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THE INTERGENERATIONAL EFFECTS OF PERMANENT LEGAL STATUS

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The Intergenerational Effects of Permanent Legal Status  
Elizabeth U. Cascio, Paul Cornell, and Ethan G. Lewis  
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**ABSTRACT**

We estimate the effects of permanent legal status on the health of children born to immigrants in the United States using variation from the Immigration Reform and Control Act of 1986 (IRCA). Our empirical approach compares trends in birth outcomes for foreign-born Mexican mothers across counties with different application rates under IRCA's large-scale legalization programs. Maternal legalization raised birthweight. Effects arose immediately after the application process began – five years before affected women became Medicaid-eligible – suggesting causal mechanisms besides improved access to early prenatal care. Changes in the composition of births, stemming from changes in fertility and family reunification, contribute to but far from fully explain the birthweight impacts. The more likely mechanisms were instead the increases in family income and reductions in stress that came from gaining legal status.

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## **I. Introduction**

An estimated 11 million undocumented immigrants currently reside in the U.S. (Baker, 2021). Most are adults, and many have had children on U.S. soil.<sup>1</sup> These children start life at a disadvantage: their parents may be unable to work in the covered sector or move freely within the U.S., limiting the scope for upward economic mobility. Even if the children themselves are eligible, fear of deportation may also prevent mixed-status families from taking up social safety net programs available to other families of similar means (Watson, 2014; Alsan and Yang, 2022). Fear may also expose children to stress that inhibits their development.

This paper estimates the effect of maternal legal status on children's well-being – specifically, health at birth – using variation from the Immigration Reform and Control Act of 1986 (IRCA). Unprecedented in scale, IRCA's legalization programs shocked the legal status of a large cohort of potential immigrant parents. From 1987 to 1988, over 3 million unauthorized immigrants applied for work and travel authorization and a stay from deportation under IRCA; shortly thereafter – between 1989 and 1991 – 2.7 million became lawful permanent residents (LPRs) or received their Green Cards. Most applicants and LPRs (70%) were between the ages of 16 and 35, so of prime age to be having children. They were also spread unevenly across the U.S. as a share of the foreign-born population, largely due to pre-existing differences in unauthorized shares among the foreign-born.

Combining this geographic variation with program rollout, our empirical approach compares trends in birth outcomes within the foreign-born population across counties in the same state with different application rates. Our analysis focuses on a particular group that can be identified in both applicant records and Vital Statistics natality detail data – foreign-born

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<sup>1</sup> An estimated five million children – including four million U.S. citizens – lived with at least one undocumented parent over 2009 to 2013 (Capps, Fix, and Zong, 2016).

Mexican women, who accounted for over 675,000 legalization applications and 3.35 million U.S. births between 1987 and 1999. While we cannot merge these anonymized universe files at the person level, we can merge estimated application rates to the natality data based on county of residence, to approximate an infant's likely *in utero* exposure to IRCA's legalization programs. To minimize the potential for contamination from ongoing immigration, we also focus on a subset of highly affected birth cohorts.<sup>2</sup>

We find that foreign-born Mexican women gave birth to heavier infants immediately after the application process began. Our estimates imply that the average Mexican mother legalized through IRCA had a baby 96 grams heavier than she otherwise would have in the first six post-IRCA years. This effect is driven by changes in the upper half of the pre-IRCA birthweight distribution. It is also robust to specification checks (e.g., changes in the cohorts under study, model controls, and functional form) and does not manifest for U.S. born Mexican ethnic mothers, supporting a causal interpretation. And while about a third of this effect is accounted for by changes in fertility, improved access to health care throughout pregnancy does not contribute. Indeed, we find no initial impact of legalization on early prenatal care, consistent with most IRCA legalization applicants in our estimation sample being denied comprehensive Medicaid access until five years after their first application was approved.<sup>3,4</sup>

This finding suggests other mechanisms for the birthweight effect, such as improvements in household income or reductions in stress. Previous research has found IRCA's legalization

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<sup>2</sup> Foreign-born Mexican women in this subset of highly affected cohorts (born 1944 to 1972) accounted for about 531,000 IRCA legalization applicants and almost 2.5 million births between 1987 and 1999. These figures should not be read as implying that the average applicant had five children in the U.S.; a significant share of births would have been to post-IRCA immigrant arrivals, both authorized and unauthorized.

<sup>3</sup> IRCA legalization applicants were entitled to Medicaid coverage for late prenatal care and delivery. We exclude California from our analysis to avoid confounding the effects of legalization with the effects of Medi-Cal, which expanded eligibility to unauthorized mothers in October 1988 (Miller and Wherry, 2022).

<sup>4</sup> Applications for temporary status (work and travel authorization and a stay from deportation) were first approved in large numbers starting in August 1987, with most approvals occurring by July 1989 (see Figure 1).

programs raised the incomes of affected immigrants, by both improving earnings prospects (e.g., Kossoudji and Cobb-Clark, 2002; Amuedo-Dorantes, Bansak, and Raphael, 2007; Pan, 2012; Steigleder and Sparber, 2017) and increasing cash transfers under the Earned Income Tax Credit (EITC) (Cascio and Lewis, 2019). Back-of-the-envelope calculations based on the findings of these studies and existing estimates of the effect of income or cash transfers on birthweight (Hoynes, Miller, and Simon, 2015) suggest that income gains may account for another third of the birthweight estimate. The remaining third arguably owes to reductions in stress, consistent with previously estimated impacts of immigration enforcement on birth outcomes,<sup>5</sup> and the fact that birthweight effects arise immediately, before many applications were approved.

We also estimate the effects of IRCA's legalization programs on birthweight from 1993 through 1999, when affected mothers could access Medicaid.<sup>6</sup> The birthweight effect persists, and indeed grows in magnitude. But the effect on early prenatal care is much too small to explain this growth, reinforcing our conclusion that health care access is not an important mechanism. While further income growth contributes to the increased effect, a rising authorized share among Mexican mothers does as well: this period was one not just of Medicaid access, but also family reunification – IRCA-legalized Mexican *men* sponsoring their wives for Green Cards (Cascio and Lewis, 2023) and establishing families in the U.S. The estimates are relatively noisy, but counties with higher application rates saw more growth in sponsored wives and births from 1993 to 1999 and a shift in birth composition toward first-born children. First-born children tend to be lighter, so adjusting for parity strengthens the birthweight effect.

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<sup>5</sup> For example, see Torche and Sirois (2019), Tome et al. (2021), and Amuedo-Dorantes, Churchill, and Song (2022), and Vu (2024).

<sup>6</sup> One caveat is that, starting August 1996, Medicaid – and indeed social assistance programs more generally – would have only been available to IRCA LPRs by state option (Royer, 2005). No state in our analysis sample besides New York filled in these benefits with their own funds. Still, about a third of IRCA legalization applicants had become naturalized citizens by 2001 (Rytina, 2002) and so would have maintained their Medicaid eligibility.

This paper makes several contributions. First, to our knowledge, we are the first to present causal estimates of the intergenerational effects of permanent legal status and a comprehensive analysis of underlying mechanisms. Despite the prevalence of mixed-status households in the American economy, there are few compelling estimates of parental legal status on children’s outcomes. Existing quasi-experimental estimates focus on Deferred Action for Childhood Arrivals (DACA), which provided work authorization and a temporary stay from deportation to a more recent cohort of unauthorized immigrants brought to the U.S. as children. DACA protections have been temporary and uncertain, so these studies do not necessarily capture the full intergenerational effects of legal immigration. They also have other limitations.<sup>7</sup>

Second, we offer a novel approach to studying the effects of immigrant legal status in large-scale data, where legal status is typically not directly given but rather inferred from observables like citizenship and year of arrival in the U.S. Using several auxiliary data sources – IRCA applicant records, a 1980 INS registry of legal immigrants, and the Census of Population – we detect substantial variation in legalized share among foreign-born Mexicans, and we use that variation in our empirical approach. Foreign-born Mexicans would mostly be indistinguishable from each other by standard legal status proxies (e.g., Borjas, 2017; Borjas and Cassidy, 2019).<sup>8</sup>

Third, our findings provide new insight into trends and variation in birth outcomes among the large Mexican ethnic population in the U.S. Consistent with the so-called “healthy immigrant effect” (e.g., Stephen et al., 1994), foreign-born women in the fixed cohort of

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<sup>7</sup> Using Medicaid claims data from Oregon and a regression discontinuity design comparing mothers eligible for Emergency Medicaid who were close in age but varied in their DACA eligibility, Hainmueller et al. (2017) show that children of likely DACA-eligible mothers were less likely to be diagnosed with adjustment and anxiety disorders. Comparing Mexican women who varied in eligibility due to cohort, Hamilton, Langer, and Patler (2021) find that DACA-eligible immigrants have had heavier babies with longer gestational ages. However, the latter paper selects on high school attainment, which was affected by DACA (Kuka, Shenhav, and Shih, 2020). Impacts of DACA on teenage pregnancy (Kuka, Shenhav, and Shih, 2019) also complicate interpretation in both papers, and neither paper carries out a comprehensive analysis of mechanisms.

<sup>8</sup> These proxies don’t detect moves to status among IRCA-legalized Mexicans (Cascio, Lewis, and Zhang, 2024).

Mexicans we consider had heavier babies than U.S. born Mexican women prior to IRCA.<sup>9</sup> Contrary to typically declining health with years in the U.S., however, the foreign-born birthweight advantage persisted as this cohort aged. We show that IRCA was fundamental to this trend: average birthweights of children born to foreign- and U.S.-born Mexican ethnic women would have converged in the absence of IRCA's legalization programs. Our findings thus suggest that policies promoting broad-based immigrant assimilation may counteract other forces that lead to worsening immigrant health outcomes with time in the U.S.

## II. IRCA's Legalization Programs

### A. *The Application Process*

IRCA provided a path to becoming a lawful permanent resident to immigrants residing without authorization in the U.S. in the late 1980s. This analysis focuses on a subset of this population – Mexican women of childbearing age at the time of application (1987-88), defined here as ages 15 to 44 (born 1944 to 1972). Mexicans comprised nearly three-quarters of all applicants and Green Cards ultimately awarded under IRCA's legalization provisions. While women were a minority of both, the numbers affected were still substantial: over 530,000 Mexican women of childbearing age applied, and nearly 482,000 received Green Cards. Most of these women (74%) applied under IRCA's General Legalization Program (GLP). The remainder applied under IRCA's Special Agricultural Workers (SAW) program.<sup>10</sup>

The application process had several phases. The first application was for *temporary* work and travel authorization and a stay from deportation. The Immigration and Naturalization

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<sup>9</sup> The “healthy immigrant effect” is the empirical regularity that first-generation immigrants tend to be healthier than the second or third generation. Related is the so-called “Hispanic health paradox” (Markides and Coreil, 1986): Hispanics tend to be healthier than whites in the U.S. despite being lower socio-economic status. For work on both, see Acevedo-Garcia et al. (2010), Antecol and Bedard (2006), Giuntella (2016, 2017), and Hummer et al. (2007).

<sup>10</sup> The GLP required proof of continuous residency in the U.S. from 1981 (or earlier) forward. The SAW program required proof of at least 90 days of work on a USDA-approved crop over the 12-month period ending May 1, 1986, with no additional residency requirement (Baker, 1990).

Service (INS) accepted GLP temporary status applications between May 1987 and May 1988 and temporary status applications under the SAW program between May 1987 and November 1988. Awards of temporary status were granted almost immediately – with a notable uptick in August 1987, three months after the first applications were received – and the success rate for the population of interest was high, at almost 94%. Figure 1 shows the cumulative number of temporary status applications submitted and approved for Mexican women born 1944 to 1972 by event time for this analysis – August of one calendar year through July of the next – based on data from the Legalization Applications Processing System (see Section III).

The second application was for *permanent* legal status, or a Green Card. GLP applicants were eligible to apply for a Green Card starting 18 months after a temporary status award, so long as they had learned English and passed a civics test. For SAW program applicants successful in the first phase, Green Cards came automatically 12 or 24 months after the award of temporary status. Most Green Cards under IRCA’s legalization programs were thus awarded in 1989 and 1990, as shown in Figure 1. The probability of success was also high in this phase for the population of interest, at 97%. Once applicants became LPRs, they became eligible for the federal EITC. Consistent with existing policy, Green Card holders were also eligible to naturalize five years after their Green Card award (so starting in 1994).<sup>11</sup>

#### *B. Timing and Potential Mechanisms*

We consider the opportunity to apply for temporary status to be the first legalization treatment. Even if application alone did not improve an immigrant’s material well-being or access to early prenatal care, the reduction in stress from simply knowing there was a prospect to become an LPR may have improved infant health. Because birthweight is largely determined in

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<sup>11</sup> The Legalization Applications Processing System does not follow applicants through 1994 and later, so we cannot include a naturalization series in Figure 1.



the third trimester of pregnancy, we consider births in August 1987 – three months after the first application month – to be the first treated. August 1987 to July 1988 is thus event year 0.

As immigrants transitioned across phases of the application process, other mechanisms for an impact on infant health – improvements in job stability or earnings, access to the EITC and other safety net programs – may have come into play. Figure 2 provides the timeline for our analysis, incorporating all key moments in the lives of legalization program applicants. Aside from the milestones in the application process, there are three moments worthy of note.

First, though IRCA allowed for Medicaid eligibility for late prenatal care and delivery, the law forbade GLP applicants cash welfare, Medicaid, and food stamps for a five-year period beginning on the date when an applicant was granted temporary status.<sup>12</sup> Because temporary status awards began in earnest in August 1987, the earliest benefit access for most IRCA legalization applicants would have been August 1992. While birthweight could thus have been affected by late 1992, the earliest improvements in early prenatal care access, by way of Medicaid, would show up with a six- to seven-month lag (January or February 1993). The first event year fully affected by Medicaid access would have thus been August 1993 to July 1994.

Second, unless an IRCA LPR naturalized,<sup>13</sup> the period over which they would have had access to Medicaid (and food stamps and cash welfare) would have been brief: welfare reform – codified in the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) – cut off IRCA LPR’s access to Medicaid and other social assistance starting in August 1996, unless states filled in those benefits with their own funds. A few states in our

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<sup>12</sup> SAW applicants had access to Medicaid and food stamps, but not cash welfare, over this five-year period. Still, we expect to see little improvement in birth outcomes due to Medicaid and/or food stamps until August 1993: most Mexican women applied through the GLP, and application rates are not correlated with the within-state composition of applications across the GLP and SAW program (Table 1).

<sup>13</sup> While overall rates naturalization rates were low, reaching only a third of all IRCA LPRs in 2001, they were higher in the GLP (closer to 40%), which dominates the population of interest (Rytina, 2002).

estimation sample (Section III) were fill-in states, but most were not, suggesting only partial Medicaid, cash welfare, and food stamp coverage from mid-1996 to the late 1990s.<sup>14</sup> However, IRCA LPRs remained eligible for the EITC through this period (Cascio and Lewis, 2019).

Third, Mexican women in the cohort of interest who were not legalized directly under the GLP or SAW program may have nevertheless been able to enter the U.S. legally starting in the 1990s. Consistent with existing law, married men receiving Green Cards under IRCA were eligible to sponsor Green Cards for their wives. Once reunified in the U.S., couples may have started or continued families. Green Card sponsored admissions of spouses were quota-restricted, and in response to IRCA, only became significant in the second half of the 1990s (Cascio and Lewis, 2023). The long dashed green line in Figure 1 shows that cumulative Green Card-sponsored wives in the cohort of interest experienced an inflection point in the mid-1990s. Citizen-sponsored admissions of spouses were not quota-restricted (short dashed red line in Figure 1) but really ramped up relative to pre-existing trends starting in the 2000s (Cascio and Lewis, 2023), which we exclude from our analysis.

How IRCA's legalization programs affected birth outcomes may have thus changed over time, even within the fixed cohort of mothers we consider. At first, reductions in stress would have been the main mechanism. However, improvements in immigrants' material well-being and access to health care could have eventually played a role. Further, family reunification may have changed the number and composition of Mexico-born mothers in the second half of the 1990s. This variation in timing is useful for identifying potential mechanisms in the data.

### **III. Data**

#### *A. Sources and Key Variables*

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<sup>14</sup> In related work, East (2020) uses variation from this period of authorized immigrants' changing eligibility to estimate the later effects on children's health of *in utero* and early childhood exposure to the food stamp program.

## 1. *Data on Prenatal Care and Birth Outcomes*

We draw outcomes from Vital Statistics Natality Detail Data, public use microdata compiled from birth certificates by the National Vital Statistics System of the National Center for Health Statistics.<sup>15</sup> We focus on data files from 1982 to 1999. This span includes five years prior to 1987, the year in which the first IRCA legalization applicants achieved temporary legal status. We end in 1999 due to aging of the cohort of interest and continuing family reunification by way of naturalization of the IRCA legalization cohort (Cascio and Lewis, 2023), which had the potential to further change the number and composition of births.<sup>16</sup> For reasons of statistical power, we consider a wide cohort (women born 1944-72) but also demonstrate the robustness of our estimates to a narrower cohort definition.

We create three sets of outcome variables. The first concerns the child's health at birth. Potentially affected by stress (Aizer, Stroud, and Buka, 2016; Persson and Rossin-Slater, 2018) and income (Hoynes, Miller, and Simon, 2015) and a predictor of school achievement (Figlio, et al., 2014) and later-life outcomes (Behrman and Rosenzweig, 2004; Black, Devereux, and Salvanes, 2007; Oreopolous et al., 2008; Royer, 2009), birthweight is the best available measure of infant health. We also consider whether a birth is small for gestational age (in the bottom decile of weight for a given gestational age in weeks) but note that low birthweight and preterm birth are relatively rare outcomes among Hispanic women, particularly immigrants (Giuntella, 2016). For this reason, our analysis focuses on birthweight (in grams).

The other two sets of outcomes speak to mechanisms. First, we measure health care access through two prenatal care indicators – one for care in the first two months of pregnancy

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<sup>15</sup> All data sets used in this paper are described in detail in Appendix A.

<sup>16</sup> We cannot distinguish births in the natality data by a mother's year of arrival. Unfortunately, maternal education is also not reported on birth certificates in Texas until 1989, so we cannot use that variable in this analysis.

“early” prenatal care) and another for “adequate” prenatal care by the Kessner index, which combines information on the timing of prenatal care initiation and the number of prenatal care visits (McDonald and Coburn, 1986). As noted, early prenatal care via Medicaid would have been accessible to most of our sample only starting in August 1992, registering in full-term births in February 1993 and not in full effect until the event year starting August 1993. The third set of outcomes are other birth characteristics, including parity and maternal age – reflecting fertility – and the presence of a father on the birth certificate, which could reflect socioeconomic status.<sup>17</sup>

Key treatment-related variables in the natality data include the child’s month of birth, as well as the county of residence, ethnicity (incorporating country of descent), and birth country of mothers. Birth country is not identified for all mothers; Mexico is the only foreign country significantly affected by IRCA that is consistently separately reported. We use maternal county of residence to link natality outcomes with application rates, defined below. We use the combination of month and year of birth to assign event years. Using maternal country of descent and birth country, we can compare birth outcomes of foreign-born Mexican mothers (potentially treated) to the birth outcomes of U.S. born Mexican-ethnic mothers (not treated).

## 2. *Data on Application and Legalization Rates*

We define a county’s application rate as the fraction of foreign-born Mexican women born between 1944 and 1972 who reside in the county and applied for legal status through IRCA. The legalization rate is then the fraction of a county’s foreign-born Mexican women in the same cohort who received Green Cards through either the GLP or SAW program. The legalization rate is of course lower than the application rate, but they unsurprisingly move close to one-to-one,

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<sup>17</sup> Marital status is also provided, but prior to 1994, Texas coded almost all mothers as married if a father was listed on a birth certificate, even if this was not the case. We thus focus on paternal reports on a birth certificate.

given the high success rates at each step of the application process (Figure 1). Because there is little variation in legalization rates given application rates, we focus on the application rate.

