Immigration and Native Employment. Evidence from Italian Provinces in the Aftermath of the Great Recession*

Stefano Fusaro
Enrique López-Bazo

Postprint version of article published in Papers in Regional Science, vol. 100, pp. 405-428

Stefano Fusaro (corresponding author)
University of Barcelona
Av. Diagonal 690, 08034 Barcelona (Spain)
e-mail: stfusarf7@alumnes.ub.edu

Enrique López-Bazo
AQR, University of Barcelona
Av. Diagonal 690, 08034 Barcelona (Spain)
e-mail: elopez@ub.edu

Short title: Immigration and Employment in Italian Provinces

*We would like to thank Alessia Matano, Javier Vazquez-Grenno, Gaetano Basso, three anonymous referee, and the editor in charge of the manuscript for their valuable comments and help. All remaining errors are our own.

Abstract

This study exploits the variability in the incidence of recent immigration inflows and the change in native employment in the Italian provinces to shed light on the impact of immigration on employment in rigid local labour markets. The study focuses on the period that followed the financial and sovereign debt crises, which strongly hit the labour markets of the Italian provinces. The results reveal a negligible overall impact of immigration on provincial employment which, however, hides differentiated impacts for different groups of natives. Employment responses to immigration shocks vary greatly depending on the skills and gender of the natives.

JEL classification: J15, J61, R10, R23.

Key words: Immigration, Native Employment, Local Labour Markets, Italian Provinces, Spatial Correlation Approach.

1 Introduction

Although immigration from poor to developed countries is a longstanding phenomenon (e.g. Peri 2016), the previously smooth pattern in the flow of immigrants has experienced a sharp rise in the most recent years. This has been particularly so in the case of Europe, that gained some 22 million international migrants between 2000 and 2017 (from 56.3 million in 2000 to almost 77.9 million in 2017). Mostly due to their geographical location, the increase in the immigrant population during this period has been exceptionally intense in some Southern European countries such as Italy, where the share of immigrants in the total population increased from around 2.4% in 2000 to 8.3% in 2017. The sharp increase in immigration, similar to that in other European countries that have only recently attracted large numbers of immigrants (e.g. Spain), explains that by 2017 the proportion of immigrants in the Italian population was close to that of the countries with greater immigration tradition, such as Germany and France.[1]

This unexpected and unprecedented influx of immigrants has resulted in an increase in foreign-born workers in the Italian labour force, fueling the argument that immigration has a pernicious impact on native employment. In this regard, theoretical arguments in the literature predict that this impact depends mainly on three aspects. First, whether and to which extent immigrants are complementary or substitute in production to native workers. Immigration is assumed to exert a positive effect on native's employment in the former case (Foged & Peri 2016), whereas natives may instead experience job losses in the latter (Borjas 2003). Second, the skill composition of the immigrant population would play a crucial role. If immigrant inflows alter the skill distribution of the workforce (because, for example, immigrants are mainly low skilled, as is the case of Italy), the adjustment to restore the pre-immigration equilibrium will imply changes not only in wages, but also in the employment structure (Dustmann et al. 2005). Last, the employment effect of immigration would depend on the amount of rigidities in the labour and product markets, that is, on the institutions of the host country. In brief,

[1] See the Online Supplemental Material (OSM) for more details on the recent evolution of the share of immigrant in the population in the aforementioned countries and in Italy.

wage adjustments to immigration shocks would be more intense in economies with flexible institutions whereas native job losses would be more frequent in countries with restrictive institutions (Angrist & Kugler 2003).

The evidence on the employment impact of immigration is inconclusive. Some studies for the U.S. estimate a detrimental impact of immigration on native employment (Altonji & Card 1991, Anastasopoulos et al. 2018), while others provide evidence in favor of a negligible and even positive impact (Card 2005, Ottaviano et al. 2013, Basso & Peri 2015). In the case of Europe, studies have focused on countries with a long tradition of immigration - Hunt (1992) and Edo (2015) for France; Dustmann et al. (2005) and Lemos & Portes (2014) for the U.K.; D'Amuri et al. (2010), Glitz (2012) and Dustmann et al. (2017) for Germany; Foged & Peri (2016) for Denmark; Basten & Siegenthaler (2018) for Switzerland -, whereas evidence for countries in which immigration is a more recent phenomenon is less abundant- e.g. González & Ortega (2011) for Spain.[2] Overall, it can be said that the evidence from immigration in Europe is also ambiguous, although results in recent studies that exploit variability among European countries point to a more intense employment response in economies with less flexible institutions (Angrist & Kugler 2003, D'Amuri & Peri 2014, Moreno-Galbis & Tritah 2016). In the specific case of Italy, the literature on the employment effect of immigration is surprisingly scarce, particularly when it comes to the impact of the most recent immigration episodes.[3] Venturini (1999) analysed the impact of illegal immigrant workers in Italy on legal employment between 1980 and 1995, concluding that immigrants working without a regular contract crowd-out legal workers in the agricultural sector. On the other hand, she identifies the presence of a complementarity in production between legal workers and illegal foreign workers in the non-tradable

[2]See Table 1 of Dustmann et al. (2016) for detailed information on the countries for which evidence is available.

[3]However, it is important to mention that other recent studies have analysed the effect of immigration in Italy on different magnitudes. For example, De Arcangelis et al. (2015) indicate that an increase in the provincial foreign-born population has a positive impact on the value added of the manufacturing sector as compared to the value added of the services sector. Brunello et al. (2020) find instead that the presence of low-skilled immigrants has induced a human capital polarization in the Italian provinces. Finally, Bratti & Conti (2018) find no evidence of an impact of low-skilled immigrants on innovation, while Michelangeli et al. (2019) conclude that ethnic minorities affect positively productivity of Italian provinces.

sector. Along these lines, Venturini & Villosio (2006) concluded that the presence of regular immigrants in Italy in the period from 1993 to 1997 did not affect the probability of native workers to change their status from employed to unemployed and vice-versa. For a period closer to the one in this study, Labanca (2020) analysed the employment impact of the unexpected migration flows subsequent to the Arab Spring (from 2009 to 2012). His findings suggest that immigrants tended to displace native Italian workers in the short-run, particularly in sectors like mining, hotel and restaurant, and wholesale trade. The effect is instead positive in construction and educational services.[4]

Therefore, according to theoretical predictions and existing evidence, the impact of recent immigration episodes in Italy may have been less straightforward than some actors preach and, at the same time, may have affected different population groups differently, depending on their work characteristics and the elasticity of their labour supply. This study tackles this issue by analysing the impact that the recent migratory waves have exerted on the native employment of the Italian provinces, in a context of economic recession and quite rigid labour market institutions.

