

IEB Working Paper 2026/16

IMPROVEMENTS IN LABOR MARKET PROSPECTS AND THE FERTILITY AND LOCATION DECISIONS OF IMMIGRANTS

Joan Monras, Eduardo Polo-Muro, Javier Vázquez-Grenno

Version September 2026

Public Policies

IMPROVEMENTS IN LABOR MARKET PROSPECTS AND THE FERTILITY AND LOCATION DECISIONS OF IMMIGRANTS

Joan Monras, Eduardo Polo-Muro, Javier Vázquez-Grenno

The **Barcelona Institute of Economics (IEB)** is a research centre at the University of Barcelona (UB) which specializes in the field of applied economics. The IEB is a foundation funded by the following institutions: “La Caixa” Foundation, Saba, the Barcelona City Hall, the Barcelona Metropolitan Area, the University of Barcelona, the Autonomous University of Barcelona, the Barcelona Provincial Council, Agbar, Cuatrecasas, Consorci Zona Franca Barcelona, Fundación Miquel y Costas, AENA and Fira de Barcelona.

The **IEB** research program in **Public Policies** aims at promoting research related to the design, implementation and evaluation of public policies that meet social needs and enhance social and individual welfare. Special emphasis is put on applied research and on work that tries to shed light on the Economics of Education, Health Economics, Innovation, Labour Markets and Security Policies. Disseminating research findings in these topics to a broader audience is also an aim of the program.

Postal Address:

Institut d’Economia de Barcelona

Facultat d’Economia i Empresa

Universitat de Barcelona

C/ John M. Keynes, 1-11

(08034) Barcelona, Spain

Tel.: + 34 93 403 46 46

ieb@ub.edu

<http://www.ieb.ub.edu>

The IEB working papers represent ongoing research that is circulated to encourage discussion and has not undergone a peer review process. Any opinions expressed here are those of the author(s) and not those of IEB.

IMPROVEMENTS IN LABOR MARKET PROSPECTS AND THE FERTILITY AND LOCATION DECISIONS OF IMMIGRANTS*

Joan Monras, Eduardo Polo-Muro, Javier Vázquez-Grenno

ABSTRACT: This paper studies how irregular immigrants respond to an improvement in labor market prospects, exploiting variation generated by the large and unexpected regularization of undocumented immigrants in Spain during the first half of 2005. Using a continuous difference-in-differences strategy, we compare fertility behavior and location decisions across provinces with different pre-policy shares of irregular immigrant populations. Our main estimates indicate that the regularization increased both birth rates among immigrant women and net reallocation of foreignborn residents, particularly families with children, toward provinces with historically lower levels of immigration.

JEL Codes: J13, J61, K37

Keywords: Labor Market Stability, Fertility, Immigration Policy

Joan Monras
Universitat Pompeu Fabra, CREi, BSE, &
CEPR
E-mail: jm3364@gmail.com

Eduardo Polo-Muro
University of the Basque Country & San
Diego State University
E-mail: edupolo23@gmail.com

Javier Vázquez-Grenno
Universitat de Barcelona & IEB
E-mail: jvazquezgrenno@ub.edu

*Eduardo Polo-Muro would like to thank the Department of Economics at the University of California San Diego for its hospitality while part of this work was carried out, especially to Tom Vogl and the participants in the Graduate Research Workshop in Applied Economics. He also acknowledges financial support from the Eusko Jauriaritza (POS-2021-1-0030, IT 1336-19, IT 1461-22).

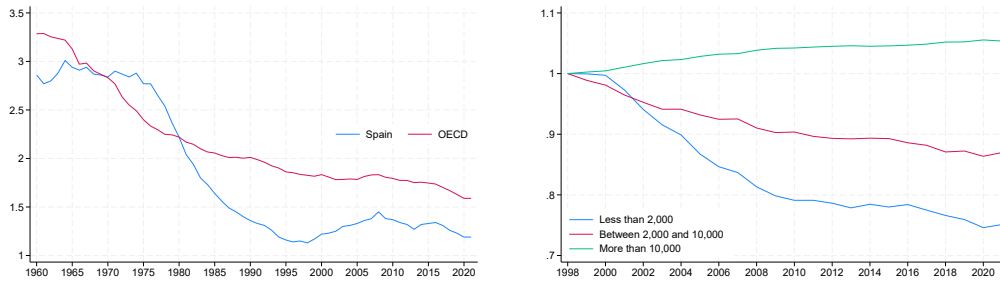
Javier Vázquez-Grenno acknowledges financial support from the Instituto de Estudios Fiscales, the Spanish Ministry of Science and Innovation (PID2022-140330NB-I00) and the Catalan Government (2021 SGR-00355).

1 Introduction

Spain, like many other European countries, faces two interrelated demographic challenges: declining fertility rates and the progressive concentration of population in large urban centers (see Figure 1). These processes are linked geographically. Fertility rates are systematically higher in smaller urban and suburban areas, where housing costs are lower, while the spatial reallocation of economic activity has disproportionately favored large urban centers.

International migration is sometimes seen as a potential response to these challenges. Immigrants tend to be younger and to have more children than the native-born population, helping to rebalance the age distribution of host economies. They are also generally more mobile and may therefore help alleviate excessive population concentration in large cities. Yet there is strong evidence that immigrants themselves disproportionately concentrate in urban areas, and for good reasons (Albert and Monras, 2022; Imbert et al., 2025). When part of immigrants' consumption is tied to their country of origin, they have strong incentives to locate in urban regions, which typically offer higher nominal wages, even if the cost of living is also higher.¹ Hence, while migration could, in principle, help to address both declining fertility and the depopulation of smaller localities, the existing evidence offers a more pessimistic picture.

Figure 1: **Declining fertility rates and depopulation of small cities**



Notes: This figure shows fertility rates in Spain and OECD countries (left panel) and the share of the population living in cities of different sizes, normalized to its value at the beginning of the period (right panel). The total fertility rate is the number of children that would be born to a woman if she were to live through the end of her childbearing years and bear children in accordance with the age-specific fertility rates of a given year. Sources: World Development Indicators, World Bank, and *Instituto Nacional de Estadística* (INE), Spanish National Institute of Statistics.

In this paper, we argue that amnesty programs granting work permits to immigrants in irregular situation, most of whom are already employed in the host economy, can contribute to addressing

¹The high cost of living in these locations, which is the standard dispersion force emphasized in the urban economics literature, is less important for immigrants whose price index is only partially tied to the destination location.

both challenges simultaneously. Our key insight is that regularization increases immigrants’ attachment to the host economy and improves their labor market prospects. These two forces imply that, under regularization programs, immigrants’ incentives to locate in large urban areas may decline while, at the same time, their incentives to have children may increase.

While the data available for Spain does not allow us to provide a direct link between fertility and mobility decisions at the household level, this paper reports empirical evidence on how *both* fertility and location decisions responded to improvements in immigrant labor market conditions. Specifically, we exploit variation generated by the large and unexpected regularization implemented in Spain in early 2005 by the first Zapatero government, which led to the regularization of nearly 600,000 immigrants within a short period of time. The outcome of the 2004 general election was suddenly and substantially altered by the terrorist attacks on Madrid commuter trains on March 11, 2004, just three days before election day. [Garcia-Montalvo \(2011\)](#) shows that the government’s mishandling of communication during this critical period likely caused the Popular Party to lose the election. As a result, the Socialist Party won and implemented the amnesty program, a policy that is difficult to imagine would have been adopted by a Popular Party government. Hence, almost overnight and unexpectedly, a large number of immigrant workers gained work permits, entered regular employment, and obtained access to better and more stable jobs, as partially documented by [Elias et al. \(2025\)](#) and further explored, using a different dataset and complementary empirical strategies in Section 2 of this paper, where we also provide more details on the overall background.

Our analysis of this episode proceeds in a few extra steps. In Section 3, we describe the data and empirical strategy. We argue that the consequences of the regularization policy can be assessed by relating changes in the number of immigrants entering the Social Security system at the time of the regularization to a range of outcomes of interest. This strategy exploits regional variation in the share of the irregular foreign labor force across provinces, while controlling for a number of potential local confounders. Intuitively, our identification assumption relies on the unexpectedness of the nation-wide reform and cross-section variation in exposure.

Section 4 presents our main findings. We organize them into two blocks. First, we examine whether the amnesty affected fertility decisions. There are many reasons why obtaining a formal job and a work permit could affect the childbearing decisions of immigrant couples. On the one hand, regular status provides new opportunities, including a more secure life without fear of detection by the authorities, as well as legal rights at work, such as parental leave and unemployment benefits. In addition, regular status improves labor market opportunities, generating better economic prospects

that may translate into improved living conditions which may facilitate long-term decisions such as childbearing (i.e., an income effect, [Becker, 1960](#); [Black et al., 2013](#)). On the other hand, these improved labor market opportunities for regularized immigrant women may increase the opportunity cost of having a child, leading them to postpone fertility decisions (i.e., a substitution effect, [Becker, 1965](#); [Schaller, 2016](#)). Whether granting work permits together with regular jobs leads to higher fertility is therefore ultimately an empirical question.

To study fertility decisions, our empirical strategy compares fertility trends at the province level for women from eligible countries of origin across provinces with greater and smaller prevalence of immigrants in irregular situation. We find that for each regularized immigrant entering the Social Security system, there are 16.6 additional births per 1,000 people. Dynamic event-study graphs show a clear break in fertility trends across provinces that aligns closely with the number of irregular immigrants per capita in each province. Placebo exercises using fertility rates of non-eligible women across provinces support the interpretation that our results are driven by the regularization of immigrant workers.

Provinces with larger irregular immigrant populations were disproportionately exposed to the regularization policy. These provinces also tended to be larger and more urban. A priori, therefore, regularization might have had a lasting effect on the relative size of provinces, favoring locations with initially high levels of immigration through increased fertility. We document, however, a second pattern in the data. In province-level population stocks, provinces more exposed to the regularization subsequently experienced relative declines in their foreign-born populations. If interpreted as net internal relocation, the estimates imply that for every 10 irregular immigrants who entered the Social Security system, the foreign-born working-age population in more exposed provinces fell by about 2.8 people during the subsequent two and a half years. As we explain below, these stock-based estimates should be read as suggestive evidence on net relocation, which we then examine more directly using bilateral migration flows.

