Do Skilled Migrants Compete with Native Workers?
Analysis of a Selective Immigration Policy

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Abstract

In recent years Western countries are expressing growing concerns about the regulation of migration flows and many are considering adopting some form of selective immigration policy. This paper analyzes the labor market effects of one of such reforms introduced in France in 2008 with the aim of encouraging the inflow of foreign workers with skills that are scarce among the local labor force. The analysis relies on administrative employer-employee data and it is based on a difference-in-differences approach. Results show that the reform increased the hiring of foreign workers in target occupations without causing any harm to native employment. As a result, the overall stock of labor grew in these jobs. Entry wages are lowered by 4% among natives and by 9% among foreigners, suggesting that these two groups may not be perfect substitutes, even when they are employed for the exact same task. The effects are stronger for the occupations with the most severe lack of native candidates and for those with an average salary largely above the minimum wage, indicating that the reform was successful in attracting candidates with rare skills and relatively high productivity.

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1 Introduction

The question of how to regulate migration flows to favor the destination economy is not new in the policy debate. European countries have been confronted for many years to the task of balancing the need for a qualified young labor force and the fear that large inflows of workers may create unemployment, lower wages and generally increase the competition for natives. The signature of the Schengen agreements in 1985 abolished all restrictions to labor movements within the area, but it did not end the discussion on how to manage immigration from non-signatory states, especially coming from outside the European continent. Moreover, in recent years the debate is reaching the forefront of the policy agenda, as shown by the Brexit referendum and the widespread political success of parties carrying a clear anti-immigration message. Several Western countries have complexified their legal framework in the attempt to move from a situation of endured immigration towards a system of chosen immigration. For instance, Canada and Australia introduced policies favoring selective immigration of high skill labor, the US instituted a system of country quotas to increase diversity in the migration flows, and the UK and France established visa facilitations for migrant workers possessing rare skills.

While it is empirically arduous to evaluate the general equilibrium effect of immigration policies, the features of the French reform under study allow to test in a partial equilibrium setting whether it was able to meet its objective of increasing the supply of skilled labor in target occupations, to verify whether it introduced additional competition for the incumbent labor force and to inform on the distributional consequences of such policies. The richness of our data allow to test the joint effect on both wages and employment, allowing to draw conclusions on the overall impact of the reform (Dustmann, Schönberg and Stuhler, 2017). This is one of the rare studies looking at the impact of highly-skilled immigration on the native labor force, since most of the existing literature focuses on flows of uneducated migrants or refugees (Card, 2001; Borjas, 2003; Foged and Peri, 2016), and especially looking at the impact of economic immigration confined to jobs suffering from lack of candidates in the local labor force. Our contribution is also methodological. Existing studies often lack exogenous supply shocks and have to rely on broad identification strategies focusing on geographic or educational differences in exposure (Altonji and Card, 1991; Card, 2001; Dustmann, Schönberg and Stuhler, 2017). Given the policy definition of a narrow list of occupations where immigration is encouraged, we can isolate the impact on the specific population affected, providing new insights to the debate on the degree of substitutability between natives and migrants in the extreme case where they are employed in the same job and where foreigners don't suffer from occupational downgrading (Dustmann, Frattini and Preston, 2012). Finally, the analysis of the heterogeneity of response across different job and firm characteristics permits to draw some conclusions about the differential elasticities at play, which can be informative for the design of future policies.

The reform was introduced in January 2008 with the aim to facilitate the hiring of extra-European workers by easing the firms' administrative procedure for employing foreign labor in a list of thirty occupations. The overall costs of hiring an immigrant are considerably high in France, notably because of the lengthiness and complexity of the process and the requirement to prove the extensive prior search of a suitable candidate already residing within the EU boundaries. Consequently, the reform is likely

to have significantly reduced the hiring constraints of firms in need of "rare" competencies. The list of occupations varies by region of employment and is defined based on the ratio between the local number of vacancies and the number of unemployed workers possessing the required competences and living in the area. The objective of the reform is thus to encourage immigration as a tool for broadening the skill pool available to companies, and can be seen as a supply side intervention. The analysis applies a difference-in-differences approach that relies on a comparison with a group of professions with similar characteristics but not included in the list, and it is based on two administrative employer-employee datasets collected by the statistical office attached to the French Ministry of Labor[2]. The first one contains information on the labor in- and outflows within each French plant with more than 50 employees and a sample of plants below 50 employees over the period from 2004 to 2015. The second contains employment and wage information for a panel of 1/12th of French employees between 2002 and 2012.

Results show that the reform increased the share of total hires made of foreigners by 16% in target occupations, and the probability of hiring a foreign employee by 17%, confirming that firms took advantage of the greater pool of workers made available by the reform. The employment prospects of natives were not undermined by the increase in competition since, depending on the specification, the probability of hiring natives is either unchanged or slightly positively affected. The raise in share of foreigners is thus entirely due to additional foreign entries, given the absence of substitution effects. These results are confirmed using the stock data, which show an employment increase of 1.1% in target occupations. While the absence of substitution between foreign and native workers can be explained by the fact that the jobs concerned were experiencing hiring difficulties prior to 2008, so that firms were probably sub-optimally staffing employees, the results on salaries reveal that these two groups may be imperfect substitutes. I find that the sudden increase in labor supply induced a negative pressure on entry wages, as economic theory would predict. The latter is however twice as important on the wages of foreign workers (-9%) that on the ones of natives (-4%). These findings reveal that the additional competition generated by immigration is downplayed by their imperfect substitutability with native workers, even when they are employed in the same jobs, and that the main losers are the migrants already present in the country. However, the graphic analysis shows that while the employment effects seem to be long lasting, the negative wage pressure dies out after 2010. In the heterogeneity analysis, I find that the effects are mostly driven by medium-high skill occupations (largely above the minimum wage), and by occupations that were characterized by very high levels of tension before the reform. The effect on entry wages may thus be in part due to the decreased level of tension, if previously firms had to offer particularly good contracts to find a candidate in the context of scarcity. I am however not able to test this channel empirically. Finally, in an extension I test the impact of the reduction in hiring costs on overall firm size and salary mass. To do so I define each firm's exposure by the share of employment in the sector accounted for by reform occupations before 2008. Results show a slight increase in overall employment and a slight decrease in the salary mass, consistent with the occupation level analysis. It is important to notice that the post-reform period is characterized by the hit of the financial crisis, which is visible by an overall drop in hires in 2009. While I argue that the econometric strategy can properly account for this fact, results have to be interpreted relative to this context, which may have exacerbated

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the negative pressure on wages due to the slack demand. When in a robustness test I exclude the year 2009, I indeed find a milder but still significant negative effect on wages.

The rest of the paper is organized as follows. Section 2 presents the debate in the literature, Section 3 describes the reform and shows how migration flows evolved after its introduction, Section 4 presents the data and the empirical strategy, Section 5 shows the results, Section 6 discussed the findings in the light of the predictions of economic theory, Section 7 concludes.

2 Literature Review

This paper mainly touches upon two branches of the economic literature. The first one discusses the potential benefits and drawbacks of selective migration policies. Constant and Zimmermann (2005) sustain that the European Union would gain from migration policies dictated by economic needs, and Docquier and Rapoport (2007) underline how an inflow of highly-skilled migrants can be a remedy against both the aging of the population and the skill shortages that afflict advanced countries. In fact, in a context of rapidly evolving skill requirements in the global economy, many European countries are shown to be increasingly competing with each other and with the rest of the world to attract international talents (Mahroum, 2001). Nonetheless, other authors have been critical of selective migration as a tool to relax the scarcity of certain competencies in the native labor force. Ruhs and Anderson (2010) highlight how there are other ways to address skill needs, notably through the improvement of wages and working conditions to foster greater interest among local workers, or through the internal training of current employees. Wickham and Bruff (2008) find that selective migration may actually exacerbate skill shortages, because it substitutes for policies aiming to adapt the education system. In addition, Devins and Hogarth (2005) describe how employers often hire migrants because they accept lower wages and worse working conditions, which generates a deterioration of the quality of these occupations that dissuade even further native workers from applying. Finally, labor shortages are often temporary, contrasting with the long term nature of immigration, which tends to perpetuate itself through several generations thanks to the establishment of migrants' networks (Rodriguez, 2004). Most of these works either look at aggregate impacts or remain descriptive. This paper is to the best of my knowledge the first in depth empirical investigation of one of such policies in terms of take-up and labor market consequences for the population of native workers that face a direct increase in competition. Furthermore, with the analysis of the heterogeneity of impact across the initial level of tension and average salary, it informs on the type of occupations and firms that are likely to react the most to these kind of policy.

The second question that is addressed by this paper is one that has been extensively explored along the years without reaching a definitive consensus: what is the impact of immigration on native workers outcomes[3]. Despite the attention that labor economists and policy makers have dedicated to the issue,

[3]Many authors have studies the example of low-skilled migrants coming from Central America into the United States, and have focused on the potential negative wage pressure imposed on low-skilled local labor (see for example Card (2001), Borjas (2003), Ottaviano and Peri (2012)).

evidence remains ambiguous, with estimations that vary widely across studies but seem to cluster around zero (Friedberg and Hunt, 1995; Borjas, 2003). The lack of clear results can in part be explained by the important empirical challenges surrounding the estimation of the causal impact of immigrants' flows, given the pervasive endogeneity in mobility decisions, and the different margins exploited by the most commonly used identification strategies (Dustmann, Schönberg and Stuhler, 2016). Borjas (1999) was the first to introduce the canonical model to think about the effects of immigration in a production function framework. His model simulations showed that immigration imposes a negative pressure on wages of natives with competing skills while it tends to raise wages of natives with complementary skills. These results underline the re-distributive consequences of immigration. Nevertheless, later studies that tried to refine the model found that the negative impact is not so clear in the long run or when some of the assumptions are relaxed (Manacorda, Manning and Wadsworth, 2012; Lewis, 2013). In a recent paper Ottaviano and Peri (2012) estimate a general equilibrium model and find that migrants and natives are imperfect substitutes even within the same education-experience-gender group. Card (2005) was the first to propose to empirically estimate the effect of immigration at the level of geographic areas, solving for the endogeneity in immigrants' location by using the presence of a previous network of migrants from the same origin as an instrument. His results challenge the findings from the canonical model by showing that immigration of low skilled workers has no impact on the wage of competing low skilled natives, implying imperfect substitutability between the two labor inputs. D'Amuri and Peri (2014) and Cattaneo, Fiorio and Peri (2015) apply the Card's instrumentation technique to follow native career progressions in Western Europe and find that low-skill immigration pushes unskilled natives to take more complex jobs, having a positive effect on their wage. Peri and Sparber (2009) find similar results for the US, underlying how low skill natives have a comparative advantage in occupations involving communication in English with respect to low skill migrants. Among the researchers that base their analysis on natural experiments, Foged and Peri (2016) use exogenous Denmark refugee dispersal rules to show that immigration pushes unskilled natives to specialize in higher paid jobs, increasing their wages and employment mobility. Glitz (2012) uses the random assignment of East Germans into cities in the West after the fall of the Berlin wall, and find a small increase in unemployment among natives and no effect on wages. Finally Angrist and Kugler (2003) are among the few to analyze the role of labor market rigidities in determining the impact of immigration. They use the wave of immigration generated by the Balkan war and find that European countries with less flexible labor markets are able to protect native workers from immigrants' competition on wages but, on the other hand, they suffer worse consequences on unemployment. Most of these articles focus on the impact of large inflows of low-skilled foreign migrants and justify the finding of imperfect substitutability by the claim that native labor can specialize in other occupations requiring skills that foreign workers don't have. This phenomenon is exacerbated by the fact that immigrants tend to suffer from downgrading in the host economy, therefore avoiding direct competition with workers possessing similar skills (Dustmann, Frattini and Preston, 2012). Our paper expand the existing literature by looking at the effect of an inflow of high-skill migrants constrained into a set of specific occupations on employment and wages of natives working in the same jobs. While I do not explicitly look at the effect of the reform on the probability that a native changes occupation, the analysis shows no change in the native hiring patterns. The paper more closely related to this work is Mayda et al. (2018), which looks at a change in the H-1B visa policy in the US that along many aspects

can be seen as the reverse of the policy studied in this paper. The H-1B visas are typically used by US firms to attract foreign employees with high technical skills and rare competences, as for example IT programmers. The reform that they study reduces the quota for these visas, and they find that while the inflow of foreign workers is significantly lowered, employment of native workers remain unchanged. They interpret these results as evidence of the low degree of substitutability between the two types of labor. While their main objective is to identify how the change affected the distribution of foreign workers across occupations and firms, I focus on the effects for the incumbent population, which I believe elicit the greatest interest, both among academics and policy makers.