The Italian case is of particular interest for several reasons. First, mostly because of its position in the centre of the Mediterranean Sea, Italy has become one of the most popular destinations for African migrants since the beginning of the 21st century, while it has also attracted citizens of Central and Eastern European countries since their accession to the European Union in 2004 and 2007 (Hanson & McIntosh 2016, Labanca 2020). Interestingly, part of this period of intense immigration in Italy overlaps with the severe downturn of the Italian economy caused by the global financial crisis and the European sovereign debt crisis. According to OECD (2017), Italy began to recover from the long and deep recession caused by these crises only in 2017. The figures indicate that the Italian real GDP per capita fell by about ten percentage points during the recessionary period. In this regard,

[4]It should be noted that Labanca (2020) focused only on illegal immigrants from Egypt, Libya, Tunisia and Yemen, and was interested in the specific sectorial effects. In contrast, our study considers immigrants regardless of their country of origin and pays attention to the heterogeneity of the effect depending on the gender and skills of the native population.

the extant literature indicates that immigrants usually have (i) a lower reservation wage; and (ii) different social norms (e.g. Edo 2015). This makes them more likely to be hired, as they are less costly compared to natives. The presence of a recession may further increase this mechanism as firms and capital owners often need to face budget cuts. Therefore, the potentially negative employment effect of immigration may be further exacerbated by the economic downturn. In this scenario of deep recession, one of the sectors more harshly affected was the labour market. To this extent, it is important to note that the Italian labour market has been characterised by a high degree of employment protection and downward wage rigidity.[5] In contrast to countries like the U.S. and U.K., wage flexibility in Italy is constrained by the system of wage bargaining, which is highly centralized at the national level (e.g. D'Amuri et al. 2010). This makes wages less sensitive to labour supply (or demand) shocks, provoking adjustments via changes in employment. This feature clearly plays a crucial role in the extent to which local labour markets are able to absorb an immigration-induced supply shock. Hence, it is motivating exploring how local employment reacted to sizeable immigration flows in a context of economic recession in a country characterized by a far from flexible labour market.

Second, the distribution of immigrants in the Italian geography is far from uniform. In fact, spatial disparities in the immigrant population resembles the ones frequently reported for other socio-economic variables in Italy (González 2011). This is consistent with the attraction of immigrants to places that offer greater economic opportunities. Immigrants were about 10% of the population in the northern and central parts of the country in 2017, whereas they were just about 4% in the South. In terms of the total number of immigrants in Italy that year, 58% of them concentrated in the northern regions, about a quarter in the central regions, while only 16% in the Southern ones. It is worth noting that there were also sizeable

[5]Italy is among the countries with the highest values of the OECD strictness of the employment protection index (`http://www.oecd.org/employment/emp/oecdindicatorsofemploymentprotection.htm`) and the ILO employment protection legislation index (`https://www.ilo.org/dyn/eplex`). Similarly, the value of the index of flexibility of wage determination produced by the World Economic Forum (`https://tcdata360.worldbank.org`) reveals that the degree of centralization of wage bargaining in Italy is comparable to that in France, Germany, and Spain, but far above that in Denmark, U.K. and the U.S.

differences in these figures between provinces within regions. For example, in Lombardia, a region in the North, the proportion of immigrants in the population was 5.1% in the province of Sondrio and 13.9% in that of Milano, whereas in Puglia, in the South of Italy, the rate was 2.2% in Taranto and twice this figure in Foggia (4.5%).[6] The great spatial variation in economic performance and resilience to recessions (Faggian et al. 2018), jointly with the heterogeneous distribution of immigrants that characterizes the Italian provinces, provide an excellent framework to evaluate the reaction of native employment to a migration-induced shock to local labour markets during a period of severe economic downturn.

Finally, the issue of immigration has reached a central position in the political debate in Italy today (Mayda et al. 2018).[7] There is a fairly widespread belief that the labour market outcomes of the Italian-born have worsened as a result of increased labour competition brought by immigrants (Mayda 2006). In fact, the perception that immigration hinders the employment of natives has gained momentum, amplifying anti-immigration messages. To this extent, if in the past the Italian public opinion was split into two opposing factions, partisans and opponents (Gavosto et al. 1999), more recently the latter have somewhat "taken over" the former.[8]

Against this background, this study tests whether the recent influx of immigrants to local labour markets in Italy has really had a negative impact on the employment of natives. By using data drawn from the Italian Labour Force Survey (LFS) and the Demographic Portal of the Italian Office for Statistics (DP-ISTAT) during the period 2009-2017, we apply the so-called "spatial correlation approach" (Borjas 2014) to estimate the effect of a change in the immigrant population on the change in native employment in the Italian provinces. In the first place, this effect is estimated for the overall native population. Then, differences between groups of

[6] See Figure SM1 in the OSM for additional information on the distribution of immigrants in the Italian provinces.

[7] In the political elections of March 2018, one of the parties that won most public support was the Northern League, well-known for its anti-immigration rhetoric.

[8] As an example, the 2017 Special Eurobarometer (number 469) reveals that the Italian population greatly overestimates the proportion of immigrants in the country's population. Similarly, the evidence derived from the Standard Eurobarometer surveys indicates that immigration and unemployment are among the problems that most concern the Italian population.

natives are explored. To be clear, the study hypothesizes that the complementary-substitutability relationship between immigrant and Italian-born workers varies for high and low educated natives and by gender. In all cases, in order to identify the causal link that connects immigrants to native employment, we control for potential labour demand shocks and compensating adjustments through internal migration that could confound the estimate of the impact of immigration. The empirical model also controls for unobserved province effects and province-specific trends in native employment. While the former seeks to account for the large heterogeneity of labour markets between the Italian provinces in general, and their employment levels in particular, the latter aims to capture differences among provinces in the path followed by employment after the crisis. In addition, an IV estimator is implemented to account for the likely endogeneity caused by the non-random sorting of immigrants into local labour markets. To isolate the supply-driven shocks associated to immigration in each provincial labour market, the empirical analysis uses the so-called "shift-share" instrument, that combines information about the pre-sample settlements of immigrants in the Italian provinces and the evolution in the number of immigrants by country of origin in the whole of Italy.

In contrast with the idea that immigrants indiscriminately "take away jobs from natives", the evidence in this study points to an overall negligible impact of immigration on native employment in the representative Italian province. However, when considering the effect on specific groups of natives the results reveal a positive impact on high-educated and a negligible one on low-educated individuals. When using occupations instead of formal education to distinguish native workers with different labour market skills, the results identify a positive, albeit marginally significant, effect on skilled manual native workers, whereas a negligible impact is observed for workers in occupations that require lower skills and for white collar workers. These results partly deviate from the canonical theoretical model of immigration (Boeri & Van Ours 2008) according to which immigrants - that in Italy are mostly low-skilled (see Bratti & Conti 2018) - act as comple-

mentary with high-skilled natives but compete for jobs with low-skilled ones. The evidence in this study suggests that in the Italian provinces, during the period under analysis, immigrants would have been less substitutes with low-skilled natives than estimated by Ottaviano & Peri (2012) for the U.S. and by Romiti (2011) for Italy in the period from 1987 to 2004. Interestingly, the results that distinguish by gender indicate that the employment of native males was not significantly affected by the immigration shocks of the 2009-2017 period. This is so regardless of their skills. In contrast, the employment of native females in the representative Italian province would have been stimulated by immigration, particularly in the case of women with high-education and working in skilled manual occupations.

The rest of the paper is structured as follows. Section 2 outlines the empirical model and discusses the identification strategy, while section 3 introduces the dataset and provides preliminary descriptive evidence on the relationship between immigration and native employment. The main results are presented and discussed in Section 4, distinguishing between the overall effect of immigration and the specific effects for groups of natives formed according to their skills and gender. Finally, section 5 concludes.