We also show that these stock changes are consistent with shifts in migrant flows across provinces. Specifically, data from the Residential Variation Statistics (*Estadísticas de Variaciones Residenciales*, RVS, INE) allow us to construct bilateral migration flows across provinces for each year. We show that net migrant flows did not increase significantly from origin provinces that experienced larger inflows of immigrants into the Social Security system following the amnesty. Instead, existing flows were redirected toward low-immigration provinces. This resulted in systematically lower bilateral inflows toward provinces with high numbers of pre-policy irregular immi-

grants. Hence, following the amnesty program, the evidence is consistent with a net reallocation of immigrant families, especially those with children, toward lower-immigration provinces.

Hence, taken together, our findings suggest that amnesty programs may help mitigate, at least to some extent, both the fertility decline and the depopulation of smaller regions.

Related Literature

While the literature on the effects of labor market prospects and regularization programs on fertility decisions is limited, a few notable contributions are worth discussing in some depth. Our study is closely related to [Amuedo-Dorantes et al. \(2022\)](#), who analyze a change in Spanish legislation that granted undocumented immigrants temporary residence in Spain if they had a Spanish child under age 18. This policy change had a significant positive impact on fertility decisions. We believe, however, that our study addresses some of the limitations of [Amuedo-Dorantes et al. \(2022\)](#). First, the women who gained work permits in 2011 in their setting had already had at least one child. Their analysis therefore identifies the effect of gaining residence permits on subsequent fertility rather than on overall fertility. Second, the policy change they analyze coincided with other policy events that may affect their estimates. For instance, their control group consisted primarily of Romanians, who initially received the same treatment as other EU nationals until work restrictions were introduced in 2012.² In addition, access to the health care system was restricted for undocumented immigrants in September 2012, leading to increased mortality among affected individuals (see [Juanmarti Mestres et al., 2021](#)). Third, during the period analyzed by [Amuedo-Dorantes et al. \(2022\)](#), there was a substantial increase in the number of Spanish citizenship grants, around 75 percent from a yearly average of 84,000 to 147,000, due to changes in bureaucratic procedures.³ This change in nationality may not be easily detected in the Spanish Labor Force Survey, potentially affecting the interpretation of their results.⁴ We therefore believe that our study offers a clearer and more robust analysis of the relationship between job prospects and fertility decisions among undocumented immigrants, complementing this prior work. Moreover, our study also examines how amnesty may affect the spatial distribution of economic activity, an issue not addressed in [Amuedo-Dorantes et al. \(2022\)](#).

In a recent paper, [Amuedo-Dorantes et al. \(2023\)](#) study the effects of a large amnesty for

²See more details in the [Law](#) (accessed in May 2026).

³See more details in the [Spanish citizenship grants report](#) (accessed in May 2026).

⁴Using the Spanish Labor Force Survey (flows data), between 2009 and 2013 we find that only 1.6 percent of interviewed individuals without Spanish nationality obtained it. However, during the same period, almost 580,000 foreign individuals gained Spanish citizenship, representing more than 10 percent of the total non-nationals in Spain.

Venezuelan workers in Colombia on fertility decisions, abstracting from any geographic dimension. They find that work permits and access to social services, especially health care, reduced the likelihood of having a child. They argue that this result reflects both better labor market opportunities for women and greater access to family planning through the health care system. The policy we exploit allows us to more clearly identify the labor market channel because the 2005 regularization in Spain granted both work permits and access to formal jobs to workers who benefited from the policy. In the Spanish case, access to the health care system was already universal, regardless of immigrants' legal status.

More generally, our analysis is also related to, and complements, papers that study the relationship between policies affecting immigrants' legal status in host economies and fertility. For example, [Avitabile et al. \(2014\)](#) study how a reform of birthright citizenship in Germany affected fertility and children's health outcomes, while [Amuedo-Dorantes and Arenas-Arroyo \(2021\)](#) analyzes the effects of immigration enforcement in the United States on immigrant fertility. Our paper also contributes to a broader literature on the effects of immigrant regularization on various other outcomes which go beyond the ones studied here: fertility and location decisions.⁵

Finally, our paper is also related to research documenting the geographic reach of recent migration waves. For example, consistent with our findings, [Card and Lewis \(2007\)](#) document how Mexican immigrants in the United States moved from initial enclaves to other parts of the country during the late 1990s and early 2000s. In a similar vein, [Imbert et al. \(2025\)](#) use Chinese data to show that policies improving migrants' amenities at destination, such as access to public education, encourage migrants to bring family dependents, thereby reducing their concentration in large metropolitan areas. The literature exploring the interaction between migrant fertility and geography, however, remains scarce.

2 Background and the Regularization Policy

Until the mid-1990s, Spain was a country of emigration. Since then, and until the beginning of the Great Recession in 2008, the country received one of the largest inflows of migrants among developed countries, transforming Spain into a country with medium-high levels of immigration. By the end of this period, more than 13 percent of its population was foreign-born, with Romania,

⁵ Among others, outcomes studied in prior literature can be grouped as follow: labor market outcomes [Elias et al. \(2025\)](#), [DiPorto et al. \(2018\)](#), [Devillanova et al. \(2017\)](#), [Amuedo-Dorantes and Bansak \(2011\)](#), [Amuedo-Dorantes et al. \(2007\)](#), and [Kaushal \(2006\)](#); crime [Fasani \(2018\)](#), [Pinotti \(2017\)](#), [Mastrobuoni and Pinotti \(2015\)](#), and [Baker \(2015\)](#); public finances [Elias et al. \(2025\)](#) and [Cascio and Lewis \(2019\)](#); and consumption ([Dustmann et al., 2017](#)).

Morocco, and Ecuador being the main countries of origin.

Concerns about the arrival of this large wave of immigrants intensified in the early 2000s. The Popular Party (right-wing), which had been in power since 1996, established tougher conditions for immigrants to settle in Spain. Like other center-right parties in Europe, it has traditionally adopted stricter regulations to limit immigration in Spain. The party won the 2000 general elections with a majority of seats, and despite the large political protests against Spanish involvement in the Iraq War, most people in Spain expected the Popular Party to remain in power after the March 2004 elections. According to the CIS (*Centro de Investigaciones Sociológicas*), the vote forecast for the two main political parties in Spain, based on a poll conducted in January 2004, was 42.2 percent for the Popular Party and 35.5 percent for the Socialist Party. On March 11, 2004, just three days before the election, terrorists attacked several commuter trains in Madrid, and 193 people died in what was the largest terrorist attack ever in Spain.⁶ As [Garcia-Montalvo \(2011\)](#) documents, the government's communication strategy during the three days between the attacks and election day likely caused the Popular Party to lose the general election on March 14, 2004.⁷

The socialist government implemented, a few months after coming to power, the largest regularization of undocumented immigrants ever carried out in Spain. Specifically, in February 2005, the newly elected government implemented a regularization policy affecting a large number of immigrants without work permits who were already living in Spain. Almost 600,000 immigrants obtained a work permit. As a consequence, the share of foreign workers registered in the social security system increased from 6 percent to more than 9 percent within a few months (Figure 2).

More specifically, the policy offered employers a period of three months (between February 7 and May 7, 2005) to apply for work permits for immigrant workers who complied with the following two criteria: 1) individuals had to be registered in municipalities (Municipal Registry) six months before the start of the application period (i.e., before August 7, 2004)⁸; and 2) the employer had to offer a work contract for at least six months.⁹ The policy also included enforcement mechanisms. In fact, the number of work inspections related to foreign workers more than doubled between 2004 and 2005. Hence, immigrants who benefited from the amnesty were already established workers

⁶For more detail on vote polls in the weeks before election day, see [Garcia-Montalvo \(2011\)](#).

⁷By comparing the voting behavior of Spanish nationals voting abroad (who voted before the attacks) with that of those voting on election day (Spanish residents), both in this election and in previous ones, [Garcia-Montalvo \(2011\)](#) concludes that the attacks ultimately changed the outcome of the election and unexpectedly brought the Socialist Party candidate (Zapatero) to power.

⁸This criterion was subsequently relaxed, accepting registration by default (*empadronamiento por omisión*) upon presentation of any official document proving that the immigrant had been in Spain in August 2004.

⁹There were some exceptions for the agricultural, construction, restaurant and hotel, and domestic service sectors, as well as for part-time workers.

living in Spain with connections to the Spanish labor market. As a consequence, gaining a work permit and transitioning to a regular job improved their labor market prospects (see [Elias et al., 2025](#)).¹⁰

Another essential characteristic for the interpretation of our empirical exercise is that, throughout the entire period of analysis, coverage under the Spanish National Health System was universal. All individuals residing in Spain, natives and immigrants alike, irrespective of their personal circumstances or administrative status in the country, were entitled to full free access to the health care system. In particular, immigrants in an irregular situation had access to the same health care services as Spanish natives (see [Juanmarti Mestres et al., 2021](#); [Belles-Obrero et al., 2024](#)). In order to receive these health care services, the only requirement was being registered in the municipality (*Padrón Municipal*).¹¹

In sum, quite unexpectedly only a few months earlier, almost one third of the Spanish immigrant population experienced a major change in their labor-market opportunities, with little change in other dimensions that could affect fertility decisions. It is also important to highlight that the regularization policy did not affect Spaniards or nationals of European Union countries, who already had work permits in Spain thanks to the Schengen Treaty.¹²

One way to measure the overall importance of the policy is to examine the entry of immigrants into the social security system around the time of the policy change. Figure 2 shows that the share of immigrants affiliated with the social security system (a proxy for formal immigrant employment) increased by nearly 4 percentage points following the regularization. [Elias et al. \(2025\)](#) exploit this variation to show that both female and male immigrants who benefited from the amnesty experienced improved labor market outcomes. In particular, obtaining work permits allowed them to move into larger and better-paying firms.