We use two datasets to construct application and legalization rates. We generate the numerator for each using anonymized IRCA legalization application data from the Legalization Applications Processing System (LAPS). The LAPS tracked all applications for legal status through the end of 1992. In addition to basic information about applicants (such as age, sex, ethnicity, and country of origin), the LAPS recorded county of residence, as well as whether and when applications for temporary status and Green Cards were awarded. We focus on cumulative applications for temporary status by – and cumulative Green Card awards to – Mexican women born 1944 to 1972, both as of 1992, under the GLP or SAW program. While counties with under 100,000 residents (as of 1990) or fewer than 25 applications were not identified for confidentiality reasons, county is reported for almost 93% of our target demographic.

There are no published county Census tabulations of the total number of foreign-born Mexican women born 1944 to 1972 – the denominator of the application and legalization rates. We instead estimate this denominator using the 5% public-use microdata sample (PUMS) of the 1990 Census of Population (Ruggles et al., 2022). County of residence is suppressed in the 1990 PUMS for counties with fewer than 100,000 residents, placing some limits on our sample.<sup>18</sup>

#### *B. Analysis Sample and Descriptive Statistics*

Our analysis sample restricts attention to counties where we observe birth outcomes for foreign-born Mexican mothers in every (event) year of our analysis. We also limit the sample states where at least four counties offer balanced panels of birth outcomes, since our

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<sup>18</sup> There were 86 counties identified in the LAPS but not in the 1990 PUMS. These counties had at least 25 applicants, and so were reported in the LAPS, but are omitted from the 1990 PUMS due to having populations lower than 100,000. There were also 24 counties in the PUMS with non-zero populations in our target demographic but no applicants. In total, we were able to calculate application and legalization rates for 273 counties.

identification strategy relies on within-state variation in application rates (see Section IV). These restrictions result in a sample of 119 counties, which account for 84% of Mexican women born 1944 to 1972 who applied and were ultimately awarded Green Cards under IRCA's legalization programs. After removing California counties due to complications for interpretation surrounding Medi-Cal expansion,<sup>19</sup> we arrive at an analysis sample of 89 counties covering 8 states (Colorado, Florida, Illinois, Indiana, New Jersey, New York, Ohio, and Texas).<sup>20</sup>

We carry out the analysis on county-by-event-year averages of the natality outcomes, weighted by average cell counts in the pre-IRCA period. Appendix Table 1 presents descriptive statistics on the estimation sample separately for Mexico-born and U.S. born Mexican-ethnic mothers in the event years before (August 1982 to July 1987) and after (August 1987 through July 1999) status of any kind was awarded under IRCA's legalization programs. Both before and after IRCA, foreign-born Mexicans were less likely to receive early or adequate prenatal care but gave birth to heavier babies than U.S. born Mexicans. Mexico-born mothers were also older, their children were higher parity, and fathers were more likely to appear on their infants' birth certificates. Over time, mothers in both groups aged (reflecting that we follow a fixed cohort), and the gap in paternal reports on birth certificates narrowed. The foreign-born disadvantage in early prenatal care also widened, and the birthweight advantage fell.

These trends do not mean that IRCA's legalization programs caused worse outcomes for immigrant mothers. For example, the Medicaid expansions of the late 1980s and early 1990s increased citizens' access to early prenatal care and raised birthweight (Currie and Gruber, 1996;

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<sup>19</sup> This expansion (in October 1988) covered non-emergency pregnancy-related services for undocumented immigrants, including early prenatal care (Miller and Wherry, 2022). By omitting California from the analysis, we thus ensure that our estimates are not confounded by concurrent policy changes affecting this population.

<sup>20</sup> The number of counties per state is 7 (Colorado), 16 (Florida), 11 (Illinois), 8 (Indiana), 10 (New Jersey), 10 (New York), 4 (Ohio), and 23 (Texas). These 89 counties account for 84% of Mexican women born 1944-1972 who applied for legalization through IRCA in these 8 states, and 61% of this population outside of California.

East et al., 2023). However, they suggest that any viable approach to identifying the effects of legalization will need to make comparisons within the population of mothers born in Mexico.

#### IV. Identification Strategy

##### A. Empirical Specification

Our identification strategy takes advantage of variation in the application rates of Mexico-born mothers across counties within the same state. If IRCA’s legalization programs had an effect, birth outcomes should have improved more after program introduction (starting August 1987) in counties where application rates were higher. In these counties, Mexico-born mothers were more likely to have experienced a change in legal status.

Formally, we begin with the event-study model:

$$(1) \quad y_{c(s)t} = \sum_{j \neq -1} \theta^j d_t^j a_{c(s)} + \gamma_{c(s)} + \delta_{st} + \varepsilon_{c(s)t}.$$

$y_{c(s)t}$  represents an average birth outcome (e.g., average infant birthweight in grams) for mothers born in Mexico between 1944 and 1972 and residing in county  $c$  in state  $s$  in event year  $t$ ;  $t = 0$  for births between August 1987 and July 1988, and all other event years are defined accordingly.  $d_t^j$  is then an event year indicator, equal to one if  $t = j$ , and  $a_{c(s)}$  is the application rate in county  $c$ .  $\gamma_{c(s)}$  and  $\delta_{st}$  are county and state-by-year fixed effects, which remove bias from fixed county characteristics and state-specific shocks, respectively.

The coefficients of interest are the  $\theta^j$ , which give how much more (or less) average outcomes changed in counties with higher application rates between August 1986 to July 1987 ( $j = -1$ ) and event year  $j$ . These coefficient estimates allow us to test whether any effects of legalization varied over time (across  $j > -1$ ), providing insights into mechanisms (Section II, Figures 1 and 2). They also allow us to test whether birth outcomes of mothers in our target

population were already diverging prior to IRCA’s legalization programs coming into effect (across  $j < -1$ ). If the coefficients are identified, this should not be the case.

Indeed, the identifying assumption of this model is that children born to Mexico-born mothers in counties with higher versus lower application rates in the same state would have experienced the same trends in outcomes in the absence of IRCA’s legalization programs. Finding no evidence of pre-IRCA trends in outcomes would support this assumption but not be dispositive; Mexico-born women in higher application counties could have still been affected differently by other shocks that coincided with the rollout of IRCA’s legalization programs. Below we show there was no impact of legalization on birth outcomes for U.S. born Mexican-ethnic women, who may have experienced the same shocks.

*B. Determinants and Correlates of Application Rates*

Still, knowing the determinants and correlates of within-state variation in application rates can help us further understand and address potential sources of bias. To this end, rewrite the application rate for county  $c$  in state  $s$  as:

$$a_{c(s)} = \frac{n_{c(s)}^{elig}}{n_{c(s)}^{pop}} \times \frac{n_{c(s)}^{app}}{n_{c(s)}^{elig}},$$

where  $n_{c(s)}^{pop}$  represents the population of foreign-born Mexican women born 1944 to 1972 in county  $c$  in state  $s$ ,  $n_{c(s)}^{elig}$  is the number eligible for IRCA’s legalization programs, and  $n_{c(s)}^{app}$  is the number of applicants. The application rate is thus directly proportional to the eligible population share,  $n_{c(s)}^{elig}/n_{c(s)}^{pop}$  (approximately the unauthorized share) and to the application rate conditional on eligibility,  $n_{c(s)}^{app}/n_{c(s)}^{elig}$ . We lack data on  $n_{c(s)}^{elig}$  when IRCA was passed and so cannot calculate these shares. However, using estimates of population and naturalized citizens from the 1980 5% Census PUMS (Ruggles et al., 2022), along with the universe of Green Card holders (from a



1980 INS registry), we can estimate the unauthorized population share in 1980 (see Appendix A).

The estimates in Table 1 Panel A provide a useful benchmark for interpretation. The first column gives the average application rate, legalization rate, and GLP share among applicants for sample counties. Column 2 then presents the estimated coefficient on the application rate,  $a_{c(s)}$ , in a regression model that includes state fixed effects.<sup>21</sup> As anticipated, the legalization rate is very strongly related to the application rate: for every 100 immigrants applying for legal status through IRCA, 97 to 98 eventually received Green Cards, implying a 97.5% probability of Green Card receipt among applicants. However, the application rate is not related to program composition of applicants (coef. (s.e.) = -0.0825 (0.102)). This is useful, since the characteristics of GLP and SAW program applicants tended to be very different (Cascio and Lewis, 2019).

The last row of Panel A repeats this exercise for the estimated 1980 unauthorized share. The coefficient on the application rate is again large and significant, implying that 87 out of every 100 IRCA legalization applicants were unauthorized in 1980 (coef. (s.e.) = 0.868 (0.136)). This figure is reassuringly close to the average GLP share among applicants in our sample – 0.859 (Panel A, column 1) – the GLP being the program targeting the long-term unauthorized, arriving before 1982 (Section II).<sup>22</sup> About half of within-state variation in the application rate is explained by the 1980 unauthorized share (within R-square=0.513; not shown in table).

The historical record also suggests some variation in application conditional on eligibility (i.e., in  $n_{c(s)}^{app}/n_{c(s)}^{elig}$ ), due to differences in INS outreach and in the support of local entities like

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<sup>21</sup> Here and throughout, statistics and regression estimates are weighted by the average annual number of births in a county across pre-IRCA event years. We winsorize legalization and application rates at one for a few counties in the sample. With small numbers of births to Mexico-born women, these counties receive little weight in our analysis.

<sup>22</sup> The GLP share in our sample is larger than the GLP share in the population of Mexican female applicants overall because our sample is weighted toward larger, urban counties where the SAW program was less prevalent.

churches and legal aid groups in the application process (Baker, 1990). However, this variation appears to have arisen largely across rather than within states: when we impute the application rate among the unauthorized from the overall application rate and 1980 unauthorized share, we find it does not significantly contribute to within-state variation in the application rate. Model (1) may therefore effectively compare foreign-born Mexican women who were unauthorized well prior to IRCA to their counterparts who were already Green Card holders or naturalized citizens, rather than unauthorized Mexican women who varied in their odds of applying.<sup>23</sup>

The relevant question then becomes: are there other reasons to expect a divergence in the outcome trends of existing authorized and unauthorized Mexican women starting in August 1987? If these groups had different baseline characteristics, for example, they may have been affected differently by the early 1990s recession or the EITC expansions spread across the period of interest – shocks that could have directly affected birth outcomes (e.g., Dehejia and Lleras-Muney, 2004; Hoynes, Miller, and Simon, 2015).

If unauthorized women had different characteristics than the authorized population, these characteristics should be significantly related to the application rate. In Appendix Table 2, we present comparable estimates to those in Table 1 Panel A for average characteristics of foreign-born Mexican women at the county level before IRCA, based on data from the 1980 5% Census PUMS (Ruggles et al., 2023). We focus on women aged 19 to 44 since many females born 1944 to 1972 would have still been children in 1980. Foreign-born Mexican women in counties with higher application rates were significantly younger and had a significantly lower likelihood of

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<sup>23</sup> Sun and Shapiro (2022) show that difference-in-differences models with uniform treatment timing but a continuous treatment can be biased if there is self-selection into treatment intensity based on expected gains. There are no counties in the U.S. that had substantial Mexican populations but IRCA application rates of zero, making it impossible to implement their fix for this type of bias. However, it is reassuring that most treatment variation in the present study derives from variation in the eligibility rate, not variation in the application rate among the eligible.

having a high school degree, possibly owing to being more recent arrivals. However, sample sizes in the 1980 Census are small, so the remaining estimates are largely uninformative.

Returning to Table 1, Panel B shows estimates of the within-state relationship between the application rate and birth outcomes for Mexico-born mothers in the pre-IRCA period, which may correlate with these characteristics but be more precisely estimated. The fact that there are few statistically significant slope coefficients is reassuring. The application rate does not significantly predict our main outcome – birthweight – or early or adequate prenatal care, the likelihood of a multiple (e.g., twin or triplet) birth, first birth, or the likelihood of the father being reported on the birth certificate. Like in the Census data, however, foreign-born Mexican mothers in counties with higher application rates were significantly younger.<sup>24</sup>

## V. Legalization and Birth Outcomes

### A. Baseline Estimates for Birthweight

Figure 3 plots estimates of the event-study coefficients, or the  $\theta^j$  in model (1), for the average weight (in grams) of babies born to foreign-born Mexican women (Panel A) and the share of those women had early or adequate prenatal care (Panel B). The capped vertical lines represent 95% confidence intervals, with underlying standard errors clustered on county. We present estimates for mechanisms aside from health care access in Section V.C.

The solid dots in Panel A show that average birthweights increased by significantly more between the event year immediately pre-IRCA (August 1986 to July 1987) and the first post-IRCA event year (August 1987 to July 1988) in higher application relative to lower application counties within the same state. The magnitude of this relative gain eroded somewhat until

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<sup>24</sup> There is also a significant positive coefficient on male, which if anything may suggest better baseline maternal health in higher application counties. The survival of male fetuses may be more sensitive to the maternal health and the *in utero* environment (Trivers and Willard, 1973). However, these are correlations, not causal relationships.

starting to grow again in the second half of the 1990s. By the end of the decade, the increase in predicted birthweight in higher application counties was larger than it was initially and again statistically significant. Supporting a causal interpretation, trends in average birthweight were not already diverging prior to IRCA (joint  $p$ -value on pre-IRCA event-study coefficients = 0.59).

IRCA's legalization programs thus appear to have affected birthweight before legalization applicants would have been Medicaid-eligible, and so better able to access prenatal care in the early stages of pregnancy. And indeed, the estimates in Panel B show that the initial post-IRCA gains in birthweight in higher application counties were not accompanied by relative improvements in the use of early prenatal care or receipt of adequate prenatal care in counties with higher application rates; in fact, the event-study coefficients for early prenatal care between August 1988 and July 1993 are negative. Though they are not significant, they are positive starting in August 1993, consistent with the timing of Medicaid access for IRCA applicants. There is no evidence of an increase in adequate prenatal care.

To describe the magnitude of the estimates and improve statistical power, we turn to a difference-in-differences model that divides the post-IRCA period into two subperiods – the first spanning August 1987 to July 1993 and the second spanning the remainder of the period:

$$(2) \quad y_{c(s)t} = \left( \theta_1 d_t^{8/87-7/93} + \theta_2 d_t^{8/93-7/99} \right) a_{c(s)} + \gamma_{c(s)} + \delta_{st} + \varepsilon_{c(s)t},$$

where  $d_t^\tau = 1[t \in \tau]$ . The coefficient  $\theta_1$  thus gives the predicted difference in the change in outcomes between the pre-IRCA period and the period from August 1987 to July 1993 between counties with higher versus lower application rates.  $\theta_2$  does the same, but for the later period – August 1993 to July 1999.

The first column of Table 2 Panel A presents model (2) estimates for birthweight. The estimate of  $\theta_1$  implies that the average IRCA legalization applicant had a baby that was 95.6

grams (about 3.35 ounces) heavier in the first six years of the post-IRCA period than she would have had in the absence of IRCA. This is a substantial effect, amounting to almost 0.17 of a standard deviation in the pre-IRCA birthweight distribution for Mexico-born mothers; in logs, it amounts to a 2.63% increase (column 2). Alternatively, due to IRCA's legalization programs, babies born to foreign-born Mexican women in the average sample county were 34 grams (1.2 ounces, 0.9%) heavier than they would have otherwise been during the late 1980s and early 1990s (95.6 and  $0.0263 \times 0.357$ ). This effect rises to 59 grams (a 1.5% increase in birthweight) between August 1993 and July 1999 ( $\hat{\theta}_2=165.4$ ;  $165.4 \times 0.357 \approx 59$ ).

The corresponding estimates for early prenatal care, in column 3 of Table 2 Panel A, are negative for  $\theta_1$  and much larger and positive for  $\theta_2$ , but not statistically significant in either case; the coefficients for adequate prenatal care are also both insignificant. There is some hint that prenatal care may matter, in that we at least marginally reject the null that  $\theta_1$  and  $\theta_2$  are the same for both birthweight and early prenatal care ( $p$ -values = 0.098 and 0.053). However, the implied effect of early prenatal care on birthweight – 217 grams ( $((165.4 - 95.6) / (0.251 - (-0.071)))$ ) – is much too large for early prenatal care to be the only factor behind the birthweight effect, and indeed existing work suggests early prenatal care explains very little of it.<sup>25</sup>

These findings point to mechanisms besides health care access for these improvements in birthweight. Before presenting further empirical evidence on mechanisms, however, we attempt to rule out other explanations for this pattern of findings for birthweight, related to confounding factors and specification choices.

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<sup>25</sup> For example, Cygan-Rehm and Karbownik (2022) find that a shift toward first-trimester prenatal care in an inframarginal population raised birthweight by on average 9 grams. Pre-IRCA, the OLS relationship between early prenatal care and birthweight among Mexico-born women was similar, at 11 grams. These estimates imply that early prenatal care might account for only between 2 to 3 grams of the 165-gram birthweight coefficient estimate.

## B. Robustness Checks

### 1. Falsification Test

The identifying assumption of our models is that foreign-born Mexican mothers in counties with higher application rates would have experienced similar trends in birth outcomes absent IRCA's legalization programs. The insignificant pre-IRCA trends support this assumption, but it is also useful to estimate these models on another subsample of mothers who may have been similarly affected by other shocks (e.g., EITC expansions) but were not affected by IRCA's legalization programs. If our estimates are identified, we should not uncover an impact of IRCA for these mothers.

The best candidate group for this falsification exercise is U.S. born Mexican ethnic mothers. Table 2 Panel B presents estimates of model (2) for this group. None of the difference-in-differences coefficient estimates are statistically significant, and we do not see the same pattern of increasing effects with the passage of time (i.e., we fail to reject that  $\theta_1 = \theta_2$  for all dependent variables). That said, for birthweight, we only reject equality of the coefficients across foreign- and U.S.-born Mexican women at conventional levels of significance in the first six years the legalization programs were in effect ( $p$ -values = 0.035, 0.119 for first and second six-year periods, respectively; Panel C).<sup>26,27</sup> In several of the robustness checks below, however, we reject equality for both periods while uncovering effects of a similar magnitude.

With these estimates in hand, we can reframe the magnitudes of our estimates, calculating the implied effect of IRCA on gaps in birth outcomes among Mexican ethnic women

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<sup>26</sup> The event-study estimates are noisier for the U.S. born, as shown in Appendix Figure 1. Appendix Figure 2 gives the difference in event-study coefficients across the two groups, corresponding to the estimates in Table 2 Panel C. A triple-difference estimate may be considered a lower bound, since one could argue that this population was indirectly affected by IRCA's legalization programs. Indeed, studies of immigration enforcement have sometimes uncovered effects on Hispanic citizens (e.g., Watson, 2014; Alsan and Yang, 2022).

<sup>27</sup> Another candidate for this exercise is foreign-born mothers from outside of Central and Latin America, who were not greatly affected by IRCA. However, there are small numbers of births to such women in the analysis counties.

by country of origin. Our estimates imply that, in the absence of IRCA, the U.S.-foreign-born Mexican gap in early prenatal care would have expanded by 17 percentage points between 1982 and 1999 rather than the observed 7 percentage points (Appendix Table 1), to a 24 percentage-point gap.<sup>28</sup> What was a persistent foreign-born birthweight advantage between 1993 and 1999 would have also been nearly eliminated had IRCA not been passed, falling to 5 grams. IRCA's legalization programs thus enabled Mexico-born to regain some ground on U.S. citizens of Mexican descent.