2 Empirical Model

2.1 The Spatial Correlation Approach

Our interest in this study is the estimation of the short-run impact of immigration on the native employment of the representative (average) Italian province in the period under analysis. To this aim, we follow the so-called "Spatial Correlation Approach", pioneered by Altonji & Card (1991), which exploits the fact that different places generally experience non-homogeneous immigrants' inflows (in terms of the number of people entering each particular labour market).[9] The uneven spatial distribution of foreign-born individuals in Italy represents an interesting source

[9]By contrast, the "National Skill-Cell Approach" initiated by Borjas (2003) relates the labour market outcome of interest in a group of natives with similar education and work experience (skill-cell) to the number of immigrants within the same skill-cell in the country as a whole.

of variation that can be exploited to estimate the impact of the recent immigration flows on native employment. As in Card (1990), Hunt (1992), Basso & Peri (2015), Foged & Peri (2016), Borjas (2017), we estimate the effect of interest from a specification where the employment of the total native population in a province is assumed to depend on the total number of immigrants in that province. Unlike the "National Skill-Cell Approach", the one based on regional variations allows to identify the "overall" impact of immigration rather than the "relative" effect that immigrants exert on the most similar natives, i.e. belonging to the same education-experience group (Dustmann et al. 2016). In addition, in contrast to the approach based on the skill-cells, the spatial strategy does not impose the assumption that immigrants and natives are homogeneous in terms of their observable levels of education and experience. Indeed, the evidence indicates that immigrants experienced the so-called skill-downgrading (Dustmann & Preston 2012), leading to an incorrect classification of immigrants in the education-experience groups that, in turn, biases the estimated impact of immigration.

Based on Card & Peri (2016), the baseline specification used to estimate the overall impact of immigration on native employment in the Italian provinces is:[10]

$$\frac{\Delta(N_{p,t})}{L_{p,t-1}} = \psi_t + \mu_p + \beta \frac{\Delta(M_{p,t})}{L_{p,t-1}} + \nu_{p,t} \tag{1}$$

where $\Delta(N_{p,t}) = (N_{p,t} - N_{p,t-1})$ and $\Delta(M_{p,t}) = (M_{p,t} - M_{p,t-1})$ are the changes in, respectively, native employment and the number of working-age foreign-born individuals in province p between years t and $t-1$. $L_{p,t-1}$, the working-age population of province p in $t-1$, accounts for the size of the province labour market in $t-1$. Therefore, the outcome variable is the yearly change in native employment of province p relative to the size of its labour market in $t-1$, whereas the regressor proxies for the relative flow of immigrants in each province and year. The specification includes time dummies, ψ_t, to account for country-wide year-specific

[10]Borjas (2003) suggested an alternative specification to analyze the impact of immigration on native labour market outcomes, that has been used by several subsequent studies. However, we have not followed this approach to minimize the risk and consequences of spurious correlation between the variables of interest in this study (as pointed out by Card & Peri 2016).

shocks in employment, and province fixed-effects, μ_p, that control for province-specific trends.[11] Specific trends induced by provincial differences in the impact of the crisis on employment during the period analysed is a potential source of heterogeneity that must be taken into account to properly identify the impact of immigration on native's employment (Wooldridge 2002).[12] Finally, $\nu_{p,t}$ is an $i.i.d.$ random term with zero mean and variance σ^2_ν.

The coefficient of interest, β, measures the short-run response of relative native employment in the representative Italian province associated to an increase of immigrants in the province of one percent point of its working-age population. As mentioned above, the aggregate spatial approach internalizes the possible spillover effects between different education-experience groups and therefore identifies the overall effect of immigration on native employment of the representative Italian province over the period analysed.

2.2 Identification of the Effect of Immigration

In the specification in (1), the relative change in native employment is regressed on the relative change in province immigration to get rid of the unobserved time-invariant differences between local labour markets that may confound the estimate of the impact of immigrant inflows. The specification in relative changes, therefore, controls for the correlation between the two variables of interest that may be due to permanent or persistent local economic conditions driving both the foreign-born population and the level of local employment. The analysis also accounts for province-specific trends in native employment (province fixed-effects in the specification in the changes of the variables) which is another source of province heterogeneity that could confound the estimate of the effect of immigration. But besides the unobserved local economic conditions, the empirical model must account for an important feature that characterizes the performance of local labour markets and, therefore, affects both natives and immigrants, namely the evolution

[11] It should be noted that the province fixed-effects, μ_p, result from the differentiation of the specification in levels that includes province-specific trends.

[12] We thank an anonymous reviewer for raising this point.

of the industry in which they are employed (e.g. Acemoglu & Autor 2011, Basso & Peri 2015). The period analysed was characterized by the turbulences caused by the global financial crisis and the European sovereign debt crisis on the Italian economy. It is sensible thinking that the particular reaction of the Italian local economies in general and their labour markets in particular depended heavily on the productivity changes of the industries in which they are specialized. If so, the lack of control of the productivity changes that different industries experienced in the period analysed will lead to confounding the estimation of the effect of immigration. Therefore, in order to identify the specific impact induced by immigration flows on the change in native employment, we include in equation (1) the "quantity version" of the so-called Bartik shock (Bartik 1991), defined as:[13]

$$B_{p,t} = \sum_{j} \frac{E_{j,p,t_o}}{E_{p,t_o}} \cdot \left[\frac{(E^{IT}_{j,t} - E^{IT}_{j,t-1})}{E^{IT}_{j,t-1}} \right]$$

and $E_{j,p,t_o}/E_{p,t_o}$ is the employment share of industry j in province p in the initial year t_0, $E^{IT}_{j,t}$ is the employment of industry j in Italy in year t, and thus the second term in the left-hand side is the annual growth of employment in industry j in the country. The Bartik shock captures changes in province labour demand that are sector-driven, and could hinder the identification of the effect of immigration.

A well-known criticism of the spatial correlation approach is that local labour markets are not closed economies (e.g. Borjas 1999, 2006). This means that there may be compensatory flows if some natives move to other locations as a reaction to the changes in wages and employment opportunities induced by immigrant inflows. Under this scenario, an analysis conducted at the local level could indicate a weak (or even absent) correlation between immigrants and native labour market outcomes, not because foreign-born individuals are not actually harmful for the employment perspectives of the natives, but because internal migration diffuses the effect of the immigration shock to other local labour markets. To counter the concern of compensatory flows, studies using the spatial correlation approach

[13]This is one of the most widely used methods to capture the productivity-induced changes in labour demand in a local economy (e.g. Baum-Snow & Ferreira 2015).

have claimed that immigrants do not induce significant migratory responses by natives (e.g. Card & DiNardo 2000, Peri & Sparber 2011). In the specific case of Italy, Venturini & Villosio (2006) and Mocetti & Porello (2010) found that immigration has a trivial impact on overall native internal mobility, albeit there could be some compensatory responses of the low-educated and highly-educated natives that would alter the skill composition of the regional labour markets.[14] Although we believe that the annual changes considered in this study do not leave much room for labour market adjustments through compensatory population flows, we add to the baseline specification in (1) a control of internal migration, namely the net migration rate:

$$IM_{p,t} = \left[\frac{(I_{p,t} - O_{p,t})}{L_{p,t-1}}\right] \cdot 1000$$

where $I_{p,t}$ is the number of people immigrating into province p at year t, $O_{p,t}$ the number of people emigrating out of the same province in the same year, and $L_{p,t-1}$ is as defined above.[15]

As a result, the extended specification is as follows:

$$\frac{\Delta(N_{p,t})}{L_{p,t-1}} = \psi_t + \mu_p + \beta\frac{\Delta(M_{p,t})}{L_{p,t-1}} + \gamma B_{p,t} + \delta IM_{p,t} + \nu_{p,t} \tag{2}$$

As in the case of the baseline specification in (1), the coefficient of interest is β which captures the short-run impact of immigration on native employment, net of productivity-induced changes in local labour demand, internal compensatory flows, province unobserved heterogeneity, and province-specific trends.