3 The Reform

3.1 The legal context

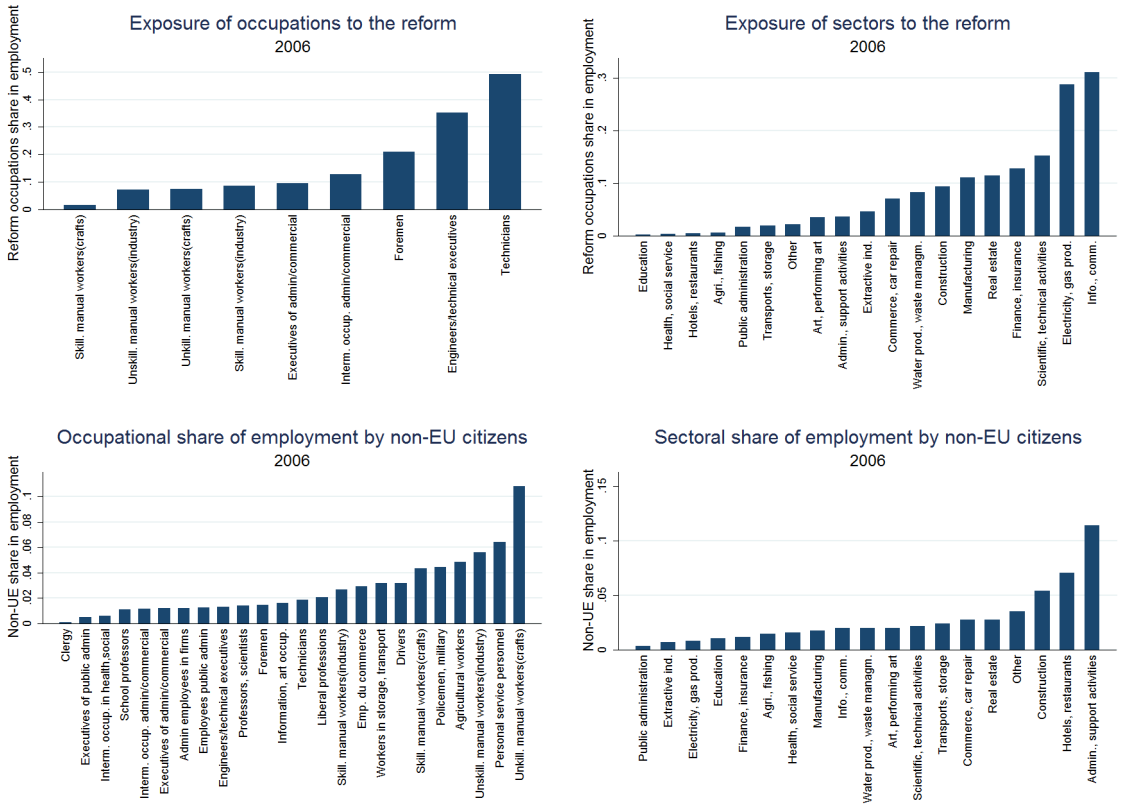
In France, the labor law gives priority to current residents and EU nationals in the hiring process. If an employer wishes to hire a non-European citizen that does not currently reside on French territory, he has to apply for a work authorization at the local prefecture. The latter has to transmit the request to the local Service of Foreign Labor, which grants it only if two conditions are met. First, the employer must prove to have searched extensively for a resident or EU candidate before considering hiring a non-European. Second, the occupation under question must appear as in tension from the statistics collected by *Pôle Emploi*[4]. The tension indicator measures the ratio between available vacancies in each occupation and the pool of current unemployed workers possessing the required competencies for the job. A high level of tension thus signals that the occupation is hard to fill. If both conditions are verified, the authorization is granted to the employer and the candidate is allowed to apply for an economic visa[5]. As evidenced by a recent report issued by the OECD (2017), the lengthiness and burdensomeness of the procedure has a discouraging effect on employers. In France all demands still have to be submitted in paper format, and despite the fact that the official time to process requests is set to a maximum of two months, often it takes much longer in practice, especially when the institutional bodies involved in the final decision are in disagreement. In 2008, the French government introduced a legislative decree to facilitate the hiring of non-resident extra-Europeans within a list of 30 occupations characterized by a high level of tension in the labor market. The new law states that, for the occupations concerned, the employer is not anymore required to prove the prior search for a priority candidate but is automatically granted the authorization to hire a foreign worker. This reform was proposed to help firms recruiting for positions subject to a scarcity of domestic labor. In a first step the list was defined at the national level, and in a second phase each region selected a subset of occupations that remained in tension at the local level. As a result, only five jobs apply to the entire French territory, while the others are only valid in certain areas. Table A1 in the appendix reports the full list of target occupations and details the regions to which each of them applies. The main job types concerned by the reform are computer science (2

[4]French governmental agency supporting the unemployed in their job-search.

[5]Figure A1 in the appendix reports a diagram taken from OECD (2017) that illustrates all the administrative steps that need to be undertaken before hiring a foreign worker.

occupations), construction (4 occupations), electricity and electronics (4 occupations), and mechanical construction and metal processing (4 occupations). Figure 1 shows the exposure to the reform of different activities and sectors (top graphs), as well as their share of employment composed by non-EU citizens in 2006 (bottom graphs)[6].

Figure 1: Characterization of the Reform



Source: Author calculations based on LFS data

The first thing to be observed is that the sectors and occupations targeted by the reform do not correspond to the ones that traditionally employ foreign workers. While the new policy selected jobs that require relatively high levels of cognitive or technical skills such as engineers and technicians in sectors such as information and communication or energy production, we can see that foreigners are traditionally employed in routine or manual occupations within low-skill sectors such as unskilled manual workers and service personnel in administrative and support activities or hotels and restaurants. This picture confirms the goal of increasing immigration of people with rare and highly demanded skills.

For the identification strategy I take advantage of the fact that the legal change under study was part of a larger effort to reform France's economic migration policy. In particular, the working group in charge of the reform started by establishing an extended list of 150 occupations to be open without restrictions

[6]The sectors reported follow the INSEE classification of French activities level 1 (21 categories) and the occupations follow the INSEE classification of socio-professional occupations level 2 (24 categories).

to European nationals coming from member states under transitory regimes[7], and then selected the subsample of 30 occupations opened to extra-EU citizens. The definition of both lists is based on the same criteria of high tension and is informed by the same data, so that their high level of comparability creates a natural candidate for the control group in the analysis. More details are presented in the next section. To precisely measure tension in each occupation, the working group considered several indicators collected quarterly by *Pôle Emploi*: i) the ratio between job supply (vacancies) and demand (unemployed with relevant skills), ii) the volume of job supply, iii) the volume of job demand, iv) the evolution in the stock of demand and supply, v) the turnover rate of job seekers at the end of the month, and vi) the share of long term contracts within the job offers. All of the indicators are collected periodically for each of the 22 regions of metropolitan France and for 225 categories of occupations. While these measures constitute the objective criteria used to design the policy, there is no hard threshold determining the inclusion into the final list, since the latter was finalized after a negotiation with the main social partners, which introduced some degree of arbitrariness due to political arrangements (OECD, 2017). This insures some degree of quasi-randomness in the inclusion or exclusion of certain categories that can be exploited as source of identifying variation. Furthermore, the use of these tension indicators is not exempt of criticism. First, they rely on vacancies and unemployed people that are registered to *Pôle Emploi*, which has an overall coverage of only 40% of the market and varies substantially across types of occupations and regions. Second, they do not include any information regarding relative wages. A shortage of skills may therefore not always mean high marginal productivity but can also reflect the fact that some occupations offer conditions that are not attractive enough to resident workers (Saint-Paul and Cahuc, 2009). Finally, they tend to be fairly volatile across time, so they may sometimes reflect temporary unbalances in the labor force, which contrast with the long-term nature of immigration policy. All these caveats add some fuzziness regarding the characteristics of the occupations included and excluded from the list, and make it possible to define a suitable control group to evaluate the effects of the reform on labor market outcomes.

3.2 Immigration in France Before and After the Reform

France has historically been an immigration country, since it received several waves of immigrant flows during the 19th and the 20th centuries. As of 2008, 11.8 million people in France are either immigrants or immigrant descendants, corresponding to about 19% of the metropolitan population[8]. Many immigrant descendants acquire the French nationality during their childhood, thanks to the facilitations granted by the *ius soli*. The latter states that every child born on French soil with at least one French parent is automatically a citizen and, if both parents are foreigners, the naturalization is granted after 5 years of residence. Given the easiness of this procedure, every year between 60 and 80 thousands people acquired the French nationality during the period from 1999 to 2011. Immigrants are very unequally distributed within the French territory, with the majority of them living in Île-de-France, Provence-

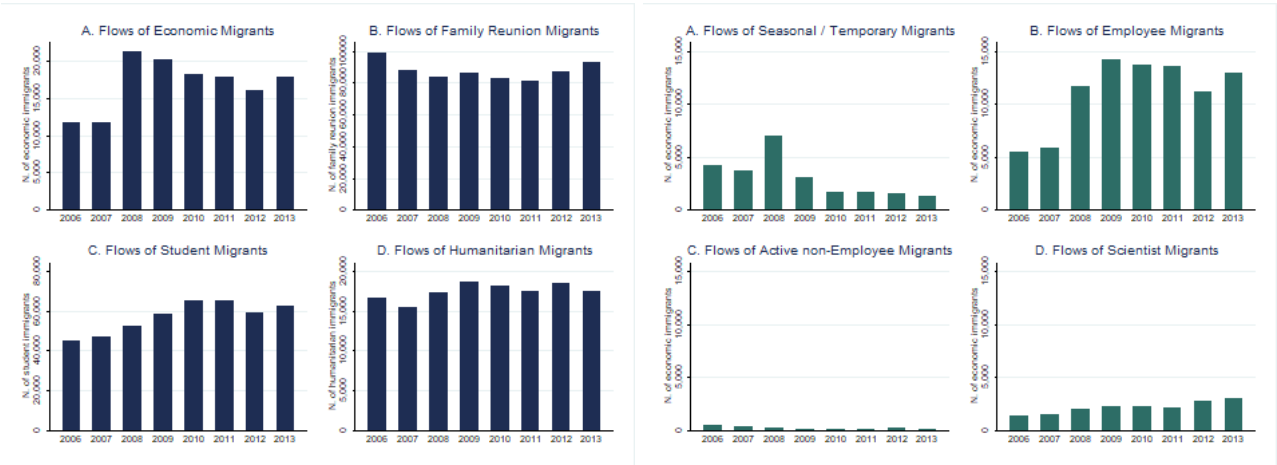
[7] At the time of the implementation of the reform this concerned only Romanian and Bulgarian nationals, which joined the European Union in 2007, but later it also included Croatians (EU members since 2013). Workers from these countries did not immediately obtain the right to work in all member states, and in France they continued to be subject to the same labor market restrictions of extra-Europeans during a probation period that lasted until 2014.

