Understanding the Effects of Granting Work Permits to Undocumented Immigrants

Joan Monras
Universitat Pompeu Fabra, CREI, Barcelona GSE, and CEPR

Javier Vázquez-Grenno
Universitat de Barcelona and IEB

Ferran Elias
Universitat Autònoma de Barcelona

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ABSTRACT

This paper studies the legalization of 600,000 non-EU immigrants by the unexpectedly elected Spanish government following the terrorist attacks of 2004. By comparing non-EU to EU immigrants we first estimate that the policy did not lead to magnet effects. We then show that the policy change increased labor market opportunities for immigrants by allowing them to enter sectors of the economy with fewer informal employment. We rely on cross-province comparisons to document that payroll-tax revenues increased by around 4,000 euros per legalized immigrant, and the heterogeneous effect of the policy on various groups of workers. We provide a theoretical framework based on monopsonistic competition to guide our empirical work and interpret our findings.

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Keywords: Immigration, undocumented immigrants, public policy evaluation.

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1 Introduction

Many countries host large numbers of "undocumented" immigrants.[1] By many accounts, the United States leads this ranking. According to the Pew Research Center, in 2017 there were as many as 10.5 million unauthorized immigrants on American soil, representing 23 percent of all immigrants.[2] These large numbers of undocumented immigrants have led recent U.S. administrations, not without controversy, to consider either legalizing the status of these immigrants or deporting many of them to their countries of origin.

The U.S. is not alone in having undocumented immigrants. In the early 2000s, Spain experienced an incredible boom in immigration. From 1995 to 2004, the share of immigrants in the working-age population increased from less than 2 percent to around 10 percent. Many of these newly arrived immigrants lacked work permits. According to some accounts, close to 1 million immigrants–in a country of around 43 million inhabitants–were undocumented by 2004 (Domingo and Recaño, 2005).

Despite these large numbers and the public policy debates around immigrant legalization, not enough is known about the effects of amnesty programs. This paper fills this gap by providing a novel theoretical framework and empirical evidence. In December 2004, the newly elected government of José Luis Rodríguez Zapatero passed a law that resulted in the legalization of around 600,000 working-age immigrants (mainly without university degrees) already working without work permits in Spain. As a result, the share of foreign workers registered in the social security system increased by around 3 percentage points overall. As a matter of fact, almost all eligible immigrants working illegally in 2004 were granted work permits and, hence, gained access to working in the formal sector. This was attained thanks to the incentives of immigrants to take part of the legalization process and to the efforts of the Spanish authorities in enforcing and monitoring the implementation of the policy.[3] For example, inspections related with foreign workers increased by an astonishing 132 percent, something that was widely announced at the time.[4]

This policy change was quite unexpected. Zapatero had won the general election in Spain only three days after the terrorist attack of March 11, 2004, in Madrid, which killed nearly 200 people, the largest terrorist attack in Spanish history. Before the attack, polls forecast that Zapatero trailed Rajoy by 7 percentage points and it was the mishandling of the crisis in the post-attack days that caused Rajoy's Popular Party to lose this election, as explained in detail in Garcia-Montalvo (2011). It is very unlikely that a government led by Rajoy would have ever passed such a large amnesty program. Previous legalizations in Spain were much smaller, easier to anticipate, and not directed at workers but mainly at family reunification.[5] Thus, we can

[1] In this paper, "undocumented" immigrants refers to workers that were born outside the country in which they reside and that do not have work permit in the host country.

[2] See https://www.pewresearch.org/fact-tank/2020/08/20/key-findings-about-u-s-immigrants/ (accessed in December 2020).

[3] The government set up 742 information points across the country and reinforced administrative staff with about 1,700 additional employees (Finotelli, 2011).

[4] For a news report on the policy, see https://elpais.com/elpais/2005/05/07/actualidad/1115453817_850215.html (accessed in December 2020). The news from El Pais at the time had a special mention of the increase in work inspections. Data for work inspections can be found at http://www.mitramiss.gob.es/itss/web/Que_hacemos/Estadisticas/index.html(accessed in December 2020). The number of yearly work inspections before the policy was around 30,000. See Appendix D for more details.

[5] While there had been previous immigrant regularizations in Spain, none compares (even slightly) in magnitude and importance to the labor market to the one introduced by Zapatero. In fact, most reforms were not exclusively focused on immigrants'

use the variation generated by this episode to understand the effects of amnesty programs.

To guide our empirical analysis, we introduce a model that represents a local labor market. Building on the recent work by Card et al. (2018) and Amior and Manning (2020), the model assumes that worker labor supplies schedules are upward sloping, which gives employers some degree of market power. The model assumes various labor types. At an upper level, we consider that high- and low-skilled workers are imperfect substitutes in production. In turn, low-skilled workers can supply their labor endowment in either the formal or the informal markets. The informal market is characterized by jobs where workers and firms do not fully contribute to the taxes associated to the labor market regulations. Given the conditions in the formal and informal market, low-skilled workers with the legal right to work decide whether to work in the formal or informal markets. In contrast, workers without the legal right to work in the formal economy, or in short undocumented immigrants, can only supply their labor in the informal market. We characterize this constrained choice in labor supply decisions of undocumented workers by assuming that undocumented workers' labor supply is more inelastic. We also assume that formal and informal labor market input is imperfectly substitutable to employers.

We use the model to think about the potential effects of an amnesty program such as the one introduced by the newly elected Zapatero government. We assume that the amnesty program affected the economy in three ways. First, and most importantly, it enlarged the labor supply choice set of undocumented immigrants that were, prior to the amnesty, forced to supply their labor endowment to the informal market. Second, given that the implementation of the amnesty program was accompanied with an increase in work inspections against informality, we assume that the policy lead to an increase in the costs of paying workers informally. Third, we assume that the policy made jobs in the formal and informal sectors more similar from the view point of workers, since a large part of informal type jobs in Spain combine some formal pay with supplemental informal rewards – an option that presumably became more complicated with the reform.

Under these assumptions, the model predicts that an amnesty program affects the economy in various ways. First, the model predicts that tax revenues increase, mainly a consequence of moving informal workers to the formal sector. Second, the increase in formal employment is smaller than the number of workers that gain work permits. This is so, because the amnesty program is unlikely to make formal and informal jobs completely equivalent and hence some of the workers who gain the legal right to work still chose to supply their labor to the informal market. Third, the model predicts an ambiguous effect on employment and wage outcomes of low-skilled workers who already had work permits prior to the policy change. On the

working status and, thus, likely had smaller labor market effects. The 1985 legalization granted legal status to around 44,000 immigrants, irrespective on whether they were working or not. In 1991 another regularization approved almost 110,000 work and residence permits, a large fraction of which were granted on the basis of family reunifications–i.e., were not linked to labor market participation. After the Spanish immigration boom started, in 2000, 150,000 immigrants obtained work/residence permits, and again a considerable fraction of these immigrants were not working. Finally, in 2001 there was another regularization process (known as *Regularización por Arraigo*) that regularized the working situation of around 235,000 immigrants, numbers that also include family reunifications (see CES, 2004). In all these regularizations, with the exception of a regularization that took place in 1996 where a labor contract at the moment of application was needed and which gave work permits to around 21,000 immigrants, there was no connection between the requirement to apply and the labor situation of the immigrants involved. Thus, their main intention was not to make workers already working illegally change their work status and make them contribute to public finances, but rather to accommodate immigrant families in the host country.

one hand, by equating the conditions in the formal and informal economy, the policy reduces the market power of employers. This is a force towards higher low-skilled wages and employment. On the other hand, however, a larger pool of workers with the legal right to work in the formal sector puts pressure on wages and employment. Finally, the model predicts that the cost increase associated to moving a bigger part of the low-skilled labor market towards formality encourages firms to substitute towards more high skilled workers, which increases their wages and employment.

In the second part of the paper, we use the model to guide our empirical investigation. We begin our analysis by documenting whether the policy affected the overall immigrant labor supply in Spain. As Liu (2019) argues, from the perspective of the host economy, immigrant policies likely affect the total supply of immigrants, its mode of entry, and its occupation choice. Following this logic, our first step is to analyze whether there is any evidence that the policy lead to "magnet effects". To study whether this was indeed the case, we leverage the fact that the amnesty program only affected immigrants from outside the European Union (EU) and, hence, we can compare immigrant stocks and growth rates from EU and non-EU countries around the policy change. In our setting, this exercise is possible because all immigrants, irrespective of the work permit status, have strong incentives to register in the Municipal Registry, and hence we can track them in our data. The evidence rejects the idea that the policy lead to magnet effects. We do not detect in the data any differential increase in the stock or growth rates of immigrants from outside the EU relative to immigrants from the EU. This is true both when we focus on short- and longer-time horizons (i.e. the first year after the policy and up to four years after). Hence, the amnesty program meant only a change in the right to work in the formal sector – as assumed in our model – and not a change in the total supply of immigrant workers. This result is in line with previous work analyzing the magnet effects of the Immigration, Reform and Control Act passed in the U.S. in 1986 (Orrenius and Zavodny, 2003).

The second step in our empirical analysis is to understand how gaining work permits affected immigrant labor market opportunities and occupation choices. For this, we analyze in detail the career path of the newly legalized immigrants who entered the social security system with the reform. The model predicts that newly legalized immigrant workers should experience a broadening of their labor market opportunities which should lead to job changes and higher wages. To examine this prediction, we focus our attention to undocumented immigrants who entered the social security system as housekeeping service workers – a sector that was characterized by a high prevalence of informality and a large number of undocumented immigrant workers. Once they gain work permits, newly legalized immigrant workers enter the social security system and hence, we can track their career paths by using data from the *Muestra Continua de Vidas Laborales* (MCVL). We document that immigrants who entered in the social security system as housekeeping workers stayed employed in the sector for about six months, which was a condition for the legalization process. After this initial period a large fraction of formerly undocumented immigrants moved into other sectors of the economy, most predominantly into "Hotels and Restaurants" and "Retail". In numbers, we show that out of the 100,000 immigrants who entered the social security system by mid 2005 as housekeeping workers, only

half remained in this sector by the end of 2006. We also document a movement from one employee firms (i.e. households employing housekeeping services) to larger and higher paying firms. We view this as evidence that gaining work permits enabled immigrant workers to enlarge their labor market opportunities and the set of potential occupation choices.

We then turn to analyzing the effects of the amnesty program on tax revenues and labor market adjustments by comparing Spanish provinces – which are a close approximation to local labor markets or commuting zones – that had large immigrant populations prior to the policy with those that had small immigrant populations, using a number of different specifications.[6] Our identification strategy relies on the fact that the policy was not anticipated, was implemented homogeneously across provinces, and linear-province specific time trends can account for secular differences across provinces in the outcomes of interest, as can be checked graphically. Hence, our estimates are obtained from relating deviations from trend in outcomes of interest to the size of the relative inflow of immigrants into the social security system, which differed across provinces.

Using Social Security data aggregated at the province level, we first estimate that, for each newly legalized immigrant, payroll-tax revenues increased by around 4,000 euros per year at the province level.[7] This is a substantial increase in tax revenues that likely exceeds the costs of the reform, given that undocumented workers in Spain already had access to public education and health care systems. The fact that this increase in payroll tax revenues comes from the labor contribution types most heavily used by immigrant workers, which include housekeeping services and agriculture, gives us confidence that our empirical strategy effectively captures the causal effect of the policy change on payroll tax collection.

Following the same empirical strategy, we next investigate the effect of the amnesty program on the labor market outcomes of various types of workers. For this, we use two different data sets: the standard Spanish Labor Force Survey (SLFS, in Spanish the *Encuesta de la Población Activa*, EPA) – which captures both formal and informal workers, although they cannot be separately identified in the survey –, and the MCVL that includes only formal employment. Using these data and comparing the results obtained in one and the other employment series we uncover a number of interesting facts.

First, we document that for every 10 newly legalized immigrants – who upon legalization necessarily entered the formal sector and who were working informally prior to the reform – only 5 formal jobs were retained. This confirms one of the predictions of the model. The policy change increases the pool of workers that can supply their labor endowment in the formal sector, but only a fraction of them end up in the formal sector. Second, we estimate that the policy reduced employment among native low-skilled workers in the informal sector. One of the defining aspects of the policy change is that work inspections increased substantially and an effort was put in reducing the size of the informal sector. As a consequence, informal type

[6] We show that our results are very robust to a number of specifications. In Appendix C.2 we show that our baseline results reported in the main text, which mainly account for potentially different trends at the province level, are robust to changing the sample of provinces, to controlling for several confounding factors and to using 2SLS strategies to estimate all our coefficients of interest.

[7] Payroll taxes in Spain are around one-third of wages. Average wages before the policy change were almost 20,000 euros.

jobs became relatively more expensive, which explains the drop in low-skilled employment in the informal sector, even among natives.

While not explicitly considered in our model, we also document that there was a small but statistically significant loss in high-skilled native formal employment which is entirely driven by females. Our interpretation of this finding is that the legalization effectively increased the costs of housekeeping services by at least 22 percent (the payroll tax rate for this type of contribution), which pushed some native high-skilled women out of the formal labor force and into home production. Given the unequal distribution of home production between males and females in Spain, it is not surprising that the lost high-skilled employment concentrated among women.

We also document that wages of low-skilled natives in the formal sector increased. Our model has ambiguous predictions on this outcome. On the one hand, by making formal and informal jobs more similar to workers, the policy change reduces market power of employers. This force implies that wages of low-skilled workers increase. On the other hand, more low-skilled workers with work permits put pressure on low-skilled wages. Empirically, we show that the first of these two forces dominates. Also on the positive side, and as predicted by the model, we document wage and employment increases among high-skilled workers. This pattern likely reflects the substitution of low- for high-skilled workers given the cost increase implied by the movement of low-skilled labor from informal to formal jobs. Finally, and consistent with the notion that gaining work permit expands the set of jobs available to immigrant workers, we show that for each newly legalized immigrant in a location, around 0.4 low-skilled immigrants relocated within Spain.

Overall, we think that we contribute to the literature in two ways. First, we provide a conceptual framework that can be used to analyze amnesty programs. Different from other literature, we study how amnesty programs reduce market power of employers of undocumented workers and potentially of low-skilled workers that can chose between working in the formal and informal sectors. Second, we use plausibly exogenous variation to analyze, guided by our conceptual framework, how the unexpected legalization of around 600,000 workers affected the Spanish labor market and, particularly new in the literature, tax collection. Relative to prior literature, our analysis hopefully provides a more comprehensive understanding of how granting work permits to immigrant workers already working informally in the host country affects the economy.

Related literature

This paper is related to the literature that examines immigration through the lenses of imperfect competition and to the literature that studies the effects of amnesty programs. On the one hand, a number of recent papers investigate the role that imperfect competition plays in shaping labor market outcomes (Manning, 2003). Within this literature, only a handful of papers use imperfect competition frameworks to study immigration. In a closely related paper, Naidu et al. (2016) suggest that immigrant workers without unconditional work permits are particularly vulnerable to employer market power. They analyze a reform in United Arab Emirates that allowed immigrant workers to access jobs beyond the employer that sponsored their visas.

This is close, in nature, to what many amnesty programs effectively do. However, to the best of our knowledge, none of the papers that studies amnesty programs uses a framework similar to that of Naidu et al. (2016). Also closely related, Amior and Manning (2020) study how immigrant shocks (not amnesty programs) affect the US economy through the lenses of a monopsonistic model of the labor market.

Several empirical papers have studied amnesty programs in a variety of countries, however the focus is generally on particular immigrant outcomes (related to the labor market and not), rather than on understanding the overall labor market effects on various groups of workers.[8] For example, in a recent paper, Pinotti (2017) uses a sharp discontinuity design to show that legal status significantly reduces crime rates.[9] Similarly, Baker (2015) finds that the Immigration Reform and Control Act of 1986 significantly reduced crime in the U.S.. There are also other papers that estimate the effects of gaining legal status on the general outcomes of immigrants (Dustmann et al., 2017), and more specifically their labor-market outcomes. Most of these papers show that the employment prospects of newly legalized immigrants improve as a result of legalization, something that is in line with our model and empirical evidence (DiPorto et al., 2018; Devillanova et al., 2017; Amuedo-Dorantes and Bansak, 2011; Amuedo-Dorantes et al., 2007; Kaushal, 2006; Cobb-Clark et al., 1995).[10] In another closely related paper Dolado et al. (1996), study an amnesty program in Spain in the early '90s, although in that case the identification strategy and data available limit the scope of their analysis.

Relative to this previous work, our case study generates arguably exogenous variation stemming from the particular circumstances that led Zapatero to become the Spanish prime minister in 2004. Moreover, relative to other studies, ours is the only paper that combines detailed data on both public revenues, labor market histories, and labor-market outcomes disaggregated at a fine geographic level, something that we argue is important for the overall analysis of amnesty programs, as highlighted by our novel theoretical framework.

In what follows, we introduce in Section 2 our data and explain the particular circumstances that led to the policy change. Section 3 introduces a monopsonistic model of a local labor market that guides our empirical analysis. In Section 4, we show evidence on magnet effects, newly legalized immigrants' labor market experiences, public revenues, and labor market outcomes, which we relate to our models' predictions. Section 5 offers our conclusions.

[8] In a recent paper, Bahar et al. (2020) investigate the labor market effects of a large amnesty of Venezuelan workers in Colombia. Their findings are similar to ours, however, relative to their paper, we can analyze more outcomes, such as tax revenues, and we provide a theoretical framework to study our and related episodes. Their focus is on analyzing formal labor market outcomes of native workers.

[9] See also related evidence in Mastrobuoni and Pinotti (2015).

[10] A recent paper by Cascio and Lewis (2017) shows that the Immigration Reform and Control Act of 1986 redistributed resources toward high immigration locations since immigrants complied with tax payments. This redistribution stemmed from increases in transfers from programs like the EITC and increases in local tax revenues.

2 Data, Background, and the Policy Change

2.1 Data

We combine a number of different data sets, from several sources, to explore the consequences that the 2005 Spanish legalization of immigrants had on immigrant labor supply, payroll-tax collection, and also on different labor-market outcomes of various other groups of workers such as employment, wages, and internal migration. We describe these data in what follows.

2.1.1 Data overview: strengths and limitations

Before describing each of the different data sets available to us, we start by providing an overview and discussing the strengths and limitations of the data at our disposal.

First, we have administrative aggregate data on the number of affiliates to the social security by nationality and province of residence at a monthly frequency, provided by the Minsitry of Labor. This enables to compute with precision the increase in social security affiliations around the amnesty program. We use these data to measure the exposure of each province to the policy change.

Second, we have aggregate administrative data on payroll tax revenues at the province level. These data report the total amount of taxes collected in each province for each of the labor market contribution types, called "regimes", available in Spain. These data cover public revenues only coming from payroll taxes. We have these data at a yearly frequency.

Third, we have individual level data from the Spanish labor force survey. From these data we have employment information, covering both workers in the formal and informal sectors. In these data we can identify native and immigrant workers of different skills, although we cannot identify if the worker is working in the formal or informal sector, or, in the case of immigrants, if they have or lack work permits. The employment question does not mention informality. Hence, if someone has worked informally in the reference week she should appear in the survey as working.[11] This data is a repeated cross-section with quarterly frequency.

Fourth, we have individual-level data on the working history of a representative sample of workers. These data are representative of the population of workers affiliated to the social security system. Among immigrants, only documented workers can be affiliated to the social security, hence, these data cover a representative sample of all the workers in the formal sector, which necessarily excludes undocumented immigrants. There are few natives not covered in this data set. While some natives work informally, most native workers sign, at some point during their working life, a legal contract. In these data we can track workers over time. Using these data we can track newly legalized immigrant workers when they gain work permits and enter the social security system (which was a requisite for the legalization process). These data

[11] The exact question in the SLFS is "*Ha trabajado de manera remunerada la semana de referencia?*", which can be translated as "Have you worked for a salary in the reference week?".

also contains good information on wages.

Finally, we have data on the universe of people living in Spain from the Municipal Register. These data cover both documented and undocumented immigrant workers. Undocumented immigrants are fully covered in these data, since registration in the Municipal Register grants them access to health care services and education. Moreover, local administrations also have incentives to track the number of people living in each municipality since it affects the amount of transfers received from upper tiers of government.

Hence, the main data limitations that we have are that a) we lack data on the wages in the informal sector (except for some information on immigrant workers coming from a survey done in 2007), and b) we cannot distinguish documented and undocumented immigrant workers in the labor force survey data. Moreover, only MCVL and SLFS data allow us to distinguish different types of workers. We 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. In what follows we explain each data set at our disposal in more detail.

2.1.2 Ministry of Labor and Social Security data

We use two different data sets from the Ministry of Labor and Social Security: statistics of registration in the social security system and payroll-tax collection, both at the province level. There are 50 provinces in Spain plus the cities of Ceuta and Melilla – two small cities in African territory that are part of Spain –, which we exclude from the analysis.[12] These data sets cover the period from 2000 to 2016. The social security registration data is available at a monthly frequency, while data on payroll-tax revenues is annual. Both the number of individuals registered in the social security system and pay-roll tax revenue data are also available disaggregated by labor market contribution type, in Spanish "regimes". There are several labor contribution types. Most workers are regulated under what is known as the general regime, which covers around 76 percent of the labor force. There are other labor contribution types that regulate particular sectors. These "special" types are the self employed, those employed in agriculture, in sea activities, in mining, and housekeeping services. These different types concentrated various degrees of immigrant workers, which help strengthen some of our results. While employment of immigrants is under-represented in the general and self employment regimes (69.6 % vs. 76.1% and 10.3% vs. 16.9%, immigrants and natives respectively) immigrant employment is clearly over-represented in the housekeeping and agricultural regimes (9.5 % vs. 0.7 % and 10.3 % vs. 5.8%, immigrants and natives respectively). In the housekeeping this over-representation is such that immigrants represents more than 50% of the total affiliates in this regime, while in total affiliation immigrants speaks for around 7.5%.