However, it is well known that the identification of the causal effect of immigration based on the specification in equation (2) faces another problem, namely that

[14] In contrast with evidence from other countries (e.g. Aydede (2017) for Canada), this is in line with the existing analyses that point to limited interregional migration in the European economies as a response to immigration shocks (e.g. Zimmermann 2009, Glitz 2012, Lewis & Peri 2015).

[15] It should be noted that $IM_{p,t}$ accounts for the annual change in the province population due to internal (inter-province) migration decisions relative to the working-age population of the province in $t-1$.

immigrants' location decisions are not randomly taken. In brief, we will observe a spurious positive correlation between the change in native employment and the inflow of immigrants if the latter tended to settle in provinces with positive, or less negative, demand-driven shocks during the period analysed. A common way to solve this bias in the estimate of the causal effect of immigration is using an instrumental variable approach. Following the path set by Altonji & Card (1991) and Card (2001), we use an instrument that proxies the labour supply-driven shocks of the immigrants' inflow. The main rationale behind this instrument is that immigrants tend to settle in locations characterized by the presence of other individuals coming from the same country of origin (e.g. Bartel 1989). The number of foreigners from a country in province p at year t is assumed to be connected with the past number of immigrants from this country in the province but unrelated to the current shocks that affect the local economy. A shift-share type of instrument for $\Delta(m_{p,t}) = \Delta(M_{p,t})/L_{p,t-1}$, widely used in the existing literature (e.g. Card 2001, Barone & Mocetti 2011, Basso & Peri 2015), is computed as:

$$\Delta(\widehat{m}_{p,t}) = \frac{\Delta(\widehat{M}_{p,t})}{\widehat{L}_{p,t-1}} = \frac{\widehat{M}_{p,t} - \widehat{M}_{p,t-1}}{\widehat{M}_{p,t-1} + ITb_{p,t-1}} \quad \text{where} \quad \widehat{M}_{p,t} = \sum_{o} \frac{M_{o,p,t_0}}{M_{o,t_0}} \cdot M_{o,t}$$

and $ITb_{p,t-1}$ refers to the Italian-born population in working-age in province p at year $t-1$.[16] The subscript o denotes the immigrants' countries of origin and t_0 a baseline year that must be distant enough from the years in which the change in native employment is measured to guarantee the unrelatedness to current shocks. The validity of the instrument requires that, conditional to the controls and unobserved province heterogeneity considered in equation (2), the distribution of immigrants by country of origin in the Italian provinces in the baseline year does not correlate with province-specific demand changes in native employment in the period analysed. As in Bratti & Conti (2018) the baseline year is set to 1995, which is well before the onset of the financial and sovereign debt crises that strongly affected the Italian economy in the period under analysis. This year also predates

[16] All migrants from each country of origin, instead of those of working-age, are used to compute the instrument. This favors compliance with the exclusion restriction.

the accession to the European Union of the member states from central and eastern Europe that spurred a substantial inflow of immigrants from these countries to Italy, as well as the migratory shock that followed the Arab spring. These two facts work in favour of the validity of the instrument, since it is sensible arguing that province-specific labour market shocks that affected the distribution of immigrants in 1995 do not strongly correlate with changes observed in employment from 2009 on (see Goldsmith-Pinkham et al. 2020). Even in the case of strong persistence in the province-specific shocks, their effect on employment changes about a decade and a half later should be largely captured by the controls (particularly the Bartik variable) and the elements associated to unobserved heterogeneity of the province included in equation (2). On the other hand, the validity of the instruments also requires that the overall inflow of immigrants from each country of origin to Italy does not correlate with shocks exerting an impact on employment changes in the province. Considering the prevalence of immigrants from the above-mentioned origins, push factors associated to the internal situation of the places of birth probably had more influence on migration decisions that pull factors motivated by the economic performance of the Italian provinces.

In any case, some evidence will be provided in section 4 to mitigate concerns about the exogeneity of the instrument.

3 Data and Descriptive Analysis

In this section we provide information on the data sources used to construct the variables introduced in the previous section. It also presents the results of a descriptive analysis that sheds some preliminary light on the relationship between the flow of immigrants and the evolution of native employment in the Italian provinces over the period 2009-2017.

3.1 Data Source

Population censuses are the data sources commonly used in the existing literature on the economics of immigration. However, such information is not available

for Italy during the period under analysis. Therefore, alternative sources of data are considered in this study. Information on the stock of foreign-born individuals with no Italian citizenship and that for the native population used to compute the immigration regressor is taken from the DP-ISTAT.[17] In both cases, data refers to the resident population at the beginning of each year. Regarding the data on native employment, we draw the information from the microdata files of the Italian LFS, carried out on a quarterly basis by ISTAT.[18] More precisely, we use the homogeneous cross-sectional quarterly data available as of the first quarter of 2009. The LFS is representative of the main magnitudes of the Italian labour market (e.g. employment status, type of job, job search, wages, etc.), disaggregated by gender, age, citizenship and geographical scope (up to the provincial level). In particular, we use the LFS files for the period 2009 to 2017 to compute the yearly changes in the number of native employees in each Italian province. As the information on the resident population is relative to the first of January of every year, in order to maximize homogeneity in the dataset, we use the data for the first quarter of the LFS for each of the years under analysis.

It is worth mentioning that, since the objective of the paper is to assess the effect of immigration on native employment, we consider only the working-age population, for both natives and immigrants. In Italy, the minimum legal working-age is 15 years, so we include in the analysis individuals from 15 to 64 years of age. On the other hand, it should be said that the main results in the paper are obtained for the Italian provinces (NUTS 3 regions in Italy), which is the territorial breakdown closer to the concept of local labour markets for which the required data for the analysis can be computed. Due to some changes in the configuration of the set of provinces in the period analysed, we had to make some adjustments that

[17] See `http://demo.istat.it/index_e.html`. Suitable data on all foreign-born individuals, either non-citizens or naturalized, is not available for the Italian provinces. As pointed out by an anonymous reviewer, this may rise concerns due to the endogeneity of immigrants' naturalization. However, it should be taken into account that our empirical exercise focuses on annual changes of the variables of interest. In this case, as emphasized by Angrist & Kugler (2003), the group of non-nationals largely overlaps the group of recently-arrived foreign born.