[8] Statistics from INSEE

Alpes-Côte d'Azur and Rhône-Alpes, while a very small portion lives in Auvergne, Basse-Normandie, Corse and Limousin.

Despite the importance of immigration flows, only a small proportion of them do it for economic reasons, as is defined by the type of visa obtained. The left panel of Figure 2 shows that every year about 80% of the new visas issued are for family reunification or study motives (almost 160 thousands migrants received a visa with these 2 motives in 2013), while only 10% are delivered for professional reasons (18 thousands migrants in 2013). However, the number of economic visas discontinuously jumped upward in 2008, while the other visa categories remained stable. Economic migrants went from about 12 thousands in 2007 to about 22 thousands in 2008, and then remained well above 15 thousands in the following years. The right panel of Figure 2 disaggregates the flows of economic visas into sub-categories, showing that most of the discontinuity comes from visas delivered to migrant employees, which went from little above 5 thousands in 2007 to about 12 thousands in 2008. I also observe a jump of 3 thousands in seasonal-temporary contract migrants, but the latter was smaller and only lasted one year. While I cannot say that all of the economic migration differential observed between 2007 and 2008 is due to the reform, these figures gives a first indication that the labor market did react to the policy change.

Figure 2: Evolution of immigration in France by type



Source: National statistics on immigration published by MI-DGEF-DSED

The trend in number of economic visas issued is however not homogeneous across the French territory. Some regions experienced particularly high growth around the time of the reform. Table A2 in the appendix reports the number of visas delivered per year and their annual growth within the 3 major categories and for the 7 regions that saw more than a 50% increase in economic migration between 2007 and 2008. In the same geographic areas I do not observe a similar discrete jump in the other visa types, again supporting the hypothesis that the reform was largely responsible for these shifts. In this group we find both the regions that traditionally receive many immigrants such as the Paris area, but also others where it is much less the case such as Corsica or Aquitaine. The classification of France into areas that saw a very large increase in economic immigrants and not, as measured from the statistics of the Ministry of Interior, is used in one of the heterogeneity analyses to corroborate the results.

4 Data and Empirical Strategy

The two main datasets used in the analysis come from official administrative records filled by firms. The first one combines the declaration of labor flows (*Déclaration des Mouvements de Main d'Oeuvre - DMMO*) with the survey on labor flows (*Enquête sur les Mouvements de Main d'Oeuvre - EMMO*), and reports information on all the employees' entries and exits taking place in plants larger than 50 employees and for a representative sample of plants with less than 50 employees. The second dataset contains a random sample of 1/12th of all the employees of France that is derived from the annual declaration of fiscal data (*Déclaration Annuelle des Données Fiscales - DADS*) and selected based on the date of birth. The periodic reporting of both sources of administrative information is a legal requirement for firms and both datasets are further cleaned and verified by the statistical office attached to the ministry of labor (*Dares*), who calls back the firms that reported some dubious answers to verify and eventually correct the entries. The DMMO-EMMO data made available for this study covers the period from 2004 to 2015, while the DADS 1/12th sample covers the period from 2004 to 2012.

The DMMO-EMMO data allows to follow every new entry and exit taking place within plants during the period of reference, including the detailed occupation, the broad nationality of the employee (French, EU, non-EU citizen), and information on whether the new contract is of defined or undefined term. At the plant level it records the regional location, the sector of activity, and of the total number of people employed during the period of reference. While the data is originally reported separately for every quarter, I decide to summarize it by year, in order to increase the cell size and to avoid problems of seasonality. The DADS data contains the gross and net salary paid to each employee in the sample, their detailed occupation, and an indication of whether they were already working for the firm in the previous year, which allows to calculate the entry wage. In this data the nationality is a binary indicator of foreign workers, so EU citizens are included among the foreign population. At the plant level the dataset contains the same information on the regional location, sector, and number of employees as the DMMO-EMMO data. It is important to notice that the nationality is an imperfect indicator of the individuals affected by the reform, since the reform only concerns non-EU citizens wanting to migrate into France through the obtainment of an economic visa, while it does not concern non-EU citizens already residing in France, for instance thanks to family reunion, which are allowed to work in any occupation without restrictions. Workers' nationality is therefore used as a proxy for exposure to the reform. Nevertheless, given that the discrete jump in 2008 is only observed within economic visas, we can expect that a discrete change in foreign entries within reform occupations reflects the actual effect of the reform.

In the main analysis I summarize the information into cells of occupation-plant-region-year, which I merge to a composite index of tension constructed using the data from *Pôle Emploi* and varying by occupation-region-year[9]. In addition, I construct an indicator that identifies occupations included in

[9]I consider all the following indicators: i) the ratio between job supply and demand registered during the reference period, ii) the volume of job supply, iii) the volume of job demand, iv) the evolution in the stock of demand and supply, v) the turnover rate of job seekers at the end of the month, and vi) the share of long term contracts within the job offers. All of them are collected by Pôle Emploi and published by Dares. I first construct a z-score for every measure by applying the following formula $Zscore_i = \frac{x_i - \bar{X}}{\sigma_X}$, and then take the average over the 6 scores. The result is a a composite tension index

the reform. The units of analysis are occupations within each establishment, which are assigned to the treatment group if they appear in the regional list where the plant is located. The outcomes of interest are the labor flows and stocks and the salary within occupations and establishments. In the last part of the analysis I aggregate the data at the plant level to look at the effect of the reform on firm size and salary mass.

The econometric approach used to recover the impact of the policy is a standard difference-in-differences comparing the group of reform occupations to a control group, and taking advantage of the panel structure of the data at the level of occupation x plant to control for all the time-invariant group-specific characteristics and for year shocks affecting all occupations equally. As a result, the identification relies on the absence of shocks affecting the two groups differently. This condition is known as the common trend assumption and it implies that the group of occupations concerned by the reform would have evolved with the same trend as the group used as control if the reform would not have happened, thus ensuring that the evolution observed in controls is a valid counterfactual. Consequently, the selection of a good control group is of crucial importance to ensure the unbiasedness of the results. Based on the characteristics of the occupations selected for the reform, I need controls that experience similar hiring difficulties but that for some "quasi-random" reason were not included. Given that the list of 30 occupations opened to non-European immigration is defined as a subgroup of the extended list of 150 occupations applicable to Romanians and Bulgarians, and that both are defined using the same criteria, I choose as control group the 120 occupations figuring in the second list but not in the first, in addition to to the occupations appearing in the list of 30 but not in the regional list where the plant is located[10]. The main threat to identification reside in the possibility of foreigners changing strategically the occupation for which they apply in order to enter the list, or of employers changing the job description at the margin to be able to attract a broader pool of candidates. While I cannot completely rule out this possibility, I observe carefully the hiring trends of control occupations at the moment of introduction of the reform, to check that there is no drop in foreign applications symmetric to the increase observed in treatment occupations. In addition, I exclude from the control group the occupations that are too similar in terms of skills required to some occupations in the treatment group, and that thus could be easily manipulated by employers or substituted by job seekers. To define similarity, I look at the first three digits of the four-digits occupation codes[11]. Through this procedure 23 occupations are excluded from the control group. Given that European citizens are partly treated in both groups through the relaxation of the conditions for Romanians and Bulgarians, I decide to exclude EU employees from the flows analysis based on the DMMO-EMMO data and only focus on extra-Europeans (*Foreigners* from now on) and French workers (*Natives* from now on). Since the size of EU nationals is small relative to

that varies by occupation and by year, and which captures all the information used by the commission to define the list of occupations for the reform.

[10]Both lists are defined by the ROME codes, which is the classification used by *Pôle Emploi*. However, the DMMO-EMMO and the DADS data reports the PCS classification used by *INSEE*, which does not match one to one with the categories of the first methodology. To conduct the analysis, I translate both lists into PCS using a bridge table provided by *Dares*. As a result, the reform list counts 37 PCS categories while the control list counts in total 141 categories.

[11]For example, I exclude *Buyers and buyers' support* (control occupation) because too close to *Marchandisers* (treatment occupation), or *R&D technicians in electricity, electronics, and electro-mechanics* (control) because too similar to *design managers in electricity and elechtronics (treatment)*.

the entire labor force (they account for only 5% of all movements), their inclusion or exclusion makes no difference in the results[12]. In the DADS data this distinction cannot be made, so EU citizens are included in the foreign labor force. Finally, the agricultural sector, the extractive industry and the public sector are excluded from the analysis.

The DMMO-EMMO analysis focuses on the effect of the reform on the labor movements in and out of plants. In particular, it tests whether the legal change had an impact on the probability of hiring a foreign worker, and on the share of entries within each occupation made of foreign labor. Further, it checks whether the first order impact crowded-out some employment opportunities for native workers, by looking at the same outcomes for this group. Finally, it measures whether the reform increased the precariousness of the employment contracts by looking at the effect on the share of temporary contracts, both for foreigners and natives. The model chosen to recover the effect of the reform follows a standard difference-in-differences specification with the addition of several levels of fixed effects:

$$Y_{oirst} = \alpha + \beta_1 D_{or} + \beta_2 D_{or} * T_t + \beta_3 \mathbf{X}_{oirt} + \gamma_t + \delta_o + \rho_r + \sigma_s + \epsilon_{oirst}$$

Where Y_{oirst} captures the outcomes of interest within occupation o, plant i, region r, sector s and time t; the treatment identifier D_{or} is a dummy varying at the region x occupation level and β_2 is the coefficient that directly measures the impact of the reform by estimating the differential trend observed in the treatment group after the reform ($D_{or} * T_t$). $\mathbf{X}_{oirt}$ is a matrix of controls that includes the average tension in each regional occupation during the period preceding the reform, which allows to correct for any pre-trend difference due to a different level of tension, and the logarithm of plant size. Finally, the model includes a wide range of fixed effects including year, occupation, region and sector level fixed effects. In a robustness check I also test a full fixed effect model at the plant-occupation level (the panel unit), but I do not chose this specification as the main one because it only captures the effect on the intensive margin and requires the use of a linear estimator to make the computation less demanding, introducing further problems as described below. The standard errors are clustered at the plant level and the time period considered goes from 2004 to 2010[13]. An important characteristic of all the outcomes considered is that they present a large number of zeros, since firms do not hire in all their occupations every year, especially when considering only the population of foreign workers. These zeros are important, because they signal the firm's choice of not to hire (or not to hire a foreigner) at that point in time, and therefore should be taken into consideration in the analysis. Consequently, linear estimators could lead to biased results. To solve for this issue, I follow the trade literature related to gravity models, which developed unbiased estimators capable of taking into account the large number of zeros present in bilateral trade data (Beine, Bertoli and Fernández-Huertas Moraga, 2016). These models were further adopted in the migration literature (Alesina, Harnoss and Rapoport, 2016). In particular, for the estimation of the

[12]Robustness of the results to the inclusion of the EU nationals in the analysis are non-reported in the interest of conciseness, but are available upon request.

[13]While the dataset would allow to analyze the effect up to 2015, the further away we get from the year of reform implementation, the harder it gets to interpret the coefficients are pure impact of the legal change. In addition, in 2011 the list was temporarily restricted by half, but was put back to its original state at the end 2012, thus including further complications for longer term analyses. However, in some graphic analysis I look at the full period available.

effect on the share of foreigners in total hires and the share of temporary contracts, I apply the quasi-maximum likelihood estimator (QMLE) suggested by Papke and Wooldridge (1996), which is a variant of the Pseudo Poisson Maximum Likelihood estimator (PPML) proposed by Silva and Tenreyro (2006) that allow to accomodate fractional data[14]. Finally, for the probability of hiring natives and foreigners, I apply a logit binary model.