2.1.3 Continuous Sample of Employment Histories

We use Spain's Continuous Sample of Employment Histories (MCVL, for *Muestra Continua de Vidas Laborales*) to compute wages and formal employment. This is a microlevel administrative data set obtained by

[12] Including Ceuta and Melilla does not change our results.

matching social security, income tax, and census records. It is a representative sample of the population that, in a given year, has any relationship with Spain's social security system (individuals who are working, receiving unemployment benefits, or receiving a pension). The MCVL represents a 4 percent non-stratified random sample of this reference population, consisting of nearly 1.1 million individuals each year, and covers the period 2004–2015, with retrospective information going back further in time. The MCVL has longitudinal information. Individuals who are present in one wave of the MCVL, and remain registered in the system, continue in the sample for the next wave. Also, new individuals are added to the sample each year to ensure that it remains representative of the population.

We use this data set for two purposes. On the one hand, these data capture formal employment. On the other hand, it reports wages of the workers covered. With the objective of estimating the unit price of labor, we restrict the sample to natives and foreign-born male workers, aged between 25 and 47 years old, who were employed at any point in our period of analysis (January 2002 to December 2007). In this analysis, we follow the *exact* same sample of individuals constructed in de la Roca and Puga (2017), but we also include immigrant workers and extend our period of analysis to include 2002.

We also use these data to track working histories of immigrant workers entering the social security system at different points in time, in particular during the three months window of the legalization.

2.1.4 Spanish Labor Force Survey

We use the Spanish Labor Force Survey (SLFS, in Spanish *Encuesta de la Población Activa*, EPA) to measure overall employment. The SLFS is conducted every quarter by the Spanish National Institute of Statistics with a sample of around 65,000 households (about 180,000 individuals) and is designed to be representative of the Spanish population. We use the SLFS for the period from 2002 to 2007 and focus our analysis on population aged 25 to 65. The SLFS captures both formal and informal type jobs. In our sample both employment and unemployment rates are higher for foreign born individuals, 72.2% vs. 67.2% and 11.5% vs. 8.2% respectively. Moreover, employment and unemployment rates are even a bit higher when we focus on immigrants from countries candidate to legalize (73.2% and 12.1% respectively).

We also use the SLFS to construct the provincial share of immigrants each quarter. In addition, and as a cross-check, we compute the same population shares using the Municipal Register of Population. We focus our analysis on the SLFS results for two reasons: 1) the SLFS allows us to compute these shares by skill level, and 2) the data are available at a higher frequency–quarterly instead of yearly. Results using the Municipal Register were deferred to Appendix C.4.

2.1.5 Municipal Register

Municipal Register (*Padrón Municipal*) contains population residing in Spanish municipalities. The population counts refer to January 1st and are used to produce official population statistics. The Municipal Register includes information about country of birth, nationality, gender and date of birth. Since no proof

of legal status is required, both regular and irregular immigrants are registered. Once immigrants arrive to Spain, they have strong incentives to register since registration enables immigrants to access public services such as health care system or education. For the different exercises we use data from 2002 to 2008.

2.1.6 National Immigrant Survey

The main limitation of the MCVL is that it only captures workers in the social security system, and hence, provides information on wages only of documented workers working in the formal sectors. To investigate potential differences in wages of documented and undocumented immigrants we use the survey *Encuesta Nacional de Inmigrantes* (ENI). This is a nationally representative survey of the immigrant population in Spain. It was conducted between November of 2006 and February of 2007 and contains 15,465 observations. The survey records answers to a number of questions, including: legal status, household composition, socio-demographic characteristics of the interviewed individuals, migratory experience, socio-economic situation in the country of origin before migration, how they arrive to Spain, labor market and housing experience in Spain, relation with the origin country and social participation in Spain among others.

2.2 Background and Policy Change

Spain is among the countries with medium-high levels of immigration. More than 13 percent of its population is foreign-born, with Romania, Morocco, and Ecuador being the top sending countries. Relative to other European countries, such as Germany, this is a recent phenomenon. Immigrants started to arrive to Spain in large numbers in the late 1990s, and this flow continued through the 2000s, up to at least the beginning of the Great Recession in 2008.

Concerns about the arrival of large waves of immigrants intensified in the early 2000s. For example, a new law drafted in 2000 and put into effect in June 2001 recognized Spain as "a land of immigration" and subsequently established tougher conditions for immigrants to settle in Spain.[13] Similarly, in June 2002, the EU Summit in Seville agreed on tougher regulations to deter illegal immigration to Europe.[14]

Most of these efforts to deter further immigration were put in place by the Popular Party. This is the major center-right party in Spain, which ruled the country under the presidency of José Maria Aznar between 1996 and 2004. Like other center-right parties in Europe, this is the party that has traditionally adopted tougher regulations to limit immigration. The party won the general election in 1996 and consolidated its power in the 2000 election with the majority of seats in Parliament. From the beginning of his mandate, Aznar announced that he would seek to stay in power for only eight years. He was replaced as head of the party by Mariano Rajoy, already in his cabinet and, at the time, one of his closest ministers. Despite the large political protests against Spanish involvement in the Iraq war, the government and most of the people

[13] See Real Decreto 864/2001.

[14] In Seville, Spanish Prime Minister Jose Maria Aznar said that reducing illegal immigration was "the most important question in European politics at the moment," and urged the EU to develop a "concrete timetable that will effectively give a very clear message that Europe is committed to combating illegal immigration.... We must combat these criminal organizations that traffic in illegal immigrants." https://migration.ucdavis.edu/mn/more.php?id=2661(accessed in December 2020).

in Spain expected the Popular Party to continue 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 (poll conducted in January 2004) was 42.2 percent for the Popular Party and 35.5 percent for the Socialist Party.

Yet something completely unexpected occurred on March 11, 2004, just three days before the election. Early that morning, several terrorists attacked a number of commuter trains in Madrid. Almost 200 people died in what was the deadliest-ever terrorist attack on Spanish soil.

The attack was, in many respects, larger than all the terrorist attacks that took place on Spanish soil from the early 1970s onward, mainly perpetrated by the Basque terrorist group ETA. Following the attacks, the three days leading to the general election were chaotic. Initially, the government tried to blame ETA. One of the government's concerns was that if the attacks had been committed by an Islamic terrorist organization, voters could perceive it as a retaliation for Spanish involvement in the Iraq war, a decision of the Popular Party that was a hugely controversial topic at the time. To avoid further stoking this controversy, the government delayed official statements on who was responsible for the attacks, even suggesting the possibility that ETA was behind them.

The government's handling of the three days after the terrorist attacks likely caused the Popular Party to lose the general election on March 14, 2004, as Garcia-Montalvo (2011) shows by comparing the voting behavior of Spanish nationals living abroad (who had cast their votes before the attacks took place) with post-attack voting (Spanish residents) from this election and prior ones. Garcia-Montalvo (2011) concludes that the attacks ultimately changed the outcome of the election and unexpectedly gave power to José Luis Rodríguez Zapatero. The Socialist Party obtained 42.6 percent of the popular vote, while the Popular Party had only 37.7 percent, in sharp contrast to the forecast of just a few weeks earlier.

Among the first laws that President Zapatero put in place was the legalization of a large number of undocumented immigrants. By December 2004, Zapatero had managed to pass new immigration guidelines that resulted in around 600,000 immigrants already in Spain obtaining legal status.[15] Thus, completely unexpected a few months earlier, a most of the Spanish immigrant population saw an extremely important change in their labor-market conditions. By gaining legal status, over the course of a few months a large number of undocumented immigrants gained a working status very similar to that of natives.

2.3 Affiliations to the Social Security

The policy became effective in February 2005 and had a huge impact on the share of migrants registered in the social security system. The stated goal of the policy was "on the one hand, to speed up the [work] authorizations based on vacancies for which employers do not find resident workers, and, on the other hand, to increase the control over the concession of these authorizations."[16] The policy recognized the "high number

[15] Real Decreto 2393/2004.

[16] Real Decreto 2393/2004. In Spanish: *"Por un lado, agilizar las autorizaciones basadas en vacantes para las que los empresarios no encuentran trabajadores residentes, y, por otro lado, aumentar el control en la concesión de dichas autorizaciones."*

of foreign-born workers lacking a work permit" and offered a period of three months (between February 7 and May 7, 2005) to give work permits to workers who complied with the following two criteria: 1) the worker had to be in the Municipal Registry of Population at least six months prior to February 7, 2005,[17] and 2) the employer needed to offer a legal working contract for at least six months.[18] In addition, the government announced that, by May 8, 2005, its policy would be inflexible with those firms employing undocumented immigrants. In fact, the number of work inspections more than doubled between 2004 and 2005, something that likely affected native workers in the informal economy as well, as we will see later.[19]

When the policy went into effect, large numbers of (mainly low-skilled) immigrants took the opportunity to gain legal status (see Table 1). The simplest way to show this is to plot the share of immigrants among the total population registered in the social security system. Figure 1 shows how the share of immigrants in the social security system moved from around 6 percent to around 9 percent in the course of the period of legalization. This is a significant change and is the result of almost 600,000 immigrants throughout the entire country gaining work permits.[20] This was an unprecedented number. In fact, Figure 1 also covers the beginning of 2001 when there was an increase of less than one percentage point in the share of immigrants affiliated in the social security system due to a social roots amnesty ("*regularización por arraigo*") implemented by President Aznar. It is clear from the graph, that the 2005 amnesty was special in magnitude as well as timing. Apart from amnesty periods, Figure 1 shows steady but continuous increases in the amount of immigrants affiliated to the social security. This suggests using linear time trends to take into account the sustained increase in the supply of immigrant labor during the period, and measure the effects of the policy as deviations from these trends.

Figure 1 goes around here

As in many other countries, there is a lot of heterogeneity in relation to where immigrants cluster. On the one hand, immigrants concentrate in coastal provinces with high levels of tourism and European retirees. This is the case, for example, in Alicante, the Balearic Islands, Girona, Tenerife, and Málaga. All these provinces had immigrant shares above 8.5 percent in 2002.[21] Immigrants also concentrate in large cities, as happens in other countries (Albert and Monras, 2019). In 2002, for example, Madrid and Barcelona had immigrant shares of 9.2 and 6.8 percent respectively, numbers that have risen further in recent years. On the

[17] This 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 of 2004.

[18] There were some exceptions for the agricultural, construction, restaurant and hotel, and domestic service sectors, as well as for part-time workers. One of the main objectives was to grant work permits to those irregular immigrants with real connections to the Spanish labor market. In order to ensure this, and unlike what happened in previous regularizations, in the Zapatero reform, it was the employers instead of the foreign workers who were irregular, who had to submit the request for authorization and the job contract that linked them with the foreigner.

[19] According to the statistics of the Ministry of Labor and social security, the number of work inspections related to foreign workers increased by 132 percent between 2004 and 2005, from a baseline of 30,000 per year.

[20] In fact, there were 691,655 applications to the amnesty program, of which 578,375 (83.6 percent) were approved. Source: Anuario Estadístico de la Inmigración 2005 (Ministry of Labor and Social Security).

[21] These immigrant shares include all foreign-born individuals, i.e. it includes foreign-born people from EU and non-EU countries.

other hand, in 2002 there were many provinces with extremely low levels of immigration: more peripheral provinces, such as Asturias, Coruña, or Lugo in the north; Córdoba, Jaén, Sevilla, or Cádiz in the south; and provinces in central Spain all had immigrant shares that were 2–3 percentage points below the national average. Actual numbers can be observed in Table 1.

Table 1 goes around here

While the share of immigrants who were granted work permits among those who applied was very high and similar across all provinces (see Table 1), the legalization of around 600,000 immigrants likely had heterogeneous effects across space since immigrants are differentialy important as a fraction of the local labor force. A simple way to view this spatial heterogeneity is to divide Spanish provinces by their median level of migration in 2002. This separates provinces into two groups: the first group (below the median), comprises all the provinces that had fewer immigrants as a share of total population than that of the median province; the second group comprises provinces above that median. In the following pages, we show two graphs: the first graph presents the raw data, which we show for provinces above and below the median; the second graph shows the raw data normalized by the value of the outcome variable in the period immediately before the policy change. These graphs allow us to visualize both the total and the proportional impact that the policy change potentially had across locations as a function of initial immigrant shares.

Figure 2 goes around here

Figure 2 depicts these two graphs for the share of immigrants registered in the social security system. The graph on the left in Figure 2 shows that, in high-immigration provinces, the share of foreign-born individuals registered in the social security system increased from around 7 percent to more than 10 percent in just three months. This is an extremely large increase, occurring in an extremely short period of time, which came from a policy change that was very unexpected. Therefore, it represents an exceptional opportunity to evaluate the consequences of this kind of immigration reforms. As can be seen in the graph on the left of the figure, this policy change disproportionately affected initially high-immigration locations in Spain.

The graph on the left of Figure 2 also shows that the policy change affected low-immigration provinces too, albeit with less intensity. The share of immigrants registered in the social security system moved from around 3 percent to around 4 percent over the same period. The graph on the right in Figure 2 shows that, in fact, the effect of the policy was similar across locations in proportional terms, suggesting that the take-up rate among undocumented immigrants was similar across provinces.

3 Theoretical framework

In this section we introduce a theoretical framework that helps to guide our empirical work of Section 4. The model represents a Spanish province. This is similar to a commuting zone in other contexts. Spanish provinces are relatively well connected local labor markets. Unlike commuting zones, they are not defined by commuting behavior, but rather by historical delineations.

We model each province as a small open economy producing a freely traded good. We assume a representative firm at the local level. There are four factors of production: **H**igh-skilled workers (L_H), low-skilled workers in the **F**ormal sector (L_F), **D**ocumented workers in the informal sector (L_D), and **U**ndocumented workers (L_U) who do not have work permits and hence necessarily work in the informal sector. Low-skilled workers with work permits decide whether to supply their labor in the formal or informal sectors. High- and low-skilled workers are imperfect substitutes (with elasticity of substitution σ) and formal and informal workers are also imperfect substitutes (with elasticity σ_L).

Spain has a relatively large informal sector. While there are some workers who only receive the returns to their labor endowment outside any type of labor market, very often informal workers receive part of their returns through part-time work and other arrangements, and, another part, informally – i.e. outside any contract. We consider these workers as informal workers. This is in contrast to full-time low-skilled workers fully paid and employed under regulated labor contracts.

We assume that the amnesty program affects the economy in a number of dimensions. First, it reduced the supply of workers lacking work permits and increased the supply of those with work permits. Second, we think about the enforcement against informality that accompanied the policy change as making jobs in the formal sector and informal sectors more similar, and hence substitutable from the view point of workers with work permits deciding whether to supply their labor endowment in formal or informal type jobs. Finally, the policy change lead to an increase in the cost of hiring workers informally. We assume that the informal market only employs low-skilled labor.

3.1 Labor supply

There are two types of low-skilled workers. First, there are low-skilled workers with the legal right to work in Spain. We denote these by N. Second there are immigrant undocumented workers, denoted by U. Low-skilled workers with work permits supply labor to either the formal (L_F) or informal sector (L_D). Workers without work permits who do not have access to formal sector jobs can only supply labor to the informal sector. We denote by L_U these workers. Hence, the total number of workers in the informal sector is given by $L_D + L_U = L_I$, while the total amount of workers with work permits N is necessarily equal to $L_F + L_D$.[22]

Low-skilled workers with work permits can decide to supply their labor in either the formal or informal sectors. Wages and tax rates are different in the two sectors. Taxes are paid by firms, as mandatory for

[22]For simplicity, we assume that workers with work permits and without work permits are perfect substitutes in the informal sector. We can relax this simplification and obtain similar results, albeit with more cumbersome algebra.

payroll taxes. Sector optimization choice leads to the following supplies of labor:

$$L_F = \frac{(w_F)^{1/\epsilon_L}}{(w_F)^{1/\epsilon_L} + (w_D)^{1/\epsilon_L}} N, L_D = \frac{(w_D)^{1/\epsilon_L}}{(w_F)^{1/\epsilon_L} + (w_D)^{1/\epsilon_L}} N \tag{1}$$

Note that these equations mean that labor supply curves are upward sloping with the labor supply elasticity governed by ϵ_L. These equations can be micro-founded with discrete choice type models, as explained in Card et al. (2018).

Workers without work permits, which we also refer to as undocumented immigrants, can only supply labor to the informal sector. They also behave according to an upward sloping supply curve which we express with the following equation:

$$L_U = (w_U)^{1/\epsilon_U} U \tag{2}$$

where U represents the total supply of undocumented workers and L_U represents the workers actually employed. We assume that $\epsilon_L < \epsilon_U$ which captures the idea that workers with work permits have a more elastic labor supply curve.

High-skilled workers, denoted by L_H, labor supply function is governed by ϵ_H, following:

$$L_H = (w_H)^{1/\epsilon_H} H \tag{3}$$

3.2 Demand for labor

Demand for labor comes from firm maximization. A representative firm produces according to the following production function.

$$Y = [L_H^\rho + L_L^\rho]^{\frac{1}{\rho}}$$

where L_H indicates high skilled workers and L_L is a composite of low-skilled workers defined as:

$$L_L = [\alpha_F L_F^{\rho_L} + \alpha_I (L_D + L_U)^{\rho_L}]^{\frac{1}{\rho_L}}$$

where, as introduced in the previous section, L_F denotes formal workers, L_D denotes documented workers in the informal sector, and L_U denotes undocumented immigrant workers. α_F and α_I represent the productivity of formal and informal workers, respectively.

Profit maximization is given by the following program:

$$\max_{L_j, j \in \{H,F,D,U\}} pY - \sum_{j \in \{H,F,D,U\}} (1+\tau_j) w_j L_j$$

subject to the labor supply decisions expressed in equations (1) to (3), where τ_j denotes the payroll tax

paid when hiring factor type j. We assume $\tau_H = \tau_F = \tau$, $\tau_D < \tau$ and $\tau_U = 0$, i.e. formal workers pay the full amount of payroll taxes, documented workers in the informal sector pay only a fraction of that amount, and undocumented workers do not pay any payroll taxes. For this maximization we have assume monopsonistic competition, i.e., firms take as given price indexes such as $W = ((w_F)^{1/\epsilon_L} + (w_D)^{1/\epsilon_L})^{\epsilon_L}$. Under this assumption, this maximization problem results in the following optimality conditions:

$$p\frac{1}{(1+\epsilon_j)(1+\tau_j)}MPL_j = w_j$$

where $MPL_j = \frac{\partial Y}{\partial L_j}$ is the marginal product of labor and w_j denotes the wage of each factor of production, which are paid a mark-down over the marginal cost. We denote by w_j the wage received by the worker and by τ_j the (payroll) taxes paid by the firm, hence $(1+\tau_j)w_j$ is the total cost of one unit of factor j. Note that as ϵ_j goes to 0, labor supply is more elastic, and hence the markdown on marginal products is smaller. p is the price of the good, which we assume is freely traded, and hence we can normalize to one.

We have that the marginal product of labor is given by:

$$MPL_H = Y^{\frac{1}{\sigma}} L_H^{-\frac{1}{\sigma}}$$

$$MPL_F = \alpha_F Y^{\frac{1}{\sigma}} L_L^{-(\frac{1}{\sigma}-\frac{1}{\sigma_L})} (L_F)^{-\frac{1}{\sigma_L}}$$

$$MPL_D = \alpha_I Y^{\frac{1}{\sigma}} L_L^{-(\frac{1}{\sigma}-\frac{1}{\sigma_L})} (L_D + L_U)^{-\frac{1}{\sigma_L}}$$

$$MPL_U = \alpha_I Y^{\frac{1}{\sigma}} L_L^{-(\frac{1}{\sigma}-\frac{1}{\sigma_L})} (L_D + L_U)^{-\frac{1}{\sigma_L}}$$

where $1 < \sigma < \sigma_L$ are the elasticities of substitution between high- and low-skilled workers, and between formal and informal workers. In particular, we have that $\rho = \frac{\sigma-1}{\sigma}$ and $\rho_L = \frac{\sigma_L-1}{\sigma_L}$.

3.3 Equilibrium

The equilibrium in the labor market equates demands and supplies for each factor of production. This yields the following equilibrium relationships between the amount of employed workers of each type (which we denote by L_j) and the total supply of high-skilled workers H, low-skilled workers with work permits N, undocumented workers U, and payroll taxes τ_j, labor supply elasticities, and the elasticities of substitution between the different factors of production.

Formal low-skilled workers (L_F)

Combining labor demand and supply for this factor type we obtain:[23]

$$\ln L_F = \delta_F - \frac{\sigma_L}{\epsilon_L \sigma_L + 1}(\ln(1+\epsilon_L)(1+\tau)) + \frac{\epsilon_L \sigma_L}{\epsilon_L \sigma_L + 1} \ln N \tag{4}$$

where δ_F combines aggregate output, aggregate labor, and various parameters that for simplification we take as fixed. Similarly, we can obtain that wages are given by:

$$\ln w_F = \kappa_F - \frac{\epsilon_L \sigma_L}{\epsilon_L \sigma_L + 1}(\ln(1+\epsilon_L)(1+\tau)) - \frac{\epsilon_L}{\epsilon_L \sigma_L + 1} \ln N \tag{5}$$

These expressions show that an increase in the supply of low skilled workers with work permits (N) leads to higher employment and lower wages, while a cost increase (τ_j) or an increase in the labor supply elasticity (ϵ_L) leads to lower employment and wages. Note, in particular, that we can recognise two effects. On the one hand, $\frac{\epsilon_L \sigma_L}{\epsilon_L \sigma_L + 1}(\ln(1+\epsilon_L)(1+\tau))$ is a monopsonistic effect. It captures the idea that when labor supply schedules are more elastic, employers have less market power and, hence, wages are higher. On the other hand, the term $\frac{\epsilon_L}{\epsilon_L \sigma_L + 1} \ln N$ is a competition effect. More workers in a market put downward pressure on wages.