[18] Other studies of the impact of immigration on the European labour markets have also used data from the LFS, including Angrist & Kugler (2003). Dustmann et al. (2005), D'Amuri & Peri (2014) and Edo (2015).

led us to work with the same group of 102 provinces for the entire period.[19]

With respect to the information required to compute the instrument, the share component uses the data collected by the Italian Ministry of Interior on the number of resident permits issued to foreign-born individuals by country of origin in each province in 1995.[20] In turn, the shift component is computed using annual data on the stock of immigrants in Italy by country of origin, available in the DP-ISTAT. Figures on all immigrants instead of those in working-age are used to compute the instrument as this minimises the risk of violating the exclusion restriction.[21]

3.2 Descriptive Analysis

Before presenting the results of the estimation of the coefficients of the empirical model sketched in section 2, in the rest of this section we present the descriptive statistics of the variables involved in the analysis as well as preliminary evidence on the relationship between the changes in native employment and immigration in the Italian provinces over the period analysed.

The descriptive statistics of the variables are reported in Table A1 of the Appendix.[22] On average during the period, native employment decreased each year by 0.45 percent points of the working-age population of the representative (average) Italian province. This is consistent with the impact of the recession on the Italian labour market. However, the value of the standard deviation confirms that this figure varied greatly between provinces and years. Information in Table A1 also reveals interesting differences between groups of workers. On average, the change in employment was positive for the highly-educated native workers and negative for those endowed with less education. When distinguishing by groups of natives based on occupations, the figures are somewhat consistent with the ones for the groups based on the level of education. On the other hand, the distinction of the change in employment by gender suggests the existence of interesting differences

[19] See the OSM for details.

[20] These data were gently provided by Prof. Massimiliano Bratti.

[21] We thank an anonymous reviewer for pointing this out.

[22] Details on the geographic distribution of the change in native employment and immigration are provided in Figures SM2 and SM3 of the OSM.

for female and male natives, that will be worth taking into account in the next section.

Regarding the immigration indicator, on average over the 2009-2017 period, the representative Italian province increased its immigrant population by 0.25 percent points of its working-age population per year. It should be stressed that this figure is consistent with that reported for the inflow of immigrants in other countries (e.g. Peri 2016).[23] Interestingly, the standard deviation and the maximum and minimum values confirm a great geographical variability in the immigrant inflows in the analysed period. Finally, it should be noted that the mean of the Bartik variable is consistent with an average negative shock on local labour demand over the period, while the low value of the internal migration rate agrees with the limited internal mobility in Italy, excepting in the case of some particular provinces in specific years.

The degree of association between the change in native employment and the change in immigrants relative to the working-age population in each province can be derived from Figure 1. The correlation between the two variables is positive and significant, which suggests that the influx of immigrants did not worsen the prospects of native employment in the average Italian province in the aftermath of the Great Recession but, on the contrary, there could have been some complementarity between immigration and native employment. However, this correlation should not be interpreted as evidence of a causal effect due to the arguments put forward in section 2. The estimation of such causal effect is the aim of the next section.

[23]It is worth noting that, as shown in Table SM1 of the OSM, immigration inflows in Italy were not of the same intensity in all the years over the period analysed. They were more intense until 2011 and in 2013 and 2014, with a net outflow in 2012 after the worsening of the economic situation in Italy due to the sovereign debt crisis, and a stagnation in the proportion of immigrants since 2014. In any case, it should be noted that this temporal pattern was not shared by all provinces.

4 Results

This section summarizes the results of the estimation of the effect of immigration on native employment from the specifications sketched in section 2 using the data for the Italian provinces described above. The impact on the overall native population is discussed first. Next, we explore differences in the effect of immigration on different groups of native workers, defined based on their skills and gender. Weighted regressions, using as weights the total number of working-age individuals in the province at the beginning of the period, are used in all cases, while standard errors are clustered at the province level.

4.1 Overall impact of immigration

The ordinary least squares estimation (OLS) of the impact of immigration on native employment from the baseline specification in equation (1) is reported in the first column of Table 1. This estimation suggests a significant positive effect of immigration. To be clear, for the representative Italian province, an increase of immigrants by one percentage point of the local working-age population was associated to an increase in native employment of around 0.31 percentage points of the working-age population. However, the baseline specification does not control for changes in local labour demand, compensatory internal migration flows, and province-specific trends in employment that may confound the estimate of the impact of immigration. To move towards the identification of the effect of interest, we estimate the coefficients of the extended specification in equation (2). The OLS results are summarized in the second column of Table 1. It is observed that the inclusion of the control variables slightly reduces the estimate of the coefficient of interest (from about 0.31 to 0.27), affecting also its significance (the estimated effect is significant at 5% in the extended specification).

This positive response of native employment was also derived from a group of EU countries that includes Italy for the period 1998-2004 by Moreno-Galbis & Tritah (2016). In addition to the complementarity between immigrants and natives, these authors argued that immigrants could be exerting a positive exter-

nality since they are more profitable workers (the productivity-wage gap is wider for immigrants than for natives). Increase in profits would lead firms to open more vacancies, which would improve the employment prospects of the natives. However, this type of adjustment is more likely in host countries with flexible institutions, which is not the case of Italy in the period analysed. In fact, the positive estimate of the effect of immigration on native employment could be due to the bias of the OLS estimator if the location decisions of immigrants in the period analysed were not random, and immigrants moved to those provinces less affected by the recession. The inclusion of the Bartik variable aims to control at least part of this problem, particularly with regard to industry-specific shocks that affected labour demand in each province depending on its sectoral composition. Still, to address this potential source of bias we use the immigrants shift-share instrument to implement an IV estimator for the extended specification.

Before presenting the results obtained with this estimator, it is worthwhile to show some evidence supporting the validity of the instrument. As mentioned in section 2, it can be argued that highly persistent province-specific shocks induce correlation between the provincial distribution of immigrants in 1995 (year used to compute the share component of the predicted amount of immigrants in each province-year) and shocks to changes in provincial employment during the period 2009 to 2017. In that case, the instrument and changes in native employment will be spuriously correlated, leading to violation of the exclusion restriction. To rule this concern out, in the spirit of Mitaritonna et al. (2017), we first computed the correlation between the instrument in the period 2009-2017 and the change in native employment between 2009 and 2010 (i.e. the first two years under analysis). The results confirm that there is no significant association between the outcome variable at the beginning of the period under analysis and the instrument measured in the following years.[24] A more accurate test would require to relate the pre-2010 values of the change in native employment to the post-2010 values of the instrument. Unfortunately, lack of data for native employment in the Italian

[24]The value of the parameter estimated in the simple regression between the two variables is -0.021, with s.e.=0.040.

provinces before 2009 prevents us to carry out such type of test. As an alternative, we can test the validity of the instrument computed for the second part of the period only (2013-2017) relative to changes in native employment for the first part (2009-2013). A significant correlation between them would point to strong serial correlation between earlier demand shocks and later values of the instrument (changes in predicted share of immigrants), casting doubt on its validity. The result clearly suggests that this is not the case, since the correlation between the change in employment in the first half of the period and the instrument in the second is not statistically different from zero.[25] Therefore, these results, jointly with the arguments provided in section 2, support the validity of the instrument based on the immigration enclaves in 1995.

The results of the first-stage regression are summarised in Table A2 of the Appendix. They show that the instrument correlates strongly with the change in the immigrants indicator. Accordingly, the value of the first-stage F-statistic clearly leads to rejecting the null hypothesis of weak instrument (based on the critical values computed by Stock & Yogo 2005). The second-stage results of the IV estimator are reported in the third column of Table 1. It can be observed that after controlling for the endogeneity of immigration shocks, the estimated effect on native employment is still positive although not statistically different from zero. It is important to notice that although the IV estimate of the effect of immigration is slightly higher than that obtained by the OLS estimator, it is estimated with less precision, leading to a non-significant effect. Therefore, this result points to a non-significant effect of the recent inflow of immigrants on native employment in the average Italian province, being consistent with the evidence reported in D'Amuri et al. (2010) for Germany and D'Amuri & Peri (2014) for a set of 15 EU countries.