## 2. *Alternative Specifications*

Figure 4 plots estimates of  $\theta_1$  and  $\theta_2$ , with 95% confidence intervals, for the baseline specification of (2) and nine alternatives, for both foreign-born and U.S.-born Mexican mothers (Panels A and B, respectively).<sup>29</sup> Collectively, these alternative specifications reinforce our initial conclusions. Many also improve statistical power.

We lacked universe data with which to calculate the denominator of the application rate, so one concern with the baseline specification is that the application rate is measured with error. Specification 1 re-estimates model (2) but substitutes a dummy for the application rate in a county being above the state median.<sup>30</sup> These coefficients are larger, pointing to possible attenuation bias in the baseline model. However, a significant foreign-U.S. born gap remains in the first six post-IRCA years ( $p$ -value for  $\theta_1 = 0.048$ ) and emerges in the second six post-IRCA

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<sup>28</sup> To arrive at this result, we multiplied the 1993-99 difference-in-differences estimates for early prenatal care (Table 2) by 0.357, the average application rate (Table 1). The resulting figures were 0.0896 (Panel A) and -0.0079 (Panel B), implying nearly a 9 percentage point increase in use of early prenatal care for foreign-born Mexican women and a 1 percentage point reduction in the use of early prenatal care for U.S.-born Mexican ethnic women. Thus, we estimate that the U.S.-foreign born gap in early prenatal care use decreased by 10 percentage points due to IRCA. We use a similar approach in our calculations for the birthweight gap.

<sup>29</sup> Appendix Table 3 gives the estimates, along with  $p$ -values on tests that  $\theta_1 = \theta_2$  within sample and that  $\theta_j$  is the same across the samples of foreign and U.S. born Mexican women.

<sup>30</sup> Figure 4 plots coefficients from this specification that are rescaled by the difference in average application rates between above- and below-median counties (approximately 0.15), to match the scale of the baseline coefficients. See Appendix Figure 3 for the corresponding event-study estimates from model (1).

years ( $p$ -value for  $\theta_2 = 0.072$ ). Nevertheless, calculating an alternative application rate using published tabulations of Hispanic female population in 1990 (based on a larger Census sample) doesn't affect the estimates at all (specification 2).

As earlier noted, we started with a wide cohort of women – born 1944 to 1972 – for power purposes. However, the eldest among these were 43 or 44 when their legalization applications would have been approved, and so unlikely to have had additional children in the post-IRCA period. Narrowing the sample to women born 1951 to 1972 (specification 3), the estimates are little changed, suggesting inclusion of older women doesn't affect our conclusions. It is nevertheless important to follow a fixed cohort: when we instead look at all women ages 16-44, regardless of birth cohort, estimates of  $\theta_2$  for Mexico-born mothers shrink and are no longer significant (specification 4). This finding is reassuring, since more recent cohorts were less likely to have been affected by IRCA's legalization programs, either directly (by obtaining a Green Card through IRCA) or indirectly (by being a Green Card or citizen-sponsored wife).

The next two models also concern measurement and interpretation. We first substitute the 1980 unauthorized share for the application rate. This model (specification 5) increases precision and yields larger effects for Mexico-born mothers and smaller effects for foreign-born Mexican ethnic mothers.<sup>31</sup> The combination yields highly significant foreign-U.S. born gaps in both difference-in-differences coefficients (both  $p$ -values  $< 0.001$ ). Unauthorized arrivals prior to 1982 were eligible for the GLP, so the larger and more precise impacts from this specification might reflect stronger attachment of GLP applicants to their adopted communities. In other words, if GLP applicants were less likely to move within the U.S., county of residence reported

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<sup>31</sup> We rescale these estimates so that they represent a one-unit change in the application rate, for comparability to estimates from the baseline specification. Estimates from the baseline specification for the more limited number of counties with 1980 unauthorized population shares (78) are comparable to the baseline estimates for the full sample.



on GLP applications would be a better predictor of county of residence at the time of birth. Specification 6 explores this idea further, returning to our original specification but limiting the sample to all counties in the four sample states with the highest average GLP shares: Illinois (90.4%), Indiana (87.3%), New York (89.6%), and Texas (87.3%).<sup>32</sup> The estimates are very similar in magnitude to specification 5. Like in specification 5, we also reject equality of the difference-in-differences coefficients across the foreign-born and U.S. born Mexican subsamples ( $p$ -value for  $\theta_1 = 0.023$  and for  $\theta_2 = 0.058$ ).

The next two specifications add controls to model (2). Adding county-by-time-varying per-capita earnings and government transfers has little impact relative to baseline (specification 7).<sup>33</sup> These controls are an alternative to (triple) differencing to address bias from local economic shocks, so this result is consistent with our earlier finding of null effects for U.S. born Mexican-ethnic women. Specification 8 then includes interactions between county average birthweight for foreign-born Mexican women in the pre-IRCA period and each of  $d_t^{8/87-7/93}$  and  $d_t^{8/93-7/99}$ . While the application rate was not significantly related to pre-IRCA birthweight (Table 1 Panel B), the coefficient was positive, raising questions about possible mean reversion. The coefficients on these new interaction terms are significantly negative, and the coefficients of interest get larger, as well as more precise. Again, this specification strengthens confidence in the conclusion that IRCA had larger effects on the children of foreign-born than U.S. born Mexican-ethnic women ( $p$ -value for foreign-U.S. differences for  $\theta_1 = 0.004$  and for  $\theta_2 = 0.064$ ).

Finally, though the pre-IRCA interactions in (1) were jointly insignificant for Mexico-born mothers, we estimated an alternative specification removing pre-IRCA linear trends from

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<sup>32</sup> For the remaining sample states, the GLP shares are 79.4% (CO), 28.2% (FL), 76.1% (NJ), and 64.8% (OH).

<sup>33</sup> These data are from the Bureau of Economic Analysis (BEA) and are denominated by fiscal year. We merge birth outcomes data from an event year that starts in August of calendar year  $b$  to income data from the fiscal year that starts in October of calendar year  $b - 1$ , to allow income to have an effect *in utero*.

the data (e.g., Goodman-Bacon, 2021). The underlying assumption is that any differential linear trend by county application rate would have continued in the absence of IRCA.<sup>34</sup> Detrending (specification 9) substantially increases standard errors, but leaves the coefficient estimates for foreign-born Mexicans little changed.<sup>35</sup>

### 3. *Alternative Outcomes*

Figure 5 Panel A shows estimates  $\theta_1$  and  $\theta_2$  from model (2) for alternative outcomes related to birthweight and gestational age, limiting attention to foreign-born Mexican mothers.<sup>36</sup> Neither coefficient is significant for low birthweight, very low birthweight, small for gestational age, or whether a birth is full term or very preterm.<sup>37</sup> Both coefficient estimates are however significantly positive for high birthweight.

High birthweight carries risks for the infant, so this is not necessarily a positive outcome. In Figure 5 Panel B, we plot estimates of  $\theta_1$  and  $\theta_2$  (with 95% confidence intervals) for the share of births in each quintile of the pre-IRCA birthweight distribution for Mexico-born mothers in the analysis counties. The cutoff for the top quintile is 3,828 grams, 172 grams below the high birthweight threshold. The estimates for the top quintile indicator are thus unsurprisingly significant. But there is a significant positive coefficient in the 4<sup>th</sup> quintile as well – within the normal range (3,531 to 3,827 grams) – with shifts out of the first three quintiles.

### C. *Changes in the Composition and Number of Births and Family Reunification*

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<sup>34</sup> We obtained these estimates in two steps. First, following Wolfers (2006), we estimated a model with all post-IRCA event-study interactions (i.e.,  $d_t^j a_{c(s)}$  for  $j \geq 0$ ) and an interaction between a linear event-time term and the application rate (i.e.,  $t \times a_{c(s)}$ ). We then averaged the event-study coefficients across the relevant event years ( $j = 0$  to  $j = 5$  for  $\hat{\theta}_1$  and  $j = 6$  to  $j = 11$  for  $\hat{\theta}_2$ ). Standard errors were calculated using the delta method.

<sup>35</sup> See Appendix Figure 4 and Appendix Table 4 for the same set of robustness checks for early prenatal care.

<sup>36</sup> Appendix Figure 5 gives the estimates for U.S. born Mexican women and Appendix Table 5 the full estimates.

<sup>37</sup> An infant is clinically low birthweight if less than 2,500 grams, clinically very low birthweight if less than 1,500 grams, and clinically high birthweight if greater than 4,000 grams. An infant is small for gestational age if in the bottom decile of weight given gestational age (in weeks). A full-term birth happens at a gestational age of 37+ weeks, whereas a very preterm birth happens at a gestational age of 34 weeks or less.

IRCA's legalization programs may have not only affected birthweight; they may have also affected the fertility of Mexican women, as well as the total number of Mexican women of childbearing age in the U.S., through Green Card sponsorship by their husbands. Effects on fertility and family reunification may be a mediator of the birthweight impacts (Section VI).<sup>38</sup> However, they are also independently interesting, speaking to the role of immigration policy in demographic change in general and IRCA's specific role in Hispanic birth trends in the 1990s (e.g., Kearney and Levine, 2015).

Figure 6 plots event-study (model (1)) coefficients for four (sets of) birth characteristics – the report of a father on the birth certificate (Panel A), parity (Panel B), sex and multiplicity (Panel C), and maternal age (Panel D), for Mexico-born mothers.<sup>39</sup> Figure 7 then gives event-study estimates for birth counts and admissions of Mexican women by way of Green Card or citizen sponsorship by their husbands; we scale both by the average annual number of births to Mexico-born women in the county in the pre-IRCA period.<sup>40</sup> Table 3 gives the difference-in-differences (model (2)) estimates for all variables across the two figures. Legalization caused changes in the composition of births that track changes in fertility and spousal admissions in sensible ways, and the timing of effects reflects the applicant timeline laid out in Figure 2.

Consider the first six post-IRCA years. Mexico-born mothers in counties with higher application rates saw larger increases in the chances a father was reported on a birth certificate; they also aged significantly more quickly, and their births were significantly higher parity. Except for share first birth, all estimates of  $\theta_1$  from model (2) are significantly different from the same coefficient estimates for U.S. born Mexican women (Table 3 Panels B and C columns 1 to

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<sup>38</sup> The county-level application and legalization rates of Mexican men and women are strongly positively correlated.

<sup>39</sup> See Appendix Figure 6 for the event-study estimates for U.S. born Mexican mothers.

<sup>40</sup> Relative to a log transformation, this transformation puts birth counts and sponsored wives on the same scale and retains in the sample county-event year cells with no sponsored wives from Mexico.

4). These compositional changes also arose without statistically significant changes in the total number of births to Mexico-born women, though the estimates for birth counts are negative (Table 3 Panel A column 7). Collectively, these findings suggest that legalization may have temporarily discouraged fertility among younger Mexican women with fewer children.<sup>41</sup>

During the second six post-IRCA years, the impact on maternal age for Mexico-born mothers persisted, and the effect on the likelihood of a paternal report grew. But there was a reversal in the impacts on parity: the estimate of  $\theta_2$  for share first birth is positive and large, while that for share third or higher birth is negative. While the parity coefficients are not statistically significant and not statistically different from those observed for U.S. born Mexican-ethnic women, the changing sign of these coefficients could reflect Mexican women having children they may have delayed. Indeed, while the estimates for the total number of births for this period are not significant, they are positive (Figure 7, Table 3 column 7), the point estimate implying the number of births to Mexico-born women was 21% higher than it would have otherwise been between August 1993 and July 1999, due to IRCA.

However, family reunification also likely played a role during this period. Figure 7 shows that higher application counties not only experienced larger increases in births between the pre-IRCA period and August 1993 to July 1999; they also saw larger gains in the number of Mexican women admitted to the U.S. through family sponsorship channels. In fact, IRCA-induced arrivals can explain slightly over half of all Green Cards awarded to Mexican wives between 1993 and 1999, consistent with the findings of Cascio and Lewis (2023). If marginal sponsored wives were responsible for all marginal births, each of these mothers would have had four children over a six-year period ( $0.766/0.205 \approx 3.75$ ). While not completely out of line with

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<sup>41</sup> This conclusion is potentially consistent with that of Kuka, Shenhav, and Shih (2019), who find that DACA reduced fertility. However, unlike that study, our estimates are not driven by reductions in births to teenagers.

the completed fertility of Mexican-born women in these cohorts, to have four children born over such a short time frame is unrealistic. Both new entrants and women legalized under IRCA therefore arguably contributed to the marginal births.

## **VI. Mechanisms**

Thus far, we have presented evidence that IRCA’s legalization programs improved outcomes of the children of affected women – specifically birthweight, a common measure of health at birth and predictor of later-life achievement and well-being. We have also shown that early prenatal care cannot explain these effects, but changes in the composition of births, stemming from changes in fertility and family reunification, may be contributing.

This section attempts to quantify the role of changing birth composition in our birthweight findings, using the estimates from Section V.C. We also discuss the potential contributions of improvements in family income and reductions in stress, drawing on previous literature. We uncover evidence that each of these channels mattered.

### *A. Birth composition*

How much of the birthweight effects presented in Section V.A. can be explained by the changes in birth characteristics documented in Figure 6? To address this question, we first estimated the relationship between birthweight and birth characteristics in the pre-IRCA period for Mexican-ethnic mothers, separately by country of birth. We then obtained an “adjusted birthweight” measure by subtracting the prediction from this regression, applied over the entire period, from actual birthweight. Effects on adjusted birthweight thus capture what would have happened to birthweight had the composition of births remained constant and the relationship between birth characteristics and birthweight remained the same as it was before IRCA.<sup>42</sup>

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<sup>42</sup> Estimates based on adjusted birthweight should be considered speculative, since the relationship between birthweight and birth characteristics may have changed over time, possibly due to IRCA’s legalization programs.

Figure 8 presents the results from this exercise. The thick black line represents the baseline event-study estimates for birthweight (repeated from Figure 3 Panel A). The remaining plots give event-study coefficients for adjusted birthweight, derived from three regressions with different combinations of birth characteristics. Had the composition of births remained unchanged along the dimensions of parity (dummies for first and third or higher parity), maternal age (cubic), male (dummy), and multiplicity (dummy), average birthweight for the children of Mexico-born women would have increased by 65 grams (Table 4 column 2), not 96 grams, between August 1987 and July 1993. Adjusting in addition for paternal reports on the birth certificate further lowers the estimate of  $\theta_1$  to 58 grams (column 3) but adding in early prenatal care – and coming full circle with the findings in Section V.A. – increases it to 74 grams (column 4). Estimates of  $\theta_2$  for adjusted birthweight vary in a tighter window around the baseline estimate of 165 grams.

Changes in birth composition, at least insofar as characteristics reported on the birth certificate, thus contribute to our estimates, but much more in the first post-IRCA period, and mostly due to the first adjustment. However, under the fully saturated adjustment (Table 4 column 4), over two-thirds of the birthweight effect remains unexplained in the first period. Moreover, changes in observed birth composition account for little of the larger birthweight effect between 1993 and 1999, leaving open the question of why the impact might have grown.

One potential explanation for a growing birthweight effect – still owing to compositional changes – is that IRCA-induced changes in fertility and family reunification boosted the IRCA-authorized share among Mexico-born mothers over time. Our estimates are reduced from in the sense that we do not observe whether a given mother was authorized at the time of birth. Since counties with higher application rates saw larger inflows of Mexican wives sponsored for Green

Cards in the second six-year post-IRCA period (Figure 7, Table 3 Panel A column 8), the difference in average birthweight across counties with higher versus lower application rates should have risen, so long as these women had children once in the U.S. Relative increases in fertility among Mexican women directly legalized through the GLP or SAW programs would have had the same effect.

How much of the rising birthweight effect we can explain by a rising legalized share depends on the initial IRCA-authorized share, as well as how much the Mexican women admitted through IRCA (directly through the GLP or SAW program, or indirectly by way of a husband's sponsorship) account for these births. We observe neither and the number of marginal births (based on the Table 3 Panel A column 7 estimate) is imprecisely estimated. Still, suppose that all marginal births were to IRCA-authorized women, and that the initial (August 1987 to July 1993) IRCA-legalized share among mothers was 33% – about the average IRCA legalization rate (Table 1 Panel A). As we show in Online Appendix B, under these assumptions, the IRCA-authorized share among Mexico-born moms would have risen to about 45% between August 1993 to July 1999 – a 36% percent increase that can account for about half of the 73% increase in the birthweight effect across the two post-IRCA periods.

#### *B. Family Income*

What role do increases in family income play in our findings, both initially and as the legalization applicants matured? Previous research has tied legalization directly to family income and family income to birth outcomes. Family income is not directly reported on birth certificates, precluding incorporation of it in our adjusted birthweight measure. While we do observe some correlates of income – like paternal reports on a birth certificate – adjustments on this basis will arguably not capture its full effect.

Assessing the potential role of family income thus requires drawing on estimates from past studies. We carry out a back-of-the-envelope calculation based on the Cascio and Lewis (2019) estimates of the effect of IRCA’s legalization program on income (including EITC transfers) across the 1990s, combined with the Hoynes, Miller, and Simon (2015) estimates of the effect of income on birthweight, based on variation from the 1993 EITC expansion. This calculation implies that income gains from legalization raised birthweight by on average 35 grams between August 1987 to July 1993 and 59 grams between August 1993 and July 1999 – about a third of our estimates each period.<sup>43</sup> Over part of the latter period, IRCA LPRs would also have had access to near-cash assistance – food stamps – making the 59-gram figure a lower bound.<sup>44</sup>

### C. *Reductions in Stress*

Another channel by which legal status might have affected birth outcomes is maternal stress. Central to this channel is a (reduced) fear of deportation: IRCA included an immediate stay of deportation of anyone who was likely to meet the eligibility criteria for legalization (Section II). This channel may therefore explain both the immediate birthweight effects and growing effects over time, as IRCA admits passed from temporary to permanent legal status. Unfortunately, we cannot do the same kind of back-of-envelope calculation for stress as we did for family income, since we lack estimates of how the IRCA’s legalization programs affected stress levels in the foreign-born Mexican population. However, two literatures suggest stress may account for birthweight effects not explained through other channels.

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<sup>43</sup> See Online Appendix B for details. There are caveats on these conclusions. For example, income is also not independent of the birth characteristics considered in Section VI.A. Some of underlying estimates, particularly those for adjusted gross income in Cascio and Lewis (2019), also have wide confidence intervals.

<sup>44</sup> Food stamp receipt has been linked to birthweight. For example, using variation from program rollout, Almond, Hoynes, and Schanzenbach (2011) find that participation in the food stamp program (FSP) reduced the risk low birthweight. Perhaps more pertinent to this study, using variation from immigrants’ changing eligibility in the late 1990s, East (2020) estimates that 3<sup>rd</sup> trimester FSP eligibility for immigrants raised birthweight by 6.5 grams.



First, numerous studies have concluded that increased immigration enforcement negatively affects birth outcomes.<sup>45</sup> Enforcement may directly affect material circumstances (e.g., Amuedo-Dorantes, Arenas-Arroyo, and Sevilla, 2017), including by “chilling” the use of public programs (Watson, 2014; Alsan and Yang, 2022). However, the oft-positited channel for these effects is an increased salience of deportation risk, which is associated with heightened anxiety among Latino youths (Capps, et al., 2020). Magnitudes of estimates in enforcement studies are also in the range of the birthweight effects that remain unexplained in this paper (e.g., between 10 and 60 grams, depending on the study).