Informal documented low-skilled workers (L_D)

Doing similar steps we can obtain the equilibrium employment level of informal documented low-skilled workers:

$$\ln L_D = \delta_D - \frac{\sigma_L}{\epsilon_L \sigma_L + 1}(\ln(1+\epsilon_L)(1+\tau_D)) + \frac{\epsilon_L \sigma_L}{\epsilon_L \sigma_L + 1} \ln N - \frac{1}{1+\epsilon_L \sigma_L} \ln(1 + \frac{L_U}{L_D}) \tag{6}$$

where δ_D combines aggregate output, aggregate labor, and various parameters as before, and where $\tau_D < \tau$ are the taxes paid by informal workers, some of which, may be providing part of their labor through part-time work that is taxed. Alternatively, τ_D can also capture the risk of being caught by enforcement against informality.

Wages are given by:

$$\ln w_D = \kappa_D - \frac{\epsilon_L \sigma_L}{\epsilon_L \sigma_L + 1}(\ln(1+\epsilon_L)(1+\tau_D)) - \frac{\epsilon_L}{\epsilon_L \sigma_L + 1} \ln N - \frac{\epsilon_L}{1+\epsilon_L \sigma_L} \ln(1 + \frac{L_U}{L_D}) \tag{7}$$

Undocumented workers (L_U)

For the undocumented immigrants we can follow the same steps as above and hence, obtain:

[23] From $L_F = (\frac{MPL_F}{(1+\epsilon_L)(1+\tau)})^{1/\epsilon_L} \frac{N}{W}$ we obtain that $L_F^{1+\frac{1}{\sigma_L \epsilon_L}} = (\frac{\alpha_F Y^{\frac{1}{\sigma}} L^{(\frac{1}{\sigma} - \frac{1}{\sigma_L})}}{(1+\epsilon_L)(1+\tau)})^{1/\epsilon_L} \frac{N}{W}$, which allows us to obtain the expression 4.

$$\ln L_U = \delta_U - \frac{\sigma_L}{\epsilon_U \sigma_L + 1} \ln(1 + \epsilon_U) + \frac{\epsilon_U \sigma_L}{\epsilon_U \sigma_L + 1} \ln U - \frac{1}{1 + \epsilon_U \sigma_L} \ln(1 + \frac{L_D}{L_U}) \tag{8}$$

And wages:

$$\ln w_U = \kappa_U - \frac{\epsilon_U \sigma_L}{\epsilon_U \sigma_L + 1} \ln(1 + \epsilon_U) + \frac{\epsilon_U}{\epsilon_U \sigma_L + 1} \ln U - \frac{\epsilon_U}{1 + \epsilon_U \sigma_L} \ln(1 + \frac{L_D}{L_U}) \tag{9}$$

High skilled workers

Similar steps lead to the equilibrium employment and wages for high-skilled workers:

$$\ln L_H = \delta_H - \frac{\sigma}{\epsilon_H \sigma + 1} \ln(1 + \epsilon_H)(1 + \tau) + \frac{\epsilon_H \sigma}{\epsilon_H \sigma + 1} \ln H \tag{10}$$

And wages:

$$\ln w_H = \kappa_H - \frac{\epsilon_H \sigma}{\epsilon_H \sigma + 1} \ln(1 + \epsilon_H)(1 + \tau) + \frac{\epsilon_H}{\epsilon_H \sigma + 1} \ln H \tag{11}$$

3.4 Properties

Equations (4) to (11) characterize employment and wage levels for each factor of production as a function of parameters of the model and population levels. This framework allows us to study the effect of an amnesty program.

There are several governments that have introduced amnesty programs, i.e. that have given work or residency permits to workers that were illegally in a given country. However, these policy changes are usually combined with other policies. Very often, legalizations of immigrant workers come together with increased border enforcement, as happened, for example, with IRCA in 1986 (Hanson and Spilimbergo, 1999; Orrenius and Zavodny, 2003). In other episodes, governments have increased enforcement against informality at the same time that they have granted work permits, like in the Spanish case. Hence, to use this model to evaluate a particular policy change, it is important to first identify what the policy change meant.

In our case, we think that the policy change is well captured by exogenous changes in three parameters of our model. First, the policy decreased the number of workers who were undocumented (U) and increased those with legal work permits (N). Second, the policy increased enforcement against informality. This has two consequences. On the on hand, it increased the cost of hiring informal type workers, i.e. τ_D increased. On the other hand, it made formal and informal type jobs more similar from the view point of workers, which in the model is captured by a decline in ϵ_L. We can use this framework to derive the consequences of a policy change like the one implemented by the Zapatero government, which we summarize in the following proposition.

Proposition 1. *We define the policy change, which we denote by $\partial\theta$ as a policy that:*

1. *Transforms undocumented workers into documented workers, hence $\frac{\partial U}{\partial \theta} = -\frac{\partial N}{\partial \theta}$*
2. *Increases the cost of informal work, i.e. $\frac{\partial \tau_D}{\partial \theta} > 0$*
3. *Makes the jobs in the formal and informal sector more similar to workers, i.e. $\frac{\partial \epsilon_L}{\partial \theta} < 0$*

Under these assumptions we have that:

1. *In the informal sector, wages of undocumented immigrant workers are lower than wages of documented workers, as long as ϵ_U is sufficiently large.*
2. *Total tax collection increases with the amnesty program.*
3. *There is an ambiguous effect on wages of formal low-skilled workers. Two forces are in place. On the one hand, the policy change increases the overall supply of formal workers, which puts pressure on wages. On the other hand, the policy decreases market power of firms, which tends to increase wages.*
4. *Employment in the informal sector declines.*
5. *Employment in the low-skilled formal sector increases, but by less than the amount of low-skilled entrants into the formal sector.*
6. *Employment and wages increase for high-skilled workers.*

Proof. See Appendix A. □

Proposition 1 states various results. First, it says that undocumented workers face fewer job opportunities and hence, employers can exert higher market power over them. Second, it says that payroll taxes increase with the policy change. This is so mainly because undocumented workers enter the formal market, and hence increase payroll tax collection. Third, low-skilled workers in the formal sector may see their wages increase. This is explained by the fact that the policy change makes working in the formal and informal sectors more similar, which reduces the ability of formal sector firms to extract surplus from workers, as illustrated in Figure A.1 in the Appendix. Fourth, the reform increases enforcement against informality and grants work permits to undocumented workers, which leads to a decline in informal sector jobs. Fifth, our framework shows that the increase in formal sector jobs is smaller than the increase in the number of workers who gain work permits. This result comes from the fact that the reform does not necessarily "kill" the informal labor market. Hence some of the undocumented immigrant workers can chose to remain in the informal market (at least after the initial 6 months where the employee had to offer them a formal contract). Finally, the amnesty program makes the low-skilled labor aggregate (L_L) more expensive. Hence, employers try to substitute low- for high-skilled labor.

4 Empirical Evidence

4.1 The Absence of Magnet Effects

A preliminary step of our analysis is to understand whether the policy change affected the overall supply of immigrants in Spain, something that we have abstracted from in the theoretical framework. Formally, the policy gave work permits to immigrant workers in the informal sector and increased enforcement against informality. However, such a policy may also have side effects with respect to overall immigrant supply (Liu, 2019). We investigate this in this section by comparing immigrant stocks from countries affected by the amnesty program and EU-countries which were not affected by the policy.

Immigrants from the European Union were not part of the legalization process because in 2005 Spain was, and had been for many years, part of the Rome and Schengen treaties that allows European citizens to freely move and work within the EU without borders.[24] Hence, we can compare whether there is a change in the stock of immigrants from countries of origin affected by the policy relative to the stock of immigrants from the EU – excluding the countries that were admitted to the EU in May of 2004 but whose citizens were not allowed to move completely free to Spain until more than two years later.

To document the potential presence of magnet effects, we use data from the Municipal Registry, which as argued in Section 2, captures both documented and undocumented immigrants. We start our empirical investigation by showing in panel A of Figure 3 the stock of immigrants from the top four sending countries, three of which were affected by the policy, one which was not. The graph does not show any significant change in the stock of immigrants from the UK (non-affected by the policy), Ecuador (affected), Romania (affected), and Morocco (affected). This suggests that the policy did not lead to a substantial change in the (net) flow of immigrants from any of these countries.

Figure 3 goes around here

We test more formally whether stocks of immigrants systematically diverged towards countries of origin affected by the policy change right after the reform using the following equation:

$$y_{ot} = \delta_t + \delta_o + \delta_o * t + \beta \text{Affected countries}_{o,t} + \varepsilon_{o,t} \tag{12}$$

where y_{ot} are different measures of immigrant stocks or growth rates from origin o at year t. "Affected countries" is a dummy variable that takes value equal to 1 if the country is affected by the policy at time t.

[24] Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, and Slovakia joined the EU in May 2004. However, EU members could delay until 2011 the free mobility of workers with these countries (except Cyprus). Spain applied mobility restrictions until May of 2006 to dependent workers (self-employed workers could freely enter into Spain already in May of 2004). Despite these restrictions on mobility, workers from new accession EU countries were not eligible to the amnesty program. Hence, we consider immigrants from these countries as EU members when evaluating the effect of the amnesty program on magnet effects. We show a robustness exercise that excludes those countries form our analysis in Appendix C.1.

δ_o and δ_t are country of origin and year fixed effects respectively. $\delta_o * t$ denotes country-specific linear time trends.

In a first set of specifications we investigate whether the amnesty program affected the composition of immigrants from the different countries of origin. To investigate this, we use as dependent variable $y_{ot} = \frac{\text{Immigrants}_{ot}}{\text{Immigrants}_{t}}$, which measures the fraction of the overall stock immigrants that is from country o in each time period. If $\beta \neq 0$ then it would be evidence that the policy changed the composition of immigrant labor in Spain. Under the assumption that immigrants not affected by the amnesty continued to immigrate into Spain in the same way as they did before the reform, then a change in immigrant composition would indicate that the reform affected migration decisions in countries affected by the policy change. If instead $\beta = 0$, then this is evidence that the policy did not lead to a change in the immigrant composition, which we interpret as an absence of magnet effects.

An alternative specification is to check whether immigrant growth rates diverged around the policy change for non-EU migrants relative to EU migrants. We investigate this using as dependent variable $y_{ot} = \frac{\Delta\text{Immigrants}_{ot}}{\text{Immigrants}_{ot-1}}$. In this case, if $\beta \neq 0$ then it would be evidence that the policy changed the growth rate of the arrival of immigrants from treated versus non-treated countries of origin. Instead, $\beta = 0$ would suggest that the arrival growth rate of immigrants did not change differentially between non-EU and EU countries of origin.

Table 2 goes around here

Table 2 reports the estimates of β, defined in equation 12. We show two different specifications. Panel A inlcudes only country and year fixed effects, and Panel B extends the specification by allowing country-specific linear time trends. Column 1 shows that there is no systematic change in the stock of immigrants from countries affected by the policy change around the time of the change. In this first column, the sample years include 2002 to 2009. In columns 2 to 4 we change the years selected, by zooming into the year 2005 when the policy change was implemented. As we zoom in, it is clear that there is no differential change in the stock of immigrants from affected and non-affected countries. Estimates in Panel B are similar to those in Panel A, although some times marginally statistically significant. Its magnitude, however, is small and the sign is always negative.

We illustrate these results visually in Panel B of Figure 3, where we plot the estimates of the interaction between a time-invariant dummy that identifies "Affected countries" both before and after the policy and year dummies. Hence, it shows the year by year estimate of the difference-in-difference regression shown in equation 12. We observe that in the years prior to the policy the share of immigrants was increasing more or less at the same rate for immigrants from the treated countries of origin relative to non-treated. Hence, point estimates of the treatment dummy with year dummies lie around 0. If there had been strong magnet effects we would see a strong increase in the estimates that coincides with the timing of policy change, i.e.

around 2005. As can be seen in the graph, the relative share of immigrants from treated countries of origin was similar after the policy change. If anything there was a small decline which cannot be statistically distinguished from 0.

Panel C in Table 2 shows the results of our alternative specification. It investigates whether the growth rate of the stock of immigrants changed differentially across countries as a result of the policy change. We investigate this point by using as dependent variable in equation 12 the flow of immigrants between any two periods divided by the stock in the first period. Results suggest that immigrant flows did not change substantially around the policy change. If anything they seem to have declined, but only after 2008, and, hence, far from the policy change and outside of the period we analyze later on.

Overall, Figure 3 and Table 2 show that the composition of immigrant in Spain did not tilt towards immigrants from non-EU countries of origin, nor did the growth rate of immigrant stocks change substantially between treated and non-treated countries of origin around the implementation of the amnesty program.

4.2 Newly Legalized Immigrants' Labor Market Experience

One of the first insights from the model is that the amnesty program might have changed the labor supply choice set of undocumented immigrant workers. Prior to the policy, only jobs in the informal sector were available to these workers. With the policy change, these workers gained access to a wider array of potential jobs.

We provide empirical support to this idea in two different ways. First, the model suggests that if undocumented immigrant workers have less options, then employers of these workers have higher market power over them, which necessarily translates into lower wages.

While wages in the informal sector are not captured in the MCVL, since the sample only covers workers affiliated in the social security, we use the ENI, which we describe in more detail in Section 2.1, to compare the wages of workers in the same occupations some with the legal right to work in Spain, some without it.

Table 3 goes around here

Table 3 shows that immigrants without work permits, i.e. undocumented immigrants, earn systematically less than documented ones. The ratio of wages between undocumented and documented immigrants is around 80%, irrespective of whether we consider all immigrants in the sample or various subgroups. This figure indicates that even when comparing the earnings in similar type of jobs, like housekeeping services displayed in panel B, immigrant workers without work permits, who are more likely to face constraints in their labor market supply decisions, end up having lower wages. We interpret these results as suggesting that employers can exert higher market power over undocumented rather than over documented immigrants (in our model $\epsilon_L < \epsilon_U$). While other explanations could also rationalize these results, like productivity differences, the stability of the results, and in particular, the results in sectors of activity where there is

perhaps a low range of potential productivity differences, makes us think that labor market power plays a significant role, as assumed in our theoretical framework.

Another way to study whether the amnesty program reduced the power of employers on undocumented workers is to follow their working histories after the previously undocumented workers enter the social security system. Once these workers enter the social security system, they are captured by the MCVL data. Moreover, we can leverage one of the particularities of the policy change, namely the fact that immigrants required an employer to offer them a work contract for 6 months. This requirement likely pushed immigrant workers to stay in the same job than the one they had while being undocumented for around 6 months, to then more freely choose their employer.

To study this, in this section we focus our attention on the immigrant workers who entered for first time in the social security system between February and August of 2005 using the labor market contribution type designed for housekeeping services and stayed in the social security until 2009. We focus on these immigrants because they use a particular labor contribution type that we can track in our labor market data (MCVL) and the prevalence of informal work in this sector was, prior to the policy change, extremely high. The legalization process was an opportunity for many of these workers to gain work permits and potentially a path towards other types of occupations. To gain work permits through this labor market type, workers in housekeeping needed to work at least 30 hours per week. Hence, we can consider the workers that entered the social security after the legalization in this way as full-time workers, with little room for side informal payments (at least when working under legal labor contracts).[25]

Figure 4 goes around here

Figure 4 shows six graphs that illustrate the effect of the reform on labor market choices of housekeeping service workers. The graph on the top-left part of the figure, label as Panel A, shows the total number of affiliates in the social security system that use the contribution type associated to housekeeping services. This number fluctuates around 60,000 prior to the amnesty program. Coinciding with the policy change this number jumps immediately to almost 160,000. After six months, the number of affiliates decreases to a plateau of around 100,000 workers.

Among the newly legalized workers who remained in the social security until 2009 (and hence for which we can reconstruct their working history), we can track their sector of activity in each month. The top-right graph of Figure 4, labeled as Panel B, shows the fraction of these newly legalized workers that remained in the housekeeping sector. It is striking that the fraction who remained in the housekeeping services stayed very close to 1 for the entire 2005. These workers necessarily had a 6 month work contract with the families through which they had entered into the formal market. However, around the beginning of 2006, many of

[25]These 30 hours per week did not need to be in the same household. Workers could be working in several places to reach these 30 hours.

these workers started to move to other sectors of the economy with, as we will argue, good labor market opportunities.

The evidence in Panel B of Figure 4 is in sharp contrast to the working history of immigrants who entered the social security system in 2004 as housekeeping services. These immigrants could not use the amnesty program to enter the social security system. In contrast to what was required by the reform of 2005, immigrant workers in the housekeeping sector did not have incentives to remain with their employer for 6 months. As can be seen in Panel C of Figure 4, immigrants entering the system in 2004 switched much more smoothly from housekeeping services to other sectors than immigrants who entered through the amnesty of 2005, and, overall, a smaller fraction of them had left the sector in the following 3 years (50 percent of stayers for those entering in 2004 versus less than 40 percent of stayers for those entering in 2005).

It is interesting to investigate the destination sectors of immigrants entering the social security system through housekeeping services thanks to the amnesty program, and the characteristics of these new jobs available to them. Panel D of the figure shows this evidence. Most of these immigrants entered the Hotels and Restaurants (H&R), and other services, although many also entered other sectors. Panel E shows the average size of the firms where these workers were working. When employed in the housekeeping services, the employer is typically a family that usually hires one person to either clean the house or take care of either the young or the elderly. As they move to other sectors, the average size of the employer increases substantially. Panel F shows that the wage of movers was around 30 percent higher than the average wage of those legalized immigrants who stayed in the sector. Therefore, these graphs suggest that the housekeeping workers that left the sector moved into larger firms and higher paying jobs. The same figures for two other sectors with high presence of undocumented migrants, albeit with lower informality, like Construction and Hotels and Restaurants, are shown in Appendix C.5. Broadly, the graphs show similar patterns.

Overall, we view this as evidence that the policy change allowed immigrant workers to enter the formal market economy and explore jobs beyond the ones they had prior to the legalization, something that likely contributed to their assimilation to the host country, as argued using data for the United States and variation from the Immigration, Reform, and Control Act in Bratsberg et al. (2002). We interpret these findings as suggesting that market power against undocumented workers was reduced as a consequence of the policy, in line with evidence from developing countries (Naidu et al., 2016).

4.3 Public Finances

One of the most immediate consequences of the reform was that employers of formerly undocumented immigrants started to pay payroll taxes. Thus, once we have showed that the policy did not affect the total supply of immigrants in Spain and after showing how migrants used the policy to enter into the formal economy, it is worth studying the effect that the reform had on tax revenues. We do so by comparing provinces with high and low levels of immigration. As argued in Section 2.3, the amnesty program affected all Spanish regions but with different degrees of intensity based on the local importance of immigration.

As before, we first plot the level and proportional changes in total payroll-tax revenues. Figure 5 shows that total payroll taxes in Spain generated around 70 billion euros in 2004. Provinces with high levels of immigration tend to be larger. Thus, the split between below- and above-median levels of immigration results in high-immigration provinces generating around 50 billion euros in 2004. The trend in total payroll-tax revenues was positive in the early 2000s. This was mostly a consequence of the high participation rates and low unemployment rates typical of a booming economy. In the graph on the left of Figure 5, we see that there is a small break in the trend in 2005 that coincides with the policy change. The break in the trend is in fact more pronounced in high- than in low-immigration provinces.

Figure 5 goes around here

The graph on the right in Figure 5 normalizes the level of tax revenues in the province to the year 2004 (note that this normalization plays essentially the same role as a province fixed effect). It is clear from the graph that, from 2005 on, the increase in total payroll-tax revenues is larger in high-immigration provinces. To help us clarify the magnitude of the change, it is useful to remove location-specific linear trends leading to the policy change. When we do so, we obtain Figure 6.

Figure 6 goes around here

Figure 6 allows us to understand the effect on total payroll-tax collection of legalizing immigrants. We observe that, relative to trend, the reform increased by almost 2 percent total revenue in high-immigrant provinces and by almost 1 percent in low-immigrant locations from 2004 to 2005. The increase continued in the following years in part a result of the newly legalized immigrant workers moving towards better paid sectors that were not available to them.

To see whether these are large or small changes in total payroll tax revenue, it is worth comparing them to the change in the share of workers who registered in the social security system as a result of the reform. Figure 1 shows that the policy change increased the number of immigrants as a share of total population registered in the social security system by more than 3 percentage points. Since, as we just showed, the increase in tax collected by the social security was about 1.5 percentage points on average, every immigrant that obtained a work permit contributed around half as much as the existing population. This is not surprising, since immigrants in Spain tend to be less skilled than natives, and within the same skill levels immigrants tend to earn less. Moreover, the reform may have impacted the labor market directly, affecting tax collected from different groups of workers. We investigate this further in Section 4.4.

To gain further confidence that, indeed, these changes in total payroll-tax revenues are a consequence of the policy reform, it is worth zooming in on particular items of total payroll-tax collection. As mentioned before, Spain has different regimes for different types of workers. Most workers are in the general regime,

but there are also a number of special regimes. One that is used particularly by the immigrant population, as discussed in Section 4.2, is the housekeeping regime, which corresponds to housekeeping services.[26] We can use revenues from this contribution type to show that the change is, in this case, more pronounced than in contribution types used less often by immigrants.