This conclusion about the overall impact of immigration on native employment in the Italian provinces in the period analysed is robust to a set of alternative specifications and samples, as reported in columns (4) to (11) of Table 1.[26] In particular,

[25] The value of the parameter estimated in the simple regression between the two variables is 0.011, with s.e.=0.026.

[26] We thank three anonymous reviewers for suggesting several of the robustness checks.

column (4) shows that the estimated effect is not driven by the use of province population weights, since similar results are obtained with the unweighted IV estimator. In turn, results in column (5) correspond to the specification that adds two lags of the change of the immigrants indicator. Following Jaeger et al. (2019), in this way we aim to capture the dynamic response of employment to immigration, due to adjustments to past immigration shocks. In brief, these authors argue that the instrument will be correlated with ongoing responses to previous shocks if the provincial distribution of the inflow of immigrants remains stable during the analysed period. As a result, the IV estimator based on the shift-share instrument will not identify the short-run effect of immigration on employment but a mixture of the short- and long-run effects. Following the method proposed by Jaeger et al. (2019), we use the first two lags of the shift-share instrument to account for the endogeneity of the corresponding lags of the immigration regressor. Results in column (5) confirm that the estimated short-run effect of immigration is not statistically different from zero, this also being the case of the dynamic response of employment to the immigration shocks.[27]

We also check the robustness of the estimated short-run impact of immigration to the exclusion of internal migration. This is important inasmuch as it can be argued that this variable is a bad control given that, as long as it is determined by immigration shocks, it is an outcome variable rather than a valid control. The results in column (6) confirm that the estimation of the impact of immigration is not affected by the exclusion of internal migration. As an alternative to this control, in line with Altonji & Card (1991) and Dustmann et al. (2005), we included a set of variables that capture changes in the composition of the provinces population. These are changes in native (ΔA^{NAT}) and immigrant (ΔA^{IMM}) average age, and the (log of the) ratios of high to low ($\Delta \Pi^{HL}$) and intermediate to

[27]The result of the first-stage F-statistic in the dynamic specification clearly rejects that the instrument and its lags are jointly weak. As indicated in Jaeger et al. (2019), evidence on weak instruments is obtained when there are no substantial changes over the period analysed in the composition by country of origin of national inflows, meaning that the instruments will be highly correlated. In this regard, it is worthwhile noting that there is no significant serial correlation neither in the instrument nor in the immigration regressor used in this study. On the other hand, it should be mentioned that similar results were obtained with a different (reasonable) number of lags.

low ($\Delta\Pi^{IL}$) educated natives. These controls aim to capture differences in the propensity to migrate of different population groups that affect the composition of the population. As shown in column (7), the estimated effect of immigration in this alternative specification is somewhat lower and remains not statistically significant. The main conclusion on this effect is also not affected by the inclusion of the proportion of workers in each skill group. Although results in column (8) confirm that the shares of skilled manual (E^{skm}) and white collar (E^{white}) workers affect positively changes in native employment, their inclusion as controls does not modify the conclusion about the impact of immigration. Furthermore, its impact is also not affected by the inclusion of an additional control that aims to account for the effect of agglomeration economies. To be clear, the results in column (9) correspond to the estimated coefficients in a specification that includes the lagged annual growth of population density (i.e. $\Delta\vartheta_{p,t-1}$) interacted with year dummies to allow for the effect of agglomeration to vary across years.[28]

Finally, we check the robustness of the estimated impact of immigration to the exclusion from the analysis of the largest provinces (column 10) and immigrants from EU 15 countries others than Italy (column 11). In the first case, removing provinces with more than 2 million inhabitants (Milano, Rome and Naples) leads to an increase in the estimated effect of immigration. However, it is not statistically significant as there is also a decrease in the precision with which the parameter is estimated. Therefore, there is no evidence that the estimated effect reported in column (3) is driven by the evolution of employment and immigration in the most populated Italian provinces. Similarly, results in column (11) confirm that the estimate of the impact of immigration on native employment is robust to the exclusion of the group of immigrants from countries of the EU 15.

Overall, these robustness checks confirm that there was a positive although not significant effect of immigration on native employment in the Italian provinces in

[28]We thank an anonymous reviewer for suggesting the inclusion of the interaction between a measure of agglomeration and year dummies as a robustness check. The results in the next subsection are obtained without the agglomeration controls since their inclusion does not modify the estimated effect of immigration and due to our concern about the endogeneity of population density, the treatment of which is beyond the scope of the current study. Undoubtedly, this is an issue that deserves further attention in a specific study.

the period from 2009 to 2017. In other words, empirical evidence does not support the assertion of a general negative impact of immigration on native employment in the Italian provinces in the aftermath of the Great Recession.

4.2 Heterogeneity in the impact of immigration

So far, we have considered all native-born workers in a single group, as if they were homogeneous workers and were similarly affected by immigration shocks, regardless of their job characteristics. Nevertheless, both theoretical arguments and empirical evidence seem to contradict this hypothesis (Kerr & Kerr 2011, Borjas 2014, Dustmann et al. 2016). In brief, immigrants can act as complementary for a part of the native population, specifically the highly educated (Chassamboulli & Palivos 2013, Dustmann et al. 2017) and as substitute for natives with low levels of education (Altonji & Card 1991, Dustmann et al. 2017). If so, the negligible overall estimated effect could be masking significant opposite effects for native workers with different skills, which cancel out in the aggregate. Therefore, following the advice of Dustmann et al. (2016), we investigate the effect of immigration shocks on the employment of several native groups. Specifically, to assess the impact of immigration on natives with different skills, we classify them into two groups based on their level of education: one formed by native workers with primary and secondary education and another composed of natives with a university degree and higher stages of tertiary education. According to the low level of education of immigrants in Italy during the period analysed (e.g. Fullin & Reyneri 2011, Bratti & Conti 2018) and the imperfect transferability of the education that they acquired in their countries of origin, i.e. skill-downgrading (e.g. Dustmann & Preston 2012), the former group of natives would have been more exposed to immigrants' competition. Also, the elasticity of labour supply is likely to differ between the two groups, leading to different employment responses to the immigration shocks (Dustmann et al. 2016). Finally, natives with different levels of education could be subject to downward wage rigidities with different intensity (e.g. depending on the type of contract - Edo 2015). Therefore, the

extended specification in equation (2) is estimated by IV for the samples defined by these two categories of workers to identify the specific effect of immigration on the employment of native workers of high and low education.[29]

The results are summarized in the first two columns in Table 2. They suggest a positive impact on the highly educated natives and a negligible one for those with a low endowment of education. To make it clear, an increase in immigrants of one percentage point of the local working-age population in an Italian province would have caused, on average, an increase in the employment of natives with high education of 0.37 percentage points of the working-age population. Surprisingly, the estimated impact on low-educated workers is very close to zero (i.e. -0.066) and not statistically significant. This result, although somehow counterintuitive,[30] is consistent with a situation in which immigrants are employed in occupations different from the ones undertaken by natives (even if similarly skilled, see Ottaviano & Peri 2012), that are typically manual intensive (Peri & Sparber 2009, Foged & Peri 2016). Therefore, in this scenario immigrants (i) do not directly compete with natives and (ii) induce natives to upgrade their jobs, moving to more communication intensive tasks, for which they have a comparative advantage *vis-à-vis* immigrants (Peri & Sparber 2009, Giuntella 2012).