We complement these findings by using data from the National Immigrant Survey to show that the policy change indeed improved the labor market outcomes of immigrant workers, including both men and women.¹³ Specifically, we identify the effects of the policy change on immigrant labor

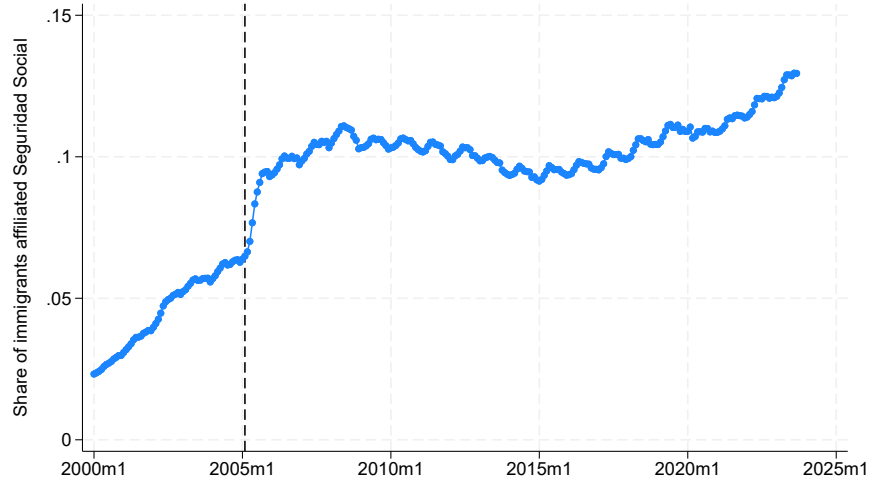
¹⁰Additional evidence, presented in Appendix B.1, indicates that the policy did not affect the overall number of immigrants in Spain.

¹¹All residents (including irregular immigrants) similarly benefited from access to public education, social assistance programs, school meals for children, soup kitchens, supervised flats or residences, psychological support, home care services, and occupational training courses and programs providing assistance in finding a job.

¹²It is worth noting that nationals from Romania and Bulgaria, which at the time of the policy implementation were still not part of the European Union, were also affected by the policy change (they joined the EU in 2007). Romania and Bulgaria ranked second and sixth, respectively, in terms of the number of individuals who regularized their status through the regularization. Table A.1 in Appendix A reports the number of immigrants who obtained work permits by country of origin.

¹³This survey collects responses to a wide range of questions, including legal status, household composition, socio-

Figure 2: **Immigrants Affiliated to the Social Security**



Notes: This graph shows the fraction of immigrants affiliated with the social security system as a percentage of all affiliates (natives and immigrants) for each month between 2000 and 2023. Source: Own elaboration based on Social Security data.

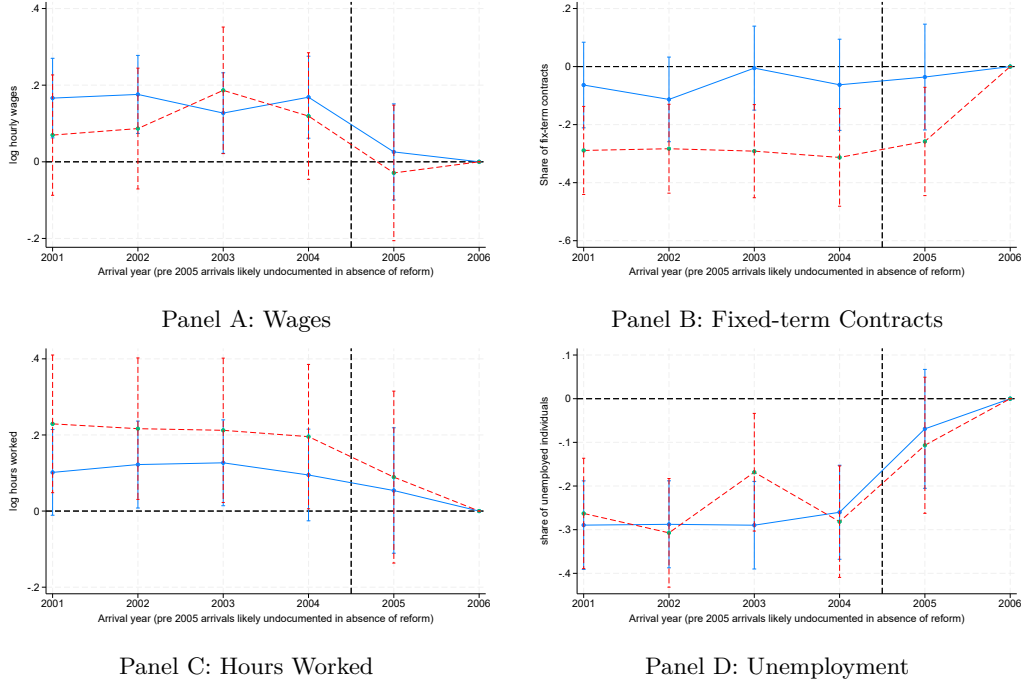
market outcomes by comparing immigrant workers from eligible countries of origin who arrived just before the policy implementation with those who arrived shortly after eligibility for the amnesty program had ended.

Specifically, we compare labor market outcomes in 2007 for immigrants who arrived in Spain between 2001 and 2004 (those likely eligible for the amnesty program) with those who arrived in 2005 or 2006, after the program had ended. The analysis controls for region fixed effects, years of schooling, age, country of origin, and remittances sent.¹⁴ Figure 3 illustrates the average outcomes by year of arrival, showing that immigrants who likely benefited from the regularization outperformed later arrivals across four labor market indicators. Specifically, our estimates indicate that obtaining regular status through work permits led to a roughly 15 percent increase in wages for both men and women, a reduction of 7 to 20 percentage points in the incidence of fixed-term contracts, a 15 to 20 percent increase in hours worked, and a substantial decrease in unemployment rates of about 25 percentage points. Importantly, the gains from regularization appear to be even greater for women. Overall, these findings suggest that regularization significantly enhanced the labor market prospects of formerly undocumented immigrants.

demographic characteristics of the respondents, migratory experiences, socio-economic conditions in the country of origin prior to migration, the timing and means of arrival in Spain, labor market and housing experiences in Spain, ties with the country of origin, and social participation in Spain, among others.

¹⁴These controls account for other determinants of wage differences between the two groups.

Figure 3: Labor Market Outcomes



Notes: These figures illustrate the estimated differences in various labor market outcomes between documented and undocumented immigrants before and after the regularization. Solid lines represent male outcomes. Dashed lines represent female outcomes. Panel A presents the estimates for wages (log hourly wages). Panel B presents the estimates for the share of workers with fixed-term contracts. Panel C shows the differences in hours worked (log of hours worked), and Panel D shows the share of unemployed individuals. In all figures, the vertical line indicates the period before the reform. Source: Own elaboration based on National Immigrant Survey (*Encuesta Nacional de Inmigrantes* - ENI, INE) data.

3 Main data sets and identification strategies

3.1 Data

Our main data source to study fertility is an administrative database of birth certificates from the INE, covering the period 2003–2008.¹⁵ This dataset includes the universe of births registered in Spain and provides detailed information such as the month of birth, newborn health indicators, and maternal and family characteristics (e.g., parents' nationalities, maternal age, marital status, and number of previous children). We complement this source with data from the Municipal Population Register (*Padrón Municipal*, INE), which provides annual provincial population figures that we use to construct the dependent variable in our main empirical strategy.¹⁶ By combining these two datasets, we can assess whether immigrant women from candidate countries adjusted their fertility

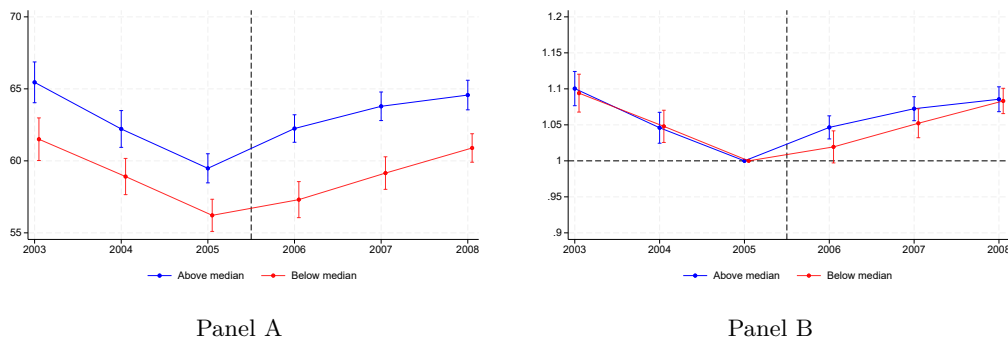
¹⁵We end the analysis period in 2008 to avoid potential confounding effects from the Great Recession and the implementation of a universal child benefit program in Spain in July 2007 (see [González and Trommlerová, 2023](#)).

¹⁶The Municipal Register also provides the number of immigrant women disaggregated by nationality and age, which we use in the aggregate analysis, focusing on the female population aged 16 to 49 by country of origin (see Section B.2).

behavior in response to the legalization policy, which changed the legal status of many immigrant couples from outside the European Union.

Figure 4 displays the aggregate raw fertility rates of women from candidate countries. It illustrates the spatial heterogeneity of fertility patterns by dividing Spanish provinces according to their median level of migration in 2002. Fertility rates are higher in high-immigration provinces, declining until 2005 and then rising again from 2006 onward. In low-immigration provinces, fertility rates are lower overall, but both groups of provinces exhibit similar trends prior to the policy; these trends begin to diverge afterward. This divergence is most evident in Panel B of Figure 4, where fertility rates in both groups are normalized to the pre-policy period. Panel B shows that although fertility rates rise in both groups after the policy change, the increase is more pronounced in high-immigration provinces. The partial convergence visible toward the end of the period should not be overinterpreted, since this descriptive figure does not condition on province-specific trends or changes in population composition and may partly reflect mobility across provinces in the two groups.