Figure 7 goes around here

Figure 7 shows that payroll-tax revenues from housekeeping services increased by 50 percent in 2005 and by almost 100 percent in 2006 in high-immigrant provinces, while the increases were around 40 and 50 percent, respectively, in low-immigrant locations. This is a remarkable increase, which is in line with the heavy presence of immigrants in this social security category. It is also remarkable that in 2007 payroll tax revenues from housekeeping services declined in high-immigrant locations. This is a result of the movement of immigrant workers to other parts of the economy.

We use the insights from Figures 5 and 6 to quantify immigrants' contributions to total payroll-tax revenue. In particular, we estimate the euro increase per regularized immigrant that followed the reform by directly translating the figures into regressions, using the following equation:

$$\Delta \widehat{Y}_c = \alpha + \beta \Delta \frac{\widehat{\text{Imm Soc Sec}}_c}{\text{Pop}_c} + \gamma X_c + \varepsilon_c \tag{13}$$

where the hat indicates that we have removed province specific linear trends *prior* to the policy, province and year fixed effects, and where Δ indicates that we have taken the difference between the pre- and the post- policy change period. X_c indicates control variables which include political alignment, coastal dummies, fraction of immigrants from non EU-15 countries in 2004 and the pre-reform share of workers in the construction sector. c indicates Spanish provinces. Hence, our identification relies on deviations from these province specific trends coinciding with the policy change as made explicit in Figure 6. In the main regressions we consider 2002 to 2004 as the pre-period and 2005 to 2007 as the post-period. We explicitly stop our analysis in 2007 to avoid the differential effect that the Great Recession could have had across Spanish provinces.

The results of our main specification are shown in Table 4. We discuss why this is our preferred specification in Appendix B and we provide a number of robustness checks in Table C.1 of Appendix C, which are similar to the results reported in this section.[27] In total, as shown in column (9) each newly regularized immigrant increased payroll-tax revenues by almost 4,000 euros. Columns (1) to (8) show the disaggregate estimates for each of the labor market contribution types (note that the sum of the coefficients shown in

[26] According to the statistics of the Ministry of Labor and Social Security, the share of workers affiliated with the "*régimen del hogar*," or housekeeping regime, in 2004 was 0.7 for natives and 7.1 percent for immigrants.

[27] More concretely we show that our results are almost unchanged when we 1) use an alternative sample of provinces (excluding the four biggest provinces in Spain), 2) exclude controls and, 3) use 2SLS relying on the past shares of migrants candidates to gain the legalization, at province level, to predict the actual share of immigrants affiliated to the social security.

these columns adds to the one in column (9)). The increase in pay-roll tax collection comes from the increase in payroll-tax revenues from the general regime (99% of the overall increase in total pay-roll tax collection), housekeeping regime (5%), and agrarian regime (5%), with some decline in the contributions for unemployment benefit (12%), although not statistically significant. The general, agrarian, and housekeeping regimes are the most commonly used by immigrant workers. The results in this table suggest that the policy was effective in one of its main goals; i.e., it helped to raise tax revenues.

Table 4 goes around here

4.4 Labor Market Outcomes

In this section we investigate the effect of the policy on labor market outcomes of natives and immigrants of various skill levels. We split the section into several outcomes: employment, wages, and internal migration.

4.4.1 Employment

We begin our exploration of the consequences that the legalization of almost 600,000 immigrants had on the labor market by documenting changes in employment rates. Employment rates are defined as the share of the working-age population that is actually working. We also differentiate between natives and immigrants and between different skill levels, as the reform might have affected each group differently.[28] In this section we use data from two different source: the MCVL and the SLFS. The MCVL captures formal employment while the SLFS captures the combination of formal and informal labor market jobs. Sample sizes are considerably larger for the MCVL.

One of the predictions of our model is that formal employment increases but by less than the number of workers who obtain work permits. The requirement that new legalized immigrants had to be offered a formal contract for the 6 months following the legalization allows us to compute with precision the number of newly legalized workers. We can contrast that number, which we obtain directly from Ministry of Labor, to formal employed workers captured in the MCVL data in the years following the reform. If each immigrant that gains work permits translates into less than one additional job, then the evidence would be in line with the model.

Panel A of Table 5, shows the effect that the reform had on formal employment, using the same empirical strategy as in the previous section 4.3. The first column of the table shows that the reform lead to an increase in formal employment. This is one of the intended goals of the reform, since it moved informal immigrant workers to formality by granting them work permits. The estimate that we obtain suggests that

[28] Remember that, we define high-skilled workers as workers having at least a university diploma, while we define low-skilled workers as having less than a university diploma.

for each immigrant that entered the formal sector during the reform lead to an increase of only .5 jobs over the course of the subsequent two years and a half, which is substantially and statistically lower than 1.

Table 5 goes around here

The second column of Table 5, Panel A, shows that on average, the reform did not change the total number of native workers employed, instead all the increased formal employment comes from immigrants, as shown in column 3. Column 4, shows that formal employment of native low-skilled workers did not increase or decline. Our model has ambiguous predictions on this estimate. On the one hand, having more immigrants with the legal right to work in formal sector jobs puts pressure on native low-skilled employment. If this was the only force we should observe a negative estimate in this column. There is, however, a second force. We argue in the model that enforcement against informality makes formal and informal sector jobs more similar to documented low-skilled workers. This reduces firms' market power which leads to increased formal employment (and wages, as we will see below). These two forces seem to cancel out which can explain an estimate in column 4 that is statistically indistinguishable from 0.

Column 5 of Panel A in Table 4 shows a small decline in native high-skilled employment. As shown in Panel B of that same table, this decline comes entirely from high-skilled women. We interpret this finding through the effect that the reform had on the cost of housekeeping services. The increased cost of home production might have shifted the labor supply of some high-skilled women away from the formal labor market and into home production. This evidence is in line with what is reported in a seminal paper by Cortes and Tessada (2011).

Columns 6 and 7 of Panel A in Table 4 show that the great majority of immigrant formal employment gain was concentrated among low-skilled immigrants. This is not surprising, given that immigration in Spain is strongly low-skilled biased, see also Table 1.

These results suggest that we should fine a decline in overall employment. This is so because all the immigrants that were legalized were already living in Spain for at least 6 months prior to the reform and needed a formal work contract for 6 additional months after the reform, and yet 10 newly legalized workers lead to only 5 new formal jobs. We investigate whether indeed there is a decline in total employment by turning to data from the SLFS, which in principle captures both formal and informal jobs. It is worth noting too that the model suggest that the overall decline in employment should be concentrated among low-skilled workers since both the legalization and the enforcement policies against informality made low-skilled labor relatively more expensive.

In Panel C of Table 5 we quantify the effects of the policy change on total employment. As anticipated we see that employment rates dropped as a consequence of the immigration reform. For each newly regularized immigrant, a bit under 0.5 workers lost their jobs (which are necessarily informal sector jobs since formal

sector employment increased). This estimate represents the average effect over the two and a half years following the reform.[29]

When we look at the split by skill groups and place of birth, we see that the overall loss of employment must have concentrated among low skilled workers in the informal sector. This evidence is consistent with two ideas. First, that the policy change increased enforcement against informality, and hence, some native low-skilled workers working informally lost their informal jobs. Second, it is also consistent with the idea that the policy made low-skilled informal type jobs more expensive, and hence employers substituted away from these type of jobs.

4.4.2 Wages

As we showed with the model, the effects on wages should mimic, in many respects, those of the employment rates. For instance, the model predicts ambiguous effects for labor types that experience increased competition with newly legalized immigrant workers, like formal low-skilled workers. Instead, the model predicts positive wage effects for labor types that complement low-skilled workers and for workers who experience a reduction in employee labor market power. The size of the various (sometimes opposing) forces operating in the model, may generate, however, differences in the estimates of the policy on wages and employment.

In contrast to the evidence on employment, we can only use the MCVL to study the effect of the reform on wages. These means that all our results on wages describe what happens to formal sector workers, of various skills. To study the effect of the policy change on wages we use the same empirical strategy. Our measure of wages is "composition adjusted wages".[30] More concretely, we use a Mincerian regression allowing for specific returns across skills (low- and high-skilled) and allowing for linear specific trends at the province level. That is, we run the following regression: $\log w_i = \beta_0 + \beta_1 \ X_i + \xi_i$, where $\log w_i$ is the *log* of the real daily wage of individual i and the vector X_i reflects individual characteristics, including skills, tenure, tenure squared, experience, experience squared, type of contract, and sector of activity for each skill level. In addition, we also include province and year fixed effects and province-specific linear trends. The assumptions that we make with this procedure are that the return to personal characteristics is equal across provinces and time, but we allow that different periods and different provinces may have different wage levels and wages may be evolving differently across provinces. In the baseline results we use wages of working-age males, since there is usually less unexplained variance for this group of workers. In Appendix C.2 we show that results do not depend on including or excluding women.

We present the estimates in Table 6, and we provide a number of robustness checks in Appendix C.[31]

[29] In Appendix C.3 we show that employment losses of low-skilled natives are stronger in sectors with high concentrations of immigrants workers. This is consistent with the idea that the policy created some competition between natives and immigrants, even within sectors.

[30] We consider the tax base of social security contributions divided by days worked each month as a proxy of daily wages. This is considered a "proxy" of wages since this tax base is bounded between a minimum and maximum amount that, in 2005, stood at 598.2 and 2,813.4 euros per month. However, for a large majority of workers these limits are not binding.

[31] In Table C.5 we present estimates of this relationship: 1) without controls; 2) including women in the sample; 3) for an alternative sample of provinces (excluding four main provinces); 4) reduced form that relies on the past shares of migrants candidates to gain the legalization, at province level, to predict the actual share of immigrants affiliated to the social security

Table 6 shows that native workers' wages increased following the policy change. Given that we have controlled for observable characteristics, the estimated changes in wages can only come from changes in the price of labor or changes in unobservable characteristics of those who are working.

Wages for high-skilled natives in high-immigration locations increased by 0.31 log points (although not statistically significant at conventional levels) for a one percentage-point increase in the share of immigrants registered in the social security system, while wages for low-skilled natives increased by 0.25 log points. The results are more mixed for immigrants. The policy seems to have increased the wages of high-skilled immigrants substantially (although standard errors are large, reflecting the small number of high-skilled immigrants in our sample), while the wages of low-skilled immigrants decreased in the formal sector, although not statistically significant at conventional levels.

Table 6 goes around here

The increase in wages of high-skilled natives and immigrants reflects, according to our model, the increased demand for high-skilled labor once low-skilled labor becomes more expensive. Instead the increase in wages of native low-skilled workers is in line with the fact that the policy change made formal and informal type jobs more substitutable, decreasing firms' market power over low-skilled workers with work permits. This force seems to dominate the pressure on formal low-skilled workers' wages coming from the increase in the number of low-skilled workers with work permits.

4.4.3 Internal migration

The final variable that we study is internal migration. As emphasized above, the amnesty program gave more opportunities to previously undocumented immigrants to work in a wider set of potential jobs. This might have translated in a movement to new jobs in the same province, but also, in a movement to jobs in new locations. We investigate this in this section using the same empirical strategy as in the previous ones.

For this exercise, we use data from SLFS (see section 2.1). We base our main estimates on SLFS data instead of administrative data (Municipal Register) because we can distinguish skill levels in SLFS data. In Appendix C.4, we show that we obtain the same results using administrative data from the Municipal Register.[32]

Table 7 goes around here

Table 7 shows that for every newly legalized immigrant, around 0.38 immigrants left high-immigration provinces. This is due to the outflow of low-skilled immigrants towards low-immigration locations, since, as

and, 5) the 2SLS estimate using the past immigrant shares as instrument.

[32] Using the Municipal Register has the advantage that there are no concerns about the coverage of undocumented immigrants. Both local administrations and undocumented immigrants have strong incentives to have everyone registered. Using the SLFS data has the advantage that we can split the population by education groups.

we showed in section 4.1 total migrant flows to Spain seemed to be unaffected by the policy. For every newly legalized immigrant, around 0.49 low-skilled immigrants left high-immigration locations, while 0.11 high-skilled immigrants moved in. These estimates are relative to native population and thus implicitly assume that native population did not respond by moving across provinces. The last column shows that when instead of immigrants we use overall low-skilled population we obtain similar point estimates, suggesting that mostly immigrant workers account for internal migration responses. These results reflect that after the reform immigrant workers who gained work permits and were free to move internally, took the opportunity to perhaps better profiting from employment opportunities outside traditional migrant network local markets.

5 Conclusion

This paper studies the consequences of a large amnesty program in Spain. To do so, we combine detailed geographic data on tax revenues and labor market outcomes, and we show that the legalization of around 600,000 immigrants directly increased tax revenues because employers of these workers started to pay taxes, but it also had consequences for the labor market. We also examine the working histories of newly legalized immigrants who enter the formal labor market.

The results suggest that the amnesty program increased labor market opportunities of immigrant workers. Around half of the previously undocumented workers stayed in the formal sector, and many moved to better and higher paying jobs. The entry of immigrants in the formal sector lead also to an increase in payroll tax collection. The amnesty program was accompanied by increased enforcement against informality something that contributed to the destruction of informal jobs also among native low-skilled workers. High-skilled workers benefited, in general, from the reform, since the reform increased the relative cost of hiring low-skilled labor. There are, however, some native high-skilled women in the labor market who seem to leave employment, perhaps a result of the increase in the cost of housekeeping services.

We interpret these results through a model where market power in the labor market plays a crucial role. Immigrant workers without work permits experience a reduced set of potential jobs which allows employers to exert market power. Similarly, formal and informal type jobs segment (to some extent) the labor market for low skilled workers. This segmentation, partially broken by higher enforcement against informality, also contributes to the capacity of employers to exert their market power. An amnesty program that gives work permits to immigrant workers and that reduces the difference between formal and informal type jobs contributes to reducing the capacity of employers to exercise their market power.

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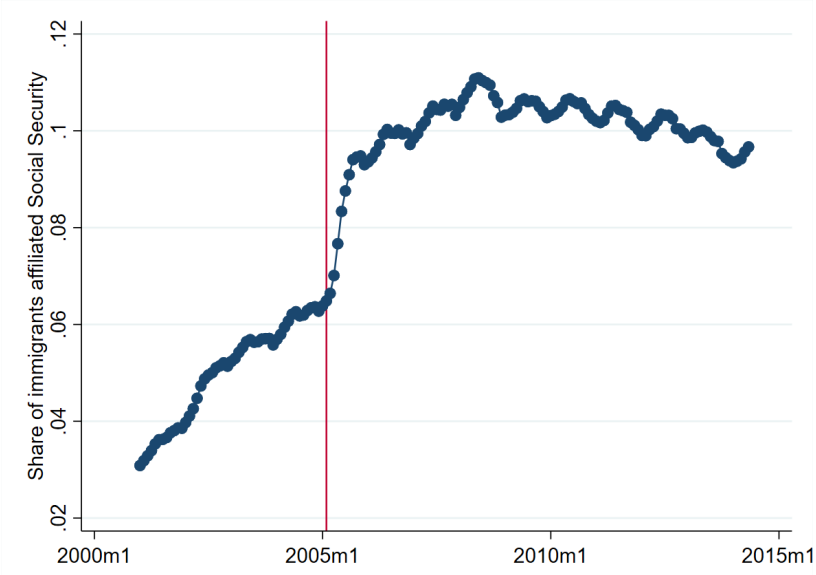
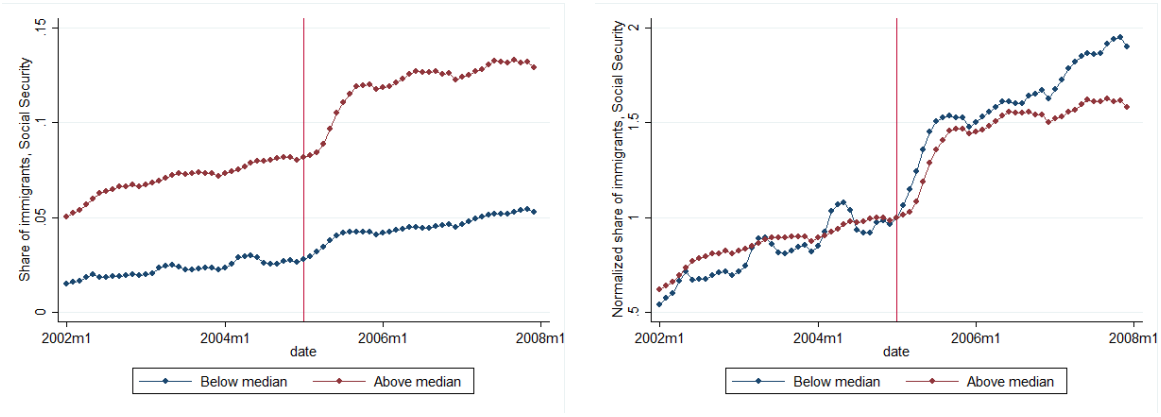
6 Figures

Figure 1: **Social Security Registration and Immigration Reform**



NOTE: This figure shows the (monthly) share of immigrants registered in the social security system. Source: Ministry of Labor and Social Security.

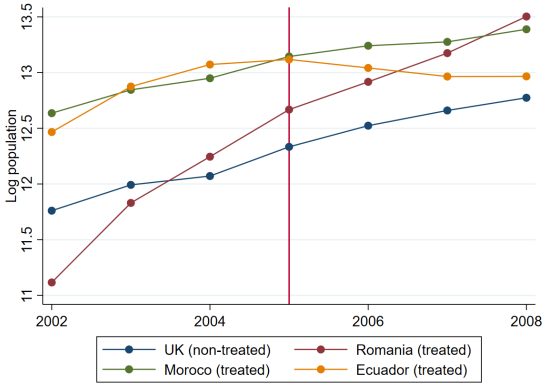
Figure 2: **Social Security Registration and Immigration Reform**



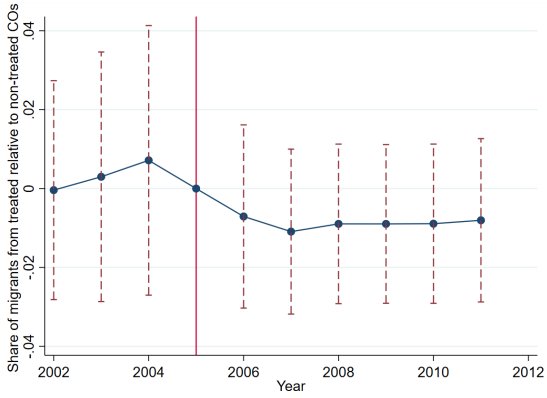
NOTE: The figure on the left shows the (monthly) share of immigrants registered in the social security system in Spanish provinces above and below the median level of immigration (in 2002). The vertical red line indicates the last period before the reform (2005m1). The figure on the right normalizes the figure on the left, using the last observation before the policy intervention. Source: Ministry of Labor and Social Security.

Figure 3: **The Absence of Magnet effects**

Panel A: **Largest sending countries**

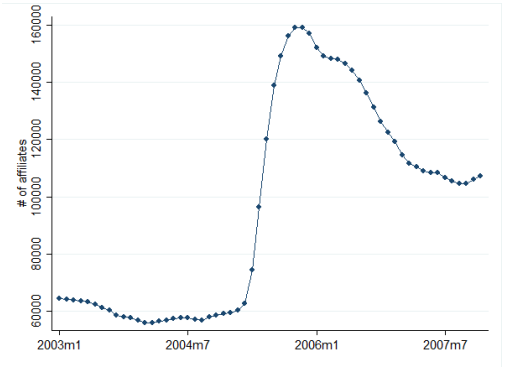


Panel B: **Share of immigrants from treated relative to non-treated countries of origin**

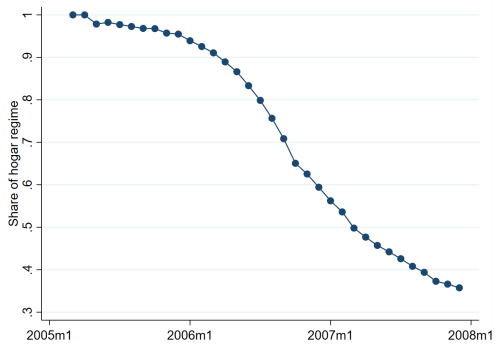


NOTE: Panel A of this figures shows the evolution of the (log) stock of immigrants from the four top sending countries, three of which were affected by the policy change (labeled as "treated"), one of which was not (labeled as "non-treated"). Panel B of this figure show an estimate of the share of immigrants (over all immigrants) from countries of origin affected by the amnesty program relative to countries not affected. The vertical red line indicates the last period before the reform (2005). Data com from the Municipal Register which covers both documented and undocumented immigrants. The Municipal Register reports the number of individuals residing in municipalities on January 1st each year.