However, the interpretation of these results should take into account that "over-education" is a characteristic of labour markets in different countries in southern Europe, including Italy (e.g. Flisi et al. 2014). In short, the considerable proportion of native workers in the Italian provinces employed in occupations that required less education than they had can somehow affect the conclusions derived for the groups of workers with different levels of educational attainment. To overcome this drawback, under the usual assumption that occupations differ in term of the required skills, we complement the analysis with the results of the grouping of the native population according to occupations. In particular, we classify native workers into three categories of occupations, from more to less skilled: white collar,

[29]The results of this section using the OLS estimator are reported in Tables SM4 and SM5 of the OSM.

[30]The canonical theoretical model of immigration predicts a negative effect of low-skilled immigrants on the employment prospects of their natives counterparts (Boeri & Van Ours 2008).

skilled manual, and blue collar. The results are shown in the last block of columns in Table 2. Although the estimated effect of immigration is not significant in any of the skill groups, the point estimate for skilled manual natives is much higher than that of the other two groups, being almost significant (at the 10% level). Therefore, these results suggest that, in the aftermath of the Great Recession, immigration may have stimulated, on average, the employment of skilled manual natives, while having no effect on white collar and low skilled manual workers. However, there could have been a wide dispersion in impact even for skilled workers which, as shown below, can be explained by different responses of female and male natives.

As a final stage in the analysis, we explore heterogeneous responses in native employment by gender. The reason is that some studies have suggested that the impact that immigrants exert when entering the host country's labour market might affect in a different way male and female natives (Barone & Mocetti 2011, Farré et al. 2011, Forlani et al. 2015). This could be particularly important in the case of the Italian labour market, characterized by striking gender disparities. For example, the employment rate of the working-age population in Italy in 2017 was 67.1% for males but only 48.9% for females. However, the gender gap narrowed in the case of workers with tertiary education. In this case the employment rates were 83.1% and 74.7%, respectively.[31] In this context, the complementarity/substitutability mechanisms may have worked differently for native male and female workers. For example, Barone & Mocetti (2011) argued that the high presence of immigrants providing household services is associated with an increase of the hours worked by the high-skilled native females. A gender heterogeneous response could indeed be behind the low precision with which the effect of immigration is estimated for the overall population of natives and, particularly, for the group of skilled manual workers.

For these reasons, in Table 3 we report not only the estimated effect of immigration on the employment of female and male natives, but also that obtained by distinguishing between female and male workers of different levels of education

[31] Data from the LFS available in the Eurostat Database, `https://ec.europa.eu/eurostat/data/database`.

and occupations. First, it is observed that the estimate of the overall effect for female natives is positive and significant, whereas it is not statistically significant and, indeed, very close to zero in the case of their male counterparts. Second, the distinction by skills reveals interesting differences in the reaction of female and male employment to immigration shocks. The results confirm complementarity with the highly educated natives. More precisely, they suggest a positive and significant effect for the high-educated females of around 0.20. For males with high education the estimated effect is somewhat smaller in magnitude (0.18), being estimated with much less precision. In fact, for this group of native workers the estimated effect is not significant from a statistical point of view. Interestingly, the results do not support the claims that immigrants hinder employment of the low-educated Italians. The effect estimated for the native males with low education is negative, which is consistent with certain degree of substitutability between low-skilled immigrants and their native males counterparts. However, the coefficient for this group of workers is not statistically significant. The effect of immigration is also not significant for low educated native females, although in this case the point estimate is positive.

The positive impact on employment for females (both high- and low-skilled) may be explained by the fact that immigrants, particularly females (whose share over the total immigrant population in Italy is higher than that of males in the period under analysis[32]) tended to substitute native females in the household production services (Cortés & Tessada 2011, Farré et al. 2011) therefore allowing the latter to increase their labor force participation. Consistent with the evidence in Forlani et al. (2015) from a group of developed countries, the evidence from the Italian provinces during the period analysed in this study supports a positive impact of immigration on the employment of native females, particularly for highly skilled women.

The evidence from the occupational groups that distinguish between male and female natives (columns 4 to 6 of Table 3) confirms the lack of a substitution effect of immigration on native employment, regardless of the skills of the lat-

[32]For more details, refer to Table SM1 of the OSM.

ter. In fact, the results point to the complementarity between immigration and the employment of native females. To be clear, the point estimate of the impact of immigration on native male employment is quite modest (and statistically insignificant) in all occupation groups. By contrast, the impact on females in skilled manual occupations would have been significant and sizeable.

Summing up, the evidence from Italian provinces in the period that followed the financial and sovereign debt crises confirms that native employment reacted differently to immigration shocks depending on skills and gender. On the one hand, there would have been a positive response in the employment of highly-skilled natives, particularly in the case of females. On the other, recent immigrant inflows to the Italian provinces would have not hinder significantly the employment of low-skilled natives.

5 Conclusions

This study has provided evidence on the short-run effect of recent immigration shocks on native employment in the Italian provinces. The results are particularly interesting because they have been obtained for a country where immigration is a relatively recent phenomenon, the inflow of immigrants in recent years has been particularly intense, and their geographical distribution has been far from uniform. Besides, in contrast to most previous studies, this one has considered a period of economic recession that strongly hit the labour markets of Italian provinces and, in particular, the employment prospects of their native populations. The overlapping of large immigration inflows and job losses would have contributed to fuelling a passionate anti-migratory rhetoric. Interestingly, the study has estimated differentiated employment responses for separate groups of natives to account for heterogenous impacts of the immigration shocks depending on characteristics of the natives and their labour supply elasticities. All of this for an economy with intense downward wage rigidity; a feature that has been shown to favour employment adjustments to immigration shocks.

Once local labour demand shocks, internal compensatory flows, province-specific

trends in employment and, especially, the non-random spatial distribution of immigrants are controlled for, the results point to a negligible adjustment of provincial native employment to the immigration shocks over the period analysed. However, the study shows that this overall impact of immigration on employment hides interesting heterogeneous responses of different groups of natives. To be clear, the evidence from the Italian provinces since the onset of the Great Recession confirms that the employment response varied according to the skills of the natives. While immigration inflows would have stimulated employment of the highly-educated natives, the impact on the low-educated would have been negligible. Therefore, although most immigrants that arrived in Italy in the period under analysed were low-educated and that they probably experienced to some extent the skill-downgrading, it does not seem that immigrants substitute native of similar skills. Labour market rigidities that make difficult and costly to fire workers to replace them with newcomers could partly explain this result.

Interestingly, the study has revealed that the distinction by gender is crucial. There are no signs that clearly indicate a pernicious effect of immigration inflows on the employment of native males in the aftermath of the Great Recession. In sharp contrast, the evidence points to a positive response of female employment, that would be particularly significant in the case of native women with high education and employed in skilled manual occupations. This result is consistent with immigrants substituting native females in housekeeping and child and elderly care, which leads them to increase participation in the labour market. In this regard, the results in this study are particularly important from a policy perspective due to the still substantial gender disparities in the participation rate that characterize the Italian labour market and the differences in female participation between the Italian local economies.