Figure 4: **Raw Fertility Rates**



Notes: Panel A shows the fertility rates of mothers from candidate countries eligible to obtain a work permit. We calculate fertility rates as the number of births per one thousand women aged 16 to 49 for each country (or group of countries). The vertical line indicates the last period before the reform. Panel B normalizes the figure on the left using the last observation before the policy intervention. One standard deviation from the mean is also displayed. Source: Own elaboration based on INE data.

In addition, for our internal migration analysis, we leverage the Spanish Labor Force Survey (SLFS or EPA). The SLFS is a repeated cross-sectional survey conducted quarterly that provides labor market information on workers in both the formal and informal sectors. While the data allow us to identify native and foreign workers by skill level¹⁷, the SLFS does not distinguish between employment in the formal and informal sectors. The SLFS also provides information on household composition—such as whether workers have children—which we use in part in our internal migration

¹⁷We classify workers with at least a university degree as high-skilled workers, and we label the rest of the labor force as low-skilled workers.

analysis.

Finally, for our analysis of internal relocation we use data from the Residential Variation Statistics (*Estadísticas de Variaciones Residenciales*, INE), which allow us to construct annual migration flows across provinces. Specifically, this dataset enables the construction of origin–destination flow matrices, capturing individual movements between Spanish provinces each year.

Our empirical exercises hinge on two crucial aspects of immigrants’ behavior: geographic mobility and fertility decisions. Before analyzing how these outcomes respond to the regularization, it is worth emphasizing that immigration in Spain is, in many ways, similar to what we observe in other countries. Rather than being evenly spread across the territory, immigrants, both regular and irregular, are concentrated in certain regions, as shown in the map in Figure A.1 in Appendix A. In Spain, most immigrants live either in large cities or along the Mediterranean coast. Table A.2 reports the systematic correlation between immigrant concentration (defined as the ratio of immigrants in a province relative to all immigrants in Spain, compared with the same measure for natives) and the size of each province, which is itself strongly correlated with population density and the presence of large cities, since provinces are similar in geographic size. Both across and within broad geographic regions, we observe a strong concentration of migrants in large provinces, in line with the evidence for the United States and China reported in Albert and Monras (2022) and Imbert et al. (2025). This pattern holds for both households with and without children, as shown in columns 3 to 6 of Table A.2. However, the concentration of immigrants in large provinces is stronger among immigrant households without children, consistent with the idea that having children weakens ties to the home country, which often take the form of remittances and other connections that incentivize immigrants to locate in populated destinations with high densities, high nominal wages, and high living costs.

3.2 Empirical Strategy

Our main empirical strategy employs a standard (continuous) difference-in-differences approach. We illustrate our main identification strategy using fertility rates. Specifically, we compare fertility rates in provinces – a geographic unit comparable to a commuting zone – with higher versus lower increases in the share of immigrants from treated countries entering the Social Security system, measured as immigrant entries into Social Security relative to the working-age population.¹⁸

¹⁸As a secondary empirical strategy, we compare the fertility rates of women from treatment countries to those of various groups of women from the European Union and Spain. This analysis is presented in Appendix B for brevity.

Formally, we estimate the following model:

$$\frac{\widehat{Births}_{p,t}}{Pop_{p,t}} = \beta \frac{\widehat{New Imm. in Soc. Sec.}_{p,2005}}{Pop_{p,2005}} * post_t + \delta_t + \delta_p + \epsilon_{p,t} \quad (1)$$

where $\widehat{Births}_{p,t}$ denotes the number of children born to women from treatment countries in province p at time t ; $Pop_{p,t}$ is the number of individuals aged 16 to 64 in province p in year t ; and $\widehat{New Imm. in Soc. Sec.}_{p,2005}$ represents the number of foreign-born affiliates from treatment countries who entered the social security system at the time of the policy change—specifically, the province-level jump observed in Figure 2. The Social Security data identify the province in which the firm or branch registering the worker is located, rather than the worker’s province of residence. We therefore interpret this measure as local labor-market exposure to the regularization. Since the regularization required a formal labor contract and the data are administrative records, systematic misreporting of this province should be limited. At the same time, the distinction between employer location and residence means that the estimates should be read as reduced-form effects of local exposure to the regularization rather than as estimates based on exact residential location at the time of application. The terms δ_t and δ_p correspond to time and province fixed effects, respectively. Following [Elias et al. \(2025\)](#), we allow for province-specific linear time trends prior to the policy change to account for potentially divergent pre-existing trends in births per capita across provinces. The hat notation indicates that these linear trends, estimated using pre-treatment data in a panel setting, have been removed from the dependent variable. This strategy is proposed in [Goodman-Bacon \(2021\)](#) and applied in studies such as [Miller et al. \(2021\)](#), [Goodman-Bacon \(2021\)](#), and [Dustmann et al. \(2022\)](#).

4 Empirical Evidence

4.1 Fertility: Province-Level Findings

In this subsection, we estimate the effect of the policy reform on fertility at the province level. Intuitively, the regressions relate the increase in social security affiliations to the subsequent increase in births among mothers from treatment countries, across provinces. The resulting estimates capture how many additional births are associated with each newly legalized immigrant worker at the province level.

4.1.1 Main Results

Results are presented in Table 1, where we report estimates from two different model specifications. The first specification is a simple difference-in-differences design that includes differential linear trends across provinces, estimated using pre-policy data, as detailed in Section 3.2. The estimates suggest that for every 1,000 immigrants who entered the social security system in early 2005, there were approximately 13.8 additional births per year over the subsequent two and a half years, which represents a bit more than a 15% increase from the baseline fertility rate (comparable in magnitude to the improvement in labor market outcomes explained in Section 2). Column 2 shows that the estimate of this effect remains stable, with a point estimate of 16.6, after including a number of controls: political alignment dummies, coastal province indicators, and the baseline share of employment in construction. Across all specifications, the results consistently indicate a positive and statistically significant impact of the regularization policy on local fertility outcomes.

Table 1: Effects of the Reform on Province level fertility

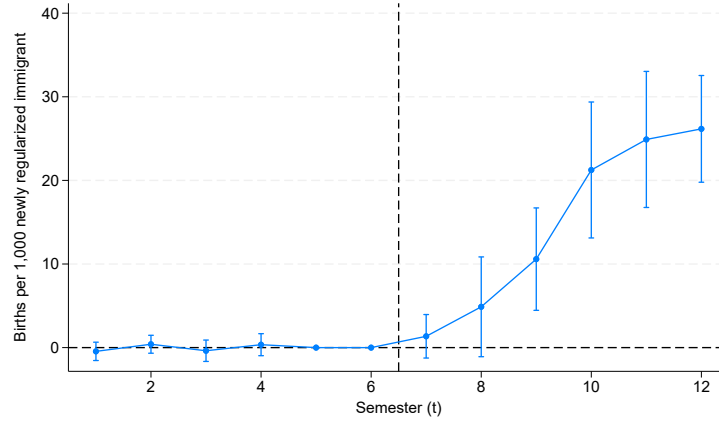
	(1)	(2)
Dep. variable	Δ Births per 1,000 of people	
Δ Imm. in social security/pop.	13.800 (3.697)	16.576 (3.085)
Controls	No	Yes
Observations	50	50

Notes: This table shows estimates of the effect of the entry of immigrant workers into the social security system (regularization) on the number of births per 1,000 people across provinces. Δ Imm. in social security/pop. denotes the change in the share of immigrants entering the Social Security system relative to the working-age population. Estimates are based on a continuous difference-in-difference strategy, where province-specific pre-change linear trends are removed. Regressions are weighted by population. Controls include: political alignment dummies, coastal dummies and share of construction at baseline. Robust standard errors are reported.

Figure 5 presents results from a dynamic difference-in-differences specification. This analysis confirms that provinces with higher numbers of immigrants entering the social security system experienced a greater deviation from pre-existing linear trends in birth rates. The pattern is clearly visible in the graph: the number of births begins to rise approximately nine months after the period during which immigrant workers received work permits, as indicated by the vertical line.

Appendix B complements the evidence in this section by showing aggregate results. Specifically, we compare aggregate fertility trends in Spain from countries of origin affected by the amnesty program to those which were not affected. These aggregate comparisons confirm the results discussed in this section.

Figure 5: Effects of the Reform on Province level Births by Semester



Notes: This graph shows the effect of the entry of immigrants into the social security system on births per 1,000 people across provinces. The data are collapsed at the biannual level. Ninety-five percent confidence intervals are also displayed, based on standard errors clustered at the province level.

4.1.2 Heterogeneity

We also examine potential heterogeneity in the response to the policy, as its effects are unlikely to be uniform across all groups. First, we expect the impact to be more pronounced among women of childbearing age, who are biologically and demographically more likely to respond to changes in legal and economic conditions by adjusting their fertility behavior. Second, the policy may have had a differential impact on women at the margin of deciding whether to have an additional child, suggesting that regularization could influence not only the decision to enter motherhood but also higher-parity births. Lastly, we investigate heterogeneity by broad regions of origin, grouping countries into regional blocks (i.e., Latin America, Africa, and Asia) to examine whether the effect of the policy varies across different immigrant communities. This broader classification allows us to circumvent the data scarcity problem that arises when disaggregating by individual country of origin at the province level, which often results in a large number of zero observations. In this section, we explore these different dimensions of heterogeneity.