Second, there is direct evidence that maternal stress affects birth outcomes. Some studies (e.g., Aizer, Stroud, and Buka (2016)) link stress to income, suggesting that some of any income effect may work through stress reduction.<sup>46</sup> However, increases in stress holding income constant can also lower birthweight. For example, Persson and Rossin-Slater (2018) find that the loss of a maternal relative during pregnancy reduces birthweight by about 10 grams.

## **VII. Conclusion**

Unauthorized immigration is a pervasive fact of American life. And yet, we know little about the well-being of children born to unauthorized immigrants in the U.S. Getting empirical traction on this question is difficult: it not only requires large-scale data linking parents and

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<sup>45</sup> 287(g) agreements in conjunction with Immigration Control and Enforcement (ICE) enforcement in one county in North Carolina were associated with a 60-gram decline in the weight of babies from less-educated immigrants (but not native-born) mothers in the county relative to mothers in comparison counties (Tome et al., 2021). Broader measures of immigration enforcement, such as “Secure Communities” (Vu, 2024), the Legal Arizona Workers Act (Torche and Sirios, 2018), E-Verify mandates (Strully et al., 2020) and an index of policies like these (Amuedo-Dorantes, Churchill, and Song, 2020), are also associated with lower birthweight.

<sup>46</sup> Following mothers in New England in the 1960s, Aizer, Stroud, and Buka (2016) found that higher levels of a blood marker for stress during late pregnancy was associated with significantly lower birthweight, even within mother across pregnancies. The most stressed mothers (top quintile) birthed babies that were over 100 grams lighter than the least stressed mothers (bottom quintile), though this difference was not always statistically significant.

children, but also “as good as” random variation of the legal status of immigrant parents.

Observation of legal status is also essentially impossible in existing data.

This paper has attempted to overcome these challenges using data from the universe of birth certificates, which link parents and children by design, and variation in parental legal status from an historic U.S. amnesty 35 years ago, under provisions of the Immigration Reform and Control Act. Marshalling a variety of administrative data, we have constructed a localized measure of amnesty exposure among foreign-born Mexican women, almost all of whom would be classified identically by standard proxies for legal status. Exploiting that geographic variation alongside the timing of IRCA’s legalization programs, we have shown that both the promise and realization of permanent legal status raised the average birthweight of children born in the U.S. to Mexican women, and that these birthweight effects increased over time, as the legalized cohort matured. These estimates survive a battery of specification checks, and additional empirical and narrative evidence has suggested that a combination of factors – changes in fertility and family reunification, increases in family resources, and reductions in stress – contributed.

The U.S. seems politically very far away from establishing any new legalization programs like those authorized under IRCA. We would urge caution in generalization even if this were not the case, since the unauthorized population is no longer majority Mexican (Baker, 2021), and the economic, health care, and immigration enforcement environments are different than they were 30 years ago. But the question of how parental legal status affects children is still highly relevant, if only because parents of U.S. citizens who are unauthorized are likely to remain so for the foreseeable future. Our findings suggest that having an unauthorized parent affects a child’s health endowment.

Data constraints have precluded us from estimating the longer-term intergenerational effects of permanent legal status. The implied effects on longer-term outcomes, based on our birthweight estimates and existing research, are also quite small.<sup>47</sup> However, effects flowing exclusively through birthweight are arguably a lower bound on the true longer-run impacts, since the positive effects of having an authorized parent would be ongoing throughout childhood. We leave to future research direct estimation of these longer-run effects.

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<sup>47</sup> For example, a 4.33% (or 165 gram) increase in birthweight is associated with only 0.02 to 0.03 standard deviation increases in achievement or IQ test scores (Figlio, et al., 2014; Black, Devereux, and Salvanes, 2007), a 0.4 percentage point increase in the likelihood of completing high school (Black, Devereux, and Salvanes, 2007), and 0.026 more years of schooling (Royer, 2009).

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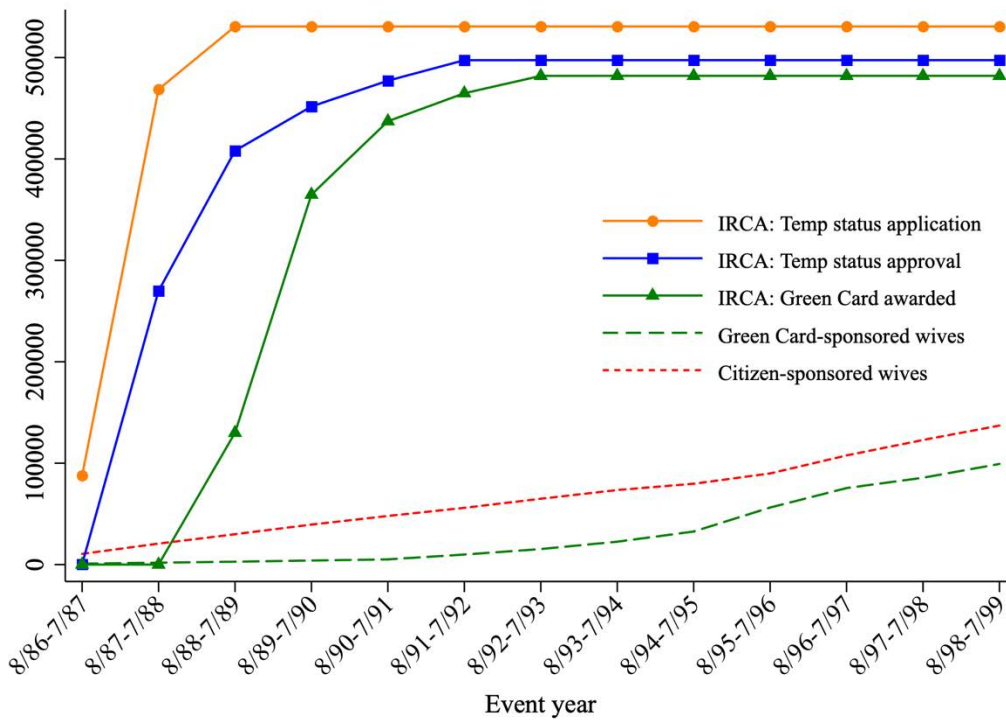
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Figure 1.  
 Cumulative Legalization Applications Submitted and Approved:  
 Mexican Women Born 1944-72



Sources: Legalization Applications Processing System and *Immigrants Admitted to the United States*.  
 Notes: Samples limited to women born in Mexico between 1944 and 1972. Birth years imputed from age and date of application. Green Card award dates assigned to SAW applicants 12 months after approval of their temporary status applications.

Figure 2. Timeline for IRCA's Legalization Applicants

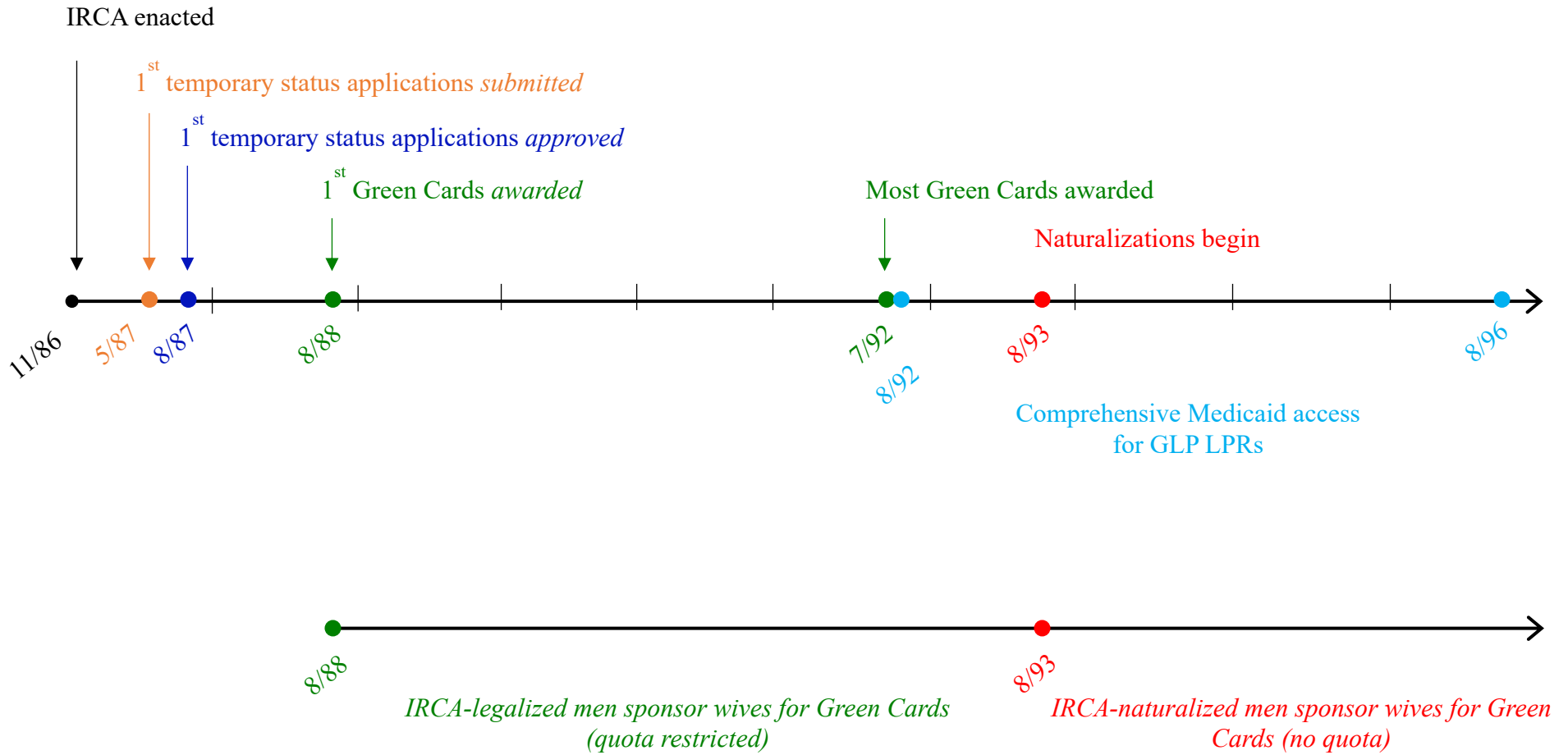
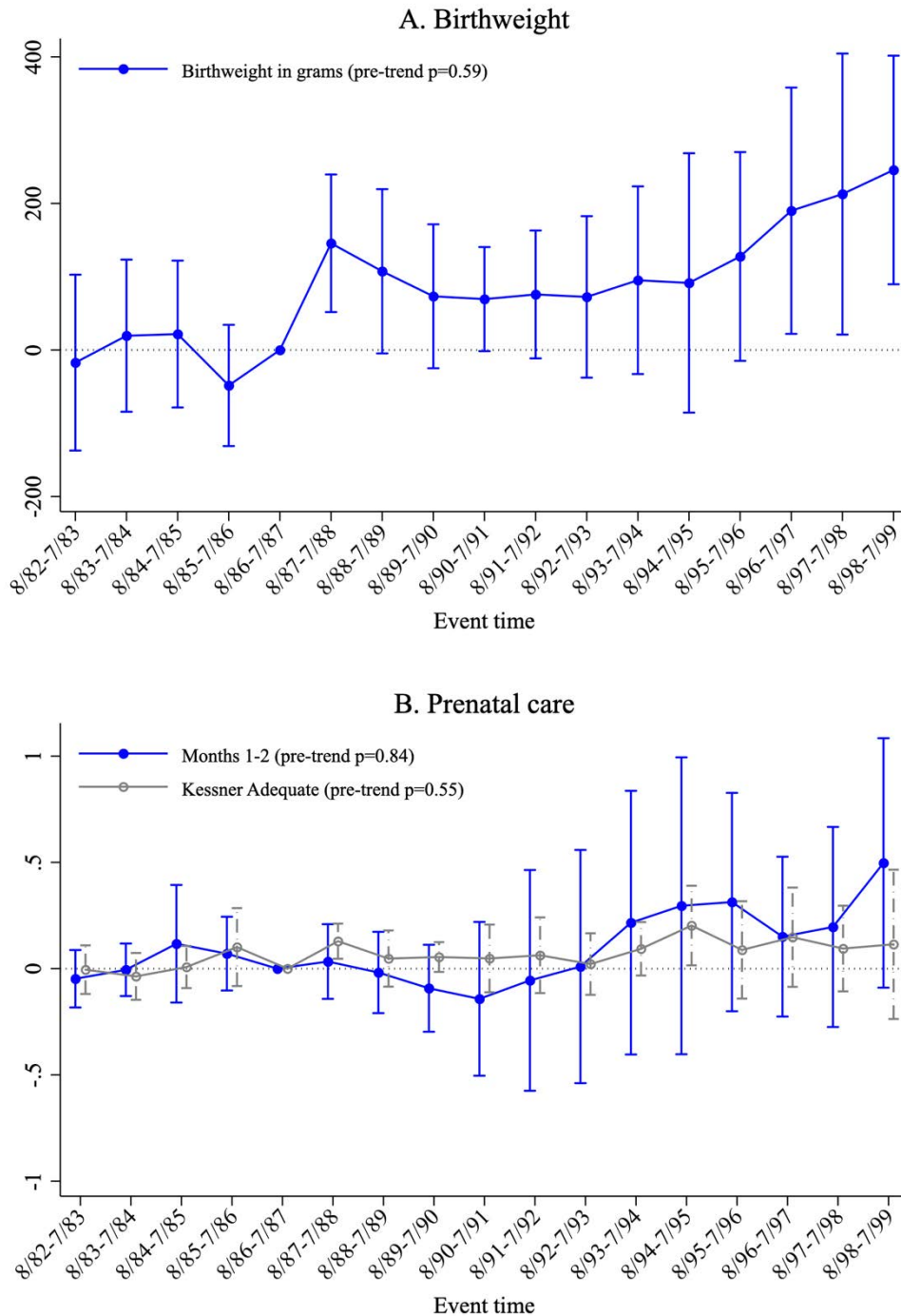


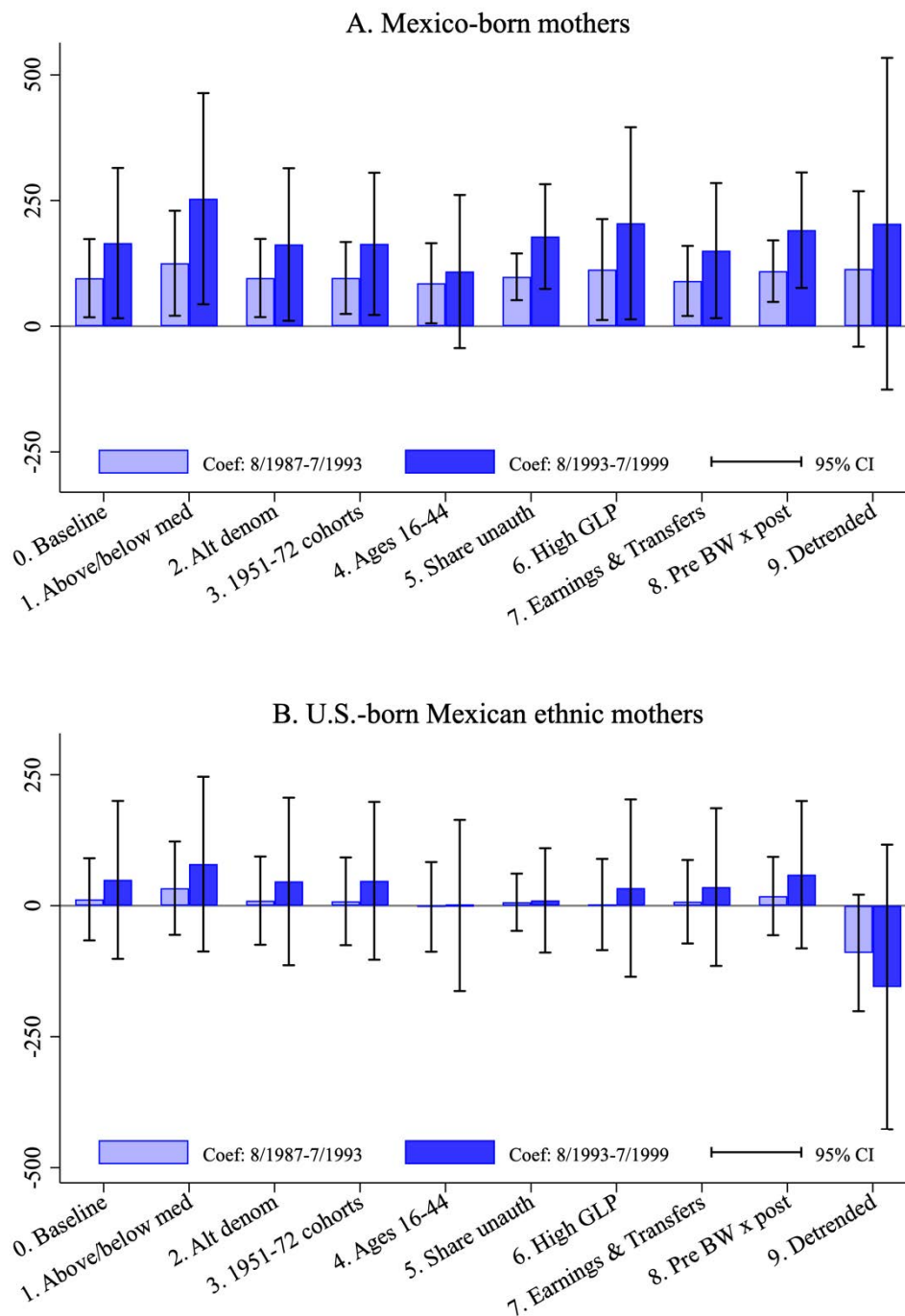
Figure 3.  
Event-Study Estimates for Birthweight and Prenatal Care:  
Mexico-Born Mothers



Sources: Vital Statistics Natality Detail Files, Legalization Applications Processing System, 1990 5% Census PUMS (Ruggles et al., 2022).

Notes: The unit of observation is a county-event year, and the estimation sample includes a balanced panel of 89 counties across 8 states (CO, FL, IL, IN, NJ, NY, OH, and TX). Births limited to mothers born in Mexico between 1944 and 1972. Markers represent coefficients on interactions between a county's application rate and event-year indicators in model (1). Capped vertical lines represent 95% confidence intervals. Standard errors are clustered on county, and estimates are weighted by average annual births to Mexico-born mothers in a county in the pre-IRCA period (8/82-7/87).