The analysis based on the DADS data focuses on the impact of the reform on the total employment within occupations and plants, to check whether the effects observed on the flows are confirmed using stock data, and on the gross monthly salary of native and foreign workers, both overall and restricted to the compensation of newly hired employees. Given that here the outcomes are not concerned by the problem of zero-values, I use a linear estimator using the same difference-in-differences model presented above with the addition of plant fixed effects and add a specification with panel fixed effects by occupations x plants, which captures the effect on the intensive margin. Finally, the last part of the analysis looks at the impact of the reform on plant-level size and salary mass. The plant exposure to the reform is defined using the share of employment composed by reform occupations in the sector of activity before 2008. The exposure is not based on the share of employment at the plant level because, given that the occupations targeted are characterized by high level of tension, this measure may reflect more the ability to find a suitable candidate with these skills than the need for it. On the other hand, by taking the sectoral average disaggregated to 65 categories, we may get a closer measure of technological demand in the production function for this particular type of labor. The treatment impact is captured by the interaction between the intensity of exposure and the post-reform period, and is therefore measuring the marginal effect of greater exposure.

Table 1 presents the summary statistics of the main variables of interest across the two datasets, separately for treatment and control occupations. The two groups are balanced across most characteristics except for the level of tension, which is significantly higher in treatment occupations. For this reason, it is important to control for the pre-reform tension level in the regression analysis. Foreigners represent about 3% to 4% of total hires in both treatment and control occupations, and the probability of hiring a foreigner in a given year is about 5%. The share of temporary contracts (CDD) in total hires is about 10% lower in treatment occupations than in controls, and is similar for foreigners and natives. In the DADS data we observe about 1.8 employees per occupation within a plant, the gross monthly salary of natives is on average 3317 Euros in treatment occupations and 2853 Euros in controls, while foreigners have higher salaries than natives within treatment occupations (3808) but similar to natives within controls (2677). This signals that the jobs in question are relatively high skilled, and so are the foreigners that are hired to do them.

Figure A2 in appendix presents some graphs showing the unconditional trends followed by the main variables of interest. The common trend seems to hold before the reform, even without conditioning

[14] In an earlier version of the paper I looked at the effect on the number of foreign and native hires in each occupation x plant using the PPML estimator. Results are consistent with the outcomes presented in this version but the absence of pre-reform common trend cannot be rejected. I thus decided to exclude them from the paper. These results are available upon request.

neither for the pre-reform tension level nor for the fixed effects. After the reform we see a clear increase in the probability of hiring a foreigner and in the share of foreigners within new hires in treated occupations as compared to controls. On the other hand, no clear difference in hiring probability appears among natives. In all these flow measures the negative shock of the crisis that hit in 2009 is clearly visible but seems to be symmetric across groups and can therefore be captured by the year fixed effects. The stock of total employment has been steadily decreasing in both groups of occupations, but there is no evident differential trend after the reform. Similarly, the trends in salary, both of natives and foreigners and among all the employees and new entrants seem to follow similar trends across the two groups with no immediately visible change after 2008. The share of foreigners hired within controls remained stable between 2007 and 2008, which comforts the assumption of no strategic substitution in the occupations sought by foreigners or advertised by employers.

Table 1: Summary Statistics

DMMO-EMMO Database				***DADS 1/12th Database***			
Variable	**statistics**	**Treatment**	**Control**	**Variable**	**statistics**	**Treatment**	**Control**
	mean	0,03	0,04		mean	1,81	1,75
Share of foreign entries	(sd)	(0,15)	(0,16)	N. of employees	(sd)	(3,44)	(2,81)
	Share obs>0	5%	5%				
	mean	0,12	0,16		mean	3317	2853
N. of foreign entries	(sd)	(1,74)	(2,54)	Gross monthly salary natives	(sd)	(2057)	(2441)
	Share obs>0	5%	5%				
	mean	0,09	0,16		mean	2905	2347
N. of foreign exits	(sd)	(1,03)	(2,47)	Gross monthly salary native new entrants	(sd)	(1863)	(2035)
	Share obs>0	5%	5%				
	mean	0,05	0,05		mean	3808	2677
Prob. of foreign entry	(sd)	(0,22)	(0,22)	Gross monthly salary foreigners	(sd)	(76573)	(3889)
	Share obs>0	5%	5%				
	mean	0,04	0,04		mean	3019	2322
Prob. of net foreign entry	(sd)	(0,19)	(0,19)	Gross monthly salary foreign new entrants	(sd)	(1966)	(5576)
	Share obs>0	4%	4%				
	mean	0,36	0,47		mean	160	133
Share of CDD in foreign entries	(sd)	(0,46)	(0,48)	Firm size	(sd)	(543)	(480)
	Share obs>0	2%	3%				
	mean	2,12	2,49		mean	0,20	0,02
N. of native entries	(sd)	(8,48)	(11,25)	Pre-reform average tension	(sd)	(0,20)	(0,21)
	Share obs>0	58%	56%				
	mean	2,07	2,56				
N. of native exits	(sd)	(7,59)	(10,81)				
	Share obs>0	64%	67%				
	mean	0,58	0,56				
Prob. of native entry	(sd)	(0,49)	(0,50)				
	Share obs>0	58%	56%				
	mean	0,36	0,34				
Prob. of net native entry	(sd)	(0,48)	(0,47)				
	Share obs>0	36%	34%				
	mean	0,35	0,44				
Share of CDD in native entries	(sd)	(0,44)	(0,46)				
	Share obs>0	25%	28%				
Pre-reform average tension	mean	0,18	0,03				
	(sd)	(0,20)	(0,20)				
Firm Size	mean	307,48	297,40				
	(sd)	(716,47)	(692,47)				
N. of observations		213'699	641'113	N. of observations		534,259	1,359,023
N. of occup. x establishments		95'250	289'299	N. of occup. x establishments		221,018	559,755
N. of establishments		31'038	42'674	N. of establishments		154,369	297,99

5 Results

5.1 Main results

Table 2 presents the main results obtained on the flow outcomes. Columns (2) to (4) look at the effect on foreign nationals while columns (5) to (7) look at the effects on natives. All the coefficients have to be interpreted in terms of incidence ratios. The reform increased the share of foreigners in new hires by 16% on average over the three years following the reform, the probability of hiring a foreigner in a given year rose by 17% and so did the probability of having a positive net entry of foreigners (having more workers entering a given plant in a treated occupation than exiting the same plant and occupation). When looking at natives, the probability of entry and net entry appears, if anything, slightly positively affected by 2%. Since the significance of the coefficient is not robust to all of the robustness checks I conclude that native employment prospects are left unchanged by the rise in foreign inflows, so that the effect in column (1) can bee seen as purely caused by higher foreign entries. Finally, the precariousness of working contracts is unchanged for foreigners and slightly decreased for natives, indicating that the increase in inflows did not degrade the working conditions offered by firms. The number of foreign and native entries are not used as outcomes in the regressions despite their availability in the data because the common trend assumption is not verified for them. Given the legal requirements associated with the issuance of work permits, high levels of tension strongly increase the employment probability of foreigners, while they slightly decrease the one of natives, which are harder to find for these positions. On the other hand, treatment occupations hire less foreigners for a given level of tension, which can be explained by the fact that these jobs are relatively more skilled than controls and differ from the type of positions usually taken by foreigners, as shown in the summary statistics. Finally, as predictable, large firms offer a smaller proportion of short term contracts and tend to hire more foreigners, while it is not the case for natives. This can be due to the fact that is very burdensome and costly for small companies to go through the procedure of work permit applications, so they tend to focus on local labor instead.

Table 2: Main Results using DMMO data

	(1) Share foreign hires	(2) Prob. hiring foreigner	(3) Prob. net entry foreigners	(4) Share CDD foreigners	(5) Prob. hiring native	(6) Prob. net entry natives	(7) Share CDD natives
VARIABLES	QML	LOGIT	LOGIT	QML	LOGIT	LOGIT	QML
Treat	0.463***	0.312***	0.380***	1.526**	0.940*	1.106***	1.547***
	(0.0453)	(0.0268)	(0.0378)	(0.274)	(0.0347)	(0.0359)	(0.0823)
Treat x Post Reform	1.160***	1.178***	1.171***	1.010	1.021**	1.029***	0.964***
	(0.0326)	(0.0264)	(0.0295)	(0.0460)	(0.0100)	(0.0103)	(0.0133)
Mean pre-ref. Tension	1.363***	1.215***	1.232***	0.704***	0.963	0.953*	0.839***
	(0.109)	(0.0868)	(0.0908)	(0.0929)	(0.0275)	(0.0251)	(0.0357)
log of firm size	1.033***	1.253***	1.235***	0.914***	0.997	0.961***	0.954***
	(0.00765)	(0.0102)	(0.0103)	(0.0110)	(0.00408)	(0.00367)	(0.00531)
Constant	0.231***	0.204***	0.0842***	3.726***	2.506***	0.655***	4.190***
	(0.0155)	(0.0133)	(0.00595)	(0.408)	(0.0889)	(0.0212)	(0.207)
Observations	500,077	871,065	871,065	47,576	871,065	871,065	483,103
R2/ Pseudo R2		0.123	0.0964		0.0327	0.0149	

Robust seeform in parentheses *** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at firm level, exponentiated coefficients reported. Occupation, region, sector and time fixed effect model. Period of analysis: 2004-2010. the sectors of agriculture, extractive industrie and the public sectors are excluded from the analysis.

Table 3 presents the results obtained with the DADS data. The outcomes are inserted in the model in logarithmic form, to accommodate their skewed distribution and allowing to interpret coefficients as

semi-elasticities. The results reported are based on a similar specification as the one applied to the flow data, with the only addition of firm fixed effects, and capture the total effect on both the extensive and intensive margins. Table A3 in appendix reports the results obtained with a full fixed-effect model at the level of plant x occupation, thus capturing only the effects on the intensive margin. Coefficients are highly comparable across the two methods so we focus on the partial fixed effects model to ease comparability. Column (1) and (2) show that the salary of native employees did experience some negative pressure following the inflow of foreign workers, which amount to a 0.7% decrease on all wages and to a 4% decrease on the wages of new hires. Column (3) and (4) show that the effect observed on foreign workers is doubled, with a negative pressure of almost 3% on overall wages and of 9.3% on wages of new entrants. These findings are consistent with the high tension that characterized occupations before the reform, since we can think that the salaries were particularly high in order to attract the few available workers possessing the right set of skills. By enlarging the pool of potential candidates, the reform may thus have contributed to lower the wage required to fill the positions. Nonetheless, the presence of such an important difference on the effect between natives and foreigners points towards the hypothesis that these two types of labor are not perfect substitutes, not even within the same occupation and same firm. While the detailed occupation classification does not allow to control for some workers characteristics such as experience and grade (for example junior versus senior positions), it is hard to believe that compositional differences between natives and foreigners along these characteristics can explain all of the differential effect. Consequently, the main losers of the policy are the foreign workers that were already present in the economy. Finally column (5) confirms the results obtained on the movement data, showing that the overall stock of employment in treated occupations increased thanks to the reform, and this by a magnitude of about 1.1%. The salary regressions present very high levels of R-squared, given the battery of fixed-effects used.