Table 2 presents the heterogeneity results. Panel A shows that the bulk of the effect is concentrated among mothers aged 25 to 34, who appear to have responded most strongly to the policy. This age group is typically at the peak of their reproductive years, which may explain why the labor market improvements associated with regularization translated into a greater likelihood of childbearing. When we further disaggregate the sample by number of children, we find that the estimated effect is largest for mothers with no children, suggesting that the policy encouraged

Table 2: Effects of the Reform on Province level Births, heterogeneity

	(1)	(2)	(3)
Dep. variable	Δ Births per 1,000 of people		
Panel A: heterogeneity by age of the mother			
	16 to 24	25 to 34	35 to 49
Δ Imm. in social security/pop.	4.286 (1.980)	13.375 (2.303)	-1.082 (0.617)
Panel B: heterogeneity by number of kids			
	No kids	One	Two or more
Δ Imm. in social security/pop.	9.428 (4.270)	6.174 (2.231)	0.973 (2.090)
Panel C: Regions of origin			
	Latin-America	Africa	Asia
Δ Imm. in social security/pop.	5.442 (2.166)	7.826 (1.832)	1.344 (0.627)
Controls	Yes	Yes	Yes
Observations	50	50	50

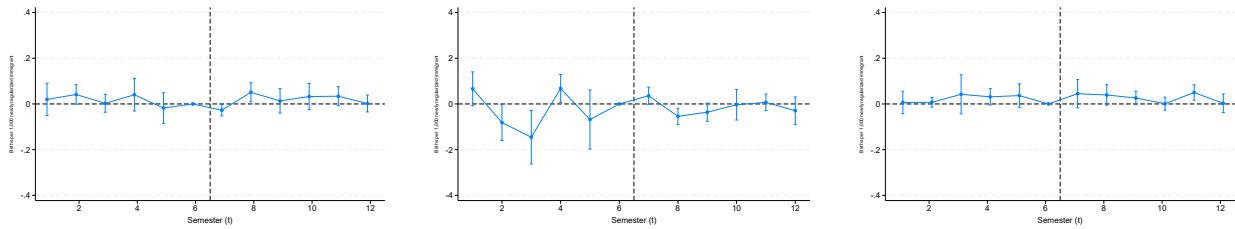
Notes: This table shows estimates of the heterogeneous effects of the entry of immigrant workers into the social security system (regularization) on the number of births per 1,000 people across provinces. Panel A, B and C show estimates by the age of the mother, number of previous kids and region of origin, respectively. Δ Imm. in social security/pop. denotes the change in the share of immigrants entering the Social Security system relative to the working-age population. Estimates are based on a continuous difference-in-difference strategy, where province-specific pre-change linear trends are removed. Regressions are weighted by population. Controls include: political alignment dummies, coastal dummies and share of construction at baseline. Standard errors clustered at province level.

many women to initiate family formation. The effect is also positive and statistically significant for mothers with one child, indicating that regularization supported the decision to have a second child (Panel B). By contrast, the estimated effect is considerably smaller and not statistically significant for mothers with two or more children, implying that the policy had little impact on families that had already reached a higher level of fertility. Panel C reveals substantial heterogeneity by region of origin. The estimated coefficients are positive and statistically significant across the three regions of origin, although the coefficient for women from Asia is substantially smaller than those for Latin America and Africa. These patterns could reflect differences across origin groups in labor market attachment, family formation norms, and familiarity with local institutions and administrative procedures, all of which may shape the extent to which regularization translates into fertility responses.

4.1.3 Placebo

In this section we repeat our empirical exercise using three groups of workers not affected by the policy: EU nationals, low-skill natives, and new EU accession countries. Specifically we can check whether there is a jump in the number of births by mothers from these different groups of countries across provinces that coincides with the policy change. Figure 6 shows no detectable change around the policy for these three groups of mothers, reassuring us, once more, that what we capture in our main regressions is the effect of the policy change on fertility decisions of immigrants who gained work permits.

Figure 6: Placebo groups



Panel A: Foreign EU

Panel B: Native Low-Skill

Panel C: New accession

Notes: In all panels, estimates are based on a continuous difference-in-difference strategy, where province-specific pre-change linear trends are removed. In all panels, we consider as treated all births where both parents are nationals of placebo “candidate” countries eligible to obtain the work permit. In Panel A, we use non-Spaniard couples with at least one parent holding an EU nationality, except Romania and Bulgaria, which are treated. Panel B displays the estimates using couples where both parents are natives and the mother is low-skilled. Panel C consists of mothers originating from a new EU accession country, excluding Romania and Bulgaria, which are treated. The data are collapsed at the biannual level. Ninety-five percent confidence intervals are also displayed.

4.2 Internal Relocation

Beyond its impact on fertility, the regularization may also have triggered internal migration responses. These could stem either from natives relocating across Spanish provinces or from immigrants moving themselves. Indeed, immigrants tend to display greater internal mobility than natives, who are often more rooted in their place of residence ([Cadena and Kovak 2016](#); [Monras 2015](#)).

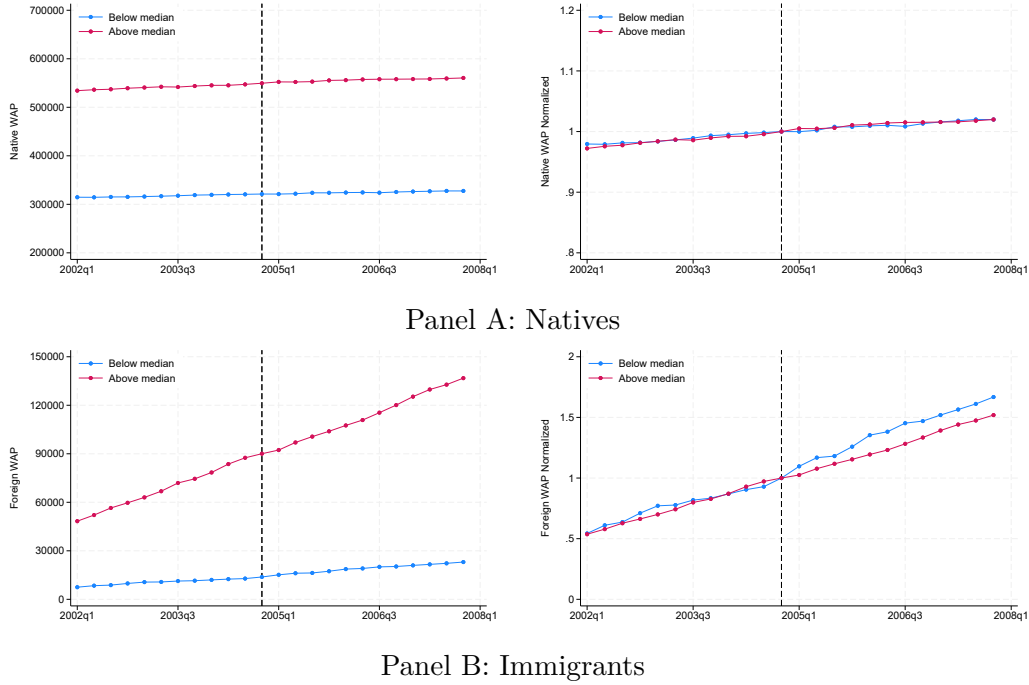
4.2.1 Province level results

To investigate this issue in greater depth, our analysis begins by dividing the sample of Spanish provinces into two distinct groups: those that historically received high inflows of immigrants and those where immigration has traditionally been low. This distinction allows us to compare patterns across different types of regional labor markets and demographic contexts. After establishing this

division, we plot the evolution over time of both the total native population and the total immigrant population in each group of provinces, relying on data drawn from SLFS. This survey provides rich information that not only captures overall population dynamics but also makes it possible to classify individuals by their level of educational attainment and by the composition of their households. These additional dimensions allow us to analyze how variation in skill levels and household characteristics may have influenced migration patterns across provinces.

Figure 7 shows these series for natives (Panel A) and for immigrants (Panel B). When we look at levels and when we normalize the series, we see that native population trends remain unchanged around the time of the policy change. From the graphs of Panel B, it seems that more immigrants (on net) started to move to low-immigration provinces right at the time of the reform. This change is particularly apparent when we normalize the series in the graph on the right of Panel B.

Figure 7: **Spanish and Foreign-Born Population and the Immigration Reform**



Notes: The figures on the left show Spanish and foreign-born working age population (WAP), aged between 25 and 64 years old, in Spanish provinces above and below the median level of immigration (in 2002). The vertical red line indicates the last period before the reform (2004q4). The figures on the right normalize the figures on the left, using the last observation before the policy intervention. Source: SLFS.

We quantify this province-level population response in Table 3 using various outcomes, following the empirical strategy explained in Section 3.2, equation 1. Specifically, we estimate the effect of the reform on four dependent variables: the share of all immigrants, the share of low-skilled immigrants, the share of high-skilled immigrants, and the share of low-skilled natives, each measured as a

share of the total provincial working-age population. We then detrend these series following the same procedure used above (equation 1). We use population shares rather than absolute levels to facilitate comparisons across provinces. These regressions do not observe individual moves directly, so the estimates should not mechanically be interpreted as migration flows. The share of the foreign-born population can change because natives or immigrants relocate, because cohort sizes evolve differently across provinces, or because the employment-based treatment measure differs from residence at the time of regularization. We control for differential cohort-size trends using province-specific linear time trends, while the evidence in Figure 7, the native-placebo columns below, and prior literature suggest that natives are unlikely to be very responsive to the policy change. Hence, changes in the foreign-born population share are best interpreted as suggestive evidence on immigrant net relocation across provinces, which we complement with direct bilateral-flow evidence in Section 4.2.2.

Table 3: The effects of the regularization on the share of foreign born working-age population

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variables	Δ Share of Foreign Population		Δ Share of Foreign Population low-skilled		Δ Share of Foreign Population high-skilled		Δ Share of Native Population low-skilled	
Δ Imm. in social security/pop.	-0.533 (0.344)	-0.282 (0.285)	-0.549 (0.294)	-0.363 (0.289)	0.016 (0.168)	0.081 (0.185)	0.275 (0.272)	-0.078 (0.345)
Political alignment		0.013 (0.007)		0.010 (0.006)		0.003 (0.004)		-0.003 (0.008)
Mediterranean coast		-0.006 (0.008)		0.002 (0.007)		-0.008 (0.004)		-0.001 (0.010)
Atlantic coast		0.024 (0.010)		0.022 (0.010)		0.002 (0.003)		-0.028 (0.013)
Construction		0.000 (0.002)		-0.000 (0.002)		0.001 (0.001)		-0.003 (0.002)
Observations	50	50	50	50	50	50	50	50

Notes: This table estimates the effect of immigrant regularization on province-level working-age population shares. Columns 1–2 use the share of all foreign-born individuals; columns 3–4 use the share of low-skilled foreign-born individuals; columns 5–6 use the share of high-skilled foreign-born individuals; and columns 7–8 use the share of low-skilled natives. Δ Imm. in social security/pop. denotes the change in the share of immigrants entering the Social Security system relative to the working-age population. Estimates are based on a continuous difference-in-differences strategy in which province-specific pre-treatment linear trends are removed using the time period 2001 to 2008. Regressions are weighted by population. Standard errors are clustered at the province level.