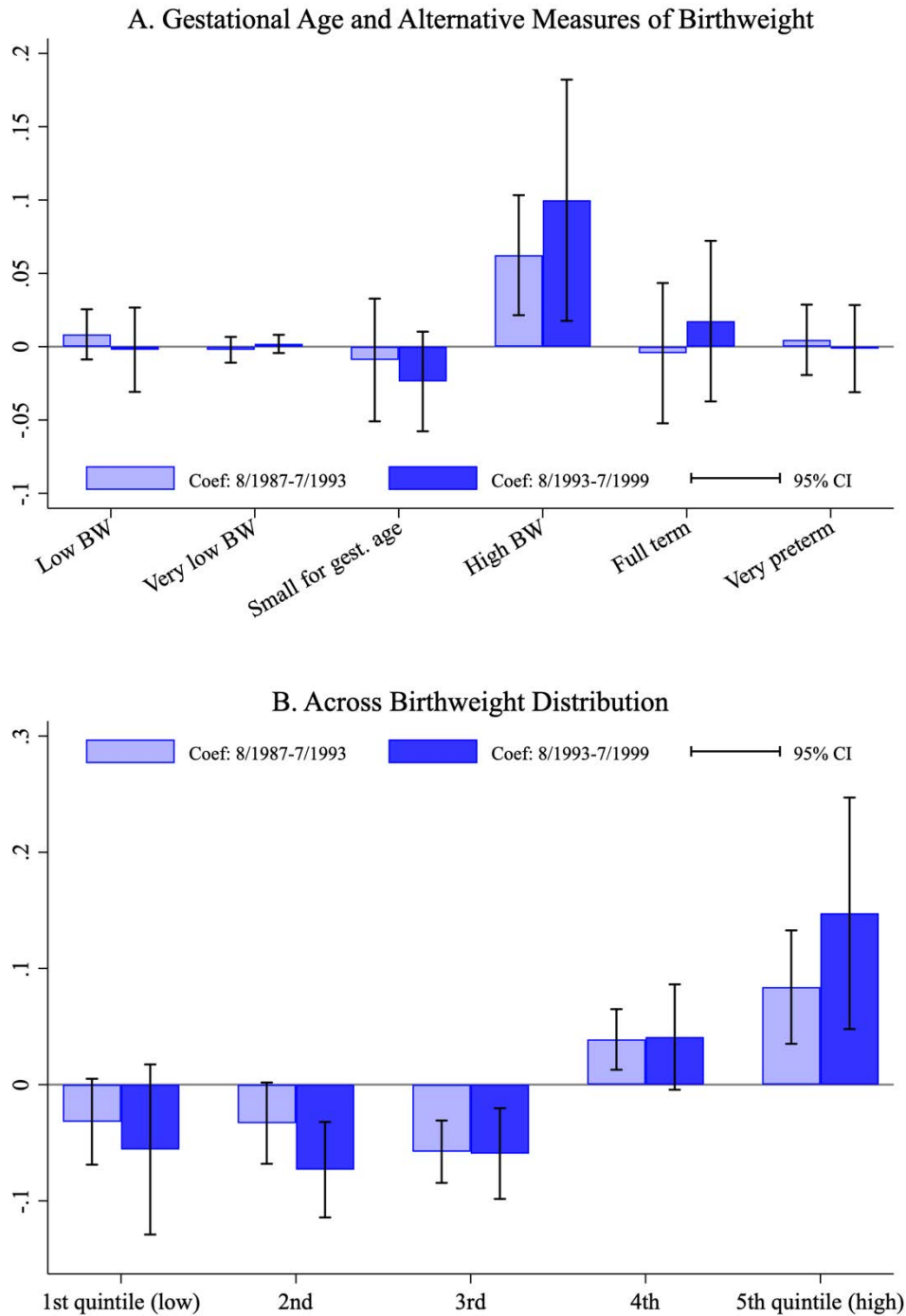
Figure 4.  
Robustness of Difference-in-Differences Estimates for Birthweight



Sources: See Figure 3.

Notes: Figures plot coefficient estimates on the interaction terms in model (2) across different specifications and samples. Spec. 1 replaces  $a_{c(s)}$  with an indicator for whether county  $c$ 's application rate was at or above the median in state  $s$ . Spec. 2 calculates  $a_{c(s)}$  using published tabulations of the female Hispanic population. Spec. 3 limits the natality detail data to mothers born 1951-72, while spec. 4 includes mothers aged 16 to 44 regardless of birth cohort. Spec. 5 replaces  $a_{c(s)}$  with estimated 1980 unauthorized share in the target population. Spec. 6 limits attention to the 4 highest GLP states (IL, IN, NY, TX). Spec. 7 controls for county-by-event-year-varying per-capita earnings and government transfers. Spec. 8 controls for interactions between the two post-IRCA indicators and average county pre-IRCA birthweight among foreign-born Mexican mothers. Spec. 9 residualizes birthweight for pre-IRCA linear trends. Throughout, capped vertical lines represent 95% C.I.s, standard errors are clustered on county, and estimates are weighted by average annual births to Mexico-born mothers in the pre-IRCA period.

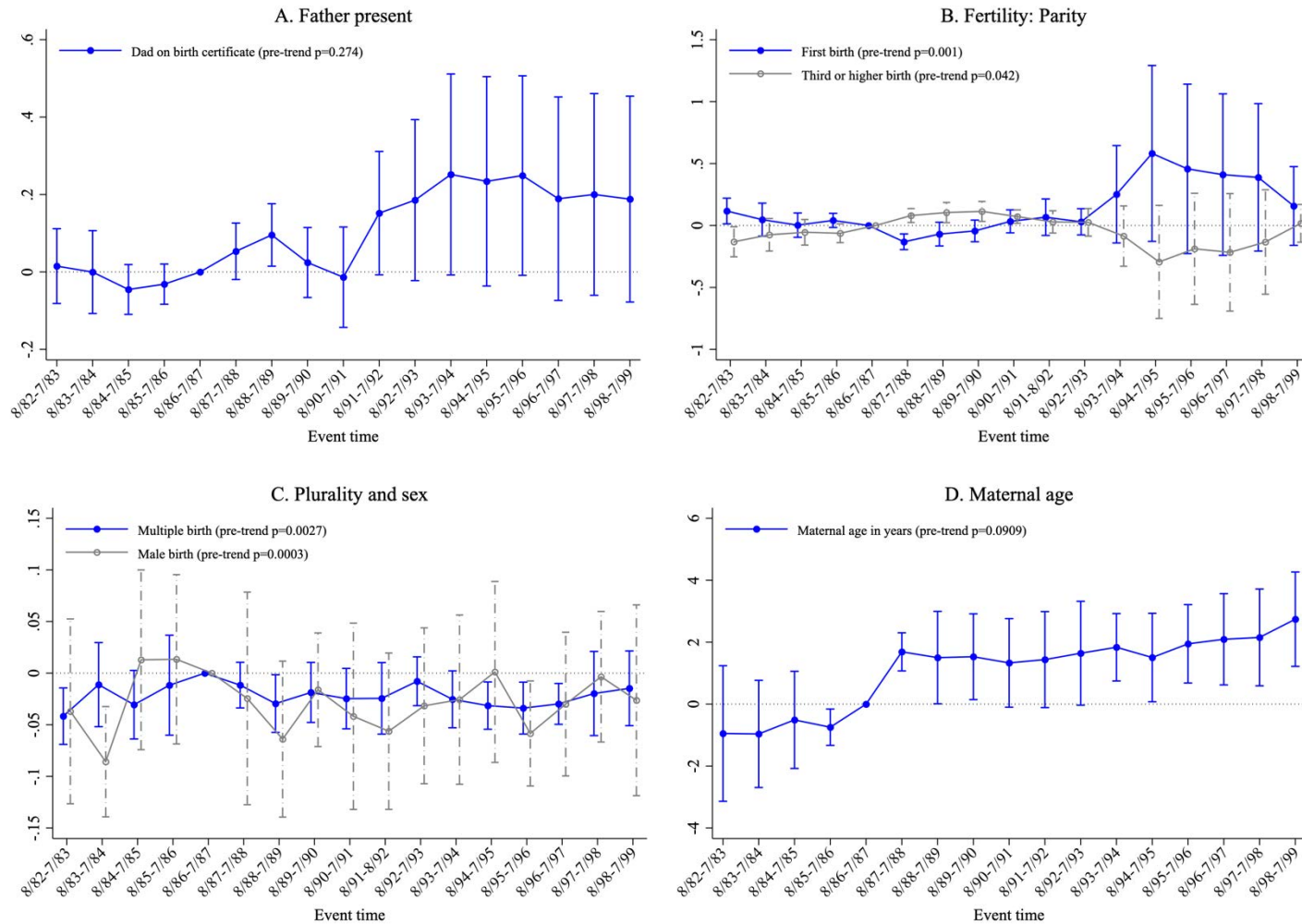
Figure 5.  
 Difference-in-Differences Estimates for Alternative Outcomes:  
 Mexico-Born Mothers



Sources: See Figure 3.

Notes: Figures plot coefficient estimates on the interaction terms in model (2) for different dichotomous outcomes (Panel A) the share of births in each quintile of the pre-IRCA birthweight distribution of Mexico-born mothers (Panel B). Throughout, capped vertical lines represent 95% C.I.s, standard errors are clustered on county, and estimates are weighted by average annual births to Mexico-born mothers in the pre-IRCA period.

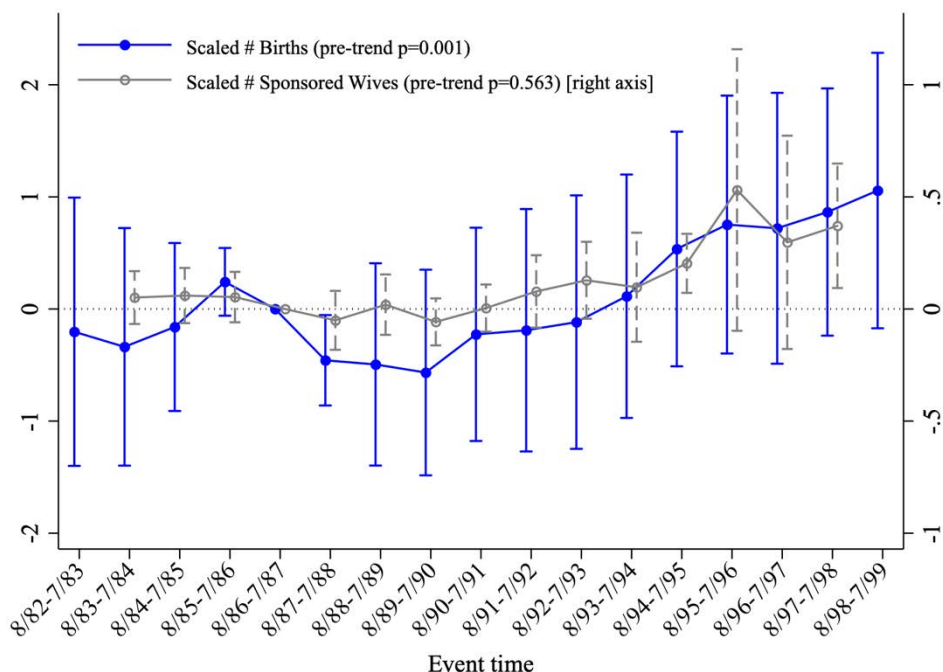
Figure 6.  
Event-Study Estimates for the Composition of Births:  
Mexico-Born Mothers



Sources: See Figure 3.

Notes: The unit of observation is a county-event year, and the estimation sample includes a balanced panel of 89 counties across 8 states (CO, FL, IL, IN, NJ, NY, OH, and TX). Births limited to mothers born in Mexico between 1944 and 1972. Markers represent coefficients on interactions between a county's application rate and event-year indicators in model (1). Capped vertical lines represent 95% confidence intervals. Standard errors are clustered on county, and estimates are weighted by average annual births to Mexico-born mothers in a county in the pre-IRCA period (8/82-7/87).

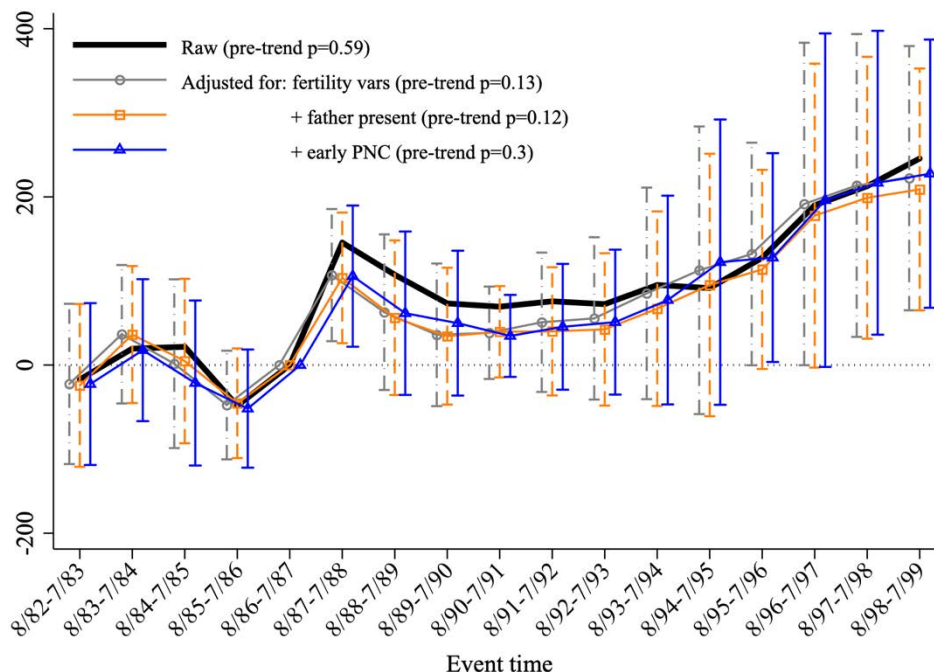
Figure 7.  
 Event-Study Estimates for the Number of Births and  
 of Wives Sponsored for Green Cards: Mexico-Born Mothers



Sources: Vital Statistics Natality Detail Files, Legalization Applications Processing System, 1990 5% Census PUMS (Ruggles et al., 2022), *Immigrants Admitted to the United States*.

Notes: Both outcomes are scaled by the average annual number of births in a county in the pre-IRCA period. The unit of observation is a county-event year, and the estimation sample includes a balanced panel of 89 counties across 8 states (CO, FL, IL, IN, NJ, NY, OH, and TX). Births and admissions limited to women born in Mexico between 1944 and 1972. Markers represent coefficients on interactions between a county's application rate and event-year indicators in model (1). Capped vertical lines represent 95% confidence intervals. Standard errors are clustered on county, and estimates are weighted by average annual births to Mexico-born mothers in a county in the pre-IRCA period (8/82-7/87).

Figure 8.  
 Event-Study Estimates for Birthweight Adjusted for Changes to Composition:  
 Mexico Born Mothers



Sources: Vital Statistics Natality Detail Files, Legalization Applications Processing System, 1990 5% Census PUMS (Ruggles et al., 2022).

Notes: The unit of observation is a county-event year, and the estimation sample includes a balanced panel of 89 counties across 8 states (CO, FL, IL, IN, NJ, NY, OH, and TX). Births limited to mothers born in Mexico between 1944 and 1972. Bold solid line represents coefficients on interactions between a county's application rate and event-year indicators in model (1) for raw birthweight in grams. Other markers represent the same coefficients but for adjusted birthweight, the difference between raw birthweight and birthweight predicted based on the characteristics indicated using natality microdata limited to the pre-IRCA period. Capped vertical lines represent 95% confidence intervals. Standard errors are clustered on county, and estimates are weighted by average annual births to Mexico-born mothers in a county in the pre-IRCA period (8/82-7/87).



**Table 1. Key Variables: Pre-IRCA Means and Relationship with the Application Rate**

	Mean [sd]	Coef. (se) on application rate
	(1)	(2)
<i>A. Legalization Variables</i>		
Application rate	0.357 [0.094]	-
Legalization rate	0.329 [0.091]	0.975 (0.0173)
GLP share	0.859 [0.108]	-0.0825 (0.102)
Unauthorized share (1980) <sup>a</sup>	0.364 [0.133]	0.868 (0.136)
<i>B. Pre-IRCA Birth Characteristics: Mexico-Born Mothers</i>		
Birthweight (grams)	3,368 [51.1]	33.79 (108.5)
Early prenatal care	0.313 [0.116]	0.0215 (0.275)
Adequate prenatal care	0.107 [0.047]	-0.0424 (0.0991)
Male	0.512 [0.026]	0.0176 (0.00814)
Multiple	0.018 [0.011]	0.00208 (0.00575)
First birth	0.319 [0.037]	0.0300 (0.0318)
Third or higher birth	0.401 [0.041]	-0.0606 (0.0568)
Mother's age	25.54 [0.744]	-4.949 (0.835)
Father on birth certificate	0.892 [0.070]	-0.110 (0.109)

*Sources:* Panel A - Legalization Applications Processing System, 1980 and 1990 5% Census PUMS (Ruggles et al., 2022), *Aliens Admitted to the United States*, 1980. Panel B - Vital Statistics Natality Detail Files, August 1982 to July 1987.

*Notes:* Estimation sample includes 89 counties spanning 8 states (CO, FL, IL, IN, NJ, NY, OH, and TX). Estimates are weighted by average annual births to Mexico-born mothers in the pre-IRCA period. Regressions in column (2) include state fixed effects; standard errors (in parentheses) are heteroskedasticity-robust (Panel A) or clustered on county (Panel B). <sup>a</sup> Observed for 78 counties only.

**Table 2. Difference-in-Differences Estimates for Birthweight and Prenatal Care**

	Dependent variable:			
	Birthweight (grams) (1)	Birthweight (natural log) (2)	Early prenatal care (3)	Adequate prenatal care (4)
<i>A. Mexico-Born Mothers</i>				
Aug. 1987 - July 1993 (=1)	95.55	0.0263	-0.0710	0.0471
x Application rate	(39.17)	(0.0127)	(0.184)	(0.0447)
Aug. 1993 - July 1999 (=1)	165.4	0.0433	0.251	0.110
x Application rate	(75.22)	(0.0230)	(0.283)	(0.124)
<i>p</i> : 1987-93 = 1993-99	0.098	0.178	0.053	0.623
R-square	0.617	0.822	0.822	0.823
N (county x year)	1,513	1,513	1,512	1,512
<i>B. U.S. Born Mexican Ethnic Mothers</i>				
Aug. 1987 - July 1993 (=1)	12.14	0.00227	-0.120	0.0256
x Application rate	(39.45)	(0.0131)	(0.110)	(0.0654)
Aug. 1993 - July 1999 (=1)	49.20	0.0141	-0.0300	-0.231
x Application rate	(75.84)	(0.0253)	(0.109)	(0.204)
<i>p</i> : 1987-93 = 1993-99	0.432	0.444	0.306	0.115
R-square	0.638	0.533	0.907	0.846
N (county x year)	1,506	1,506	1,506	1,506
<i>C. P-values on Foreign-U.S. Born Difference</i>				
Aug. 1987 - July 1993 (=1)	0.035	0.089	0.599	0.657
x Application rate				
Aug. 1993 - July 1999 (=1)	0.119	0.236	0.177	0.002
x Application rate				

*Notes:* Estimation sample includes 89 counties spanning 8 states (CO, FL, IL, IN, NJ, NY, OH, and TX). Each column in Panels A and B presents estimates of the difference-in-differences coefficients in model (2), which also includes county and state-by-year fixed effects. *p*-values in Panel C correspond to coefficients on the triple interactions between the grouped event-year indicators, the application rate, and a foreign-born Mexican indicator in a stacked and fully interacted (with the foreign-born indicator) version of model (2). Estimates are weighted by average annual births to mothers in the pre-IRCA period. Standard errors (in parentheses) are clustered on county.