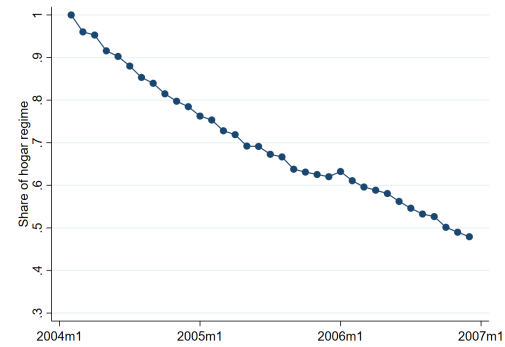
Figure 4: **Newly Legalized Immigrants and Sector Switching**



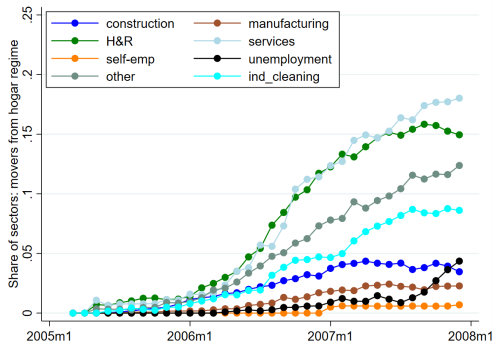
A. Affiliates in Housekeeping services



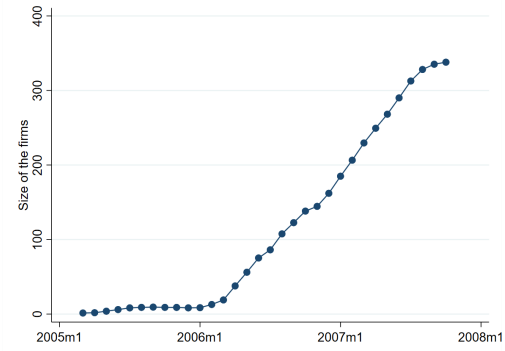
B. Share staying in housekeeping services in 2005



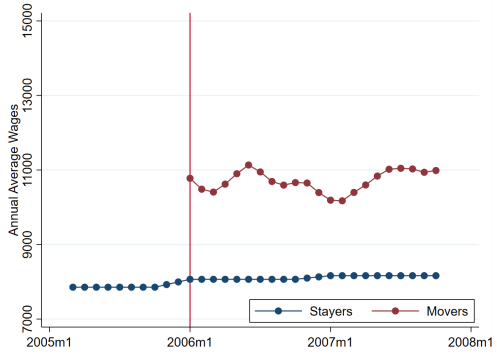
C. Share staying in housekeeping services in 2004



D. Sectors of destination



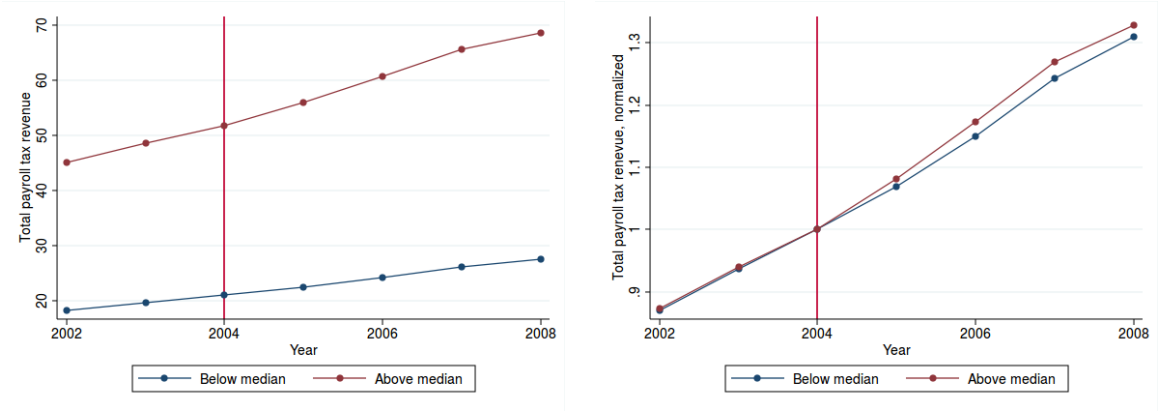
E. Firm size at sectors of destination



F. Wages of stayers and movers

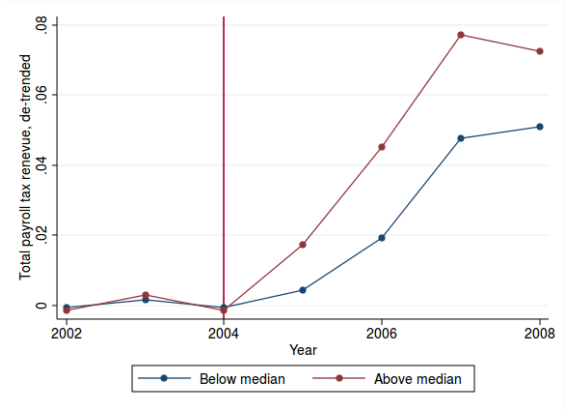
NOTE: Panel A shows the total number of affiliates in the housekeeping labor contract (*Regimen del Hogar*). Panel B shows the fraction of immigrants who remained in housekeeping services among the immigrants who entered the social security system with the legalization in the housekeeping sector and continued in the sector throughout the period. Panel C shows the fraction of immigrants who remained in housekeeping services among the immigrants who entered the social security system one year before the legalization in the housekeeping sector and continued in the sector until 2007. Panel D shows the sectors where immigrants, who entered the social security system with the legalization using housekeeping services contribution types and continued in the social security throughout the period, move to. Panel E shows the average size of the firm where immigrants, who entered the social security system with the legalization using housekeeping services contribution types and continued to work throughout the period, were working. Panel F shows the difference between annual average wages of legalized immigrants who move away from the housekeeping to others sectors of activity and the annual average wages of workers legalized through the housekeeping sector who remain in the sector. The red vertical line indicates the beginning of 2006 where we observe that most movements took place.

Figure 5: **Payroll Taxes and Immigration Reform**



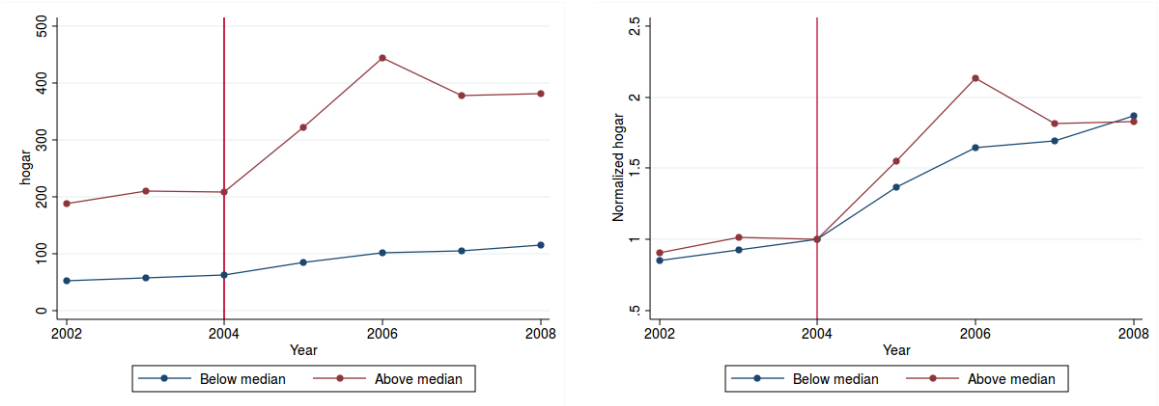
NOTE: The figure on the left shows the payroll-tax revenue in Spanish provinces above and below the median level of immigration (in 2002). The vertical red line indicates the last period before the reform (2004). The figure on the right normalizes the figure on the left, using the last observation before the policy intervention. Source: Ministry of Labor and Social Security.

Figure 6: **Payroll Taxes and Immigration Reform, De-trended**



NOTE: This figure shows the de-trended series of total payroll-tax revenues. The vertical red line indicates the last period before the reform (2004). Source: Own elaboration based on Ministry of Labor and Social Security data.

Figure 7: **Payroll Taxes and Immigration Reform, Housekeeping Services**



NOTE: The figure on the left shows the payroll-tax revenue from the housekeeping regime, in Spanish provinces above and below the median level of immigration (in 2002). The vertical red line indicates the last period before the reform (2004). The figure on the right normalizes the figure on the left, using the last observation before the policy intervention. Source: Ministry of Labor and Social Security.

7 Tables

Table 1: **Immigrant Shares across Selected Spanish Provinces**

Province name	Immigrant share	Share Low-skilled among immigrants	Population in 1000s	Legalization rate	Coast	Rank
Alicante	0.135	0.854	1,595.2	0.803	1	1
Illes Balears	0.121	0.890	932.2	0.910	1	2
Girona	0.101	0.940	608.9	0.905	1	3
Madrid	0.092	0.751	5,623.0	0.787	0	4
Tenerife	0.090	0.759	904.0	0.859	1	5
Málaga	0.086	0.824	1,352.5	0.884	1	6
Almería	0.086	0.809	555.9	0.840	1	7
Las Palmas	0.082	0.878	965.3	0.805	1	8
Murcia	0.079	0.900	1,248.1	0.880	1	9
Castellón	0.073	0.939	509.7	0.948	1	10
Barcelona	0.068	0.698	4,979.4	0.843	1	11
Tarragona	0.067	0.884	642.7	0.849	1	12
Ávila	0.018	0.830	165.3	0.866	0	39
Salamanca	0.017	0.804	347.7	0.933	0	40
Asturias	0.016	0.748	1,074.7	0.908	1	41
Cádiz	0.015	0.745	1,148.3	0.783	1	42
Coruña	0.014	0.829	1,116.4	0.785	1	43
Lugo	0.013	0.839	361.1	0.943	1	44
Sevilla	0.012	0.734	1,770.8	0.820	0	45
Palencia	0.011	0.921	175.6	0.908	0	46
Badajoz	0.010	0.745	663.0	0.887	0	47
Jaén	0.009	0.671	649.5	0.813	0	48
Zamora	0.009	1.000	200.2	0.954	0	49
Córdoba	0.009	0.797	773.5	0.749	0	50
National average	0.042	0.831	42,133.0	0.836	–	

NOTE: This table shows the top and bottom dozen provinces out of the 50 total Spanish provinces by immigrant share in mid-2002. Population is measured in thousands. Immigrants are defined as foreign-born individuals. Legalization rate measures, at the province level, the ratio between workers legalized and applicants to the program. Source: Authors' elaboration based on Municipal Register and*Anuario Estadístico de la Inmigración* (Ministry of Labor and Social Security).

Table 2: **The effect of the policy on migrant composition and growth rates**

Panel A: **Composition, country of origin fixed effects**

	(1)	(2)	(3)	(4)
	$\frac{\text{Immigrants}_{ot}}{\text{Immigrants}_{t}}$	$\frac{\text{Immigrants}_{ot}}{\text{Immigrants}_{t}}$	$\frac{\text{Immigrants}_{ot}}{\text{Immigrants}_{t}}$	$\frac{\text{Immigrants}_{ot}}{\text{Immigrants}_{t}}$
VARIABLES	OLS	OLS	OLS	OLS
Affected countries	-0.008	-0.007	-0.006	-0.006
	(0.012)	(0.011)	(0.009)	(0.007)
Observations	896	784	672	448
R-squared	0.919	0.928	0.952	0.975
Year FE	yes	yes	yes	yes
Country FE	yes	yes	yes	yes
Country trends	no	no	no	no
Sample	2002-2009	2002-2008	2002-2007	2003-2006

Panel B: **Composition, country of origin specific trends**

	(1)	(2)	(3)	(4)
	$\frac{\text{Immigrants}_{ot}}{\text{Immigrants}_{t}}$	$\frac{\text{Immigrants}_{ot}}{\text{Immigrants}_{t}}$	$\frac{\text{Immigrants}_{ot}}{\text{Immigrants}_{t}}$	$\frac{\text{Immigrants}_{ot}}{\text{Immigrants}_{t}}$
VARIABLES	OLS	OLS	OLS	OLS
Affected countries	-0.008*	-0.011*	-0.012*	-0.008*
	(0.005)	(0.006)	(0.007)	(0.005)
Observations	896	784	672	448
R-squared	0.992	0.992	0.991	0.996
Year FE	yes	yes	yes	yes
Country FE	yes	yes	yes	yes
Country trends	yes	yes	yes	yes
Sample	2002-2009	2002-2008	2002-2007	2003-2006

Panel C: **Flows, country of origin specific trends**

	(1)	(2)	(3)	(4)
	$\frac{\Delta\text{Immigrants}_{ot}}{\text{Immigrants}_{ot-1}}$	$\frac{\Delta\text{Immigrants}_{ot}}{\text{Immigrants}_{ot-1}}$	$\frac{\Delta\text{Immigrants}_{ot}}{\text{Immigrants}_{ot-1}}$	$\frac{\Delta\text{Immigrants}_{ot}}{\text{Immigrants}_{ot-1}}$
VARIABLES	OLS	OLS	OLS	OLS
Affected countries	-0.129***	-0.053	0.034	-0.036
	(0.038)	(0.059)	(0.080)	(0.061)
Observations	896	784	672	448
R-squared	0.793	0.817	0.858	0.941
Year FE	yes	yes	yes	yes
Country FE	yes	yes	yes	yes
Country trends	yes	yes	yes	yes
Sample	2002-2009	2002-2008	2002-2007	2003-2006

NOTE: This table estimates whether the effect of the legalization policy on the flow of immigrants from 112 countries of origin into Spain comparing countries that were affected by the policy (non-EU countries) and that were not affected by it (EU countries). The estimates in columns 1 to 4 show different windows around the policy change. Panel A is our baseline specification shown in equation 12. Panel B includes linear country of origin-specific time trends. Observations weighted by the number of immigrants from each country of origin. The weighted mean of the dependent variable = 6.4%. Panel C uses the same specification as panel B, but with the immigrant growth rate by country of origin as dependent variable. Robust standard errors clustered at the country of origin level reported. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

Table 3: **Wages of documented and undocumented immigrants**

	Panel A: **All**			Panel B: **Housekeeping services**		
	Documented	**Undocumented**	**Ratio**	**Documented**	**Undocumented**	**Ratio**
monthly wage (Euros)	1,034.0	842.3	0.81	805.8	692.90	0.86
hourly wage (Euros)	5.6	4.5	0.81	4.6	3.7	0.81
	Panel C: **Construction**			Panel D: **Hotels & Restaurants**		
	Documented	**Undocumented**	**Ratio**	**Documented**	**Undocumented**	**Ratio**
monthly wage (Euros)	1,224.4	982.1	0.80	992.2	824.9	0.83
hourly wage (Euros)	6.5	5.34	0.82	5.5	4.5	0.81
	Panel E: **men**			Panel F: **women**		
	Documented	**Undocumented**	**Ratio**	**Documented**	**Undocumented**	**Ratio**
monthly wage (Euros)	1,068.1	860.6	0.81	994.1	825.24	0.83
hourly wage (Euros)	5.8	4.7	0.80	5.5	4.4	0.81
	Panel G: **younger (less 35 y.o.)**			Panel H: **older (more 35 y.o.)**		
	Documented	**Undocumented**	**Ratio**	**Documented**	**Undocumented**	**Ratio**
monthly wage (Euros)	1,037.5	853.8	0.82	1,030.0	826.9	0.80
hourly wage (Euros)	5.7	4.6	0.82	5.6	4.4	0.79
	Panel I: **new migrants (<3 years)**			Panel J: **old migrants (>= 3 years)**		
	Documented	**Undocumented**	**Ratio**	**Documented**	**Undocumented**	**Ratio**
monthly wage (Euros)	1,033.2	822.2	0.80	1,036.4	860.4	0.83
hourly wage (Euros)	5.6	4.5	0.79	5.7	4.6	0.82

NOTE: This table uses data from the *Encuesta Nacional de Inmigrantes* to report immigrant wages as a function of their work permit status (Documented vs. Undocumented). The table provides estimates for different groups of workers, based on sector of employment, gender, age, and years since migration. The variable "Ratio" is the ratio of wages of undocumented to documented workers.

Table 4: **Estimates of the Change in Payroll-Tax Revenues per Newly Legalized Immigrant**

Dep. Var.:	Change in per capita payroll tax revenues by labor market contract type								
	General Reg. (1)	Self.emp. (2)	Agricult. (3)	Sea (4)	Coal (5)	Housekeeping (6)	Accident (7)	Unemp. (8)	Total (9)
Δ Immigrants in social security/pop.	3,870*** (1,116)	94.5* (54.0)	186.6*** (47.2)	-3.9 (17.1)	12.1 (20.5)	186.0*** (57.8)	-17.0 (29.7)	-446.8 (301.7)	3,882*** (914.4)
Observations	50	50	50	50	50	50	50	50	50
R-squared	0.584	0.194	0.419	0.225	0.092	0.700	0.216	0.497	0.642
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Share of contribution	99%	2%	5%	0%	0%	5%	0%	-12%	100%
Immigrant share	6.9%	4.5%	12.3%	5.1%	5.2%	51.3%	—	—	7.5%

NOTE: This table estimates the contribution per regularized immigrant in each regime of social security in euros. 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, share of construction and share of immigrants from non EU-15 at baseline. The coefficients in columns (1) to (8) add to the coefficient in column (9). Robust standard errors are reported. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level. Immigrant share represents the percentage of immigrants in each regime (average 2002-2007).

Table 5: **Estimates of the Effect of the Immigration Reform on Employment**

	Panel A: Formal Employment (MCVL)						
	Dep. Var.: Δ Formal Employment / pop.						
	Total Emp.	Natives	Immigrants	Nat. LS	Nat. HS	Imm. LS	Imm. HS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Δ Immigrants	0.491**	-0.007	0.497***	0.044	-0.050***	0.475***	0.022***
in social security/pop.	(0.204)	(0.139)	(0.097)	(0.140)	(0.012)	(0.094)	(0.006)
Observations	50	50	50	50	50	50	50
R-squared	0.277	0.194	0.804	0.218	0.421	0.801	0.456
Controls	yes	yes	yes	yes	yes	yes	yes
Share of contribution	100%	0%	100%	8%	-10%	97%	4%

	Panel B: Formal Employment, females (MCVL)						
	Dep. Var.: Δ Formal Employment / pop.						
	Total Emp.	Natives	Immigrants	Nat. LS	Nat. HS	Imm. LS	Imm. HS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Δ Immigrants	0.092	-0.100**	0.192***	-0.065	-0.035***	0.182***	0.011***
in social security/pop.	(0.072)	(0.045)	(0.043)	(0.044)	(0.010)	(0.041)	(0.004)
Observations	50	50	50	50	50	50	50
R-squared	0.162	0.334	0.789	0.332	0.415	0.784	0.286
Controls	yes	yes	yes	yes	yes	yes	yes

	Panel C: Total Employment: Formal + Informal (SLFS)						
	Dep. Var.: Δ Employment / pop.						
	Total Emp.	Natives	Immigrants	Nat. LS	Nat. HS	Imm. LS	Imm. HS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Δ Immigrants	-0.538**	-0.390	-0.149	-0.607***	0.217	-0.391**	0.243*
in social security/pop.	(0.211)	(0.244)	(0.160)	(0.213)	(0.301)	(0.188)	(0.121)
Observations	50	50	50	50	50	50	50
R-squared	0.143	0.175	0.101	0.294	0.077	0.217	0.293
Controls	yes	yes	yes	yes	yes	yes	yes

NOTE: This table estimates the effect of immigrant regularization on employment. 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, share of construction and share of immigrants from non EU-15 at baseline. Robust standard errors reported. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

Table 6: **Estimates of the Effect of the Immigration Reform on Wages**

	Dep. Var.: Δ log wages						
	Δ Total log wages	Natives	Immigrants	Nat. LS	Nat. HS	Imm. LS	Imm. HS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Δ Immigrants	0.185*	0.257**	-0.449	0.250**	0.306	-0.571	3.080*
in social security/pop.	(0.097)	(0.100)	(0.305)	(0.096)	(0.271)	(0.340)	(1.671)
Observations	50	50	50	50	50	50	50
R-squared	0.333	0.430	0.149	0.376	0.194	0.176	0.123
Controls	yes	yes	yes	yes	yes	yes	yes

NOTE: This table estimates the effect of immigrant regularization on employment. 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, share of construction and share of immigrants from non EU-15 at baseline. Robust standard errors reported. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

Table 7: **Estimates of the Effect of the Immigration Reform on Internal Migration**

	Δ Immigrant population share			Δ Share of LS
	Total	Low Skilled	High Skilled	Population
	(1)	(2)	(3)	(4)
Δ Immigrants	-0.376*	-0.490**	0.114	-0.558
in social security/pop.	(0.194)	(0.231)	(0.115)	(0.345)
Observations	50	50	50	50
R-squared	0.062	0.089	0.003	0.052
Controls	yes	yes	yes	yes

NOTE: This table estimates the effect of immigrant regularization on the share of foreign-born population. Regressions are weighted by population. Estimates are based on a continuous difference-in-difference strategy, where province-specific pre-change linear trends are removed. Controls include: political alignment dummies, coastal dummies, share of construction and share of immigrants from non EU-15 at baseline. Robust standard errors reported. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

Online Appendix, Not for Publication

A Proofs

The main proposition states that when the policy change is such that it:

1. Transforms undocumented workers into documented workers, hence $\frac{\partial U}{\partial \theta} = -\frac{\partial N}{\partial \theta}$
2. Increases the cost of informal work, i.e. $\frac{\partial \tau_D}{\partial \theta} > 0$
3. Makes the jobs in the formal and informal sector more similar to workers, i.e. $\frac{\partial \epsilon_L}{\partial \theta} < 0$

Then:

1. In the informal sector, wages of undocumented immigrant workers are lower than wages of documented workers.
2. Total tax collection increases with the amnesty program.
3. There is an ambiguous effect on wages of formal low-skilled workers. Two forces are in place. On the one hand, the policy change increases the overall supply of formal workers, which puts pressure on wages. On the other hand, the policy decreases market power of firms, which tends to increase wages.
4. Employment in the informal sector declines.
5. Employment in the low-skilled formal sector increases, but by less than the amount of low-skilled entrants into the formal sector.
6. Employment and wages increase for high-skilled workers.