Table 3 presents evidence consistent with a relative decline in the foreign-born working-age population of provinces with historically high immigrant concentrations after the regularization. If this stock response is interpreted as net relocation, the estimate in column (2) implies that for every immigrant who obtained a work permit during the regularization, approximately 0.28 foreign-born individuals left, on net, more exposed provinces. This pattern appears to have been driven primarily by low-skilled immigrants. Importantly, this reshuffling took place without affecting the

overall inflow of immigrants into Spain, which remained essentially stable throughout the period (see appendix B.1 and [Elias et al., 2025](#), for details). Examining the point estimates in greater detail, the results suggest that for each newly regularized immigrant, the low-skilled foreign-born population in high-immigration areas fell by about 0.36 individuals, while the high-skilled foreign-born population increased by about 0.08 individuals. All estimates are based on population shares, so their interpretation, as already mentioned, depends partly on whether natives also adjusted their migration behavior in response. We explore this possibility in the last two columns of the table, where the dependent variable is the share of the native low-skilled population rather than the share of the foreign population. The estimated coefficients are notably smaller, and the estimate in the final column is close to zero. Taken together, these findings suggest that the observed population-share patterns were likely driven primarily by low-skilled immigrant workers.

Table 4 provides a more detailed analysis of population-share responses among low-skilled foreign-born and native workers, distinguishing between individuals with children and those without. This disaggregation is useful because family responsibilities and household composition can strongly influence mobility decisions. The results indicate that the population-share response associated with the regularization reform was concentrated among low-skilled foreign-born workers with children. In particular, columns (1) and (2) show a statistically significant negative relationship between the increase in the share of immigrants regularized through Social Security and the share of low-skilled foreign-born workers with children living in high-immigration regions, with an estimated coefficient of -0.47. Interpreted as net relocation, this estimate suggests that regularized foreign-born families with children were more likely to leave, on net, provinces with historically high immigrant concentrations, pointing to a meaningful shift in settlement patterns. By contrast, the response of low-skilled foreign-born workers without children was much weaker: the estimated coefficients are statistically insignificant, indicating no robust evidence of a comparable relocation process for this group.

Turning to natives, columns (5) through (8) show only small and statistically insignificant changes in the shares of low-skilled workers, regardless of whether they had children. This lack of response suggests again that native internal mobility was largely unaffected by the regularization. In other words, the observed population-share patterns do not appear to reflect changes in natives' behavior in response to immigrant regularization, but were instead driven mainly by immigrant workers themselves.

Taken together, these findings suggest that the internal migration response to the reform was

not random, but instead concentrated among immigrant families with children. This selective mobility may reflect a combination of factors, including stronger attachment to the host economy, the desire to access better living standards, improved educational opportunities for children, and more stable or suitable employment opportunities outside traditional high-immigration areas. We do not observe household consumption, income, or remittances in these data, so we cannot isolate the precise mechanism. Other plausible channels include an increase in the bargaining power of formerly irregular workers, allowing them to search for better opportunities in more affordable areas, or a reduced dependence on established ethnic enclaves for access to information, goods, and services. By enabling immigrants to obtain regular work permits, the reform may therefore have reduced barriers to mobility and allowed families to move beyond established migrant provinces, thereby reshaping the geography of immigrant settlement in Spain.

Table 4: The effects of the regularization on the share of foreign born working-age population: workers with and without kids

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variables	Δ Share of Foreign Pop. low-skilled with kids		Δ Share of Foreign Pop. low-skilled without kids		Δ Share of Native Pop. low-skilled with kids		Δ Share of Native Pop. low-skilled without kids	
Δ Imm. in social security/pop.	-0.495 (0.240)	-0.467 (0.265)	-0.054 (0.245)	0.104 (0.192)	0.133 (0.407)	-0.185 (0.425)	0.143 (0.505)	0.107 (0.603)
Political alignment		0.008 (0.005)		0.002 (0.006)		-0.002 (0.006)		-0.001 (0.009)
Mediterranean coast		-0.002 (0.005)		0.004 (0.006)		0.002 (0.006)		-0.003 (0.011)
Atlantic coast		0.008 (0.005)		0.014 (0.007)		-0.016 (0.010)		-0.012 (0.011)
Construction		-0.002 (0.001)		0.001 (0.002)		-0.005 (0.001)		0.002 (0.002)
Observations	50	50	50	50	50	50	50	50

Notes: This table estimates the effect of immigrant regularization on province-level working-age population shares by nativity and household composition. Columns 1–2 use the share of low-skilled foreign-born individuals with children; columns 3–4 use the share of low-skilled foreign-born individuals without children; columns 5–6 use the share of low-skilled natives with children; and columns 7–8 use the share of low-skilled natives without children. Δ Imm. in social security/pop. denotes the change in the share of immigrants entering the Social Security system relative to the working-age population. Estimates are based on a continuous difference-in-differences strategy in which province-specific pre-trends are removed. Regressions are weighted by population. Standard errors are clustered at the province level.

4.2.2 Gravity

Section 4.2.1 documents a decline, on net, in the number of foreign-born residents in provinces that experienced a larger increase in the number of immigrants entering the Social Security system. In this section, we use interprovincial entries and exits as a proxy for internal mobility. As discussed in Section 3, the data allow us to observe both the province of exit from the population register and the province of entry, separately for foreign-born and native-born individuals, and hence, move

our analysis to bilateral flows rather than province level net flows.

To study these dynamics in greater detail, we adopt a gravity framework to examine the mobility patterns identified above. Specifically, we estimate the following equation:

$$\begin{aligned} \frac{\text{Net outflow}_{odt}}{\text{Population}_{ot}} = & \delta_o + \delta_d + \delta_t + \delta_{od} + \beta_1 \left(\frac{\Delta \text{Immigrants in Soc. Sec.}_o}{\text{Population}_o} \times \text{Post}_t \right) \\ & + \beta_2 \left(\frac{\Delta \text{Immigrants in Soc. Sec.}_d}{\text{Population}_d} \times \text{Post}_t \right) + \varepsilon_{odt}. \end{aligned} \quad (2)$$

The dependent variable, $\frac{\text{Net outflow}_{odt}}{\text{Population}_{ot}}$, measures the net flow of foreign-born individuals between provinces, defined as the number of individuals moving from province o to province d minus the number moving from d to o , normalized by the population in the province of origin o . The variable $\frac{\Delta \text{Immigrants in Soc. Sec.}_k}{\text{Population}_k}$, for $k \in \{o, d\}$, captures the change in the number of immigrants from eligible countries entering the Social Security system between the pre- and post-reform periods, relative to the working-age population of province k . Finally, Post_t is an indicator equal to one in periods after 2004 and zero otherwise.

In this specification, a positive estimate of β_1 implies that net flows from origin province o to destination province d increase when o experiences a larger post-amnesty inflow of immigrants into the Social Security system, consistent with higher outmigration from more exposed provinces. Conversely, a negative estimate of β_2 implies lower net inflows into destinations that experienced relatively larger immigrant inflows in the Social Security System after the reform, consistent with these provinces becoming less attractive destinations. Hence, either a positive β_1 or a negative β_2 is consistent with the patterns documented above: the former reflects higher outflows from more exposed provinces, while the latter reflects lower inflows into them.

To further investigate whether these mobility responses were disproportionately directed toward provinces with relatively low immigrant inflows into the social security system, we estimate the following interaction equation:

$$\begin{aligned} \frac{\text{Net outflow}_{odt}}{\text{Population}_{ot}} = & \delta_{ot} + \delta_{dt} + \beta_3 \left(\frac{\Delta \text{Immigrants in Soc. Sec.}_o}{\text{Population}_o} \times \text{Post}_t \right) \\ & \times \text{Low inflow dest.}_d + \varepsilon_{odt}. \end{aligned} \quad (3)$$

where the variable $\text{Low inflow dest.}_d$ is an indicator equal to one if destination province d received immigrant inflows below the median, i.e., an indicator for low-immigration provinces.

A positive estimate of β_3 suggests that provinces more exposed to the regularization reform experienced relatively larger net outflows toward low-immigration provinces. This interpretation is consistent with the province-level changes in the distribution of immigrant workers documented above, whereby lower-immigration provinces absorbed a growing share of the immigrant population.

We report the estimation results in Table 5. Column (1) presents the coefficients from the baseline specification. The estimate of β_1 is close to zero and statistically insignificant, suggesting that the reform was not associated with a measurable change in net outflows from provinces with relatively large numbers of regularized immigrants. By contrast, the estimate of β_2 is negative and statistically significant, suggesting that the adjustment operated primarily through reduced inflows rather than increased outflows. In other words, following the reform, provinces with larger regularization shocks did not experience a marked acceleration in outward migration. Instead, high regularization provinces experienced a relative decline in new arrivals, suggesting a redirection of migration flows away from more exposed provinces and toward destinations with lower immigrant inflows. Quantitatively, these results suggest that the net flow toward a destination province decreased by 0.0017 workers for every immigrant worker entering the social security system at destination, for an origin-destination pair of similar size. For each destination, the total reduction in net arrivals would reflect the decline in migration coming from all potential origins (50 of them). Hence, if all provinces were of similar size, this estimate would be consistent with a reduction of almost 0.1 worker per immigrant worker entering the social security system, i.e., about one third of the estimate reported in Section 4.2, and within the 95% confidence intervals – that is, if the net change in the share of foreign-born workers is only due to internal relocation and not to differential trends in cohort size.

Column (2) reports the estimate of β_3 from equation 3, which is positive and significant. This result is consistent with the view that, following the implementation of the amnesty, immigrant flows from more exposed origin provinces were disproportionately directed toward provinces with initially lower immigration. Column (3) estimates a specification that includes origin times year and destination times year fixed effects. The estimate of β_3 remains positive and statistically significant.