Table 3: Main Results using DADS data

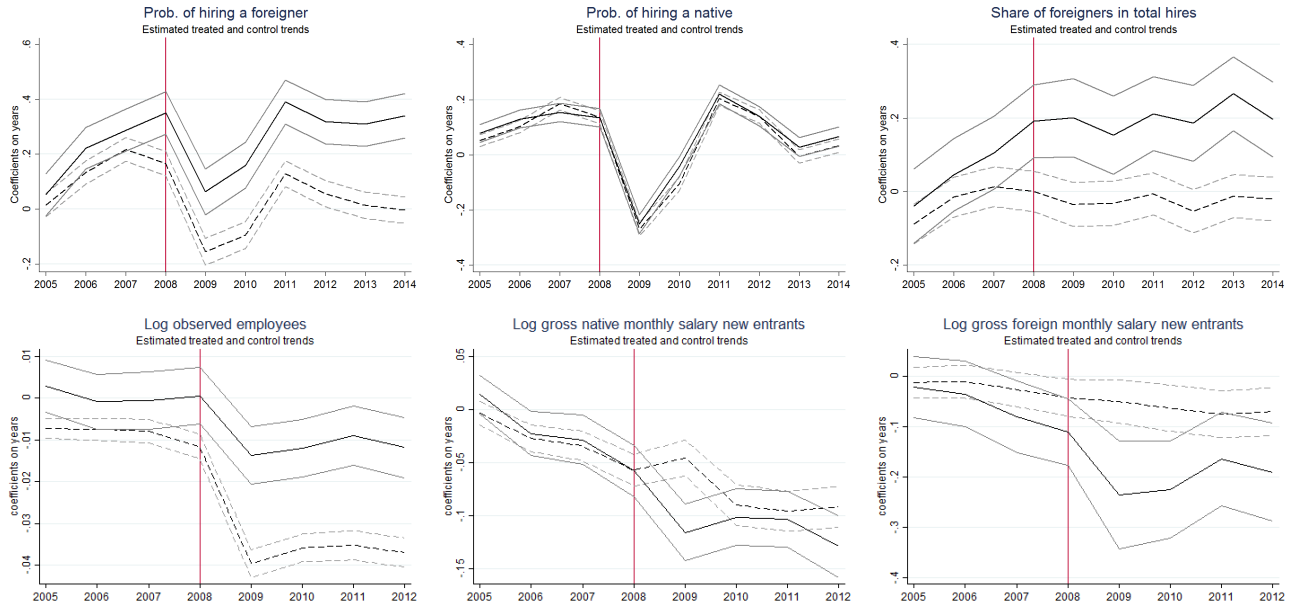
	(1) Log salary natives	(2) Log salary native new entrants	(3) Log salary foreigners	(4) Log salary foreign new entrants	(5) Log employment
VARIABLES	Partial FE	Partial FE	Partial FE	Partial FE	Partial FE
Treat	0.00672	0.0232*	-0.00499	-0.00831	0.0203***
	(0.00434)	(0.0130)	(0.0154)	(0.0442)	(0.00600)
Treat x Post Reform	-0.00736***	-0.0417***	-0.0296***	-0.0934***	0.0112***
	(0.00206)	(0.00855)	(0.00623)	(0.0256)	(0.00189)
Pre-reform tension	-0.0128	-0.0474**	-0.0641***	-0.0615	-0.0386***
	(0.00900)	(0.0227)	(0.0238)	(0.0478)	(0.0125)
Log firm size	-0.0172***	0.0112	-0.00929*	0.0118	0.106***
	(0.00274)	(0.00704)	(0.00482)	(0.00887)	(0.00240)
Constant	8.856***	7.121***	7.453***	7.378***	0.202**
	(0.224)	(0.0401)	(0.0335)	(0.0816)	(0.0988)
Observations	1,223,416	322,434	164,292	57,818	1,350,539
R-squared	0.780	0.828	0.805	0.829	0.472

Robust seeform in parentheses *** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at firm level. The partial FE specification includes firm, occupation, region, sector and time fixed effects. Period of analysis: 2004-2010. The sectors of agriculture, extractive industrie and the public sectors are excluded from the analysis.

Figure 3 provides the validation test for the common trend assumption on the main outcomes and shows how the effect evolved in the years following the reform. The same graphs for the additional outcomes not included here are reported in figure A3 in the appendix. The figures plot the coefficients

obtained from a flexible model interacting each year dummy with the treatment group indicator. The dashed lines show the estimated trend for the control group, which is measured by the year dummies alone, while the solid lines show the estimated trend for the reform group, which is measured by summing the year dummies and the interaction terms between the year dummies and the treatment indicator. From the top row we see that the paths in the share of foreigners in new entries and the probability of hiring a foreigner started diverging in 2008, year of the reform, while they were highly comparable before the reform. On the other hand, the paths followed by the probability of hiring a native is highly comparable all along the period, comforting the result that native employment was not harmed by the policy. The fact that the share of foreign workers in control occupations remained very stable during the entire period provides validation for the assumption of no strategic manipulation of the occupations where foreigners apply nor where employers advertise internationally. The bottom row show the trends estimated using the DADS data. Here as well it seems that both groups were following similar paths before the reform and significantly diverged after. In addition, while the employment effects appear to be long lasting, the negative effect on wages is rather temporary since it disappears after 2010[15]. It is important to notice that the levels may be different at each point, since in the graphs we do not consider the coefficient on the treatment dummy alone, but since the difference-in-differences method controls for all time-invariant differences the latter is not a concern.

Figure 3: Estimated outcome trends



Note: The dashed lines show the estimated trends for the control group while the solid lines show the ones for the treatment group.

[15]Given that the reform was temporarily modified between 2011 and 2012 we cannot test the length of the effect more formally and we have to exclude the post 2010 period from the econometric analysis.

5.2 Robustness checks and heterogeneities

Table A4 and A5 in the appendix present the results of several robustness tests performed using the DMMO and the DADS data respectively. In these tables each raw shows the estimated treatment effect for a different specification, and the number of observations and R-squared are not reported since they vary across all of them. The first line copies the results from the main analysis to ease comparison.

First, I restrict the samples to firms appearing at least once before and at least once after the introduction of the policy. This allows to verify that the measured effect is not entirely driven by plant entry or exit. The estimated impact remains highly similar both in terms of magnitude and significance across all specifications except for the coefficients on the probability of hiring a natives, which remain positive but lose significance. For this reason my interpretation is that there is no effect on native employment. If I exclude the year 2009, at the hit of the economic crisis, and only consider the effect for 2008 and 2010, I find effects of similar magnitude on employment but slightly smaller on salaries, since the negative pressure on the wages of native new entrants goes down to 2% and the one of foreign new entrants goes down to 6%. This is consistent with the hypothesis that the negative effect on wages may have been exacerbated by the overall drop in demand due to the crisis and that it may not be long-lasting. Further, I exclude the construction sector, since several of the occupations in the reform list specifically target this activity and some voices in the public debate expressed the fear that the policy may just have contributed to the legalization of previously illegal workers, defying the purpose of attracting new qualified labor force into the country. The coefficients present slightly smaller magnitudes but remain significant and economically meaningful. The same happens when I exclude the region where Paris is located, which is for many reasons not comparable with the rest of the country. To ensure that the model is able to account for the difference in the level of tension before the reform, I construct a measure of propensity to enter the list before 2008 for each occupation x region based on the level of the tension index[16]. I then add the measure as control in the main regression and exclude from the sample the occupations x regions that fall outside of the base of common support. Results are highly comparable to my main specification. For the DMMO data I include in the robustness checks table the results from the linear full fixed effects specification to test the robustness to this alternative method. Given the large number of zeros that cannot be accounted by this approach I expect the results to be biased so I only interpret the sign and significance. The latter is consistent with my baseline results. As additional validation of the main specification, I costruct a different control group that is identified as the occupations entering the top two quintiles in the distribution of pre-reform tension but are excluded from the list of 30. Results hold to this alternative definition of the control group. Finally, I include additional fixed effects that interact sectors and years, to rule out the possibility that the observed effects are driven by differential trends at the level of sectors. Here most of the effects on the flows disappear, except for the positive impact on the share of foreign workers. However, they remain significant and economically meaningful in the DADS outcomes, including the effect on the stock of employment. I thus conclude that the limited number of positive values for foreign entries in the DMMO data may render it

[16]The propensity score is the predicted probability obtained from the following logit model: $treat_{ort} = \beta tension_{ort} + \gamma_t + \delta_o + \rho_r + \epsilon_{ort} | year < 2008$.

too sensitive for additional levels of fixed effects.

In addition to testing the robustness of the results to the methodology used and the sample selected, I look at the heterogeneity of the effects across some meaningful categories. Table 4 shows the heterogeneity analysis on the flow outcomes and table 5 does the same for the stock and salary outcomes. As additional validation, the sample is split between the seven regions that experienced a growth of economic visas above 50% between 2007 and 2008, and the rest of the country, to test whether the estimated impact of the reform using plant level data reflects what is observed in the macro-level statistics[17]. Results using both datasets confirm that coefficients on all outcomes are much larger in magnitude and are more significant when the model is estimated on the sample of regions that present the highest jump in economic immigrants as of the statistics from the ministry of interior. In these areas, the share of foreign workers grew by 19%, the probability of hiring a foreigner increased by 22.6% and the wage of new entrants dropped by 5% and 12% for native and foreign workers respectively. Even in these areas, I find no negative effect on native employment while the decrease in the share of short term contracts among them is confirmed.

Table 4: Heterogeneity of DMMO results

	(1) Share foreign hires	(2) Prob. hiring foreigner	(3) Prob. net entry foreigners	(4) Share CDD foreigners	(5) Prob. hiring native	(6) Prob. net entry natives	(7) Share CDD natives
REGRESSIONS	QML	LOGIT	LOGIT	QML	LOGIT	LOGIT	QML
TE in high immigration regions	1.190***	1.226***	1.204***	1.013	1.018	1.028*	0.941***
	(0.0430)	(0.0360)	(0.0394)	(0.0598)	(0.0155)	(0.0160)	(0.0208)
TE in low immigration regions	1.114**	1.065*	1.077*	0.999	1.010	1.019	0.985
	(0.0508)	(0.0377)	(0.0438)	(0.0734)	(0.0130)	(0.0133)	(0.0176)
TE in high initial tension	1.163***	1.194***	1.160***	1.004	1.000	1.006	0.964**
	(0.0400)	(0.0331)	(0.0363)	(0.0569)	(0.0118)	(0.0122)	(0.0164)
TE in low initial tension	1.029	0.980	1.026	1.082	1.031	1.044**	0.962
	(0.0594)	(0.0441)	(0.0527)	(0.0980)	(0.0204)	(0.0214)	(0.0268)
TE close to MW	1.022	0.834**	0.872	0.942	0.894***	0.941	0.963
	(0.0941)	(0.0597)	(0.0784)	(0.129)	(0.0344)	(0.0357)	(0.0440)
TE far from MW	1.135***	1.177***	1.143***	1.015	1.017	1.017	0.974*
	(0.0344)	(0.0283)	(0.0308)	(0.0499)	(0.0105)	(0.0108)	(0.0143)

Robust seeform in parentheses *** p<0.01, ** p<0.05, * p<0.1
Each cell contains the treatment effect obtained from different regressions. Standard errors clustered at firm level, exponentiated coefficients reported. Occupation, region, sector and time fixed effect model. Period of analysis: 2004-2010. the sectors of agriculture, extractive industrie and the public sectors are excluded from the analysis.

