa Overstayers			
Total	0.23	0.31	0.15
	(0.17)	(0.17)	(0.12)
On Short-Term Visas[a]	0.14	0.20	0.08
	(0.12)	(0.12)	(0.08)
On Student/Exchange[b]	0.02	0.03	0.02
	(0.02)	(0.03)	(0.02)
On Another Visa	0.07	0.09	0.05
	(0.09)	(0.09)	(0.08)
Country x Years	256	136	120

Notes: Reports means and standard deviations (in parentheses) of row-labeled variable per 1980 LPR. The "high legalization ratio" variable is a dummy for being above the median on the legalization ratio ($lpr_{c,IRCA}/lpr_{c,1980}$), scaled by the mean difference in legalization ratios above/below median. See text and Appendix A for data sources.

[a] B-visas and border crossing cards.

[b] F-, J-, and M-visas. Expected overstays are the product of visa counts with the country-specific fiscal 2016 overstay rate for each visa category (U.S. Department of Homeland Security, 2017).

Appendix B: Derivation of Main Estimating Equation

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

Let a_{ct} represent immigrants from country *c* admitted to the U.S. (with Green Cards) in year *t*. We begin by modeling admissions from *c* as reflecting a country-fixed effect, δ_c, with deviations subsequent to IRCA (after 1988) proportional to the number of Green Cards issued to country *c* immigrants through IRCA's legalization programs, $lpr_{c,IRCA}$. That is,

$$a_{ct} = \tilde{\delta}_c + \sum_{\tau>1988} \theta_\tau D_t^\tau lpr_{c,IRCA} + u_{ct}, \tag{B.1}$$

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

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

$$a_{ct} = \widetilde{\delta_c} + \sum_{\tau>1988}\left(\theta_\tau D_t^\tau lpr_{c,IRCA} + \gamma_\tau D_t^\tau lpr_{c,1980} + \mu_\tau D_t^\tau cit_{c,1980}\right) + e_{ct}, \tag{B.2}$$

where $lpr_{c,1980}$ and $cit_{c,1980}$ represent the 1980 stocks of LPRs and citizens from country *c* in 1980, the latest pre-IRCA year in which we have data. Model (B.2) thus regression-adjusts $ircalpr_c$ and a_{ct} for other, logical channels through which a_{ct} may change over time.

Second, even with this addition, the model is susceptible to influence from outliers – countries with large numbers of admissions. We therefore scale the equation by $lpr_{c,1980}$:

$$\frac{a_{ct}}{lpr_{c,1980}} = \delta_c + \sum_{\tau>1988}\left(\theta_\tau D_t^\tau \left(\frac{lpr_{c,IRCA}}{lpr_{c,1980}}\right) + \gamma_\tau D_t^\tau + \mu_\tau D_t^\tau \left(\frac{cit_{c,1980}}{lpr_{c,1980}}\right)\right) + \tilde{e}_{ct}. \tag{B.3}$$

The year effects in this model, the γ_τ, thus represent the impacts of pre-existing LPRs on new arrivals; whereas the θ_τ and μ_τ continue to capture the differential impacts of IRCA LPRs and pre-existing citizens on new arrivals, respectively. 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.

Our third set of modifications to the stylized framework account for the possibility that the intensity of IRCA as a legalization shock, or $\frac{ircalpr_c}{lpr_{c,1980}}$, may correlate with other, unobserved country-by-time varying determinants of admissions, $\tilde{e}_{ct}$. These modifications include a full set of year fixed effects and the interaction of those fixed effects with indicators for world region and with the legalization ratio, i.e.,

$$\text{(B.4)} \qquad \frac{a_{ct}}{lpr_{c,1980}} = \delta_c + \gamma_{rt} + \sum_{\tau \neq 1988} \left(\theta_\tau D_t^\tau \left(\frac{ircalpr_c}{lpr_{c,1980}} \right) + \mu_\tau D_t^\tau \left(\frac{cit_{c,1980}}{lpr_{c,1980}} \right) \right) + \varepsilon_{ct}$$

The only difference between model (B.4) and model (1) is that model (1) assumes that $\mu_\tau = 0$ for all τ. We have estimated versions of (1) with interactions between year indicators and $\frac{cit_{c,1980}}{lpr_{c,1980}}$, and consistently found the estimates of θ_τ to be unaffected. Normalizing by $lpr_{c,1980}$ instead of $lpr_{c,1980} + cit_{c,1980}$ also improves the precision of our estimates and makes them less subject to division bias. $lpr_{c,1980}$ is based on universe data, and $cit_{c,1980}$ is based only on a 5% sample.