Taken together, Sections 4.2.1 and 4.2.2 present evidence consistent with net immigrant relocation toward initially lower-immigration provinces. The province-level results in Table 4 suggest that this adjustment was concentrated among immigrant households with children.

Table 5: Net interprovincial migrant flows around the amnesty program

	Net outflow between origin and destination / Population		
	(1)	(2)	(3)
Δ Share Imm. in S.S. at origin X Post	-0.030 (0.035)	-0.076 (0.055)	
Δ Share Imm. in S.S. at dest. X Post	-0.170 (0.060)	-0.108 (0.048)	
Δ Share Imm. in S.S. at origin X Post X Low Dest		0.077 (0.042)	0.180 (0.083)
Origin FE	Yes	Yes	Yes
Destination FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
O - D FE	Yes	Yes	Yes
Origin-Time FE	No	No	Yes
Destination-Time FE	No	No	Yes

Notes: This table reports estimates of the effect of immigrant regularization on net interprovincial flows of foreign-born individuals over the period 2002–2007. The unit of observation is an origin–destination province pair by year, excluding within-province flows. The dependent variable is the net bilateral outflow rate, defined as the number of foreign-born individuals moving from origin province o to destination province d minus the number moving from d to o , normalized by the population of province o . Δ Share of immigrants in S.S. denotes the change in the share of immigrants entering the Social Security system relative to the working-age population. Low-inflow destination is an indicator equal to one if the destination province received immigrant inflows below the median. Net outflow rates are multiplied by 100. Standard errors, clustered at the origin–destination pair level, are reported in parentheses.

5 Conclusion

This paper studies how improved legal status and labor market prospects affect fertility and location decisions among immigrants. We exploit the large and unexpected regularization program implemented in Spain in 2005, which granted work permits and access to formal employment to nearly 600,000 undocumented immigrants already living in the country. This episode provides a useful setting in which to examine how a sudden improvement in immigrants’ legal and economic status shaped both family formation and internal mobility.

We find that regularization increased fertility among affected immigrant women. The effects are concentrated among women aged 25 to 34 and among mothers with no previous children or with one child, suggesting that improved labor market opportunities and greater stability encouraged family formation. We also find that the reform altered the spatial distribution of immigrants across provinces. Provinces with larger regularization inflows experienced relative declines in their foreign-born population, and the evidence is consistent with this reallocation being driven primarily by low-skilled immigrant families with children. Bilateral flow estimates further show that migration was redirected toward provinces with lower immigrant inflows.

Taken together, these findings suggest that regularization policies may have demographic and spatial consequences that extend beyond the labor market. By improving immigrants’ economic

prospects and possibly easing mobility constraints, such policies may contribute both to higher fertility and to a broader geographic dispersion of immigrant settlement. More generally, the results highlight that immigrant regularization is not only a labor market policy, but also a demographic and spatial policy with potentially important implications for population dynamics in receiving countries.

References

- Albert, Christoph and Joan Monras**, “Immigration and Spatial Equilibrium: The Role of Expenditures in the Country of Origin,” *American Economic Review*, November 2022, *112* (11), 3763–3802.
- Amuedo-Dorantes, C., A.M. Ibáñez, S. Rozo Villarraga, and S. Traettino**, “More Benefits, Fewer Children: How Regularization Affects Immigrant Fertility,” *Policy Research working paper*, 2023, (10431).
- **and C. Bansak**, “The Impact of Amnesty on Labor Market Outcomes: A Panel Study Using the Legalized Population Survey,” *Industrial Relations*, 2011, *50* (3), 443–471.
- **and E. Arenas-Arroyo**, “Immigration policy and fertility: Evidence from undocumented migrants in the U.S.,” *Journal of Economic Behavior and Organization*, 2021, *189*, 274–297.
- **, C. Bansak, and S. Raphael**, “Gender Differences in the Labor Market Impact of IRCA’s Amnesty Provisions,” *American Economic Review*, 2007, *97*(2), 412–416.
- **, C. Borra, and N. Rivera Garrido**, “Fertility implications of family-based regularizations,” *Journal of Economic Geography*, 2022.
- Avitabile, Ciro, Irma Clots-Figueras, and Paolo Masella**, “Citizenship, Fertility, and Parental Investments,” *American Economic Journal: Applied Economics*, 2014, *6* (4), 35–65.
- Baker, Scott R.**, “Effects of Immigrant Legalization on Crime,” *American Economic Review*, May 2015, *105* (5), 210–13.
- Becker, Gary S.**, “An economic analysis of fertility,” in “Demographic and economic change in developed countries,” Columbia University Press, 1960, pp. 209–240.
- Becker, Gary S.**, “A Theory of the Allocation of Time,” *The Economic Journal*, 09 1965, *75* (299), 493–517.
- Belles-Obrero, C, C.T. Rice, and J. Vall-Castello**, “Hit Where it Hurts: Healthcare Access and Intimate Partner Violence,” *IEB Working Paper 6/2024*, 2024.
- Black, Dan A., Natalia Kolesnikova, Seth G. Sanders, and Lowell J. Taylor**, “Are Children “Normal”?,” *The Review of Economics and Statistics*, 03 2013, *95* (1), 21–33.

- Cadena, B. and B. Kovak**, “Immigrants Equilibrate Local Labor Markets: Evidence from the Great Recession,” *American Economic Journal: Applied Economics*, 2016.
- Card, D. and E. Lewis**, “The Diffusion of Mexican Immigrants During the 1990s: Explanations and Impacts,” *Mexican Immigration to the United States*, 2007, *George J. Borjas (ed)*, University of Chicago Press.
- Cascio, Elizabeth U. and Ethan G. Lewis**, “Distributing the Green (Cards): Permanent residency and personal income taxes after the Immigration Reform and Control Act of 1986,” *Journal of Public Economics*, 2019, *172*, 135 – 150.
- Devillanova, C., F. Fasani, and T. Frattini**, “Employment of Undocumented Immigrants and the Prospect of Legal Status: Evidence from an Amnesty Program,” *Industrial and Labor Relations Review*, 2017.
- DiPorto, E., E.M. Martino, and P. Naticchioni**, “Back to Black? The Impact of Regularizing Migrant Workers,” *CSEF Working Papers No. 517*, 2018.
- Dustmann, C., A. Lindner, U. Schoenberg, and M. Umkehrer**, “Reallocation Effects of the Minimum Wage,” *Quarterly Journal of Economics*, 2022, *137* (1), 267–328.
- , **F. Fasani, and B. Speciale**, “Illegal migration and consumption behavior of immigrant households,” *Journal of European Economic Association*, 2017, *15*(3), 654–691.
- Elias, Ferran, Joan Monras, and Javier Vázquez-Grenno**, “Understanding the Effects of Granting Work Permits to Undocumented Immigrants,” *Journal of Labor Economics*, 2025, *43* (3), 763–802.
- Fasani, Francesco**, “Immigrant crime and legal status: evidence from repeated amnesty programs,” *Journal of Economic Geography*, 2018, *18* (4), 887–914.
- Garcia-Montalvo, J.**, “Voting after the bombing: a natural experiment on the effect of terrorist attacks on democratic elections,” *Review of Economics and Statistics*, 2011, *93*(4), 1146–1154.
- González, Libertad and Sofia Karina Trommlerová**, “Cash Transfers and Fertility,” *Journal of Human Resources*, 2023, *58* (3), 783–818.
- Goodman-Bacon, Andrew**, “Difference-in-differences with variation in treatment timing,” *Journal of Econometrics*, 2021, *225* (2), 254–277. Themed Issue: Treatment Effect 1.

- Imbert, C., J. Monras, M. Seror, and Y. Zylberberg**, “Floating Population: Migration with(out) Family and the Spatial Distribution of Economic Activity,” 2025.
- Juanmarti Mestres, Arnau, Guillem López Casasnovas, and Judit Vall Castelló**, “The deadly effects of losing health insurance,” *European Economic Review*, 2021, 131.
- Kaushal, N.**, “Amnesty Programs and the Labor Market Outcomes of Undocumented Workers,” *Journal of Human Resources*, 2006, 16(3), 631–647.
- Mastrobuoni, G. and P. Pinotti**, “Legal Status and The Criminal Activity of Immigrants,” *American Economic Journal: Applied Economics*, April 2015, 7 (2), 175–206.
- Miller, Sarah, Norman Johnson, and Laura R Wherry**, “Medicaid and Mortality: New Evidence From Linked Survey and Administrative Data*,” *The Quarterly Journal of Economics*, 01 2021, 136 (3), 1783–1829.
- Monras, J.**, “Economic Shocks and Internal Migration,” *IZA Discussion Paper No. 8840*, 2015.
- Pinotti, P.**, “Clicking on Heaven’s Door: The Effect of Immigrant Legalization on Crime,” *American Economic Review*, January 2017, 107 (1), 138–68.
- Schaller, Jessamyn**, “Booms, Busts, and Fertility,” *Journal of Human Resources*, 2016, 51 (1), 1–29.