The sample can further be split between occupations characterized by very high levels of tension before the reform versus occupations where tension was lower. Since the tension index used as a control is constructed as a mean of z-scores that are centered at zero, I classify into high tension all the occupations with a positive index prior to 2008 and to low tension the ones with a zero or negative index. Both groups include a sufficient number of treatment and control observations for the analysis. Not surprisingly, the occupations that took advantage of the reform are the ones experiencing the most severe shortages of native labor, so that all the results are driven by them. Finally, I can also divide occupations by their distance to the minimum wage. Given that in 2010 Euros the French minimum wage was set around 1400 monthly gross salary, I classify as close to minimum wage all the occupations with an average gross monthly wage below 2000 Euros, while above this threshold they are considered as far from the minimum wage. Not surprisingly, the negative pressure on wages is only present among occupations far above the minimum wage. Perhaps more surprisingly, this is true also for the positive employment effect on foreign workers, signaling that the reform was successful in stimulating the hire of high-skilled highly

[17] c.f. Table A2 in the appendix for a detailed list of regions

paid foreign professionals. This results also contribute to rule out the possibility that the reform was used to massively legalize illegal workers at the bottom of the occupational ladder.

Table 5: Heterogeneity of DADS results

	(1) Log salary natives	(2) Log salary new natives	(3) Log salary foreigners	(4) Log salary new foreigners	(5) Log employment
REGRESSIONS	Partial FE	Partial FE	Partial FE	Partial FE	Partial FE
TE in high immigration regions	-0.0145***	-0.0506***	-0.0388***	-0.120***	0.0153***
	(0.00348)	(0.0129)	(0.00916)	(0.0349)	(0.00328)
TE in low immigration regions	-0.00252	-0.0299**	-0.0194**	-0.0511	0.00859***
	(0.00256)	(0.0117)	(0.00852)	(0.0379)	(0.00227)
TE in high initial tension	-0.00540**	-0.0483***	-0.0278***	-0.108***	0.00843***
	(0.00235)	(0.0117)	(0.00725)	(0.0335)	(0.00221)
TE in low initial tension	0.00366	-0.0223	-0.0180	-0.0803	0.00635
	(0.00517)	(0.0230)	(0.0153)	(0.0750)	(0.00476)
TE close to MW	-0.00553	-0.00564	-0.0190	-0.0381	-0.0114
	(0.00973)	(0.0414)	(0.0241)	(0.173)	(0.00709)
TE far from MW	-0.00501**	-0.0440***	-0.0284***	-0.0851***	0.0128***
	(0.00196)	(0.00906)	(0.00652)	(0.0286)	(0.00198)

Robust seeform in parentheses *** p<0.01, ** p<0.05, * p<0.1
Each cell contains the treatment effect obtained from different regressions. Standard errors clustered at firm level. The partial FE specification includes firm, occupation, region, sector and time fixed effects. Period of analysis: 2004-2010. The sectors of agriculture, extractive industrie and the public sectors are excluded from the analysis.

5.3 Firm level outcomes

The analysis has shown that firms reacted to the reform by hiring more foreign labor, thus increasing the stock of employment in these jobs, and by lowering the entry wages of workers in target occupations. An interesting question that arises from these findings is what happens to outcomes at the plant level. If the policy was successful in lowering the hiring costs for a set of occupations that were previously creating bottlenecks in production, we would expect firms dependent on these tasks to increase their total employment and eventually their output. However, the ability of the tension indexes to identify highly productive occupations that are under shortage is debated, and some authors sustain that they may actually reflect a lack of interest from the firm side, who would otherwise adjust the level of salary to increase the supply of these competences and eliminate the shortage (Saint-Paul and Cahuc, 2009). In this case, the lower hiring costs are likely to generate some substitution in production with other types of occupations, canceling out the size effect overall. Finally, a related question following the reduction in production costs is the margin of adjustment of the firm: it can either hire more labor, raise salaries, lower prices or make more profits. due to the data limitations I don't have any information on firm output, profits or prices, so I can only look at total employment and total wage bill.

The identification strategy used until now defines treatment at the occupation level, and can therefore not be applied directly to the plant level. Ideally, to define plant exposure to the reform we would like to use a measure of technological need for these tasks in the production process. The share of employment composed by reform occupations measured at the plant level may however not be a good measure for it, since - given the tension - it may reflect more the capacity of the firm to hire rare candidates rather than

the intensity of the need. I believe that a better measure for the technological demand for these tasks is their share of employment within narrowly defined sector. Firms belonging to the same narrow sectors are expected to produce similar products using comparable technologies, and the presence of both large and small companies within a sector allows to average out the "ability to find candidates" component across sectors. the result is likely to be a better proxy for the exposure to the reform. Table A6 in appendix reports the level of exposure of each of the 65 sectors considered, based on data from 2006 and 2007. The treatment effect is then captured by interacting sectoral exposure with the post-reform dummy, and has to be interpreted as the marginal impact of one additional percentage of exposure. Since the effect is likely to be non-linear, in some specification I add a squared term. Finally, plant, region, broad sector and year fixed effects are added to the analysis.

Table 6: Firm level outcomes

	(1) Log Firm Size	(2) Log Firm Size	(3) Log Firm Salary Mass	(4) Log Firm Salary Mass
VARIABLES	Linear FE	Linear FE	Linear FE	Linear FE
Exposure to treat	-0.000293	-0.00138	0.0115**	-0.00457
	(0.00318)	(0.00552)	(0.00553)	(0.0105)
Exposure to treat^2		0.000145		0.00286
		(0.000969)		(0.00200)
Exposure to treat x Post Reform	0.00326***	0.00664***	-0.00988***	0.00271
	(0.000912)	(0.00153)	(0.00124)	(0.00320)
Exposure to treat^2 x Post Reform		-0.000666**		-0.00222***
		(0.000333)		(0.000572)
Constant	2.425***	2.426***	10.46***	10.47***
	(0.0241)	(0.0241)	(0.0295)	(0.0296)
Observations	2,226,900	2,226,900	2,256,193	2,256,193
R-squared	0.004	0.004	0.010	0.010
Number of id	752,949	752,949	761,544	761,544

Robust seeform in parentheses *** p<0.01, ** p<0.05, * p<0.1
Linear coefficients reported. Firm, region, sector and time fixed effects included in all regressions. Period of analysis: 2004-2010. The sectors of agriculture, extractive industrie and the public sectors are excluded from the analysis.

Table 6 reports the results. The reform had a positive and significant effect on total employment within plants, and a negative and significant effect on the overall salary mass. This tells us that firms used the opportunity to hire more labor and that the lower salary paid to the new entrants more than compensated the growth in employment (despite the larger size, the total wage bill went down). Consequently, the firm benefited from an overall decrease in production costs that may have been translated in lower prices, higher profits or more investments. Unfortunately the data does not allow to disentangle the margin of adaptation further. Finally, there are some significant non-linearities at play. The positive effect on employment is concave, with stronger effects at low levels. Interestingly, the negative effect on salary mass show the opposite pattern, since it is absent at low levels of exposure but becomes more important as the exposure gets bigger. This indicates that at low levels of exposure the drop in the individual salaries is compensated by the increase in employment, resulting in a null effect on total salary mass, while at higher levels of exposure the employment effect stabilizes and the salary effect prevails.

6 Theoretical Discussion of the Results

The starting context in which the effects of the reform have to be considered is one where there are some rigidities preventing the labor market from clearing. In particular, some of the labor demand from the firm side is not met because of the lack of candidates with the appropriate competences, obliging companies to work using a suboptimal amount of labor inputs and, in the absence of technological substitutes, restraining total production. At the same time, France was very far from full employment in 2007, since it had an unemployment rate of about 8%. The coexistence of unmet labor demand and excess supply can therefore be explained by the presence of skill mismatch, rendering the available workers unsuitable for the available positions and de facto creating a number of segmented labor markets that do not (or only weakly) interact with each other. In fact, since the development of the literature on skill mismatch, many economists have considered each occupational market as separate from the rest (Shimer, 2007), which is a good approximation given the low levels of occupational mobility observed in France (Lalé, 2012). Given that the occupations concerned by the reform mostly require medium to high levels of education as well as some specific technical expertise, they are likely to be characterized by high entry barriers, justifying considering them as segmented markets.

The change introduced by the reform can be represented as a positive shock on the labor supply in each of the targeted markets, since the sharp reduction of hiring costs effectively enabled French firms to access a wider pool of candidates. Given that such firms were previously facing hiring constraints, the first theoretical prediction is that they will increase the volume of employment to reach the optimal level by hiring candidates from abroad. As a result, we should observe an increase in the number of foreign hires and in the share of new employees that are foreigners, no effect on native hires, and a positive effect on the employment stock. The empirical findings from this paper are thus in line with the theoretical predictions. In terms of the equilibrium wages, in the starting situation employees detain some monopoly power since firms have to compete with each other to obtain the labor inputs they need. On of the core predictions of the search and matching literature is indeed that tighter markets are characterized by higher wages, when everything else is held equal (Pissarides, 2000). By relaxing the level of tension in these segments, the reform is thus expected to lower the equilibrium wage. Given that the wage of incumbent workers are extremely rigid, at least in nominal terms, the effect is likely to be more visible on the starting salary of new entrants. Once again, this is what I find in the empirical analysis. Nonetheless, under the base hypothesis that native and foreign workers active in the same occupational segment can be seen as perfect substitutes in the firm production function, the theory predicts the negative pressure on entry wages to be the same among both groups. However, the empirical results show a negative pressure that is twice as large on foreign workers' entry wages than on natives ones. To reconcile these findings with the theory one has to assume that native and foreign workers are not perfect substitutes in production, so that the native labor force maintains some monopoly power over the employers. Finally, the descriptive evidence showing a positive long lasting effect on employment combined with a short-lived negative effect on wages is consistent with the hypothesis that capital adjust in the long run, thus bringing back wages to their initial level (Manacorda, Manning and Wadsworth, 2012; Ottaviano and Peri, 2012).

7 Conclusion

In recent years selective immigration policies have been implemented in several developed countries. Despite their growing popularity, little evidence exists to date documenting their impact on the local labor markets. This paper aims to address this gap by focusing on a reform that was introduced in France in 2008 to re-orient economic migration towards competencies that are the most in need in the economy. It tests whether the policy was successful in meeting its declared goals, and checks whether it had additional consequences for native workers in the labor market. The characteristics of the reform further allow to measure some interesting elasticities, such as the degree of substitutability between native and foreign labor and the degree of responsiveness of occupations with different initial levels of tension, which can inform the implementation of future policies.

A first descriptive examination of the migration trends shows that the visas issued for economic motive doubled after the reform, while the other types of visas remained stable. This gives a first indication that the policy had an impact on labor supply. The results from the main empirical analysis confirm that the hiring of non-European workers increased within the targeted occupations, while native employment flows are mostly not affected. The reform was thus able to alleviate the tension level in target occupations, revealing that such kind of policy may be effective in addressing skill scarcity, at least in the short run. A second effect discovered is a negative pressure on entry wages of about 4% among natives and 9% among foreigners, which gives a strong signal of the imperfect substitutability between these two groups. The negative effects on wages can be explained by the decreased level of tension, which may have lowered the wage that firms have to offer in order to fill their empty positions, and is likely to have been exacerbated by the overall slack in demand generated by the crisis in 2009. Additionally, the graphic analysis shows that while the employment effects appear long lasting, the negative wage pressure dies out after 2010. The results are robust to a variety of tests and the heterogeneity analysis reveals that they are entirely driven by occupations that were afflicted by severe shortages before the reform and that pay an average salary well above the minimum wage. This further confirms the success of the reform in encouraging the immigration of a highly skilled foreign labor force and lessens the concerns regarding the usage of the policy to legalize foreign workers previously employed by the black market in occupations at the bottom of the ladder. Finally, the policy increased overall employment within the plants that were most exposed to the legal change du to their technological need for these tasks, and lowered their total wage bill, thus suggesting the existence of additional margins of adjustments. Unfortunately, the data restrictions prevent a more in depth study of the latter.