**Table 3. Difference-in-Differences Estimates for the Composition and Number of Births**

	Dependent variable:							
	Father	Sh. 1 <sup>st</sup>	Sh. 3 <sup>rd</sup> +	Maternal	Male	Multiple	Scaled by # Pre-IRCA Births:	
	Reported	Birth	Birth	Age	Birth	Birth	# Births	# Spon. wives
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>A. Mexico-Born Mothers</i>								
Aug. 1987 - July 1993 (=1)	0.0952	-0.0608	0.136	2.155	-0.0197	-0.0004	-0.250	-0.0869
x Application rate	(0.0300)	(0.0219)	(0.0338)	(0.453)	(0.0118)	(0.0067)	(0.454)	(0.0274)
Aug. 1993 - July 1999 (=1)	0.231	0.333	-0.085	2.679	-0.0045	-0.0068	0.766	0.205
x Application rate	(0.117)	(0.253)	(0.149)	(0.436)	(0.0119)	(0.0068)	(0.625)	(0.110)
<i>p</i> : 1987-93 = 1993-99	0.142	0.115	0.192	0.101	0.165	0.0489	0.062	0.011
R-square	0.827	0.692	0.776	0.983	0.166	0.174	0.802	0.732
N (county x year)	1,513	1,513	1,513	1,513	1,513	1,513	1,513	1,513
<i>B. U.S. Born Mexican-Ethnic Mothers</i>								
Aug. 1987 - July 1993 (=1)	-0.0198	-0.0131	0.0004	0.236	-0.0057	0.0051	0.318	-
x Application rate	(0.0268)	(0.0205)	(0.0272)	(0.840)	(0.0089)	(0.0062)	(0.418)	-
Aug. 1993 - July 1999 (=1)	0.0960	0.152	-0.0456	1.002	0.0099	-0.0055	0.0201	-
x Application rate	(0.0831)	(0.141)	(0.0700)	(1.100)	(0.0138)	(0.0080)	(0.271)	-
<i>p</i> : 1987-93 = 1993-99	0.121	0.235	0.592	0.0248	0.209	0.141	0.163	-
R-square	0.840	0.831	0.853	0.980	0.150	0.263	0.824	-
N (county x year)	1,506	1,506	1,506	1,506	1,506	1,506	1,506	-
<i>C. P-values on Foreign-U.S. Born Difference</i>								
Aug. 1987 - July 1993 (=1)	0.0003	0.193	0.0002	0.017	0.359	0.584	0.082	-
x Application rate								
Aug. 1993 - July 1999 (=1)	0.090	0.458	0.772	0.079	0.425	0.886	0.242	-
x Application rate								

Notes: See Table 2.

**Table 4. Difference-in-Differences Estimates for Birthweight:  
Raw and Adjusted for Changes in Composition**

	Dependent variable:			
	Birthweight (raw)	Birthweight adjusted for:		
	Fertility variables <sup>a</sup>	+ Father present	+ Early prenatal care	
	(1)	(2)	(3)	(4)
<i>A. Mexico-Born Mothers</i>				
Aug. 1987 - July 1993 (=1)	95.55	64.78	58.46	73.70
x Application rate	(39.17)	(37.98)	(36.76)	(32.87)
Aug. 1993 - July 1999 (=1)	165.4	165.9	149.3	177.0
x Application rate	(75.22)	(74.27)	(68.50)	(71.83)
<i>p</i> : 1987-93 = 1993-99	0.098	0.050	0.060	0.055
R-square	0.617	0.663	0.645	0.656
N (county x year)	1,513	1,513	1,513	1,512
<i>B. U.S. Born Mexican-Ethnic Mothers</i>				
Aug. 1987 - July 1993 (=1)	12.14	10.08	12.89	16.81
x Application rate	(39.45)	(34.05)	(34.63)	(35.00)
Aug. 1993 - July 1999 (=1)	49.20	30.40	25.07	39.05
x Application rate	(75.84)	(69.69)	(65.75)	(71.40)
<i>p</i> : 1987-93 = 1993-99	0.432	0.636	0.757	0.635
R-square	0.638	0.674	0.672	0.666
N (county x year)	1,506	1,506	1,506	1,506
<i>C. P-values on Foreign-U.S. Born Difference</i>				
Aug. 1987 - July 1993 (=1)	0.035	0.205	0.304	0.166
x Application rate				
Aug. 1993 - July 1999 (=1)	0.119	0.047	0.057	0.037
x Application rate				

*Notes:* Estimation sample includes 89 counties spanning 8 states (CO, FL, IL, IN, NJ, NY, OH, and TX). Each column in Panels A and B presents estimates of the difference-in-differences coefficients in model (2), which also includes county and state-by-year fixed effects. *p*-values in Panel C correspond to coefficients on the triple interactions between the grouped event-year indicators, the application rate, and a foreign-born Mexican indicator in a stacked and fully interacted (with the foreign-born indicator) version of model (2). The dependent variable in column 1 is raw birthweight (in grams). The dependent variables in columns 2-4 are adjusted birthweights, differences between raw birthweight and birthweight predicted based on the characteristics indicated using natality microdata limited to the pre-IRCA period. Estimates are weighted by average annual births to mothers in the pre-IRCA period. Standard errors (in parentheses) are clustered on county.

<sup>a</sup> A cubic in maternal age and indicators for second or third or higher parity, male, and multiple birth.

*Online Appendices (Not for Publication)*  
**The Intergenerational Effects of Permanent Legal Status**

Elizabeth U. Cascio  
Paul Cornell  
Ethan Lewis

June 2024

## Appendix A. Data

### I. Treatment Variable

#### 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, split across two files) and forms I-700 (application for temporary legal status under IRCA’s SAW program) received by the Immigration and Naturalization Service (INS), consisting of 3,040,948 records in total.

These fields describe some outcomes of the application process, including whether and when a Green Card was awarded, through the end of the 1992 fiscal year.<sup>1</sup> These fields also include the applicant’s age, sex, country of birth, and state and county of intended residence within the U.S. (current U.S. address) all at the time of application. They can thus be used to create a count of the number of Mexican women admitted under the legalization programs born roughly between 1944 and 1972, the numerator of our treatment measure, by county.

#### B. *Total Count of Mexicans*

The denominator of the treatment is the sum of the foreign-born Mexican women born 1944 to 1974 estimated from the 1990 Census PUMS (Ruggles et al., 2022). The sample is limited to women residing in identified counties. We estimate birth year as 1990-age-1, given the Census date of April 1.

#### C. *Mexican Population in 1980*

We measure the share of the Mexican population that was unauthorized in 1980 using a combination of data sources. First, we estimate the total number of Mexican females born between 1944 and 1972, our target demographic, in the 1980 Census PUMS (Ruggles et al., 2020). This is the denominator. To estimate the number of unauthorized Mexicans, we subtract from this total the set of Mexicans who are legally authorized (and who are in this target demographic), either citizens or LPRs. We first estimate the number of Mexicans who are citizens again using the 1980 Census PUMS. The 1980 LPR count is estimated with the immigrant “registry” described next.

#### C. *Alien Address Reports*

To estimate the number of Mexican LPRs living in the U.S. in 1980, we turn to microdata on LPRs in 1980 available in the *Alien Address Reports, [United States], 1980 Public Use File*, available at ICPSR, also known as the immigrant registry. These public-use microdata consist of selected fields from anonymized records of registered aliens in the U.S. in 1980 (collected as part

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<sup>1</sup> 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.

of the INS's alien address reporting program). LPRs are separately identified. The fields include country of birth and state and zip code of residence within the U.S., which we map to counties. It also contains age and sex, which allows us to construct the Mexican LPR count for our target demographic.

Combined with the Census data (I.C) we then have enough information to compute the number of Mexican females who are not authorized, as a share of the total number of Mexican females, in 1980.

## II. Outcomes Data

### A. *Nativity Detail Public Use Files*

Our main outcomes are constructed from the *Detail Nativity Public Data Tapes* (U.S. Department of Health and Human Services, National Center for Health Statistics, various years) for 1982 through 1999. We obtained these data through the NBER.<sup>2</sup>

### B. *Immigrants Admitted to the United States*

We calculate admission of sponsored wives by county from *Immigrants Admitted to the United States* microdata, available on ICPSR, for fiscal years 1983-1997 (United States Department of Justice, Immigration and Naturalization Service, various years) and 1999 (United States Department of Justice, Immigration and Naturalization Service, various years) and from the National Archives file for fiscal year 1998. In table source notes, we refer to these files collectively as *Immigrants Admitted to the United States* (1983-1998). 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), month and year of admission, country of birth, age, zip code of residence at the time of admission (through 1998), marital status, and sex. Specifically, these data identify Mexican-born women who are either (1) married and admitted by a Green Card holding sponsor or (2) citizen-sponsored spouses.<sup>3</sup> The sum these two gives our total count of Mexican wives who are admitted on a family-sponsored visa.

## III. References

### A. *Legalization Application Processing System Data*

Department of Justice. Immigration and Naturalization Service. Office of Strategic Planning. Statistics Division. 1991-1995. *1992 Legalization Summary Public Use Tape: Application Form I-687 Data File for California*. Distributed by the United States National Archives, <https://catalog.archives.gov/id/1315257>.

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<sup>2</sup> <https://www.nber.org/research/data/vital-statistics-nativity-birth-data>

<sup>3</sup> The former is needed to proxy for Green Card sponsored spouses in the 1999 public use data (used in Figure 1), which only identifies a broader category of Green Card sponsored wives and children (technically called the “family second preference” visa category). As it turns out, in all other years, the number of married spouses in this category is nearly identical or identical to the actual number of Green Card sponsored spouses.

Department of Justice. Immigration and Naturalization Service. Office of Strategic Planning. Statistics Division. 1991-1995. *1992 Legalization Summary Public Use Tape: Application Form I-687 Data File for States Other Than California*. Distributed by the United States National Archives, <https://catalog.archives.gov/id/1315263>.

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*B. Natality Detail Public Use Data*

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----. *1993 Detail Natality Public Use Data Tape*. Hyattsville, Maryland, October 1995.

----. *1994 Detail Natality Public Use Data Tape*. Hyattsville, Maryland, October 1996.

----. *1995 Detail Natality Public Use Data Tape*. Hyattsville, Maryland, September 1997.

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----. *1998 Detail Natality Public Use Data Tape*. Hyattsville, Maryland.

----. *1999 Detail Natality Public Use Data Tape*. Hyattsville, Maryland.



C. *Immigrants Admitted to the United States.*

- . *Immigrants Admitted to the United States, 1983.* Inter-university Consortium for Political and Social Research [distributor], 2010-04-02. <https://doi.org/10.3886/ICPSR08963.v2>
- . *Immigrants Admitted to the United States, 1984.* Inter-university Consortium for Political and Social Research [distributor], 2010-04-02. <https://doi.org/10.3886/ICPSR08964.v2>
- . *Immigrants Admitted to the United States, 1985.* Inter-university Consortium for Political and Social Research [distributor], 2010-04-07. <https://doi.org/10.3886/ICPSR08965.v2>
- . *Immigrants Admitted to the United States, 1986.* Inter-university Consortium for Political and Social Research [distributor], 2010-04-07. <https://doi.org/10.3886/ICPSR08966.v2>
- . *Immigrants Admitted to the United States, 1987.* Inter-university Consortium for Political and Social Research [distributor], 2010-04-19. <https://doi.org/10.3886/ICPSR09268.v2>
- . *Immigrants Admitted to the United States, 1988.* Inter-university Consortium for Political and Social Research [distributor], 2010-05-12. <https://doi.org/10.3886/ICPSR09269.v2>
- . *Immigrants Admitted to the United States, 1989.* Inter-university Consortium for Political and Social Research [distributor], 2010-05-13. <https://doi.org/10.3886/ICPSR06161.v2>
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<https://doi.org/10.18128/D010.V12.0>

E. *Alien Address Reports in 1980*

United States Department of Justice. Immigration and Naturalization Service. *Alien Address Reports, [United States]: 1980 Public Use File*. [distributor], 1992-02-16.  
<https://doi.org/10.3886/ICPSR07998.v1>

## Appendix B. Further Details on Mechanisms Calculations

### I. Legalized Share Calculations

One potential explanation for a rising effect of IRCA's legalization programs on birthweight over time (Table 2 Panel A) is a rising IRCA-legalized share among foreign-born Mexican mothers. The IRCA-legalized share among mothers may have increased due to either increasing fertility among women authorized directly under IRCA's legalization provisions or the influx of family- (specifically husband-) sponsored Mexican wives in the second post-IRCA period (Figure 1, Table 3 Panel A, Figure 7).

To formalize, let  $n_t^{legal}$  be the number of births to Mexican IRCA-authorized mothers (including sponsored wives) in period  $t$ , with  $t = 1$  for August 1987 to July 1993 and  $t = 2$  for August 1993 to July 1999. Let  $n_t^{tot}$  then represent the total number of births to foreign-born Mexican women in  $t$ . The IRCA-legalized share of births in  $t = 2$  is then given by:

$$n_2^{legal}/n_2^{tot} = (n_1^{legal} + \bar{\Delta}n^{legal} + \Delta n^{legal}) / (n_1^{tot} + \bar{\Delta}n^{tot} + \Delta n^{tot}), \quad (B1)$$

where  $\Delta$  represents the change from  $t = 1$  to  $t = 2$  attributable to changes in fertility or family reunification stemming from IRCA, and  $\bar{\Delta}$  represents the change from  $t = 1$  to  $t = 2$  that would have happened for the cohort of interest in the absence of fertility or family reunification effects, due to aging and baseline differences in fertility between IRCA-legalized mothers and other foreign-born Mexican women.

Given (B1), how much of the rising birthweight effect can we explain through changes in the legalized share among mothers, stemming from fertility or family reunification effects of IRCA? The answer depends on: (1) the number of marginal births in  $t = 2$  attributable to IRCA (i.e.,  $\Delta n^{tot}$ ); (2) how much Mexican women legalized due to IRCA (either directly, through the GLP or SAW program, or indirectly, through family-sponsorship) contributed to the marginal births (i.e., the relationship between  $\Delta n^{tot}$  and  $\Delta n^{legal}$ ); (3) how the raw number of births overall and the raw number of births to IRCA-legalized mothers would have changed between  $t = 1$  and  $t = 2$  in the absence of fertility or family reunification effects (i.e., the values of  $\bar{\Delta}n^{legal}$  and  $\bar{\Delta}n^{tot}$ ); and (4) the initial legalized share ( $n_1^{legal}/n_1^{tot}$ ).

Imputations based on sample statistics and the estimates in column 7 of Table 3 Panel A provide an answer to (1): IRCA's legalization programs increased the number of births to foreign-born Mexican women by 21% in  $t = 2$  relative to the number of births that would have happened in the absence of IRCA. For the purposes of this calculation, we calculate the aggregate number of births across all counties in our sample attributable to IRCA in  $t = 2$  ( $\Delta n^{tot} = 52,264$ ).

For (2), we will assume no spillovers, or that the IRCA-legalized population is responsible for all marginal births (i.e.,  $\Delta n^{legal} = \Delta n^{tot} = 52,264$ ). Regarding (3), note that  $n_2^{tot} - \Delta n^{tot} = 249,999$ , i.e., there would have been about 250,000 births in  $t = 2$  if IRCA hadn't had any fertility or family reunification effects. We can relate this to  $n_1^{tot} = 309,249$  to arrive at the

expression  $\bar{\Delta}n^{tot} \approx -0.2n_1^{tot}$ . We will assume that the number of births to IRCA legalized mothers would have changed by the same proportion, i.e.,  $\bar{\Delta}n^{legal} \approx -0.2n_1^{legal}$ .

We can relate the number of marginal births to  $n_1^{tot}$  as well:  $\Delta n^{tot} = \Delta n^{legal} = 0.17n_1^{tot}$ . Substituting this collection of expressions into (B1), we arrive at:

$$n_2^{legal}/n_2^{tot} = (n_1^{legal} - 0.2n_1^{legal} + 0.17n_1^{tot})/(n_1^{tot} - 0.2n_1^{tot} + 0.17n_1^{tot})$$

or

$$n_2^{legal}/n_2^{tot} = (0.8n_1^{legal} + 0.17n_1^{tot})/0.97n_1^{tot}.$$

or

$$n_2^{legal}/n_2^{tot} = (0.8/0.97)(n_1^{legal}/n_1^{tot}) + 0.17/0.97. \quad (B2)$$

Assuming that  $n_1^{legal}/n_1^{tot} = 0.33$  – the approximate legalized share in our average county (from Table 1 Panel A) – we would conclude that  $n_2^{legal}/n_2^{tot} \approx 0.45$ . In other words, incorporating the effects of IRCA on fertility and family reunification, the legalization rate among mothers in  $t = 2$  would have been about 45%, compared to 33% in  $t = 1$ . This is a 36% increase, suggesting that increases in the legalization rate alone explain just shy of half of the 73% increase in the birthweight effect estimate between  $t = 1$  and  $t = 2$ .<sup>1</sup>

This back-of-the-envelope calculation has relied on some strong assumptions. First, if legalization did in fact postpone births among affected mothers, the IRCA legalized share in  $t = 1$  may have been lower than 33%. Assuming an initial maternal legalization rate of 25%, for example, the maternal legalization rate would have increased to 38% in  $t = 2$ , based on (B2) – a 53% increase that would account for the lion's share of the 73% increase in the birthweight effect. In general, the lower the initial ( $t = 1$ ) legalized share among mothers, the more a rising legalized share due to fertility and family reunification effects might explain our estimates. In addition, we have taken point estimates (e.g., for the effect of IRCA's legalization programs on the number of births) as truth when they are in fact noisy estimates. Still, the exercise suggests that a rising legalized share among mothers contributes to our estimates.

## II. Family Income Calculations

There have been several past studies of the earnings effects of IRCA's legalization programs (Kossoudji and Cobb-Clark, 2002; Amuedo-Dorantes, Bansak, and Raphael, 2007; Pan, 2012; Steigleder and Sparber, 2017). However, the most useful for our purposes is Cascio and Lewis (2019), which estimates IRCA's impacts on both an earnings proxy (adjusted gross income (AGI)) and cash transfers (from the EITC) across the same two periods and using similar identifying variation as the present paper. Cascio and Lewis (2019) find that IRCA's legalization programs increased AGI on the marginal (IRCA LPR-filed) tax return by on average \$5,385 between 1988 and 1993 and \$8,680 between 1993 and 1999. Their estimates for annual EITC transfers, which are much more precise, are \$600 and \$1,400 per household for the two

<sup>1</sup> Based on our assumptions, we can also calculate  $n_2^{legal}/n_2^{tot}$  in the absence of fertility or family reunification effects, i.e., assuming that  $\Delta n^{tot} = \Delta n^{legal} = 0$ . Under the assumptions that we've made, it is trivial to show that the legalization rate would not have changed:  $n_2^{legal}/n_2^{tot} = n_1^{legal}/n_1^{tot}$ .

respective periods.<sup>2</sup> The implied effect on total income thus almost doubles across our study period.<sup>3</sup>

How much might average birthweight have risen with income gains like these? Hoynes, Miller, and Simon (2015) provide a convenient estimate, based on variation from the 1993 EITC expansion: every \$1,000 in (EITC) income increases mean birthweight by 5.9 grams.<sup>4</sup> The point estimates from these two studies thus imply that income gains from legalization should have raised the average birthweight of children born to Mexican women by about 35 grams between August 1987 to July 1993 and by about 59 grams between August 1993 and July 1999. In other words, income gains account for about a third of our estimates in each period.