A Descriptive Statistics

Table A.1: Applications and authorizations by country of origin

Country	Applicants	Authorized	Regularization rate
Ecuador	140.020	127.925	91,4
Romania	118.546	100.128	84,5
Morocco	86.806	68.727	79,2
Colombia	56.760	50.417	88,8
Bolivia	47.325	39.773	84
Bulgaria	25.598	22.239	86,9
Argentina	23.896	21.519	90,1
Ukraine	22.247	19.466	87,5
Pakistan	15.782	8.602	54,5
China	13.416	8.159	60,8
Uruguay	10.650	9.653	90,6
Brazil	10.488	8.069	76,9
Senegal	10.100	7.265	71,9
Venezuela	8.051	6.722	83,5
Algeria	8.038	5.979	74,4
Russia	7.950	6.767	85,1
Paraguay	7.522	5.822	77,4
Nigeria	7.326	5.197	70,9
Mali	7.205	6.249	86,7
India	5.064	2.777	54,8
Total	691.655	578.375	83,6

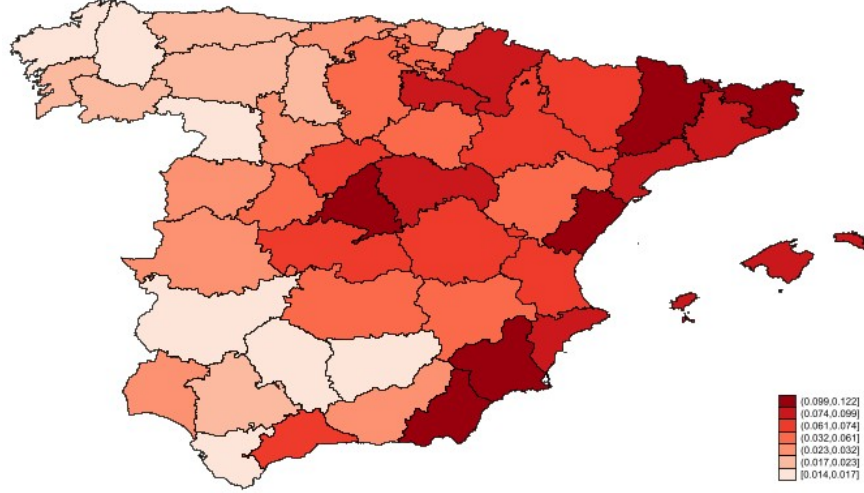
NOTE: This table shows the number of applicants, the number of applicants that fulfilled the criteria for obtaining work permits, and the regularization rate for a selected number of treatment countries of origin. Source: Spanish Ministry of Social Security.

Table A.2: Immigrant concentration and province size

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variables	<i>(log)</i> Immigrant Concentration					
	all	with kids		without kids		
log Population in 2004	0.425 (0.112)	0.361 (0.101)	0.333 (0.111)	0.247 (0.086)	0.435 (0.119)	0.385 (0.112)
Regional dummies		0.050 (0.036)		0.068 (0.032)		0.039 (0.038)
Observations	50	50	50	50	50	50

NOTE: This table reports correlations between immigrant concentrations and province size, measure by total population. Immigrant concentration is defined as the number of immigrants in a given province relative to the total number of immigrants in Spain, all this divided by the same measure for natives. Columns 3 through 6 restrict the computation of immigrants concentration to specific groups of households: those with and without kids.

Figure A.1: Distribution of immigrants



NOTE: The map shows the share of immigrants across Spanish provinces immediately before the regularization. For clarity, the two provinces of the Canary Islands are excluded, as their shares are close to the national average of 0.067.

B Additional Evidence

B.1 Magnet Effects

We examine in this section whether the legalization led to an increase in the number of immigrants in Spain. Note that larger flows of immigrants could be the reason for the increase in fertility rates. If this were the case, those provinces with increases in their fertility rates would be experiencing increases in immigrant inflows as well. To empirically test this assumption, we repeat our analysis at the province level using the number of immigrants from eligible countries as an outcome. Figure [B.1](#) shows no evidence that greater exposure to the regularization led to an increase in the number of immigrants in provinces with higher fertility rates.

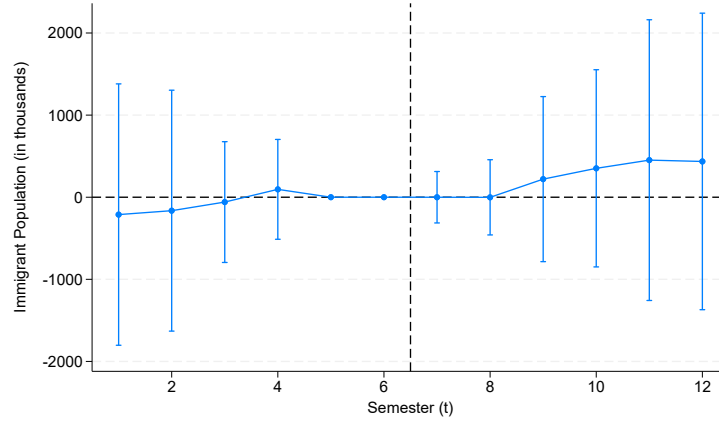
B.2 Fertility: Aggregate Level Findings

B.2.1 Empirical Strategy

In this section of the appendix, we investigate a second empirical strategy, as a robustness check, which compares, before and after the policy, the fertility rate of mothers from eligible and non-eligible countries of origin. More precisely, we use the following model:

$$fertilityrate_{c,t} = \beta treat_c * post_t + \delta_t + \delta_c + \epsilon_{c,t} \quad (4)$$

Figure B.1: Effects of the Reform on Immigrant Population



NOTE: This graph shows the effect of the entry of immigrants into the social security system on the immigrant population. The data are collapsed at the biannual level.

where $fertilityrate_{c,t}$ represents the fertility rate (births per one thousand women aged between 16 and 49 years old) for mothers originally from country c in period t , $treat_c$ is our treatment indicator—a dummy equal to one for eligible countries—, and $post_t$ is a dummy equal to one for years from 2006 onward (January 2006 is 9 months after the middle of the time window for regularization). δ_t represents time fixed effects, and δ_c represents country fixed effects. We also employ a dynamic difference-in-differences specification to estimate the precise timing of differential changes in fertility rates, relative to the base year 2005. With this methodology, we can see whether there are systematic deviations from trend across affected and non-affected countries in fertility rates up to 2005, and visualize whether changes start to occur only nine months after the regularization policy.

B.2.2 Main results

We begin the discussion of our results by presenting our findings from the difference-in-differences specification following Equation 4. The results are shown in Table B.1, where we compare fertility rates between our treatment group and various potential control groups. In column 1, we consider as the control group non-Spaniard couples with at least one parent holding an EU nationality, where EU refers to countries that belonged to the EU in 2004; that is, it excludes Romania and Bulgaria, which joined the EU after the policy change. The second column uses “new accession countries” as a control group. This control group is composed of mothers from the new EU countries in 2004, which include Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia,

and Slovenia. In column 3, we use as the control group the set of mothers with Spanish nationality but low education levels. This may be a better control group than all Spanish mothers because immigrants who gained work permits through the reform were disproportionately low educated. In all these regressions, the pre-regularization period comprises the years 2004 and 2005, and the post-period includes the years 2006 to 2008. All columns include time and country-of-origin fixed effects. The table also displays the average value of the dependent variable, measured in the second semester of 2005.

Table B.1: Effects of the Regularization on Fertility

Dep. Var.:	Fertility Rate ($\times 1000$)		
	(1)	(2)	(3)
Post*treated	5.764 (3.380)	10.440 (3.339)	6.891 (3.096)
Control group	Foreign EU	New accession	Natives l-s
Time fixed effects	yes	yes	yes
Country fixed effects	yes	yes	yes
R-squared	0.961	0.957	0.957
Observations	1,091	876	852
DV mean		45.285	

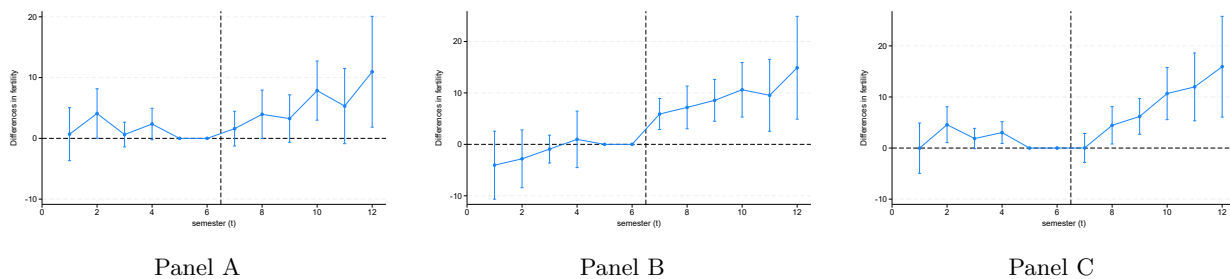
NOTE: The dependent variable mean refers to the fertility rate of women from eligible countries with at least one child born in Spain. The data are collapsed at the biannual level. Control groups: column 1, non-Spaniard couples with at least one parent holding an EU nationality, except Romania and Bulgaria, which are treated; column 2, mothers originating from a new EU accession country, excluding Romania and Bulgaria, which are treated; column 3, couples where both parents are natives and the mother is low-skilled. Standard errors clustered at the mother's nationality level are reported. All specifications are weighted using the population of each nationality.

Table B.1 shows that, irrespective of the control group considered, the regularization led to an increase in the fertility rates of women from candidate countries. We estimate that granting work permits led to an increase of around 5.8 to 10.4 points. Our preferred specification, in which we use all mothers from EU countries as the control group, suggests that the regularization increased fertility rates by almost 5.8 points, which represents a 12.6 percent increase. Therefore, our findings suggest that improvements in labor market prospects seem to have a positive and significant impact on fertility decisions.

Figure B.2 shows the same estimates as Table B.1 using a dynamic difference-in-differences approach. As can be seen, after the policy, the fertility rates of treated mothers increased relative to the fertility rates of mothers from non-eligible countries. These graphs confirm the results reported in Table B.1, and they show visually that the impact of the amnesty occurs only nine months after its implementation. It is also important for our identification to check whether there are any differential trends prior to the policy change. All three panels of Figure B.2 show that, in addition to the salient break in the trend after the regularization, there are no systematic differential

pre-policy trends in any of our three specifications.

Figure B.2: **Dynamic difference-in-differences estimates with alternative control groups**



NOTE: In all panels, we consider as treated all births where both parents are nationals of “candidate” countries eligible to obtain the work permit. In Panel A, we use as the control group non-Spaniard couples with at least one parent holding an EU nationality, except Romania and Bulgaria, which are treated. In Panel B, the control group consists of mothers originating from a new EU accession country, excluding Romania and Bulgaria, which are treated. Panel C displays the estimates using as the control group couples where both parents are natives and the mother is low-skilled. The data are collapsed at the biannual level. Ninety-five percent confidence intervals are also displayed.