Proposition 1.1: In the informal sector, wages of undocumented immigrant workers are lower than wages of documented workers, as long as ϵ_U is sufficiently larger.

Proof. For this point, we need to combine the two wage equations:

$$p\frac{1}{(1+\epsilon_j)(1+\tau_j)}MPL_j = w_j$$

Now, given that the marginal product of labor for factor D and U is the same then:

$$\frac{w_D}{w_U} = \frac{1+\epsilon_U}{(1+\tau_D)(1+\epsilon_L)}$$

Hence, as long as τ_D is not too large, and given that $\epsilon_L < \epsilon_U$, we get $w_D > w_U$.

□

Proposition 1.3: There is an ambiguous effect on wages of formal low-skilled workers. Two forces are in place. On the one hand, the policy change increases the overall supply of formal workers, which puts pressure on wages. On the other hand, the policy decreases market power of firms, which tends to increase wages.

Proof. From:

$$\ln w_F = \kappa_F - \frac{\epsilon_L \sigma_L}{\epsilon_L \sigma_L + 1}(\ln(1+\epsilon_L)(1+\tau)) - \frac{\epsilon_L}{\epsilon_L \sigma_L + 1}\ln N \tag{14}$$

We want to compute that:

$$\frac{\partial \ln w_F}{\partial \theta} = -\frac{\partial(\frac{\epsilon_L \sigma_L}{\epsilon_L \sigma_L + 1}(\ln(1+\epsilon_L)(1+\tau)))}{\partial \theta} - \frac{\partial(\frac{\epsilon_L}{\epsilon_L \sigma_L + 1}\ln N)}{\partial \theta} \tag{15}$$

Hence, we need to understand how the two terms change. We denote the first term as the monopsonistic effect and the second as the competition effect. The policy change makes ϵ_L smaller and increases the number of workers with work permits (N).

The monopsonistic effect is always positive: i.e., $-\frac{\partial(\frac{\epsilon_L \sigma_L}{\epsilon_L \sigma_L + 1}(\ln(1+\epsilon_L)(1+\tau)))}{\partial \theta} > 0$. This is so because $\frac{\epsilon_L \sigma_L}{\epsilon_L \sigma_L + 1}$ which is a value between 0 (as ϵ_L tends to 0) and 1 (as ϵ_L tends to infinity) decreases when ϵ_L decreases, and because $(\ln(1+\epsilon_L)(1+\tau))$ also becomes smaller when ϵ_L decreases. Hence, the first term, becomes smaller when ϵ_L decreases and, given the negative sign, the monopsonistic effect unambiguously becomes smaller as ϵ_L becomes smaller.

The competition effect tends to put pressure on formal low-skilled wages: The policy affects the second term of the previous equation in two different ways. On the one hand, $\frac{\epsilon_L}{\epsilon_L \sigma_L + 1}$ is a term between 0 (when ϵ_L goes to 0) and $\frac{1}{\sigma_L}$ (as ϵ_L goes to infinity). In other words, when ϵ_L becomes smaller the competition effect also becomes smaller. However, the policy also increases the number of workers with work permits N, which tends to put pressure on wages. Which one of these two forces dominates is a priori ambiguous. to investigate this further note that:

$$\frac{\partial(\frac{\epsilon_L}{\epsilon_L \sigma_L + 1}\ln N)}{\partial \theta} = \frac{\partial(\frac{\epsilon_L}{\epsilon_L \sigma_L + 1})}{\partial \theta}\ln N + (\frac{\epsilon_L}{\epsilon_L \sigma_L + 1})\frac{\partial \ln N}{\partial \theta} = \frac{1}{(\epsilon_L \sigma_L + 1)^2}\ln N + (\frac{\epsilon_L}{\epsilon_L \sigma_L + 1})\frac{\partial \ln N}{\partial \theta}$$

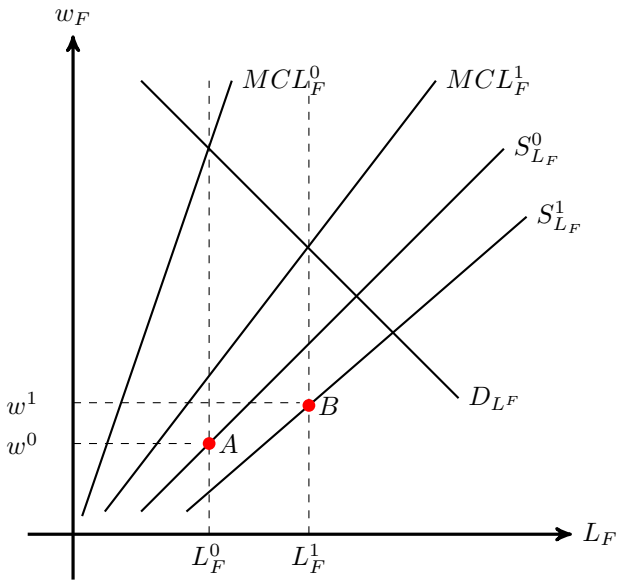
And so:

$$\frac{\partial(\frac{\epsilon_L}{\epsilon_L \sigma_L + 1}\ln N)}{\partial \theta} = \frac{1}{(\epsilon_L \sigma_L + 1)^2}\ln N - \frac{U}{N}(\frac{\epsilon_L}{\epsilon_L \sigma_L + 1})\frac{\partial \ln U}{\partial \theta}$$

Which is positive as long as $\ln N > \frac{U}{N}(\epsilon_L \sigma_L + 1)\epsilon_L \frac{\partial \ln U}{\partial \theta}$ which is necessarily satisfied unless ϵ_L is too large.

Note that this effects can be anlayzed with the following graph A.1 which shows the case when wages of formal low-skilled workers increase:

Figure A.1: Graphical representation of the model



□

Proposition 1.5: Employment in the low-skilled formal sector increases, but by less than the amount of low-skilled entrants into the formal sector.

Proof. From:

$$\ln L_F = \delta_F - \frac{\sigma_L}{\epsilon_L \sigma_L + 1}(\ln(1 + \epsilon_L)(1 + \tau)) + \frac{\epsilon_L \sigma_L}{\epsilon_L \sigma_L + 1} \ln N \tag{16}$$

We have that:

$$\frac{\partial \ln L_F}{\partial \theta} = -\frac{\partial(\frac{\sigma_L}{\epsilon_L \sigma_L + 1}(\ln(1 + \epsilon_L)(1 + \tau))}{\partial \theta} + \frac{\partial \frac{\epsilon_L \sigma_L}{\epsilon_L \sigma_L + 1} \ln N}{\partial \theta}$$

As before we have two terms. The first term increases when ϵ_L becomes smaller. The second term is affected by the policy change in two ways, the effect of the policy on ϵ_L and on N. Let's look at this in more detail:

$$\frac{\partial \frac{\epsilon_L \sigma_L}{\epsilon_L \sigma_L + 1} \ln N}{\partial \theta} = \frac{\sigma_L}{(\epsilon_L \sigma_L + 1)^2} \ln N - \frac{U}{N} \frac{\epsilon_L \sigma_L}{\epsilon_L \sigma_L + 1} \frac{\partial \ln U}{\partial \theta}$$

Hence, this second term is also positive. To see that the increase in formal employment is less than one to one, it is worth remembering that not all the newly legalized immigrants will choose to enter the formal sector. Formal employment may also increase thanks to native low-skilled workers, but then they face two forces: first, the reduction in market power pushes them to work more; second, competition from newly legalized immigrant workers pushes in the other direction.

□

Proposition 1.4: Employment in the informal sector declines.

Proof. We can take the equilibrium levels of employment in the informal sector and obtain that:

$$\frac{\partial \ln L_D}{\partial \theta} + \frac{\partial \ln L_U}{\partial \theta} = -\frac{\begin{vmatrix} \Pi_{L_D\theta} & \Pi_{L_D L_U} \\ \Pi_{L_U\theta} & \Pi_{L_U L_U} \end{vmatrix}}{\begin{vmatrix} \Pi_{L_D L_D} & \Pi_{L_U L_U} \\ \Pi_{L_D L_U} & \Pi_{L_U L_U} \end{vmatrix}} - \frac{\begin{vmatrix} \Pi_{L_U\theta} & \Pi_{L_U L_D} \\ \Pi_{L_D\theta} & \Pi_{L_D L_D} \end{vmatrix}}{\begin{vmatrix} \Pi_{L_D L_D} & \Pi_{L_U L_U} \\ \Pi_{L_D L_U} & \Pi_{L_U L_U} \end{vmatrix}}$$

Note that the denominators are positive by the second-order condition at the maximum of the strictly concave profit function. Thus, the sign will depend on:

$$\Pi_{L_D\theta}(\Pi_{L_U L_D} - \Pi_{L_U L_U}) + \Pi_{L_U\theta}(\Pi_{L_D L_U} - \Pi_{L_D L_D}) \tag{17}$$

$$\Pi_{L_D L_D} = -\frac{(1 + \sigma_L \epsilon_L) L_D + \sigma_L \epsilon_L L_U}{(1 + \sigma_L \epsilon_L)(L_D + L_U) L_D} < 0$$

$$\Pi_{L_U L_U} = -\frac{(1 + \sigma_L \epsilon_U) L_U + \sigma_L \epsilon_U L_D}{(1 + \sigma_L \epsilon_U)(L_D + L_U) L_U} < 0$$

$$\Pi_{L_U\theta} = \frac{\sigma_L \epsilon_U}{1 + \sigma_L \epsilon_U} \frac{1}{U} \frac{\partial U}{\partial \theta} < 0$$

$$\Pi_{L_D L_U} = -\frac{1}{(1 + \sigma_L \epsilon_L)} \frac{1}{L_D + L_U} < 0$$

$$\Pi_{L_D\theta} = -\frac{\partial \epsilon_L}{\partial \theta} \frac{\sigma_L}{1 + \sigma_L \epsilon_L} [-\sigma_L \epsilon_L \ln L_D + (1 + \sigma_L \epsilon_L) \ln w_D \frac{1}{\epsilon_L}] -$$

$$-\frac{\sigma_L}{1+\sigma_L\epsilon_L}\left[\frac{\partial\epsilon_L}{\partial\theta}\frac{1}{1+\epsilon_L}+\frac{\partial\tau_D}{\partial\theta}\frac{1}{1+\tau_D}-\frac{\partial N}{\partial\theta}\frac{\epsilon_L}{N}\right]$$

Note that $\left[-\sigma_L\epsilon_L\ln L_D+(1+\sigma_L\epsilon_L)\ln w_D\frac{1}{\epsilon_L}\right]<0$ for realistic values of L_D and w_D. Regarding the second element, $\left[\frac{\partial\epsilon_L}{\partial\theta}\frac{1}{1+\epsilon_L}+\frac{\partial\tau_D}{\partial\theta}\frac{1}{1+\tau_D}-\frac{\partial N}{\partial\theta}\frac{\epsilon_L}{N}\right]$ it will be positive as long as τ_D is sufficiently small. Then, $\Pi_{L_D\theta}<0$

Thus, the sign of 17 will depend on the signs of $\Pi_{L_UL_D}-\Pi_{L_UL_U}$ and $\Pi_{L_DL_U}-\Pi_{L_DL_D}$. After some algebra, it can be shown that:

$$\Pi_{L_DL_U}-\Pi_{L_UL_U}=\frac{\sigma_L\epsilon_L}{(1+\sigma_L\epsilon_L)(L_D+L_U)}+\frac{L_D\sigma_L\epsilon_U}{(1+\sigma_L\epsilon_U)(L_D+L_U)L_U}>0$$

$$\Pi_{L_DL_U}-\Pi_{L_DL_D}=\frac{\sigma_L\epsilon_L}{(1+\sigma_L\epsilon_L)(L_D+L_U)}+\frac{L_U\sigma_L\epsilon_L}{(1+\sigma_L\epsilon_L)(L_D+L_U)L_D}>0$$

Then:

$$\frac{\partial\ln L_D}{\partial\theta}+\frac{\partial\ln L_U}{\partial\theta}<0$$

Proposition 1.2: Total tax collection increases with the amnesty program.

Let's use T to refer to total tax collection. Thus:

$$T=(1+\tau)w_HL_H+(1+\tau)w_FL_F+(1+\tau_D)w_DL_D$$

Let's call $(1+\tau_i)w_iL_i=W_i$. Then:

$$T=W_H+W_F+W_D$$

When the policy change happens, the effect on tax collection can be summarized by:

$$\frac{\partial T}{\partial\theta}=\frac{\partial W_H}{\partial\theta}+\frac{\partial W_F}{\partial\theta}+\frac{\partial W_D}{\partial\theta}$$

Note that $\frac{\partial W_H}{\partial\theta}>0$. We will divide the proof in two cases, depending on the sign of $\frac{\partial w_F}{\partial\theta}$.

Case 1: $\frac{\partial w_F}{\partial\theta}>0$

Note that in this case, $\frac{\partial W_F}{\partial\theta}>0$. Then $\frac{\partial T}{\partial\theta}>0$ since:

$$\frac{\partial W_H}{\partial\theta}+\frac{\partial W_F}{\partial\theta}>\frac{\partial W_D}{\partial\theta}$$

Case 2: $\frac{\partial w_F}{\partial\theta}<0$

We will analyze now $\frac{\partial W_F}{\partial \theta} + \frac{\partial W_D}{\partial \theta}$.

First, realize that:

$$\text{sign}(\frac{\partial W_F}{\partial \theta} + \frac{\partial W_D}{\partial \theta}) = \text{sign}(\frac{\partial \ln W_F}{\partial \theta} + \frac{\partial \ln W_D}{\partial \theta})$$

Hence, we can work with:

$$\ln W_F + \ln W_D = \ln L_F + \ln w_F + \ln L_D + \ln w_D + \ln(1+\tau) + \ln(1+\tau_D)$$

And we want to show that:

$$\frac{\partial \ln W_F}{\partial \theta} > \frac{\partial \ln W_D}{\partial \theta}$$

Start from:

$$\ln W_F > \ln W_D$$

Substituting W_F and W_D, we get:

$$\delta_F + \kappa_F - \frac{\sigma_L(1+\epsilon_L)}{1+\sigma_L\epsilon_L}\ln(1+\tau) + \ln(1+\tau) > \delta_D + \kappa_D - \frac{\sigma_L(1+\epsilon_L)}{1+\sigma_L\epsilon_L}\ln(1+\tau_D) - \\ - \frac{(1+\epsilon_L)}{1+\sigma_L\epsilon_L}\ln(1+\frac{L_U}{L_D}) + \ln(1+\tau_D)$$

$$\frac{\sigma_L(1-\sigma_L)}{(1+\sigma_L\epsilon_L)^2}\ln w_F L_F^{\frac{1}{\sigma_L}}\frac{\partial \epsilon_L}{\partial \theta} > \frac{\sigma_L(1-\sigma_L)}{(1+\sigma_L\epsilon_L)^2}\ln w_D (L_D+L_U)^{\frac{1}{\sigma_L}}\frac{\partial \epsilon_L}{\partial \theta} - \\ - \frac{\sigma_L(1+\epsilon_L)}{1+\sigma_L\epsilon_L}\frac{1}{1+\tau_D}\frac{\partial \tau_D}{\partial \theta} - \frac{1-\sigma_L}{(1+\sigma_L\epsilon_L)^2}\ln(1+\frac{L_U}{L_D})\frac{\partial \epsilon_L}{\partial \theta} - \\ - \frac{1}{L_D+L_U}\frac{\partial L_U}{\partial \theta} + \frac{L_U}{L_D^2}\frac{\partial L_D}{\partial \theta}$$

The second element on the right-hand side is positive and enters subtracting. Note that $\frac{L_U}{L_D^2} > \frac{1}{L_D+L_U}$, and hence the last two elements also enter the equation subtracting from the right-hand side. Moreover, the first and third element on the right-hand side can be combined. Thus, the equation above can be further simplified. Call A a positive constant. Hence:

$$\frac{\sigma_L(1-\sigma_L)}{(1+\sigma_L\epsilon_L)^2}\ln w_F L_F^{\frac{1}{\sigma_L}}\frac{\partial \epsilon_L}{\partial \theta} > \frac{\sigma_L(1-\sigma_L)}{(1+\sigma_L\epsilon_L)^2}\ln w_D (L_D)^{\frac{1}{\sigma_L}}\frac{\partial \epsilon_L}{\partial \theta} - A$$

Note that the element in the left-hand side is positive since $\sigma_L > 1$. Likewise for the first element in the

right-hand side. Hence, ignoring A, the condition for the above equation to hold is:

$$\ln w_F L_F^{\frac{1}{\sigma_L}} > \ln w_D L_D^{\frac{1}{\sigma_L}}$$

In words, the increase in tax collection from the formal low-skilled labor market will outset the decrease in tax collection in the documented informal labor market as long as the first market is larger than second one. Thus, we have shown that:

$$\frac{\partial T}{\partial \theta} = \frac{\partial W_H}{\partial \theta} + \frac{\partial W_F}{\partial \theta} + \frac{\partial W_D}{\partial \theta} > 0$$

□

Proposition 1.6: Employment and wages increase for high-skilled workers.

Proof. Let w_L be the average wage in the low-skilled labor market -regardless of whether the workers is formally or informally employed. The reform increases the cost of low-skilled workers, $\frac{\partial w_L}{\partial \theta} > 0$, both because of the increase in tax enforcement ($\frac{\partial \tau_D}{\partial \theta} > 0$) and the employment surge in the formal low-skilled labor market ($\frac{\partial L_F}{\partial \theta} > 0$).

Thus, we will start by showing that $\frac{\partial L_H}{\partial w_L} > 0$. From the cost minimization problem:

$$\begin{aligned} \min_{L_H, L_L} \quad & w_H L_H + w_L L_L \\ \text{s.t.} \quad & [L_H^\rho + L_L^\rho]^{\frac{1}{\rho}} \geq Y \end{aligned}$$

Refer to L_H^* and L_L^* as the optimal values that minimize the problem. Then, the cost function is:

$$w_H L_H^*(w_H) + w_L L_L^*(w_L) = C(w_H, w_L, Y)$$

Note that L_i^* is a function of w_i because we are in a monopsonistic labor market. If we take derivatives with respect to w_H:

$$L_H^* + w_H L_H^{*'}(w_H) = C_{w_H}(w_H, w_L, Y)$$

Since the cost function is homogenous of degree 1, it can be rewritten as:

$$C(w_H, w_L, Y) = w_L C(\frac{w_H}{w_L}, 1, Y)$$

Then,

$$\frac{\partial L_H}{\partial w_L} = C_{w_H w_L}(w_H, w_L, Y) = -\frac{w_H}{w_L^2} C_{w_H w_H}(\frac{w_H}{w_L}, 1, Y) > 0$$

since $C_{w_H w_H}(\frac{w_H}{w_L}, 1, Y) < 0$ by concavity of the cost function.

Finally, the increase in w_H follows from the surge in demand for high-skilled workers.

□

B Alternative specifications

A simple way to discuss our identification strategy is to follow the terminology of the randomized control trial's literature. The policy's treatment is "giving the right to undocumented immigrants to work". For undocumented immigrants, the compliance with the policy is to do the necessary paper work to obtain the work permit. There are good reasons to believe that the difference between the treated group and the group of compliants is negligible, given the strong incentives for immigrants who were eligible to acquire legal status. However, it is worth explaining how we can compute the Intention To Treat (ITT) and Local Average Treatment Effect (LATE) using the data at our disposal. Crucially, and unlike it is standard in the randomized control trial's literature, we measure with error who belongs to the treatment group, while we measure without error the group of compliants. This data limitation implies that our ITT estimates will be downward biased and our LATE estimates may be biased, although we do not know the sign of this bias. This explains why in the main text we prefer to report the OLS estimate of the treatment effect.

To compute ITT estimates we can use the following equation:

$$\Delta \widehat{Y}_c = \alpha + \delta \frac{\text{Imm Candidates}_c}{\text{Pop}_c} + \gamma X_c + \varepsilon_c \tag{18}$$

where Imm Candidates_c is the number of undocumented immigrants who were entitled to apply to the legalization program. There is not a data set available that directly measures Imm Candidates_c without error (or in words, no one knew exactly how many immigrants had been in Spain for at least six months *and* were working). However, we can approximate this number by combining data from the Municipal Register, the SLFS and the social security. The Municipal Register has good information on the total number of immigrants (working and not working) by country of origin. The social security has information on the immigrants registered in the social security system by country of origin just prior to the legalization process. In order to be part of the program, immigrants had to have an employer willing to sponsor them, which essentially means that they had to be employed. From the SLFS we can compute the activity rate of immigrants from non-EU countries at the province level. We can then estimate the number of immigrants from non-EU countries that were in the labor market in each province. We can then subtract from this number the number of non-EU immigrants that were registered in the social security system. From this, we obtain an estimate of the number of immigrants who were candidates to be part of the program (denoted by

Imm Candidates$_c$). Note, however, that we can only measure "Imm Candidates$_c$" with error since we assign the activity rate of both documented and undocumented non-EU immigrants to undocumented non-EU immigrants.