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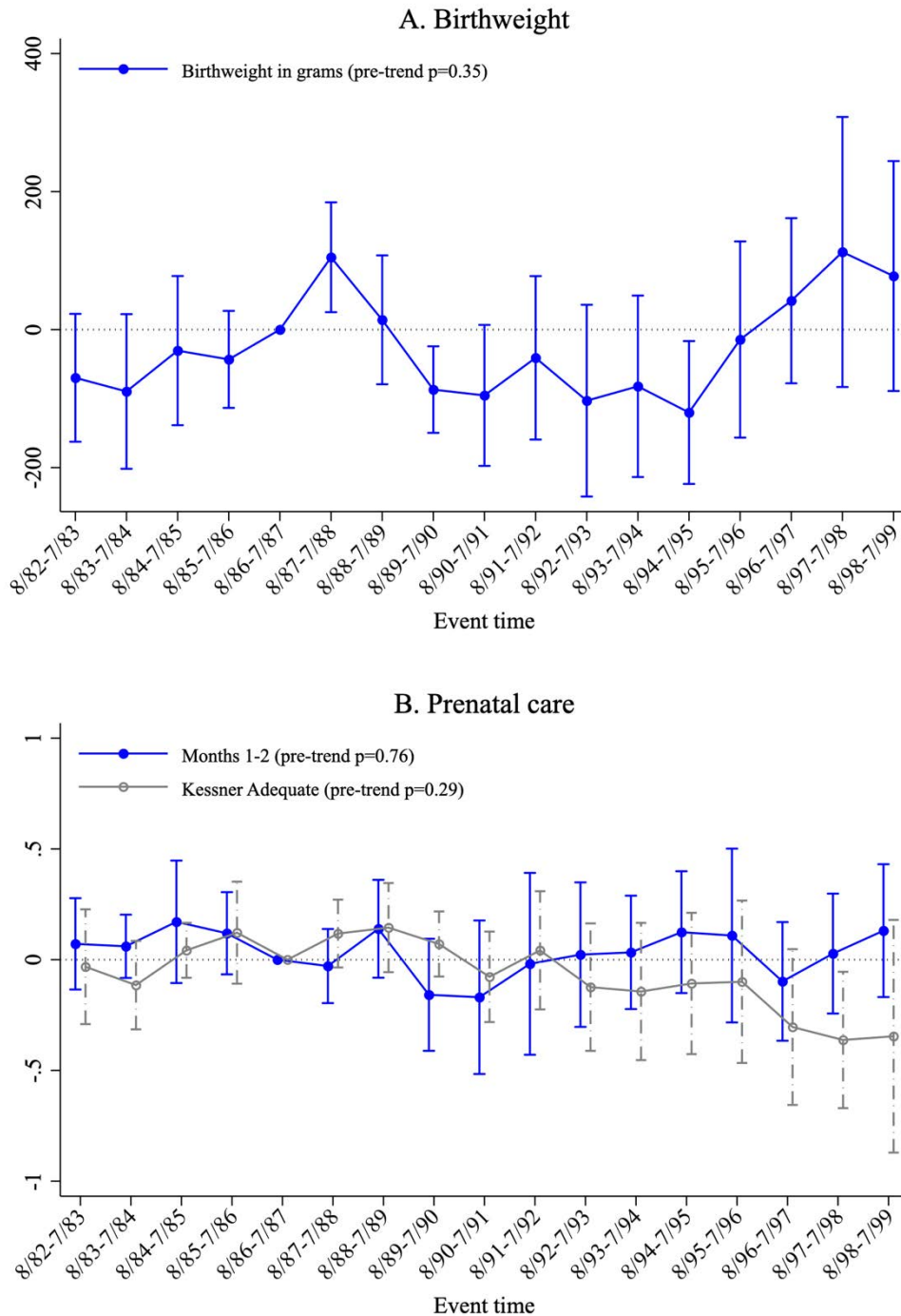
<sup>2</sup> These estimates come from Table 4 of Cascio and Lewis (2019). Dollar amounts are in 2014 dollars.

<sup>3</sup> Several other studies (Kossoudji and Cobb-Clark, 2002; Amuedo-Dorantes, Bansak, and Raphael, 2007) only present short-term effects on earnings, through 1992. At around 6%, their earnings estimates are not out of line with the Cascio and Lewis (2019) estimates for the 1988 to 1993 period.

<sup>4</sup> Their original estimates are in 2009 dollars, which we convert to 2014 dollars for comparability to the Cascio and Lewis (2019) estimates.

# Appendix Figure 1.

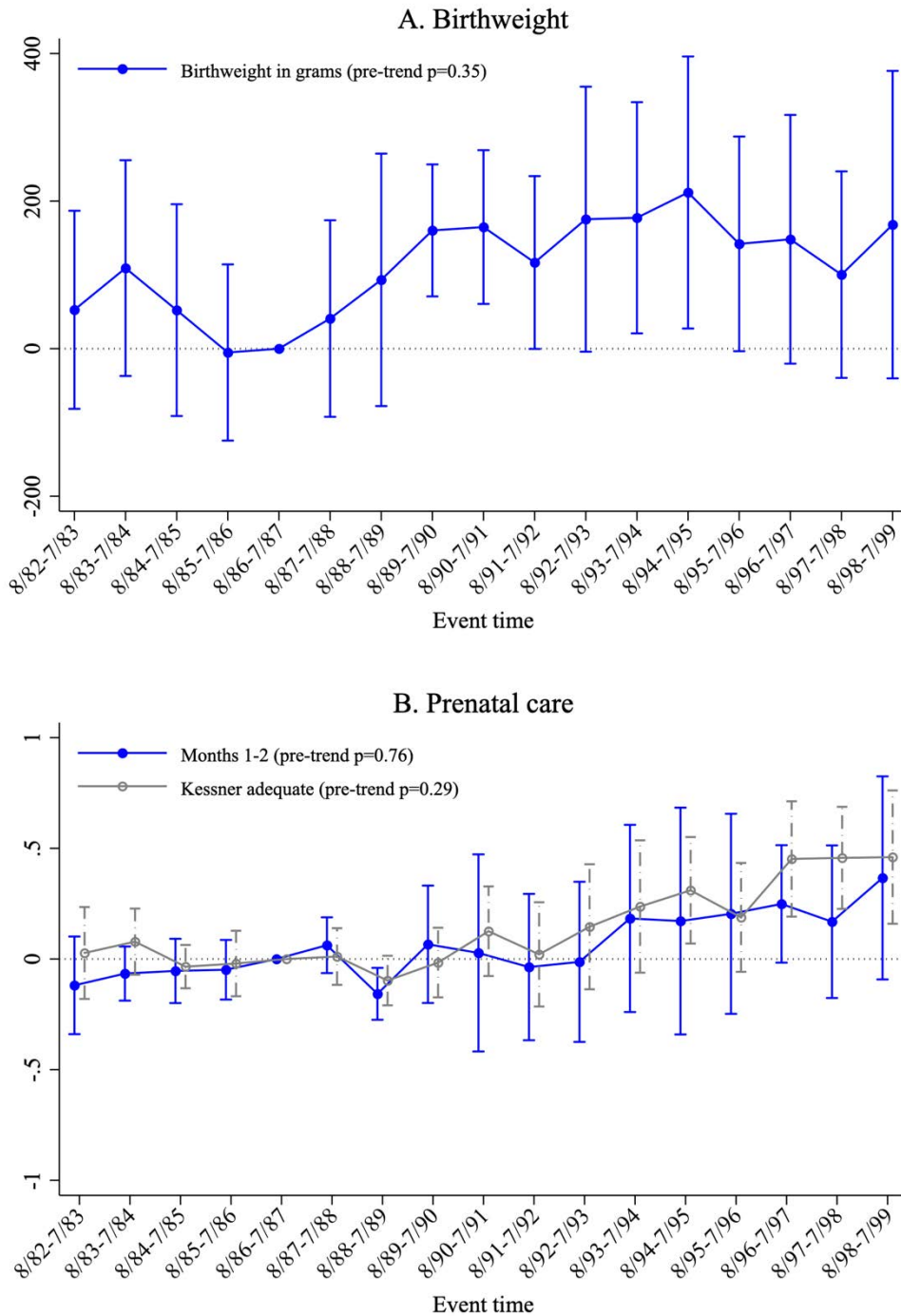
## Event-Study Estimates for Birthweight and Prenatal Care: U.S. Born Mexican Ethnic Mothers



*Sources:* Vital Statistics Natality Detail Files, Legalization Applications Processing System, 1990 5% Census PUMS (Ruggles et al., 2022).

*Notes:* The unit of observation is a county-event year, and the estimation sample includes a panel of 89 counties across 8 states (CO, FL, IL, IN, NJ, NY, OH, and TX). Births limited to Mexican-ethnic mothers born in the U.S. between 1944 and 1972. Markers represent coefficients on interactions between a county's application rate and event-year indicators in model (1). Capped vertical lines represent 95% confidence intervals. Standard errors are clustered on county, and estimates are weighted by average annual births to U.S. born Mexican mothers in a county in the pre-IRCA period (8/82-7/87).

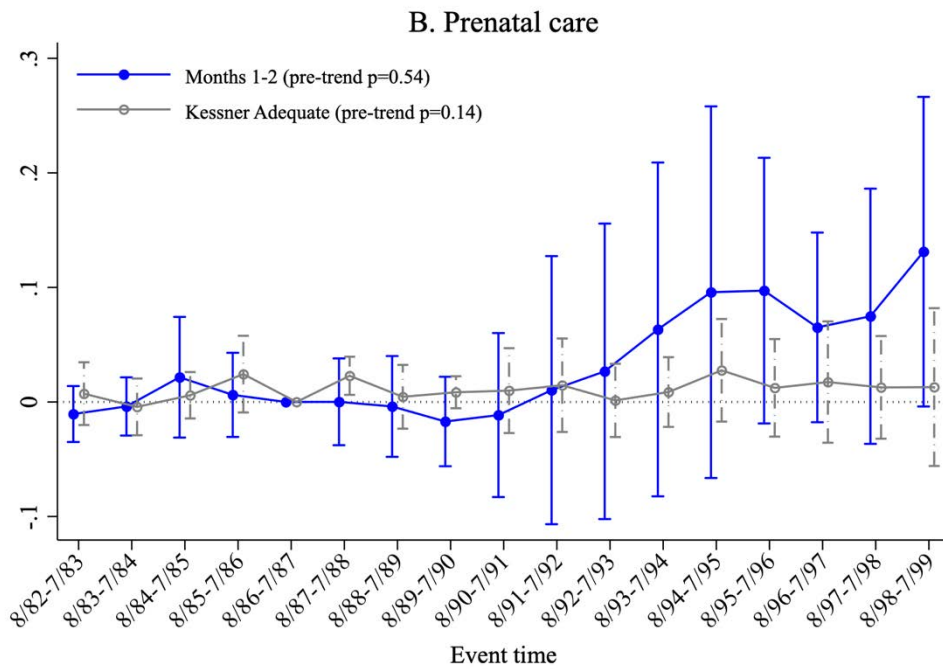
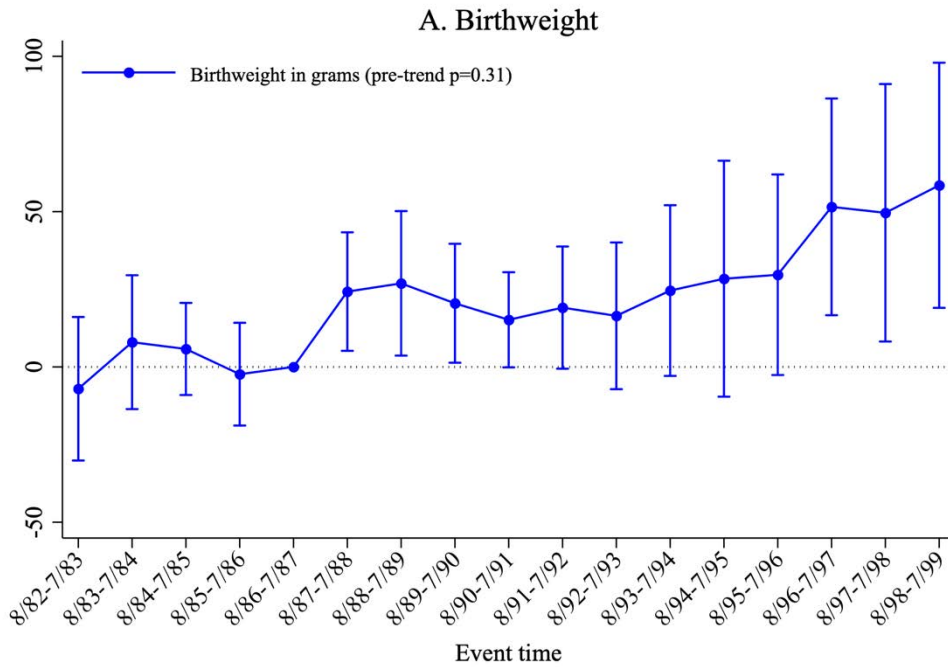
## Appendix Figure 2. Difference in Event-Study Estimates for Birthweight and Prenatal Care: Foreign versus U.S. Born Mexican Ethnic Mothers



*Sources:* Vital Statistics Natality Detail Files, Legalization Applications Processing System, 1990 5% Census PUMS (Ruggles et al., 2022).

*Notes:* The unit of observation is a county-event year, and the estimation sample includes stacked panel data on 89 counties across 8 states (CO, FL, IL, IN, NJ, NY, OH, and TX) for both foreign- and U.S. born Mexican-ethnic models. Markers represent coefficients on interactions between a county’s application rate, event-year indicators, and an indicator for foreign-born Mexican mother. Regression includes state-by-event-year-by-foreign born mother fixed effects, state-by-event-year fixed effects, county-by-foreign-born mother fixed effects, county fixed effects, and interactions between the application rate and event-time indicators. Capped vertical lines represent 95% confidence intervals. Standard errors are clustered on county, and estimates are weighted by average annual births to the relevant group of mothers in a county in the pre-IRCA period (8/82-7/87).

### Appendix Figure 3. Event-Study Estimates for Mexico-Born Mothers: Treatment as Above Median Application Rate

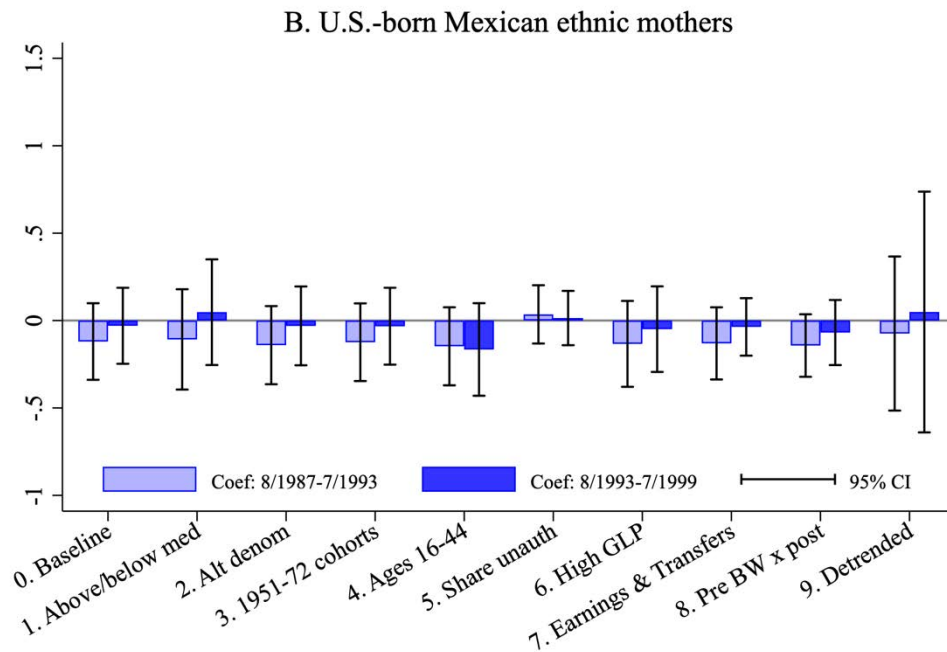
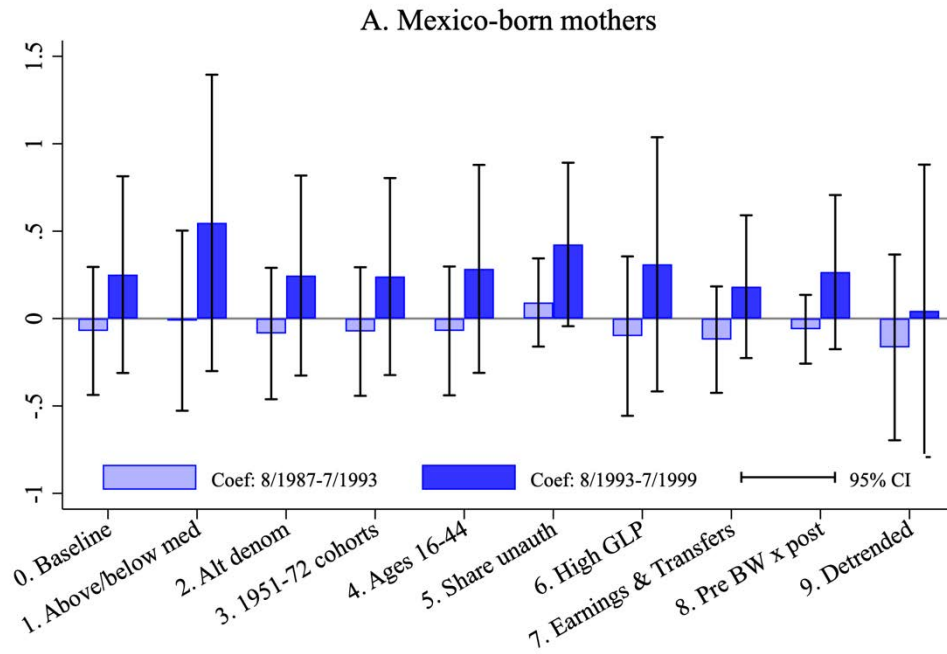


*Sources:* Vital Statistics Natality Detail Files, Legalization Applications Processing System, 1990 5% Census PUMS (Ruggles et al., 2022).

*Notes:* The unit of observation is a county-event year, and the estimation sample includes a balanced panel of 89 counties across 8 states (CO, FL, IL, IN, NJ, NY, OH, and TX). Births limited to mothers born in Mexico between 1944 and 1972. Markers represent coefficients on interactions between an indicator for whether a county's application rate was at or above the state median and event-year indicators. The regression model also includes county and state-by-event-year fixed effects, as in (1). Capped vertical lines represent 95% confidence intervals. Standard errors are clustered on county, and estimates are weighted by average annual births to Mexico-born mothers in a county in the pre-IRCA period.