An important criticism of this policy reside in the fact that the list has remained unchanged up to today, while the needs of the labor market have significantly evolved over the past 10 years. While I show that the reform has been effective in reaching its goals in the first three years, I cannot draw conclusions on the longer terms impacts. Further analysis should be undertaken, including the study of the potential disincentive to create these competencies through the domestic education system when they can be easily found abroad, which is mentioned in the literature as a possible drawback.

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Appendix

Tables

Table A1: List of 30 Occupations in the 2008 Reform (1st part)

Occupation	Rhône-Alpes	Provence-Alpes-Côte d'Azur	Poitou Charentes	Picardie	Pays de la Loire	Haute Normandie	Basse Normandie	Nord Pas de Calais	Midi Pyrenées	Lorraine	Limousin
Technician of distant selling	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Sales repr. for intermed. goods and raw materials	yes	0	yes	yes	yes	yes	yes	0	yes	0	yes
Executive of financial audit	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Computer scientist	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Senior computer scientist	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Marchandiser (design of stores and shelves)	yes	yes	yes	yes	yes	yes	0	yes	yes	yes	0
Operations manager in insurance	yes	0	yes	0	yes	yes	yes	0	0	yes	yes
Mechanic of construction machinery and agricultural machinery	yes	yes	yes	0	yes	yes	yes	yes	yes	yes	yes
Operator of glass production	yes	0	0	yes	yes	yes	0	yes	0	yes	yes
Installation driver for cement production	yes	yes	yes	0	yes	yes	yes	yes	yes	yes	yes
Machinery specialist for wood and furniture production	yes	yes	yes	yes	yes	0	0	0	yes	yes	yes
Artisan of wood and furniture production	yes	yes	yes	yes	yes	0	0	0	yes	yes	yes
Technician of industrial planning and methods	yes	yes	yes	0	0	yes	0	0	yes	0	yes
Design manager mechanical construction	yes	yes	0	0	yes	yes	0	yes	yes	0	0
Industrial designer mechanic. construction and metallurgy	yes	yes	0	0	yes	yes	0	yes	yes	0	0
Design manager in electricity and elechtronics	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industrial designer in electricity and elechtronics	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Production technician in mechanic. construction and metallurgy	yes	yes	yes	yes	yes	yes	0	0	0	0	yes
Quality-manager mechanic. construction and metallurgy	yes	yes	yes	yes	yes	yes	0	yes	yes	0	yes
Quality-manager in electricity and elechtronics	yes	0	0	0	0	0	0	0	0	0	yes
Production technician of process industry	yes	yes	0	yes	0	yes	0	0	yes	0	0
Production technician of wood and furniture	yes	yes	yes	0	yes	yes	0	yes	yes	yes	yes
Installation and maintenance of elevators	yes	yes	yes	yes	yes	yes	0	yes	0	yes	yes
Compliance inspector	yes	yes	0	0	yes	yes	0	yes	yes	yes	0
Responsible for elechtronic maintenance	yes	yes	0	0	0	0	yes	0	0	0	0
Designer of buildings and public work	yes	yes	0	yes	yes	yes	0	0	yes	0	yes
Construction surveyor	yes	yes	0	0	yes	0	yes	0	0	0	yes
Head of technical studies for buildings and public work	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	0
Head of technical studies for the underground	0	0	0	0	0	0	0	0	0	0	0
Head of construction sites for buildings and public work	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	0
Site supervisor for buildings and public work	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	0

Occupations in bold are the ones at the national level. Source: Decree n.0017 of January 20th 2008

Table A1: List of 30 Occupations in the 2008 Reform (2nd part)

Occupation	Languedoc Roussillon	Île de France	Franche Comté	Corse	Champagne Ardenne	Centre	Brétagne	Bourgogne	Auvergne	Alsace	Aquitaine
Technician of distant selling	yes	yes	0	0	yes	yes	yes	yes	yes	yes	yes
Sales repr. for intermed. goods and raw materials	yes	yes	yes	0	yes	yes	0	0	yes	yes	0
Executive of financial audit	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Computer scientist	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Senior computer scientist	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Marchandiser (design of stores and shelves)	yes	yes	yes	0	yes	yes	yes	yes	0	yes	yes
Operations manager in insurance	0	yes	yes	yes	yes	yes	0	yes	yes	yes	0
Mechanic of construction machinery and agricultural machinery	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Operator of glass production	yes	yes	yes	0	yes	yes	yes	yes	0	yes	yes
Installation driver for cement production	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Machinery specialist for wood and furniture production	yes	yes	yes	0	yes	yes	yes	yes	yes	yes	yes
Artisan of wood and furniture production	yes	yes	yes	0	yes	yes	yes	yes	yes	yes	yes
Technician of industrial planning and methods	yes	yes	yes	0	yes	yes	0	yes	yes	yes	0
Design manager mechanical construction	0	yes	yes	0	yes	yes	0	yes	yes	yes	0
Industrial designer mechanic. construction and metallurgy	0	yes	yes	0	yes	yes	0	yes	yes	yes	0
Design manager in electricity and elechtronics	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industrial designer in electricity and elechtronics	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Production technician in mechanic. construction and metallurgy	0	yes	yes	0	yes	yes	0	yes	yes	yes	yes
Quality-manager mechanic. construction and metallurgy	0	yes	yes	0	yes	yes	yes	yes	yes	yes	yes
Quality-manager in electricity and elechtronics	yes	yes	0	0	0	0	0	0	0	yes	0
Production technician of process industry	0	yes	0	yes	yes	yes	0	0	yes	yes	0
Production technician of wood and furniture	yes	yes	yes	0	yes	yes	0	yes	0	yes	yes
Installation and maintenance of elevators	yes	yes	0	0	yes	yes	0	yes	yes	yes	yes
Compliance inspector	0	yes	0	yes	0	yes	0	yes	yes	yes	0
Responsible for elechtronic maintenance	0	yes	0	0	0	0	0	0	0	yes	0
Designer of buildings and public work	0	yes	yes	0	yes	yes	0	yes	0	yes	0
Construction surveyor	0	yes	yes	0	yes	0	yes	0	0	yes	0
Head of technical studies for buildings and public work	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Head of technical studies for the underground	0	0	0	0	0	yes	0	0	0	0	0
Head of construction sites for buildings and public work	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Site supervisor for buildings and public work	yes	yes	yes	0	yes	yes	yes	yes	yes	yes	yes

Occupations in bold are the ones at the national level. Source: Decree n. 0017 of January 20th 2008

Table A2: Regions with the highest growth in economic immigration

Region	Year	Economic migrants	Growth economic migrants	Student migrants	Growth student migrants	Family Reunion migrants	Growth family migrants
Aquitaine	2006	505	-	1569	-	2508	-
	2007	600	19%	1570	0%	2101	-16%
	2008	948	58%	1764	12%	2418	15%
	2009	622	-34%	1975	12%	2404	-1%
	2010	570	-8%	2300	16%	2314	-4%
Corse	2006	103	-	33	-	694	-
	2007	71	-31%	39	18%	733	6%
	2008	305	330%	49	26%	509	-31%
	2009	436	43%	41	-16%	385	-24%
	2010	324	-26%	43	5%	462	20%
Ile de France	2006	4917	-	17539	-	43174	-
	2007	5221	6%	17679	1%	36911	-15%
	2008	9337	79%	19445	10%	34693	-6%
	2009	10171	9%	22730	17%	35091	1%
	2010	9120	-10%	24788	9%	35763	2%
Languedoc Roussillon	2006	292	-	1745	-	3533	-
	2007	312	7%	2093	20%	3604	2%
	2008	558	79%	2347	12%	3429	-5%
	2009	404	-28%	2559	9%	3366	-2%
	2010	430	6%	2738	7%	2981	-11%
Midi Pyrenées	2006	481	-	2078	-	2734	-
	2007	483	0%	2162	4%	2650	-3%
	2008	884	83%	2114	-2%	2514	-5%
	2009	769	-13%	2289	8%	2675	6%
	2010	658	-14%	2523	10%	2529	-5%
Provence Alpes Côte d'Azur	2006	1092	-	2913	-	9766	-
	2007	1068	-2%	3053	5%	8648	-11%
	2008	3858	261%	3658	20%	7476	-14%
	2009	2459	-36%	4053	11%	9350	25%
	2010	1675	-32%	4792	18%	8628	-8%
Rhône Alpes	2006	1046	-	5213	-	9949	-
	2007	1092	4%	5447	4%	9294	-7%
	2008	1676	53%	5782	6%	8834	-5%
	2009	1771	6%	6639	15%	8796	0%
	2010	1720	-3%	7423	12%	8024	-9%

Source: Regional statistics on immigration from MI-DGEF-DSED. Growth refers to annual growth from the previous year.

Table A3: DADS results with full FE model

	(1) Log salary natives	(2) Log native new entrants	(3) Log salary foreigners	(4) Log salary foreign new entrants	(5) Log employment
VARIABLES	Full FE	Full FE	Full FE	Full FE	Full FE
Treat x Post Reform	-0.000653	-0.0462***	-0.00457	-0.0924***	0.0102***
	(0.00157)	(0.00818)	(0.00425)	(0.0230)	(0.00152)
Log firm size	-0.0129***	-0.00217	-0.0102**	0.00917	0.162***
	(0.00230)	(0.00520)	(0.00398)	(0.00614)	(0.00280)
Constant	7.765***	7.725***	7.837***	7.654***	0.323***
	(0.0258)	(0.0729)	(0.0303)	(0.0988)	(0.0173)
Observations	1,223,416	322,434	164,292	57,818	1,350,539
R-squared	0.025	0.003	0.030	0.008	0.032
Number of id	536,525	260,046	85,376	47,908	586,593

Robust seeform in parentheses *** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at firm level. The full FE specification includes firm x occupation, region, sector and time fixed effects. Period of analysis: 2004-2010. The sectors of agriculture, extractive industrie and the public sectors are excluded from the analysis.

Table A4: Robustness Tests using DMMO data

Regressions	(1) Share foreign hires	(2) Prob. hiring foreigner	(3) Prob. net entry foreigners	(4) Share CDD foreigners	(5) Prob. hiring native	(6) Prob. net entry natives	(7) Share CDD natives
REGRESSIONS	QML	LOGIT	LOGIT	QML	LOGIT	LOGIT	QML
Main TE	1.160***	1.178***	1.171***	1.010	1.021**	1.029***	0.964***
	(0.0326)	(0.0264)	(0.0295)	(0.0460)	(0.0100)	(0.0103)	(0.0133)
TE with panel firm only	1.178***	1.196***	1.185***	1.001	1.020*	1.018	0.992
	(0.0382)	(0.0298)	(0.0339)	(0.0517)	(0.0113)	(0.0115)	(0.0152)
TE excluding 2009	1.140***	1.172***	1.170***	1.028	1.023**	1.031***	0.972*
	(0.0350)	(0.0281)	(0.0320)	(0.0508)	(0.0111)	(0.0114)	(0.0144)
TE excluding construction sector	1.109***	1.083***	1.080***	1.031	0.994	0.999	0.957***
	(0.0346)	(0.0266)	(0.0299)	(0.0511)	(0.0106)	(0.0109)	(0.0144)
TE excluding Paris region	1.085**	1.068**	1.072*	0.997	1.010	1.021*	0.966**
	(0.0441)	(0.0335)	(0.0383)	(0.0656)	(0.0117)	(0.0120)	(0.0156)
TE using PSM on baseline tension	1.159***	1.177***	1.170***	1.010	1.021**	1.029***	0.964***
	(0.0326)	(0.0263)	(0.0294)	(0.0460)	(0.0100)	(0.0103)	(0.0133)
TE using linear full FE model	1.007***	1.305***	1.248***	1.013	0.997	0.997	1.004
	(0.00139)	(0.0425)	(0.0438)	(0.0127)	(0.0162)	(0.0152)	(0.00330)
TE using alternative control	1.104***	1.135***	1.108***	1.034	0.993	1.001	0.974
	(0.0367)	(0.0299)	(0.0327)	(0.0551)	(0.0116)	(0.0118)	(0.0158)
TE adding sector-yr FE	1.061*	1.026	1.029	0.969	1.002	1.018*	0.978
	(0.0322)	(0.0240)	(0.0272)	(0.0499)	(0.0100)	(0.0103)	(0.0140)

Robust seeform in parentheses *** p<0.01, ** p<0.05, * p<0.1
Each cell contains the treatment effect obtained from different regressions. Standard errors clustered at firm level, exponentiated coefficients reported. Occupation, region, sector and time fixed effect model. Period of analysis: 2004-2010. the sectors of agriculture, extractive industrie and the public sectors are excluded from the analysis.