Measuring "Imm Candidates$_c$" with error *is* a problem for the standard ITT and local average treatment effect (LATE) estimates. Without measurement error, δ estimates the intention to treat. This is what usually happens in RCTs since the researcher randomly assigns the treatment to a group of individuals and this is what is best measured. With measurement error, we obtain a downward biased estimate of δ because of attenuation bias.[33]

To estimate the local average treatment effect we can use a two stage least square procedure, where the first stage is given by:

$$\Delta \frac{\widehat{\text{Imm Soc Sec}}_c}{\text{Pop}_c} = \alpha + \eta \frac{\text{Imm Candidates}_c}{\text{Pop}_c} + \varepsilon_c \tag{19}$$

In this case, η is the first stage estimate. If there is no measurement error and $\eta < 1$ then this means that the compliance rate is below 100 percent. In this case, we can use this first stage regression to estimate β in equation 13 and obtain an unbiased LATE estimate, which essentially scales up the least squares estimate. If there is measurement error, then $\eta < 1$ either because of non-compliance or because of attenuation bias in the first stage. In the latter case, the 2SLS will carry two source of bias: one η will be estimated too small, which will tend to make the 2SLS estimate too large. Second, δ will also be downward biased, which will tend to make the 2SLS LATE estimate too small. Which of these two forces dominates is unclear.

Figure B.1 shows the first-stage regression given by Equation 19. Our estimate of η is smaller than 1. This suggests that either we estimated $\frac{\text{Imm Candidates}_c}{\text{Pop}_c}$ with error (most likely), or that not everyone who could obtain work permits obtained them (something less likely given the effort of Spanish authorities).

All these considerations explain why we opted to report in the main text the estimate β using ordinary least squares as shown in equation (13). This estimate is the effect of the treatment. We report in Appendix C.2 the ITT estimates, and the LATE estimates.

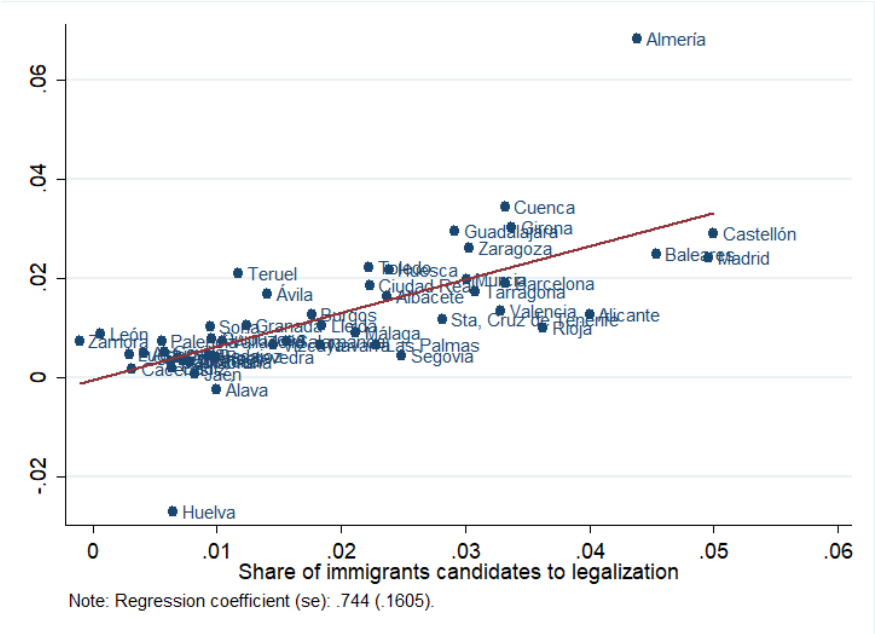
C Robustness Checks

C.1 Magnet Effects: Additional results

In this section we investigate whether the results on the absence of magnet effects are affected by the new EU accession countries. As argued in the main text, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, and Slovakia joined the EU in May 2004. However, EU members could delay, until 2011, the free mobility of workers with these countries (except Cyprus). Spain applied mobility restrictions until May of 2006 to dependent workers. Despite these restrictions, workers from new accession EU countries

[33] Under the assumption that measurement error is classical, which we think is a reasonable assumption.

Figure B.1: **First stage results**



NOTE: This graph shows the first-stage regression of the change in social security affiliations (measured as deviations from linear province-specific trends) on our estimates of the share of immigrants who were candidates to obtain work permits. These estimates are based on the number of immigrants from candidate countries in the Municipal Register, the employment rate of immigrants from candidates countries from the SLFS, and the amount of immigrants from these countries already registered in the social security.

were not eligible to the amnesty program. Hence, given this particularity of non participation but also not completely free movement, it is worth checking whether results are different when excluding these new EU countries and also check how the main results look like when considering only these new EU countries as the control group.

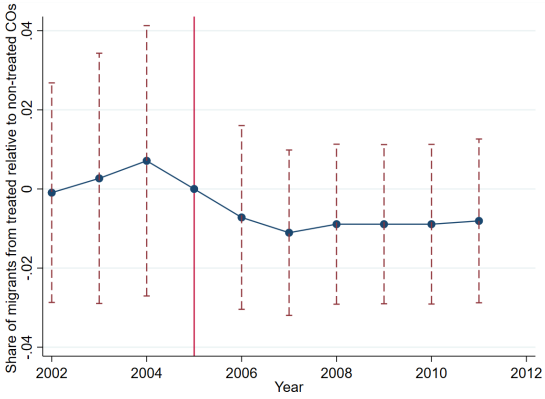
Figure C.1 shows two graphs. The first one repeats the right hand side graph of Figure 3 excluding new EU 2004 countries from the control group. The graph is very similar to the one in the main text. The graph on the right of Figure C.1, uses exclusively EU 2004 countries as control group. While there are some differences, between the two graphs, we cannot reject with confidence the null hypothesis that the amnesty program lead to magnet effects. As in the main text, if anything, it might have deterred new immigrants from entering Spain.

C.2 Empirical Evidence: Additional results

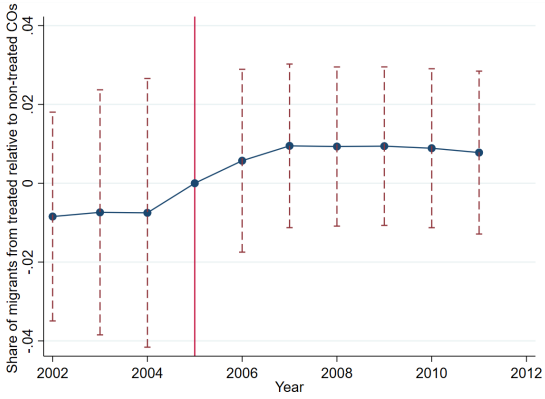
In this appendix we present several robustness checks to our baseline estimates. First we re-estimate our baseline specifications witout controls. Second, we present our main estimates for an alternative sample of provinces that excludes the four largest provinces (Madrid, Barcelona, Sevilla and Valencia). Third, we also show the reduced form and 2SLS as discussed in Appendix Section B. Finally, in the case of wages, since we estimate our baseline results excluding women from the sample, in this section we also present estimates for our baseline specification, including in the sample men and women.

Figure C.1: **The Absence of Magnet effects: the role of new EU countries that accessed in 2004**

Panel A: **Treat. vs. Non-treat. (excl. EU 2004)**



Panel B: **Treat. vs. new EU 2004**



NOTE: Panel A excludes new EU 2004 countries from the control group. Panel B uses exclusively new EU 2004 countries as control group. Data come from the Municipal Register which covers both documented and undocumented immigrants.

Generally speaking, our estimates show that our baseline results hold under alternative specifications, reducing the risk that our findings are driven by the presence of outliers, other confounding factors or endogeneity concerns.

Table C.1: **Payroll-tax revenue estimates**

	General Reg.	Self. emp.	Agricult.	Sea	Coal	Housekeeping	Accident	Unemp.	Total
Panel A: Baseline (pol. alignment; coastal dummies; construction pre-reform; share non EU-15 imm. in 2004)									
Δ Immigrants	3,870***	94.52*	186.6***	-3.915	12.07	186.0***	-16.95	-446.8	3,882***
in social security/pop.	(1,116)	(53.95)	(47.16)	(17.05)	(20.49)	(57.81)	(29.71)	(301.7)	(914.4)
Observations	50	50	50	50	50	50	50	50	50
R-squared	0.584	0.194	0.419	0.225	0.092	0.700	0.216	0.497	0.642
Panel B: Without controls)									
Δ Immigrants	3,983***	65.7	146.4***	-11.4	46.4	233.8***	-44.2	-230.7	4,189***
in social security/pop.	(1,348)	(43.05)	(50.92)	(18.91)	(38.93)	(75.00)	(28.37)	(456.0)	(1,051)
Observations	50	50	50	50	50	50	50	50	50
R-squared	0.411	0.032	0.276	0.012	0.019	0.519	0.053	0.018	0.515
Panel C: Without 4 main provinces (Mad., Bcn., Val., Sev)									
Δ Immigrants	2,509***	97.06**	162.1**	-0.796	52.48	145.7***	-51.39	401.7*	3,316***
in social security/pop.	(869.5)	(39.15)	(62.81)	(22.07)	(41.88)	(51.78)	(36.69)	(202.0)	(880.3)
Observations	46	46	46	46	46	46	46	46	46
R-squared	0.294	0.068	0.276	0.000	0.019	0.423	0.062	0.085	0.445
Panel D: Reduced form (pol. alignment; coastal dummies; construction pre-reform; share non EU-15 imm. in 2004 (ITT)									
Δ Immigrants	2,415***	28.64	93.11***	5.461	3.806	139.3***	-13.71	-523.1***	2,148***
in social security/pop.	(396.7)	(33.83)	(26.14)	(11.60)	(13.78)	(11.64)	(19.21)	(143.7)	(374.4)
Observations	50	50	50	50	50	50	50	50	50
R-squared	0.643	0.155	0.331	0.231	0.092	0.889	0.222	0.666	0.618
Panel E: 2SLS all controls (pol. alignment; coastal dummies; construction pre-reform; share non EU-15 imm. in 2004) (LATE)									
Δ Immigrants	5,272***	62.53	203.3***	11.92	8.309	304.1***	-29.93	-1,142***	4,690***
in social security/pop.	(1,133)	(67.92)	(47.37)	(24.13)	(27.87)	(58.04)	(38.68)	(419.3)	(898.1)
Observations	50	50	50	50	50	50	50	50	50
F-test of excluded instruments	37.670	37.670	37.670	37.670	37.670	37.670	37.670	37.670	37.670

NOTE: This table estimates the contribution per regularized immigrant in each regime of the social security in euros for different specifications. Estimates are based on a continuous difference-in-difference strategy, where province-specific pre-change linear trends are removed. ITT and LATE estimates are explained in detail in Appendix B. Regressions are weighted by population. Robust standard errors are reported. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

Table C.2: **Estimates of the effect of the reform on employment**

		Δ Employment					
	Δ Total Emp.	Natives	Immigrants	Nat. LS	Nat. HS	Imm. LS	Imm. HS
Panel A: Baseline (pol. alignment; coastal dummies; construction pre-reform; share non EU-15 imm. in 2004)							
Δ Immigrants	-0.538**	-0.390	-0.149	-0.607***	0.217	-0.391**	0.243*
in social security/pop.	(0.211)	(0.244)	(0.160)	(0.213)	(0.301)	(0.188)	(0.121)
Observations	50	50	50	50	50	50	50
R-squared	0.143	0.175	0.101	0.294	0.077	0.217	0.293
Panel B: Without controls							
Δ Immigrants	-0.495***	-0.254	-0.242	-0.371*	0.117	-0.405**	0.163*
in social security/pop.	(0.181)	(0.277)	(0.185)	(0.211)	(0.259)	(0.182)	(0.0939)
Observations	50	50	50	50	50	50	50
R-squared	0.069	0.015	0.021	0.050	0.006	0.077	0.054
Panel C: Without 4 main provinces (Mad., Bcn., Val., Sev)							
Δ Immigrants	-0.529***	-0.348	-0.182	-0.330	-0.0175	-0.276	0.094
in social security/pop.	(0.190)	(0.253)	(0.149)	(0.251)	(0.228)	(0.172)	(0.133)
Observations	46	46	46	46	46	46	46
R-squared	0.066	0.025	0.011	0.036	0.000	0.036	0.024
Panel D: Reduced form (pol. alignment; coastal dummies; construction pre-reform; share non EU-15 imm. in 2004) (ITT)							
Δ Immigrants	-0.431	0.093	-0.524***	-0.335	0.428	-0.523***	-0.000
in social security/pop.	(0.274)	(0.329)	(0.190)	(0.244)	(0.261)	(0.158)	(0.105)
Observations	50	50	50	50	50	50	50
R-squared	0.129	0.147	0.199	0.224	0.147	0.293	0.191
Panel E: 2SLS all controls (pol. alignment; coastal dummies; construction pre-reform; share non EU-15 imm. in 2004) (LATE)							
Δ Immigrants	-0.656*	0.141	-0.797**	-0.510	0.651	-0.797***	-0.001
in social security/pop.	(0.362)	(0.478)	(0.350)	(0.326)	(0.423)	(0.277)	(0.148)
Observations	50	50	50	50	50	50	50
F-test of excluded instruments	25.200	25.200	25.200	25.200	25.200	25.200	25.200

NOTE: This table estimates the effect of immigrant regularization on employment. Estimates are based on a continuous difference-in-difference strategy, where province-specific pre-change linear trends are removed. ITT and LATE estimates are explained in detail in Appendix B. Regressions are weighted by population. Robust standard errors are reported. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

Table C.3: **Estimates of the effect of the reform on formal employment**

		Δ Employment - All					
	Δ Total Emp.	Natives	Immigrants	Nat. LS	Nat. HS	Imm. LS	Imm. HS
Panel A: Baseline (pol. alignment; coastal dummies; construction pre-reform; share non EU-15 imm. in 2004)							
Δ Immigrants	0.491**	-0.007	0.497***	0.044	-0.050***	0.475***	0.022***
in social security/pop.	(0.204)	(0.139)	(0.097)	(0.140)	(0.014)	(0.094)	(0.006)
Observations	50	50	50	50	50	50	50
R-squared	0.277	0.194	0.804	0.218	0.421	0.801	0.456
Panel B: Without controls							
Δ Immigrants	0.423***	-0.126	0.549***	-0.0656	-0.0602**	0.527***	0.0219***
in social security/pop.	(0.152)	(0.122)	(0.0839)	(0.132)	(0.0274)	(0.0817)	(0.00505)
Observations	50	50	50	50	50	50	50
R-squared	0.213	0.027	0.762	0.008	0.200	0.755	0.391
Panel C: Without 4 main provinces (Mad., Bcn., Val., Sev)							
Δ Immigrants	0.449**	-0.136	0.585***	-0.108	-0.028**	0.564***	0.020***
in social security/pop.	(0.193)	(0.135)	(0.108)	(0.129)	(0.012)	(0.105)	(0.007)
Observations	46	46	46	46	46	46	46
R-squared	0.206	0.028	0.741	0.020	0.055	0.738	0.298
Panel D: Reduced form (pol. alignment; coastal dummies; construction pre-reform; share non EU-15 imm. in 2004) (ITT)							
Δ Immigrants	0.228**	-0.006	0.235***	0.031	-0.037***	0.223***	0.012***
in social security/pop.	(0.101)	(0.079)	(0.043)	(0.076)	(0.009)	(0.042)	(0.002)
Observations	50	50	50	50	50	50	50
R-squared	0.231	0.194	0.715	0.220	0.529	0.708	0.484
Panel E: 2SLS all controls (pol. alignment; coastal dummies; construction pre-reform; share non EU-15 imm. in 2004) (LATE)							
Δ Immigrants	0.528**	-0.014	0.543***	0.071	-0.085***	0.515***	0.028***
in social security/pop.	(0.211)	(0.169)	(0.081)	(0.164)	(0.026)	(0.078)	(0.006)
Observations	50	50	50	50	50	50	50
F-test of excluded instruments	47.760	47.760	47.760	47.760	47.760	47.760	47.760

NOTE: This table estimates the effect of immigrant regularization on formal employment. Estimates are based on a continuous difference-in-difference strategy, where province-specific pre-change linear trends are removed. ITT and LATE estimates are explained in detail in Appendix B. Regressions are weighted by population. Robust standard errors are reported. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

Table C.4: **Estimates of the effect of the reform on formal employment, females**

		Δ Employment - Women					
	Δ Total Emp.	Natives	Immigrants	Nat. LS	Nat. HS	Imm. LS	Imm. HS
Panel A: Baseline (pol. alignment; coastal dummies; construction pre-reform; share non EU-15 imm. in 2004)							
Δ Immigrants	0.0923	-0.100**	0.192***	-0.0652	-0.0349***	0.182***	0.0107***
in social security/pop.	(0.0720)	(0.0448)	(0.0434)	(0.0435)	(0.0101)	(0.0409)	(0.00363)
Observations	50	50	50	50	50	50	50
R-squared	0.162	0.334	0.789	0.332	0.415	0.784	0.286
Panel B: Without controls							
Δ Immigrants	0.0895	-0.135***	0.224***	-0.0917*	-0.0430**	0.214***	0.0104***
in social security/pop.	(0.0564)	(0.0453)	(0.0396)	(0.0486)	(0.0196)	(0.0379)	(0.00299)
Observations	50	50	50	50	50	50	50
R-squared	0.072	0.162	0.710	0.090	0.195	0.697	0.249
Δ Immigrants	0.108	-0.107**	0.215***	-0.0904*	-0.0165	0.205***	0.0100**
in social security/pop.	(0.0765)	(0.0488)	(0.0536)	(0.0451)	(0.0110)	(0.0510)	(0.00417)
Observations	46	46	46	46	46	46	46
R-squared	0.086	0.100	0.634	0.088	0.038	0.620	0.189
Panel C: All controls (pol. alignment; coastal dummies; construction sector pre-reform)							
Δ Immigrants	0.0930	-0.101**	0.194***	-0.0652	-0.0361***	0.184***	0.0104***
in social security/pop.	(0.0688)	(0.0444)	(0.0432)	(0.0423)	(0.0121)	(0.0409)	(0.00357)
Observations	50	50	50	50	50	50	50
R-squared	0.160	0.331	0.776	0.332	0.378	0.768	0.257
Panel D: Reduced form (pol. alignment; coastal dummies; construction pre-reform; share non EU-15 imm. in 2004) (ITT)							
Δ Immigrants	0.049	-0.054*	0.103***	-0.032	-0.022***	0.097***	0.006***
in social security/pop.	(0.037)	(0.028)	(0.016)	(0.026)	(0.007)	(0.015)	(0.001)
Observations	50	50	50	50	50	50	50
R-squared	0.163	0.338	0.808	0.329	0.456	0.804	0.286
Panel E: 2SLS all controls (pol. alignment; coastal dummies; construction pre-reform; share non EU-15 imm. in 2004) (LATE)							
Δ Immigrants	0.113	-0.125**	0.238***	-0.0749	-0.0500***	0.225***	0.0128***
in social security/pop.	(0.0782)	(0.0609)	(0.0357)	(0.0544)	(0.0181)	(0.0344)	(0.00285)
Observations	50	50	50	50	50	50	50
F-test of excluded instruments	47.760	47.760	47.760	47.760	47.760	47.760	47.760

NOTE: This table estimates the effect of immigrant regularization on formal employment among females. Estimates are based on a continuous difference-in-difference strategy, where province-specific pre-change linear trends are removed. ITT and LATE estimates are explained in detail in Appendix B. Regressions are weighted by population. Robust standard errors are reported. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

Table C.5: **Estimates of the effect of the reform on wages**

		Δ log wages					
	Δ Total log wages	Natives	Immigrants	Nat. LS	Nat. HS	Imm. LS	Imm. HS
Panel A: Baseline (pol. alignment; coastal dummies; construction pre-reform; share non EU-15 imm. in 2004)							
Δ Immigrants	0.185*	0.257**	-0.449	0.250**	0.306	-0.571	3.080*
	(0.097)	(0.100)	(0.305)	(0.096)	(0.271)	(0.340)	(1.671)
Observations	50	50	50	50	50	50	50
R-squared	0.333	0.430	0.149	0.376	0.194	0.176	0.123
Panel B1: Without controls							
Δ Immigrants	0.244**	0.309***	-0.199	0.296***	0.235	-0.263	1.526
in social security/pop.	(0.106)	(0.114)	(0.260)	(0.101)	(0.227)	(0.272)	(0.920)
Observations	50	50	50	50	50	50	50
R-squared	0.143	0.204	0.015	0.201	0.021	0.023	0.029
Panel B2: Including women							
Δ Immigrants	0.213*	0.265**	-0.451	0.257**	0.226	-0.617*	0.751
in social security/pop.	(0.112)	(0.125)	(0.298)	(0.122)	(0.200)	(0.312)	(0.740)
Observations	50	50	50	50	50	50	50
R-squared	0.097	0.129	0.059	0.131	0.024	0.097	0.016
Panel C: Without 4 main provinces (Mad., Bcn., Val., Sev)							
Δ Immigrants	0.076	0.129*	-0.275	0.149*	-0.0366	-0.355	2.137
in social security/pop.	(0.0758)	(0.0757)	(0.247)	(0.0746)	(0.257)	(0.277)	(1.285)
Observations	46	46	46	46	46	46	46
R-squared	0.017	0.050	0.024	0.061	0.000	0.034	0.042
Panel D: Reduced form (pol. alignment; coastal dummies; construction pre-reform; share non EU-15 imm. in 2004) (ITT)							
Δ Immigrants	0.304***	0.383***	-0.261	0.331***	0.724**	-0.359	2.803*
in social security/pop.	(0.010)	(0.092)	(0.341)	(0.092)	(0.281)	(0.372)	(1.459)
Observations	50	50	50	50	50	50	50
R-squared	0.386	0.490	0.116	0.408	0.263	0.132	0.099
Panel E: 2SLS all controls (pol. alignment; coastal dummies; construction pre-reform; share non EU-15 imm. in 2004) (LATE)							
Δ Immigrants	0.336***	0.423***	-0.289	0.366***	0.800**	-0.397	3.099**
	(0.124)	(0.124)	(0.338)	(0.115)	(0.321)	(0.362)	(1.381)
Observations	50	50	50	50	50	50	50
F-test of excluded instruments	56.300	56.300	56.300	56.300	56.300	56.300	56.300

NOTE: This table estimates the effect of immigrant regularization on *log* composition-adjusted wages. Estimates are based on a continuous difference-in-difference strategy, where province-specific pre-change linear trends are removed. ITT and LATE estimates are explained in detail in Appendix B. Regressions are weighted by population. Robust standard errors are reported. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

Table C.6: **Estimates of the effect of the reform on internal migration**

	Δ Immigrant population share			Δ Share of LS
	Total	Low Skilled	High Skilled	Population
Panel A: Baseline				
Δ Immigrants	-0.376*	-0.490**	0.114	-0.558
in social security/pop.	(0.194)	(0.231)	(0.115)	(0.345)
Observations	50	50	50	50
R-squared	0.146	0.198	0.176	0.248
Panel B: Without controls				
Δ Immigrants	-0.500**	-0.535**	0.035	-0.392
in social security/pop.	(0.213)	(0.211)	(0.089)	(0.346)
Observations	50	50	50	50
R-squared	0.062	0.089	0.003	0.052
Panel C: Without 4 main provinces (Mad., Bcn., Val., Sev)				
Δ Immigrants	-0.360**	-0.368*	0.007	-0.071
in social security/pop.	(0.176)	(0.216)	(0.113)	(0.198)
Observations	46	46	46	46
R-squared	0.030	0.043	0.000	0.002
Panel D: Reduced form - all controls (ITT)				
Δ Immigrants	-0.691***	-0.600***	-0.091	-0.768***
in social security/pop.	(0.215)	(0.195)	(0.0922)	(0.267)
Observations	50	50	50	50
R-squared	0.234	0.241	0.170	0.370
Panel E: 2SLS - all controls (LATE)				
Δ Immigrants	-1.052***	-0.914***	-0.138	-1.169**
in social security/pop.	(0.391)	(0.324)	(0.143)	(0.487)
Observations	50	50	50	50
F-test of excluded instruments	25.200	25.200	25.200	25.200

NOTE: This table estimates the effect of immigrant regularization on the share of foreign-born population. Estimates are based on a continuous difference-in-difference strategy, where province-specific pre-change linear trends are removed. ITT and LATE estimates are explained in detail in Appendix B. Regressions are weighted by population. Panels A, D and E include all controls (political alignment, coastal dummies, construction pre-reform and share non EU-15 immigrants in 2004). Robust standard errors are reported. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

C.3 Employment by sectors

In this section we show the results of employment of low-skilled natives by sector of activity. We divide local economies into three sectors: 1) high-immigrant sectors, 2) low-immigrant sectors, and 3) public administration. High-immigrant sectors are defined as sectors where, among low-skilled workers, the share of immigrants working in the sector is larger than the share of natives in the sector. Low-immigrant sectors consist of all other sectors except for public administration. We distinguish public administration from the rest because it's the only sector in the economy where the share of immigrants is negligible: only 3 percent of all immigrants work in this sector, compared to more than 12 percent of all natives.