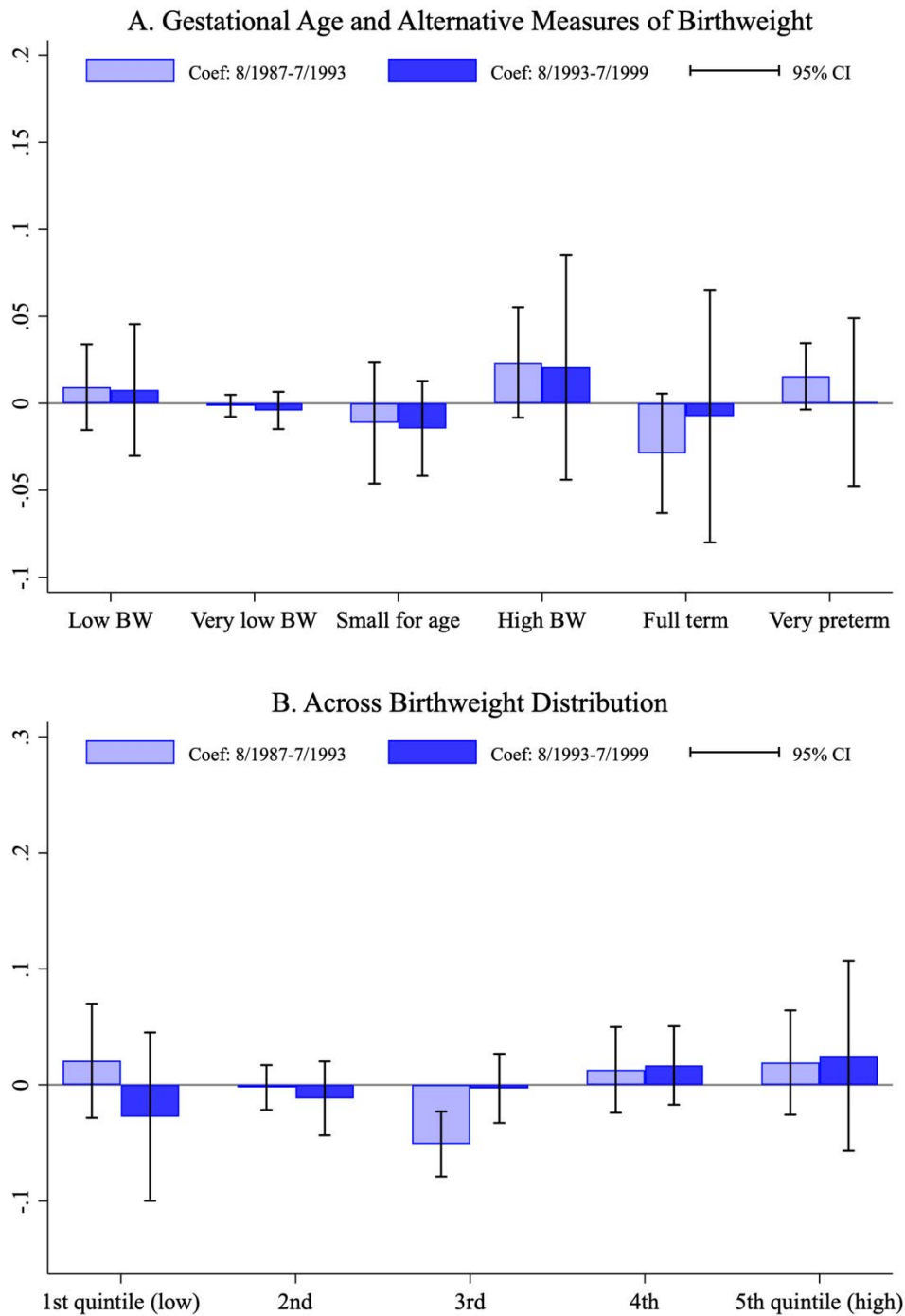


## Appendix Figure 4. Robustness of Difference-in-Differences Estimates for Early Prenatal Care



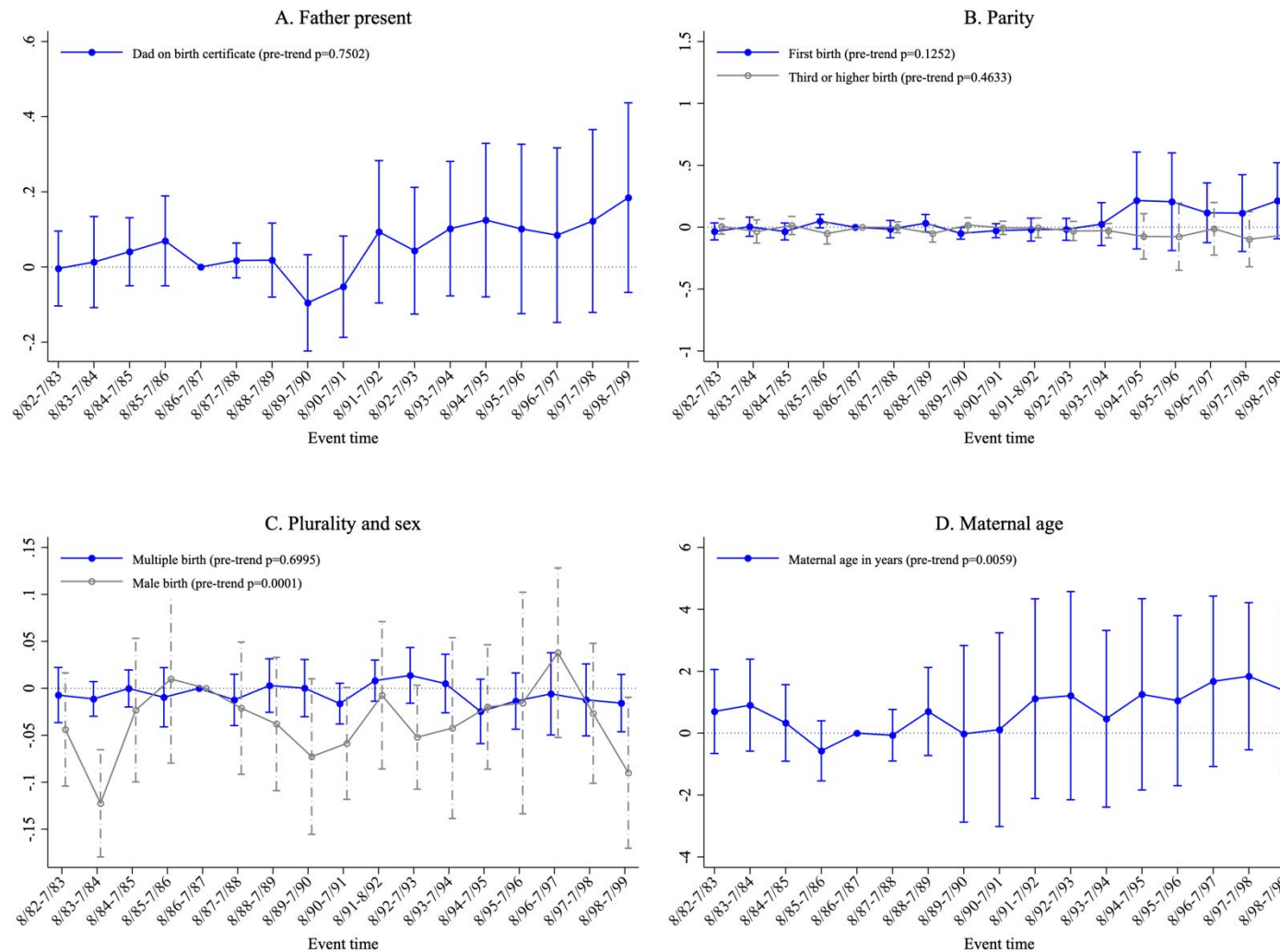
*Notes:* Figures plot coefficient estimates on the interaction terms in model (2) across different specifications and samples. Spec. 1 replaces  $a_{c(s)}$  with an indicator for whether county  $c$ 's application rate was at or above the median in state  $s$ . Spec. 2 calculates  $a_{c(s)}$  using published tabulations of the female Hispanic population. Spec. 3 limits the natality detail data to mothers born 1951-72, while spec. 4 includes mothers aged 16 to 44 regardless of birth cohort. Spec. 5 replaces  $a_{c(s)}$  with estimated 1980 unauthorized share in the target population. Spec. 6 limits attention to the 4 highest GLP states (IL, IN, NY, TX). Spec. 7 controls for county-by-event-year-varying per-capita earnings and government transfers. Spec. 8 controls for interactions between the two post-IRCA indicators and average county pre-IRCA early prenatal care among foreign-born Mexican mothers. Spec. 9 residualizes early prenatal care for pre-IRCA linear trends. Throughout, capped vertical lines represent 95% C.I.s, standard errors are clustered on county, and estimates are weighted by average annual births to Mexico-born mothers in the pre-IRCA period.

## Appendix Figure 5. Difference-in-Differences Estimates for Alternative Outcomes: U.S. Born Mexican Ethnic Mothers



*Notes:* Figures plot coefficient estimates on the interaction terms in model (2) for different dichotomous outcomes (Panel A) the share of births in each quintile of the pre-IRCA birthweight distribution of Mexico-born mothers (Panel B). Throughout, capped vertical lines represent 95% C.I.s, standard errors are clustered on county, and estimates are weighted by average annual births to Mexico-born mothers in the pre-IRCA period.

## Appendix Figure 6. Event-Study Estimates for the Composition of Births: U.S. Born Mexican Ethnic Mothers



Sources: See Figure 3.

Notes: The unit of observation is a county-event year, and the estimation sample includes a balanced panel of 89 counties across 8 states (CO, FL, IL, IN, NJ, NY, OH, and TX). Births limited to Mexican-ethnic mothers born in the U.S. between 1944 and 1972. Markers represent coefficients on interactions between a county's application rate and event-year indicators in model (1). Capped vertical lines represent 95% confidence intervals. Standard errors are clustered on county, and estimates are weighted by average annual births to Mexico-born mothers in a county in the pre-IRCA period (8/82-7/87).

**Appendix Table 1. Descriptive Statistics on Birth Outcomes and Characteristics:  
Mexican Ethnic Women by Place of Birth and Period**

	Pre-IRCA Legalization		Post-IRCA Legalization	
	Foreign-born	U.S.-born	Foreign-born	U.S.-born
	(1)	(2)	(3)	(4)
Birthweight (grams)	3,368 [51.09]	3,303 [49.03]	3,367 [40.37]	3,320 [47.78]
Small for gestational age	0.091 [0.020]	0.108 [0.020]	0.091 [0.016]	0.098 [0.019]
Low birth weight (=1)	0.051 [0.014]	0.067 [0.014]	0.054 [0.010]	0.066 [0.013]
High birth weight (=1)	0.103 [0.023]	0.083 [0.021]	0.102 [0.020]	0.089 [0.021]
Early prenatal care	0.313 [0.116]	0.384 [0.079]	0.407 [0.119]	0.551 [0.123]
Adequate prenatal care (Kessner)	0.107 [0.026]	0.170 [0.054]	0.157 [0.071]	0.277 [0.105]
Male	0.512 [0.026]	0.510 [0.025]	0.511 [0.020]	0.509 [0.024]
Multiple	0.0177 [0.011]	0.0174 [0.008]	0.020 [0.008]	0.021 [0.010]
First birth	0.319 [0.037]	0.371 [0.034]	0.272 [0.075]	0.283 [0.063]
Mother's age	25.54 [0.74]	24.13 [0.63]	27.89 [1.78]	27.25 [2.19]
Father on birth certificate	0.892 [0.070]	0.813 [0.065]	0.881 [0.052]	0.85 [0.060]

*Sources:* Vital Statistics Natality Detail Files, 1992 to 1999

*Notes:* Estimation sample includes 89 counties spanning 8 states (CO, FL, IL, IN, NJ, NY, OH, and TX). Estimates are weighted by average annual births to in the pre-IRCA period. Pre-IRCA legalization is defined as August 1982 through July 1987. Post-IRCA legalization is defined as August 1987 to July 1999. Standard deviations are in square brackets.

**Appendix Table 2. 1980 Census Characteristics: Pre-IRCA Means and Relationship with the Application Rate**

	Mean [sd]	Coef. (se) on application rate
	(1)	(2)
High school degree +	0.252 [0.075]	-0.240 (0.123)
Years of education	7.585 [0.910]	-0.675 (1.883)
In the labor force	0.486 [0.088]	-0.051 (0.157)
Employed	0.439 [0.080]	-0.0547 (0.155)
Age	29.99 [1.339]	-9.184 (1.942)
Married	0.742 [0.055]	0.177 (0.067)
Wage and salary income (\$1980)	2,810 [924.9]	909.8 (1,024)

*Sources:* 1980 5% Census PUMS (Ruggles et al., 2023).

*Notes:* Underlying Census data limited to foreign-born Mexican women ages 19 to 44 in 1980. Estimation sample includes 89 counties spanning 8 states (CO, FL, IL, IN, NJ, NY, OH, and TX). Estimates are weighted by average annual births to Mexico-born mothers in the pre-IRCA period. Regressions in column (2) include state fixed effects; standard errors (in parentheses) are heteroskedasticity-robust.

**Appendix Table 3. Difference-in-Differences Estimates for Birthweight Shown in Figure 4**

<i>Specification</i>	1. Above/below median =1 if above state median application rate	2. Alt. denom. Denominator from published Census tabulations	3. 1951-72 cohorts Application rate	4. Ages 16-44 Application rate	5. Share unauth Unauthorized share, 1980	6. High GLP Application rate	7. Earnings and transfers Application rate In per capita earnings, In per capita transfers	8. Pre BW x post Application rate Pre-IRCA early PNC x post indicators	9. Detrended Application rate Linear pre-IRCA trend
<i>Treatment</i>	None	None	None	None	None	None	None	None	None
<i>Additional controls</i>	Original	Original	1951-72 cohorts	Ages 16-44	Original	IL, IN, NY, TX	Original	Original	Original
<i>Sample</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>A. Mexico-Born Mothers</i>									
Aug. 1987 - July 1993 (=1) x Treatment	19.52 (8.189)	95.89 (39.17)	96.01 (36.02)	85.45 (40.16)	113.3 (26.89)	112.8 (50.01)	90.12 (35.03)	109.6 (30.84)	114.0 (77.82)
Aug. 1993 - July 1999 (=1) x Treatment	39.51 (16.46)	162.6 (76.36)	163.9 (71.16)	108.9 (76.65)	205.5 (60.25)	204.8 (95.20)	150.4 (67.61)	191.1 (57.76)	203.9 (166.01)
<i>p</i> : 1987-93 = 1993-99	0.045	0.123	0.099	0.560	0.041	0.080	0.140	0.023	0.322
R-square	0.628	0.615	0.62	0.661	0.657	0.646	0.620	0.673	0.623
N (county x year)	1,513	1,513	1,513	1,513	1,326	884	1,513	1,513	1,513
<i>B. U.S.Born Mexican Ethnic Mothers</i>									
Aug. 1987 - July 1993 (=1) x Treatment	5.199 (6.980)	9.555 (42.34)	8.309 (42.11)	-2.344 (43.04)	7.602 (31.62)	2.173 (43.36)	7.552 (40.10)	18.34 (37.61)	-90.2 (55.94)
Aug. 1993 - July 1999 (=1) x Treatment	12.36 (13.07)	46.25 (80.46)	47.49 (75.79)	0.409 (82.17)	11.62 (57.62)	33.61 (84.31)	35.51 (75.72)	59.12 (70.74)	-155.3 (136.70)
<i>p</i> : 1987-93 = 1993-99	0.386	0.454	0.396	0.952	0.916	0.552	0.565	0.374	0.447
R-square	0.639	0.638	0.643	0.669	0.648	0.64	0.640	0.642	0.651
N (county x year)	1,506	1,506	1,506	1,507	1,323	882	1,506	1,506	1,506
<i>C. P-values on Foreign-U.S. Born Difference</i>									
Aug. 1987 - July 1993 (=1) x Treatment	0.048	0.038	0.051	0.027	0.0002	0.023	0.033	0.004	0.041
Aug. 1993 - July 1999 (=1) x Treatment	0.072	0.128	0.131	0.135	0.0003	0.058	0.106	0.064	0.114

Sources and notes: See Figure 4.

**Appendix Table 4. Difference-in-Differences Estimates for Early Prenatal Care Shown in Appendix Figure 4**

<i>Specification</i>	1. Above/below median =1 if above state median application rate	2. Alt. denom. Denominator from published Census tabulations	3. 1951-72 cohorts Application rate	4. Ages 16-44 Application rate	5. Share unauth Unauthorized share, 1980	6. High GLP Application rate	7. Earnings and transfers Application rate In per capita earnings, ln per capita transfers	8. Pre PNC x post Application rate Pre-IRCA early PNC x post indicators	9. Detrended Application rate Linear pre-IRCA trend
<i>Treatment</i>	None	None	None	None	None	None	None	None	None
<i>Additional controls</i>	Original	Original	1951-72 cohorts	Ages 16-44	Original	IL, IN, NY, TX	Original	Original	Original
<i>Sample</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>A. Mexico-Born Mothers</i>									
Aug. 1987 - July 1993 (=1) x Treatment	-0.00188 (0.0404)	-0.0858 (0.189)	-0.0742 (0.185)	-0.0709 (0.185)	0.106 (0.146)	-0.101 (0.227)	-0.121 (0.153)	-0.0361 (0.126)	-0.165 (0.267)
Aug. 1993 - July 1999 (=1) x Treatment	0.0852 (0.0664)	0.246 (0.288)	0.240 (0.284)	0.284 (0.299)	0.488 (0.271)	0.310 (0.362)	0.182 (0.206)	0.301 (0.257)	0.044 (0.421)
<i>p</i> : 1987-93 = 1993-99	0.008	0.055	0.058	0.044	0.019	0.048	0.034	0.055	0.297
R-square	0.836	0.822	0.820	0.791	0.845	0.828	0.836	0.849	0.825
N (county x year)	1,512	1,512	1,512	1,512	1,326	884	1,512	1,512	1,512
<i>B. U.S. Born Mexican Ethnic Mothers</i>									
Aug. 1987 - July 1993 (=1) x Treatment	-0.0168 (0.0225)	-0.141 (0.112)	-0.124 (0.112)	-0.147 (0.112)	0.0405 (0.0965)	-0.133 (0.122)	-0.131 (0.104)	-0.0892 (0.0822)	-0.074 (0.222)
Aug. 1993 - July 1999 (=1) x Treatment	0.00746 (0.0237)	-0.0306 (0.113)	-0.0324 (0.111)	-0.166 (0.133)	0.0164 (0.0900)	-0.0492 (0.122)	-0.0363 (0.0828)	-0.0257 (0.111)	0.049 (0.347)
<i>p</i> : 1987-93 = 1993-99	0.134	0.212	0.300	0.841	0.764	0.4	0.261	0.310	0.422
R-square	0.908	0.907	0.908	0.848	0.911	0.915	0.909	0.914	0.91
N (county x year)	1,506	1,506	1,506	1,507	1,323	882	1,506	1,506	1,506
<i>C. P-values on Foreign-U.S. Born Difference</i>									
Aug. 1987 - July 1993 (=1) x Treatment	0.482	0.571	0.592	0.411	0.468	0.792	0.907	0.373	0.607
Aug. 1993 - July 1999 (=1) x Treatment	0.113	0.189	0.189	0.035	0.023	0.199	0.170	0.067	0.986

Sources and notes: See Appendix Figure 4.

**Appendix Table 5. Difference-in-Differences Estimates for Alternative Birthweight Measures and Gestational Age**

	Dependent variable:					
	Low Birthweight	Very low Birthweight	Small for Gestational Age	High Birthweight	Full-term	Very Preterm
	(1)	(2)	(3)	(4)	(5)	(6)
<i>A. Mexico-Born Mothers</i>						
Aug. 1987 - July 1993 (=1) x Application rate	0.00841 (0.00860)	-0.00213 (0.00443)	-0.00905 (0.0210)	0.0624 (0.0206)	-0.00440 (0.0241)	0.00467 (0.0121)
Aug. 1993 - July 1999 (=1) x Application rate	-0.00205 (0.0145)	0.00189 (0.00313)	-0.0237 (0.0171)	0.0999 (0.0414)	0.0174 (0.0275)	-0.00132 (0.0149)
<i>p</i> : 1987-93 = 1993-99	0.220	0.215	0.217	0.132	0.212	0.528
R-square	0.252	0.207	0.465	0.520	0.260	0.222
N (county x year)	1,513	1,513	1,512	1,513	1,512	1,512
<i>B. U.S. Born Mexican-Ethnic Mothers</i>						
Aug. 1987 - July 1993 (=1) x Application rate	0.00935 (0.0124)	-0.00140 (0.00316)	-0.0112 (0.0176)	0.0235 (0.0160)	-0.0288 (0.0173)	0.0155 (0.00962)
Aug. 1993 - July 1999 (=1) x Application rate	0.00766 (0.0191)	-0.00409 (0.00536)	-0.0144 (0.0137)	0.0207 (0.0325)	-0.00740 (0.0365)	0.000715 (0.0243)
<i>p</i> : 1987-93 = 1993-99	0.897	0.438	0.806	0.903	0.459	0.376
R-square	0.261	0.208	0.520	0.546	0.319	0.262
N (county x year)	1,506	1,506	1,505	1,506	1,505	1,505
<i>C. P-values on Foreign-U.S. Born Difference</i>						
Aug. 1987 - July 1993 (=1) x Application rate	0.943	0.902	0.904	0.0295	0.155	0.414
Aug. 1993 - July 1999 (=1) x Application rate	0.543	0.325	0.636	0.0182	0.413	0.926

Sources and notes: See Figure 5.