Table A5: Robustness Tests using DADS data

	(1) Log salary of natives	(2) Log salary native new entrants	(3) Log salary of foreigners	(4) Log salary foreign new entrants	(5) Log employment
REGRESSIONS	Partial FE	Partial FE	Partial FE	Partial FE	Partial FE
Main TE	-0.00736***	-0.0417***	-0.0296***	-0.0934***	0.0112***
	(0.00206)	(0.00855)	(0.00623)	(0.0256)	(0.00189)
TE with panel firms only	-0.00767***	-0.0576***	-0.0303***	-0.125***	0.00991***
	(0.00198)	(0.00850)	(0.00591)	(0.0257)	(0.00179)
TE excluding 2009	-0.00134	-0.0210**	-0.0186***	-0.0679***	0.00798***
	(0.00225)	(0.00983)	(0.00636)	(0.0249)	(0.00187)
TE excluding construction sector	-0.00344	-0.0433***	-0.0211***	-0.0697***	0.0115***
	(0.00226)	(0.00900)	(0.00730)	(0.0257)	(0.00221)
TE excluding Paris	-0.00259	-0.0276***	-0.0240***	-0.0590*	0.00885***
	(0.00227)	(0.0102)	(0.00772)	(0.0329)	(0.00203)
TE using PSM on baseline tension	-0.00738***	-0.0417***	-0.0296***	-0.0939***	0.0111***
	(0.00206)	(0.00855)	(0.00623)	(0.0256)	(0.00189)
TE using alternative control	-0.00459*	-0.0549***	-0.0196***	-0.0991***	0.00866***
	(0.00236)	(0.0105)	(0.00754)	(0.0355)	(0.00223)
TE affing sector x year fe	-0.00865***	-0.0361***	-0.0271***	-0.0735**	0.0111***
	(0.00216)	(0.00948)	(0.00669)	(0.0301)	(0.00196)

Robust seeform in parentheses *** p<0.01, ** p<0.05, * p<0.1
Each cell contains the treatment effect obtained from different regressions. Standard errors clustered at firm level. The partial FE specification includes firm, occupation, region, sector and time fixed effects. Period of analysis: 2004-2010. The sectors of agriculture, extractive industrie and the public sectors are excluded from the analysis.

Table A6: Sectoral exposure to the reform

Sector	**Employment Exposure to Reform**
Employment related activities	71%
IT programming and consulting	65%
Wood industry	51%
Other scientific-technical activities	39%
Metallurgy	37%
Furniture industry	36%
Architecture and engineering	29%
Industry of other mineral products	28%
Electricity and gas production and distribution	28%
Editing	26%
Fabrication of other metalling products	24%
Car industry	22%
Other transport industry	22%
Building construction	20%
Waste decontamination	19%
Air transportation	18%
Civil engineering	18%
Cocking and refining industry	17%
Electric material industry	17%
Telecommunications	17%
Installation and repair of machines and equipments	16%
Fabrication of other machines and equipment	16%
Insurance	15%
Water distribution	14%
Computing and electronic material industry	14%
Specialized construction	14%
Trade and repair of vehicles	14%
Financial support activities	13%
Other manufacturing	13%
Scientific R&D	13%
Pharmaceutical industry	12%
Heartquarter activities, consulting	12%
Caoutchouc and plastic industry	11%
Security activities	11%
Legal and accounting activities	11%
Real estate	11%
Renting	10%
Wholesale except vehicles	10%
Chemical industry	9%
Water collection and disposal	9%
Advertising and market analysis	8%
Financial services	7%
Other admin. And support activities	7%
Garment industry	6%
Textile industry	6%
Waste collection and disposal	5%
Movies, video, sound production	5%
Tobacco industry	5%
Beverage industry	5%
Water transportation	4%
Leather and footwear industry	4%
Information services	4%
Programming and broadcasting	4%
Travel agencies	4%
Paper industry	4%
Printing industry	3%
Retail except vehicles	3%
Ground transportation	3%
Storage	3%
Postal and mail services	3%
Food industry	2%
Building services	2%
Veterinary	1%
Hotels	1%
Restaurants	0%

Figures

Figure A1: Administrative Procedure to Hire a Foreign Worker

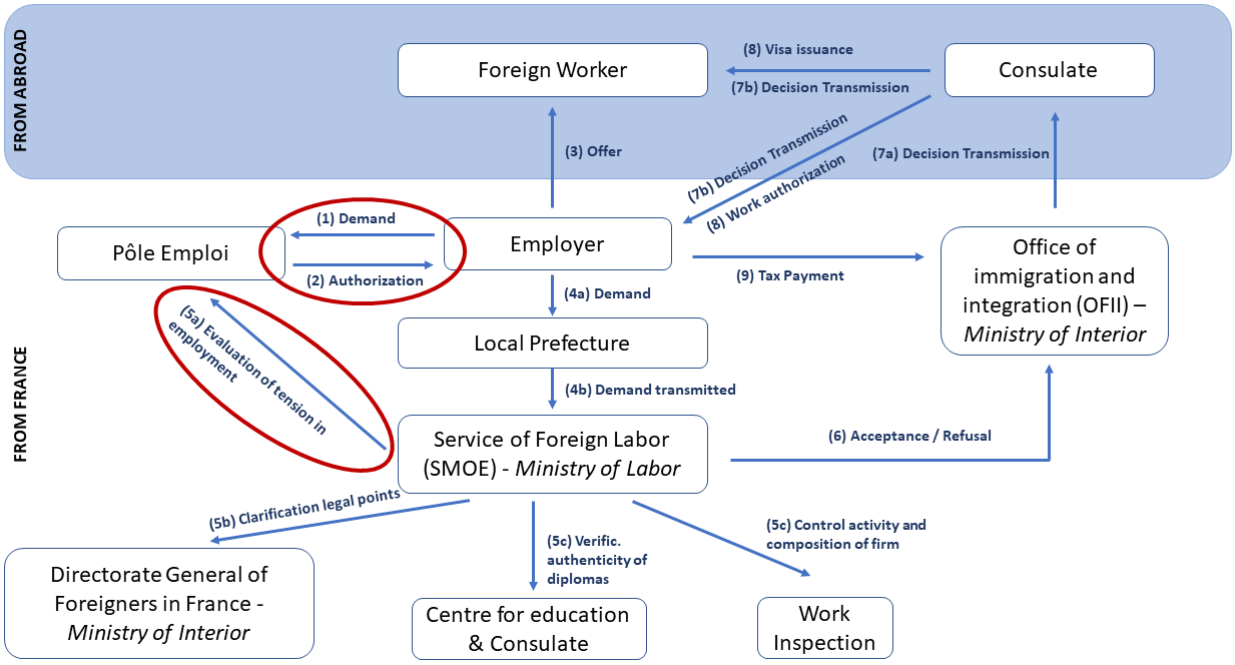

Diagram taken from OECD (2017). The red circles identify the administrative steps relaxed by the reform.

Figure A2: Unconditional graphs with outcome trends

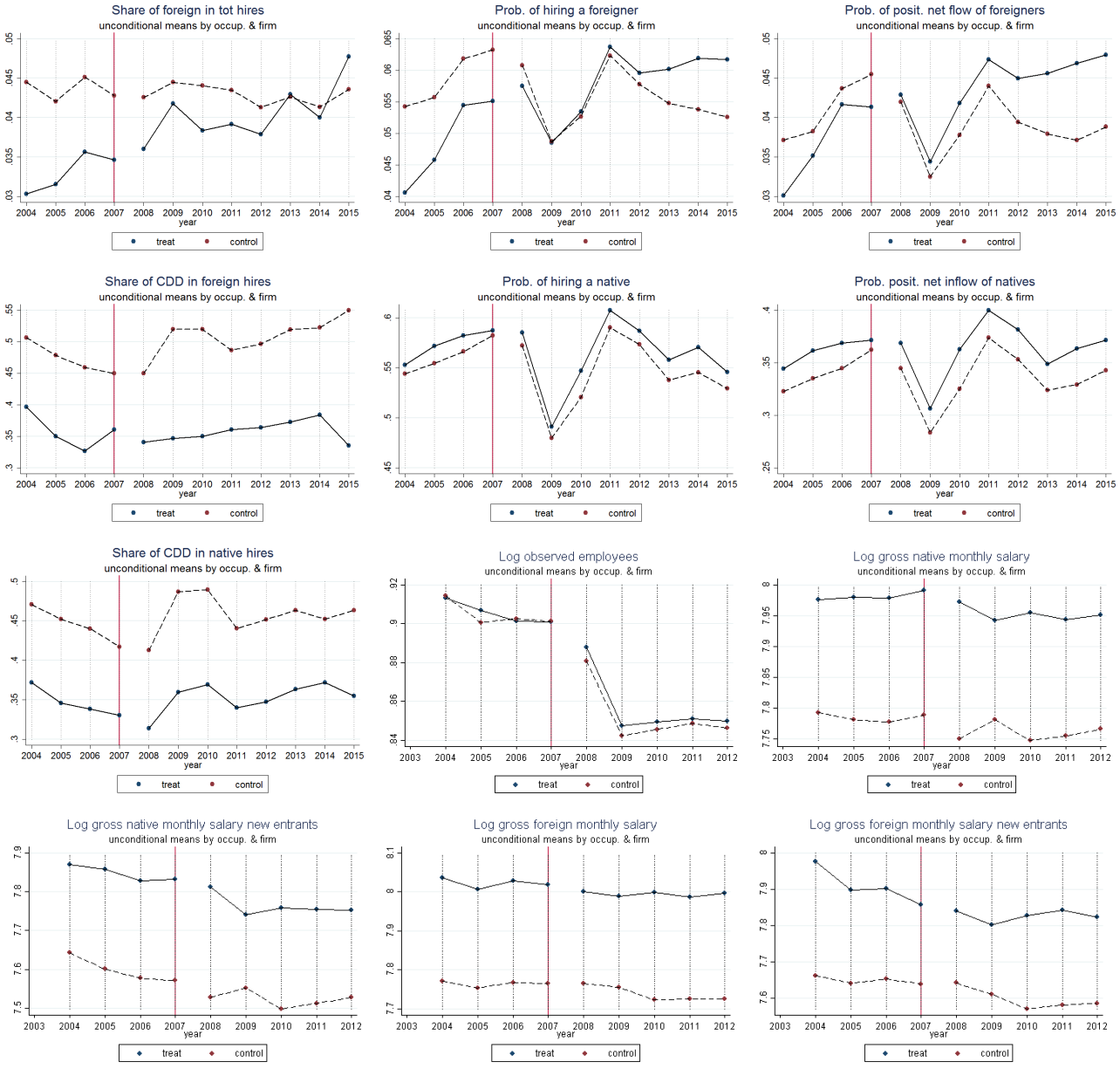

Figure A3: Additional estimated outcome trends