We show the effect of legalization on employment changes across sectors in Table C.7. The sum of the point estimates in this table should coincide with the estimate in column four of Table C.2. The results show how employment losses are concentrated in high-immigration sectors, and to a lesser extent in low-immigration sectors. These results suggest that natives and immigrants started to compete in the labor market once the legalization took place.

Table C.7: **Estimates of the Effect of the Immigration Reform on Employment by Sectors**

	Δ Employment Native Low Skilled		
	High-immigrant sectors	Low-immigrant sectors	Public administration
Panel A: Baseline			
Δ Immigrants	-0.516**	-0.221	0.131
in social security/pop.	(0.211)	(0.142)	(0.091)
Observations	50	50	50
R-squared	0.288	0.214	0.321
Panel B: Without controls			
Δ Immigrants	-0.288	-0.249	0.167
in social security/pop.	(0.186)	(0.182)	(0.117)
Observations	50	50	50
R-squared	0.031	0.028	0.037
Panel C: Without 4 main provinces (Mad., Bcn., Val., Sev)			
Δ Immigrants	-0.309*	-0.248*	0.229**
in social security/pop.	(0.166)	(0.141)	(0.093)
Observations	46	46	46
R-squared	0.037	0.031	0.072
Panel D: Reduced form - all controls (ITT)			
Δ Immigrants	-0.507***	0.0693	0.112
in social security/pop.	(0.177)	(0.194)	(0.0863)
Observations	50	50	50
R-squared	0.306	0.197	0.319
Panel E: 2SLS - all controls (LATE)			
Δ Immigrants -0.770***	0.105	0.170	
in social security/pop.	(0.257)	(0.281)	(0.119)
Observations	50	50	50
F-test of excluded instruments	25.180	25.180	25.180
	Share in sector		
Immigrants	0.740	0.231	0.029
Natives	0.511	0.365	0.123

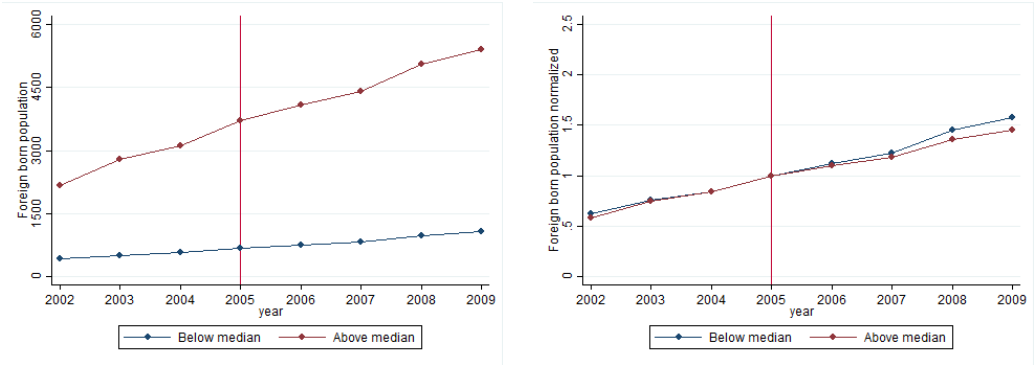
NOTE: This table estimates the effect of immigrant regularization on employment by sector of activity. High-immigrant sectors are Agriculture, Construction, Hotels and Services, and Other Services. Low-immigrant sectors are Industry (three subcategories), Transportation, and Finance. Regressions are weighted by population. Panels A, D and E include all controls (political alignment, coastal dummies, construction pre-reform and share non EU-15 immigrants in 2004).ITT and LATE estimates are explained in detail in Appendix B. Robust standard errors reported. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

C.4 Migration results

An alternative data source to measure internal migration is the Spanish Municipal Register of Population. This contains administrative data that record the location of residence of individuals living in Spain. These data have the advantage of being administrative data. However, using data from the Municipal Register, as opposed to the SLFS used in the main text, has two disadvantages: First, it is possible that people take some time to register in their new location once they have moved. Individuals have strong incentives to do so, since it gives them access to public education and health care, but there are mechanisms to obtain these services temporarily in locations other than the official residence. Second, in this data set, we cannot distinguish between high- and low-skilled workers.

It is reassuring that, using this alternative data set, we obtain very similar results compared to using the SLFS. In this appendix, we replicate the figures shown in the main text. We also check and can confirm that the estimation does not change significantly.

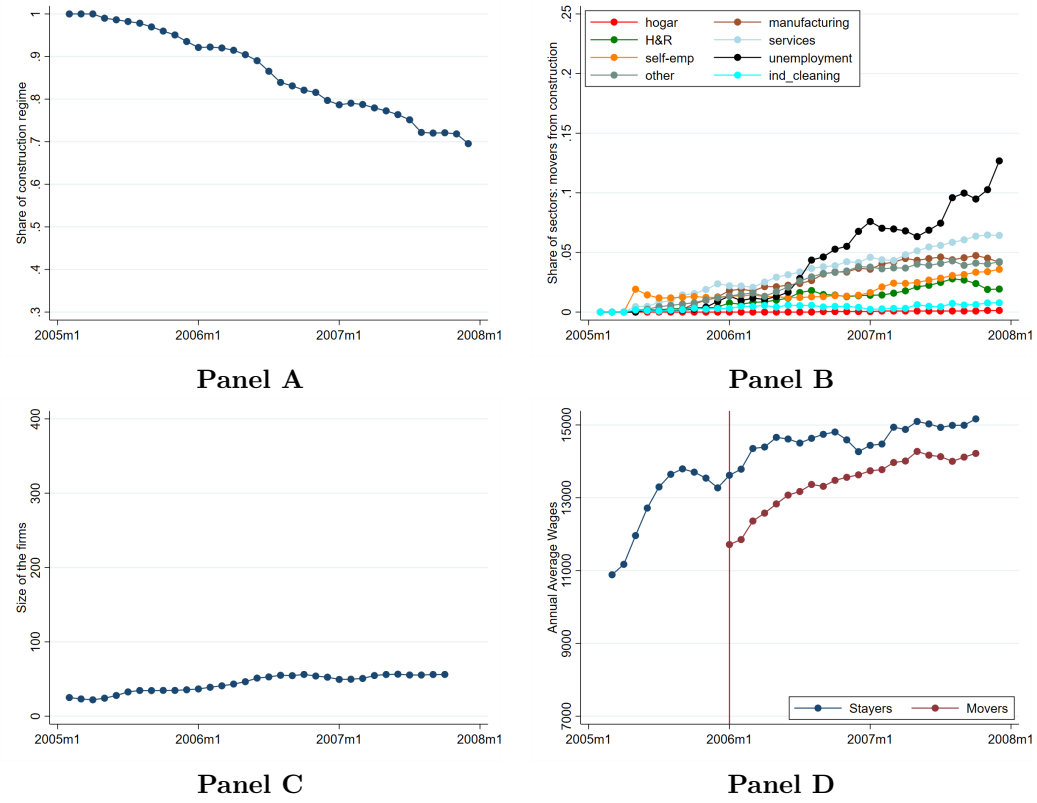
Figure C.2: **Spanish and Foreign-Born Population and the Immigration Reform, Natives and Immigrants**



NOTE: The figures on the left show Spanish and foreign-born population in Spanish provinces above and below the median level of immigration in 2002. The vertical red line indicates the last period before the reform (2005). The Municipal Register reports about the number of individuals residing in municipalities the first of January each year. The figures on the right normalize the figures on the left, using the last observation before the policy intervention. Source: Municipal Register.

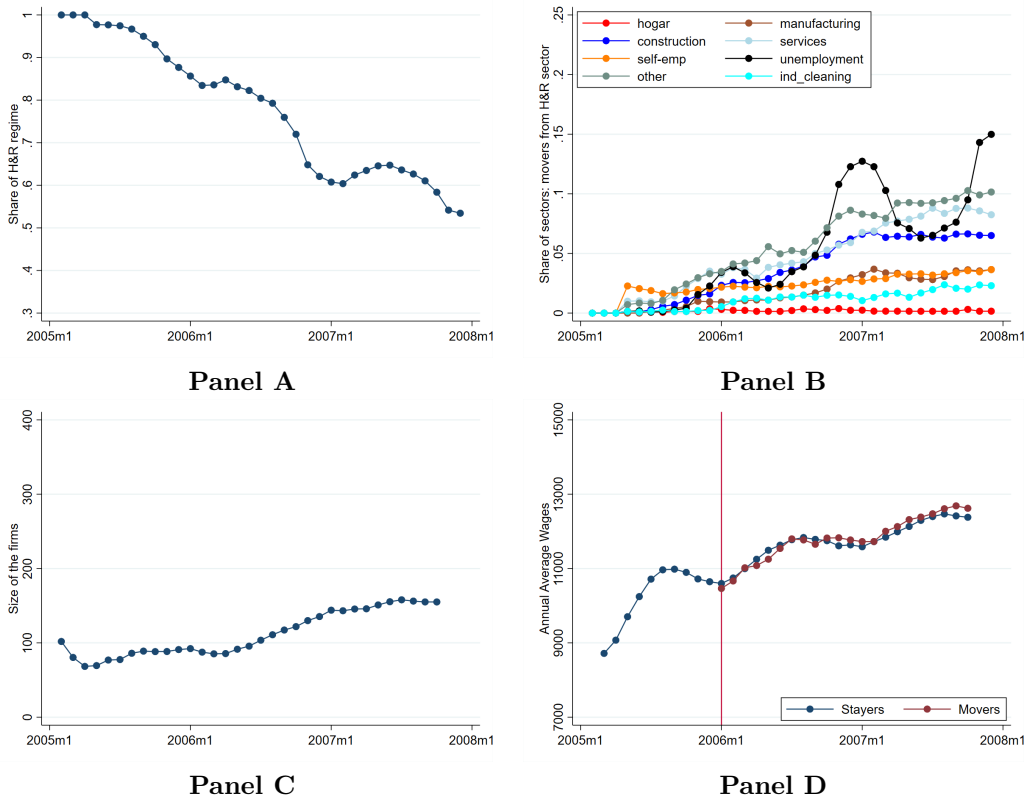
C.5 Newly Legalized Immigrants and Sector Switching

Figure C.3: **Newly Legalized Immigrants and Sector Switching: Construction**



Panel A shows the fraction of immigrants who remained in construction among the immigrants who entered the social security system with the legalization in the construction sector and continued in the sector throughout the period. Panel B shows the sectors where immigrants, who entered into the social security system with the legalization and a contract in the construction sector and continued in the social security throughout the period, move to. Panel C shows the average size of the firm where immigrants, who entered the social security system with the legalization through in the construction sector and continued to work throughout the period, were working. Panel D shows the difference between annual average wages of legalized immigrants who move away from the construction to others sectors of activity and the annual average wages of workers legalized through the construction who remain in the sector. The red vertical line indicates the beginning of 2006 where we observe that most movements took place.

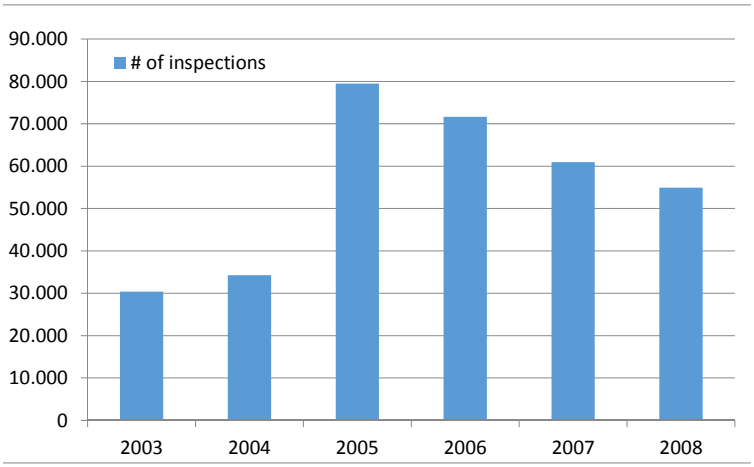
Figure C.4: **Newly Legalized Immigrants and Sector Switching: H&R**



Panel A shows the fraction of immigrants who remained in H&R among the immigrants who entered the social security system with the legalization in the H&R sector and continued in the sector throughout the period. Panel B shows the sectors where immigrants, who entered into the social security system with the legalization and a contract in the H&R sector and continued in the social security throughout the period, move to. Panel C shows the average size of the firm where immigrants, who entered the social security system with the legalization in the H&R sector and continued to work throughout the period, were working. Panel D shows the difference between annual average wages of legalized immigrants who move away from the H&R to others sectors of activity and the annual average wages of workers legalized through the H&R who remain in the sector. The red vertical line indicates the beginning of 2006 where we observe that most movements took place.

D Work Inspections

Figure D.1: Number of inspections related to foreign workers



Source: Ministry of Labor and Social Security.

E Conditions for Work Permits

This section introduces the exact description (in Spanish) of the conditions for immigrants who were eligible to obtain legal work permits.

Disposición transitoria tercera. Proceso de normalización.

1. En el plazo de tres meses desde la entrada en vigor del Reglamento de la Ley Orgánica 4/2000, de 11 de enero, sobre derechos y libertades de los extranjeros en España y su integración social, los empresarios o empleadores que pretendan contratar a un extranjero podrán solicitar que se le otorgue una autorización inicial de residencia y trabajo por cuenta ajena, siempre y cuando se cumplan las siguientes condiciones: a) Que el trabajador figure empadronado en un municipio español, al menos, con seis meses de anterioridad a la entrada en vigor del Reglamento de la Ley Orgánica 4/2000, de 11 de enero, sobre derechos y libertades de los extranjeros en España y su integración social, y se encuentre en España en el momento de realizar la solicitud. b) Que el empresario o empleador haya firmado con el trabajador un contrato de trabajo cuyos efectos estarán condicionados a la entrada en vigor de la autorización de residencia y trabajo solicitada. En el contrato de trabajo, el empresario se comprometerá, con independencia de la modalidad contractual y el tipo de contrato utilizado, al mantenimiento de la prestación laboral por un período mínimo de seis meses,

salvo en el sector agrario, en el que el período mínimo será de tres meses. En los sectores de la construcción y la hostelería, el cumplimiento del compromiso de mantenimiento de la prestación laboral de seis meses podrá llevarse a cabo dentro de un período máximo de doce meses. Cuando los contratos de trabajo sean a tiempo parcial, el período de prestación laboral se incrementará proporcionalmente a la reducción sobre la jornada ordinaria pactada en dicho contrato, en los términos que establezca el Ministerio de Trabajo y Asuntos Sociales. c) Que se cumplan los requisitos previstos en el artículo 50 del Reglamento de la Ley Orgánica 4/2000, de 11 de enero, sobre derechos y libertades de los extranjeros en España y su integración social, para el otorgamiento de una autorización para trabajar, con excepción de lo dispuesto en sus párrafos a), b) y g).

2. Con sujeción a los requisitos establecidos en los párrafos a) y c) del apartado anterior, y en idéntico plazo al establecido en éste, podrán solicitar igualmente la concesión de una autorización inicial de residencia y trabajo los extranjeros que pretendan desarrollar su actividad en el ámbito del servicio del hogar familiar, trabajando parcialmente y de manera simultánea para más de un titular del hogar familiar. Para ello deberán acreditar que reúnen los requisitos previstos por la legislación aplicable a los efectos del alta en el correspondiente régimen de Seguridad Social como empleados del hogar discontinuos y que van a realizar un número de horas de trabajo semanales no inferior a treinta, en el cómputo global. Las prestaciones laborales concertadas a estos efectos deberán de abarcar un período mínimo de actividad de seis meses. Los extranjeros que puedan desarrollar una actividad en el servicio del hogar familiar a tiempo completo para un solo empleador podrán obtener la autorización de conformidad con el apartado 1 de esta disposición, siempre que cumplan los requisitos establecidos en ella.

3. Sin perjuicio de lo establecido en la disposición adicional tercera de la Ley Orgánica 4/2000, de 11 de enero, y la disposición adicional cuarta de su Reglamento, el Ministerio de Administraciones Públicas podrá habilitar, mediante instrumentos adecuados previstos en la legislación vigente, otras oficinas públicas para la presentación de las solicitudes.

4. Las solicitudes basadas en lo dispuesto por esta disposición transitoria se tramitarán con carácter preferente. La presentación de la solicitud supondrá el archivo de oficio de cualquier otra solicitud de residencia o de residencia y trabajo para el mismo extranjero presentada con anterioridad.

5. La autoridad competente, a la vista de la documentación presentada, resolverá de forma motivada y notificará al empresario o empleador, en los casos del apartado 1, y al propio trabajador extranjero, en los casos del apartado 2, la resolución sobre la autorización de residencia y trabajo solicitada. Cuando la resolución fuese favorable, la autorización concedida estará condicionada a que, en el plazo de un mes desde la notificación, se produzca la afiliación y/o alta del trabajador en la Seguridad Social. La notificación surtirá efectos para que se proceda al abono de las tasas correspondientes. Resultará de aplicación lo dispuesto en la disposición adicional primera de la Ley Orgánica 4/2000, de 11 de enero, a los efectos del plazo para la resolución de las solicitudes.

6. Cumplida la condición de afiliación y/o alta, la autorización comenzará su período de vigencia, que

será de un año. Transcurrido el plazo de un mes desde la notificación de la autorización sin que se haya cumplido la condición señalada, la autorización quedará sin efecto. En este caso, se requerirá al empresario o empleador, en los casos del apartado 1, y al propio trabajador extranjero, en los casos del apartado 2, para que indique las razones por las que no se ha iniciado la relación laboral, con la advertencia de que, si no alegase ninguna justificación o si las razones aducidas se considerasen insuficientes, podrán denegarse ulteriores solicitudes de autorización que presente.

7. Durante el mes inmediatamente posterior a la entrada en vigor de la autorización, el extranjero deberá solicitar la tarjeta de identidad de extranjero, que será expedida por el plazo de validez de la autorización.

8. La concesión de la autorización determinará el archivo de los expedientes de expulsión pendientes de resolución, así como la revocación de oficio de las órdenes de expulsión que hayan recaído sobre el extranjero titular de la autorización, cuando el expediente o la orden de expulsión correspondiente esté basada en las causas previstas en el artículo 53.a) y b) de la Ley Orgánica 4/2000, de 11 de enero, sobre derechos y libertades de los extranjeros en España y su integración social. La denegación de la autorización implicará la continuación de los expedientes de expulsión y la ejecución de las órdenes de expulsión dictadas.