Finally, we must admit some shortcomings of this empirical exercise. For example, the analysis focused only on the partial (short-run) employment effect of immigration, although responses in the longer-term involving different mechanisms (impact on productivity, investments in education of the natives, innovation, etc.)

can also be of great importance. On the other hand, it could be argued that the annual changes considered in this study prevent controlling for highly persistent dynamic effects even in the case of adopting the approach suggested by Jaeger et al. (2019). Last, it should be noted that the study have just considered the employment effect of immigration at the extensive margin, while responses at the intensive margin could also be relevant. In any case, based on arguments and evidence in the extant literature, we can speculate that these additional sources of influence of the immigration shocks in Italy in the aftermath of the Great Recession would have probably contributed to enhance the employment prospects of the Italian-born beyond the short-run effect estimated in this study. This, therefore, would contradict one of the most powerful arguments of rhetoric against immigration in Italy and in other European countries that have experienced similar immigration episodes in the recent past.

References

Acemoglu, D. & Autor, D. (2011), Skills, Tasks and Technologies: Implications for Employment and Earnings, *in* O. C. Ashenfelter & D. Card, eds, 'Handbook of Labor Economics', Vol. 4B, Elsevier, chapter 12, pp. 1043–1171.

Altonji, J. G. & Card, D. (1991), The Effects of Immigration on the Labor Market Outcomes of Less-skilled Natives, *in* J. M. Abowd & R. B. Freeman, eds, 'Immigration, Trade, and the Labor Market', University of Chicago Press, chapter 7, pp. 201–234.

Anastasopoulos, J., Borjas, G. J., Cook, G. G. & Lachanski, M. (2018), Job Vacancies and Immigration: Evidence from Pre- and Post-Mariel Miami. *NBER Working Paper No. 24580.*

Angrist, J. & Kugler, A. (2003), 'Protective or Counter-Productive? European Labor Market Institutions and the Effect of Immigrants on EU Natives', *The Economic Journal* **113**(48), F302—F331.

Aydede, Y. (2017), 'Immigration and Location Choices of Native-born Workers in Canada', *Papers in Regional Science* **96**, S113–S134.

Barone, G. & Mocetti, S. (2011), 'With a Little Help from Abroad: The Effect of Low-skilled Immigration on the Female Labour Supply', *Labour Economics* **18**(5), 664–675.

Bartel, A. P. (1989), 'Where Do the New U.S. Immigrants Live?', *Journal of Labor Economics* **7**(4), 371–391.

Bartik, T. J. (1991), *Who Benefits from State and Local Economic Development Policies?*, Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Basso, G. & Peri, G. (2015), The Association between Immigration and Labor Market Outcomes in the U.S., *in* G. Peri, ed., 'The Economics of International Migration', Vol. 49, World Scientific Studies in International Economics, pp. 1–31.

Basten, C. & Siegenthaler, M. (2018), 'Do Immigrants Take or Create Residents' Jobs? Evidence from Free Movement of Workers in Switzerland', *The Scandinavian Journal of Economics* **121**(3), 994–1019.

Baum-Snow, N. & Ferreira, F. (2015), Causal Inference in Urban and Regional Economics, *in* G. Duranton, J. V. Henderson & W. C. Strange, eds, 'Handbook of Regional and Urban Economics', Vol. 5, Elsevier, chapter 1, pp. 3–68.

Boeri, T. & Van Ours, J. (2008), *The Economics of Imperfect Labor Markets*, Princeton University Press.

Borjas, G. J. (1999), The Economic Analysis of Immigration, *in* O. C. Ashenfelter & D. Card, eds, 'Handbook of Labor Economics', Vol. 3, North-Holland Publishing Company, chapter 28, pp. 1697–1760.

Borjas, G. J. (2003), 'The Labor Demand Curve *Is* Downward Sloping: Reexamining the Impact of Immigration on the Labor Market', *The Quarterly Journal of Economics* **118**(4), 1335–1374.

Borjas, G. J. (2006), 'Native Internal Migration and the Labor Market Impact of Immigration', *Journal of Human Resources* **41**(2), 221–258.

Borjas, G. J. (2014), *Immigration Economics*, Cambridge: Harvard University Press.

Borjas, G. J. (2017), 'The Wage Impact of the Marielitos: A Reappraisal', *ILR Review* **70**(5), 1077–1110.

Bratti, M. & Conti, C. (2018), 'The Effect of Immigration on Innovation in Italy', *Regional Studies* **52**(7), 934–947.

Brunello, G., Lodigiani, E. & Rocco, L. (2020), 'Does Low Skilled Immigration Cause Human Capital Polarization? Evidence from Italian Provinces', *Labour Economics* **63**, 101794.

Card, D. (1990), 'The Impact of the Mariel Boatlift on the Miami Labor Market', *ILR Review* **43**(2), 245–257.

Card, D. (2001), 'Immigrant Inflows, Native Outflows, and the Local Labor Market Impacts of Higher Immigration', *Journal of Labor Economics* **19**(1), 22–64.

Card, D. (2005), 'Is the New Immigration Really so Bad?', *The Economic Journal* **115**(507).

Card, D. & DiNardo, J. (2000), 'Do Immigrant Inflows Lead to Native Outflows?', *American Economic Review* **90**(2), 360–367.

Card, D. & Peri, G. (2016), 'Immigration Economics by George J. Borjas: A Review Essay', *Journal of Economic Literature* **54**(4), 1333–1349.

Chassamboulli, A. & Palivos, T. (2013), 'The Impact of Immigration on the Employment and Wages of Native Workers', *Journal of Macroeconomics* **38**(A), 19–34.

Cortés, P. & Tessada, J. (2011), 'Low-skilled Immigration and the Labor Supply of Highly-skilled Women', *American Economic Journal: Applied Economics* **3**(3), 88–123.

D'Amuri, F., Ottaviano, G. I. & Peri, G. (2010), 'The Labor Market Impact of Immigration in Western Germany in the 1990s', *European Economic Review* **54**(4), 550–570.

D'Amuri, F. & Peri, G. (2014), 'Immigration, Jobs and Employment Protection: Evidence from Europe before and during the Great Recession', *Journal of the European Economic Association* **12**(2), 432–464.

De Arcangelis, G., Di Porto, E. & Santoni, G. (2015), 'Migration, Labor Tasks and Production Structure', *Regional Science and Urban Economics* **53**(July), 156–169.

Dustmann, C., Fabbri, F. & Preston, I. (2005), 'The Impact of Immigration on the British Labour Market', *The Economic Journal* **115**(507), F324–F341.

Dustmann, C. & Preston, I. P. (2012), 'Comment: Estimating the Effect of Immigration on Wages', *Journal of the European Economic Association* **10**(1), 216–223.

Dustmann, C., Schönberg, U. & Stuhler, J. (2016), 'The Impact of Immigration: Why Do Studies Reach Such Different Results?', *Journal of Economic Perspectives* **30**(4), 31–56.

Dustmann, C., Schönberg, U. & Stuhler, J. (2017), 'Labor Supply Shocks, Native Wages, and the Adjustment of Local Employment', *The Quarterly Journal of Economics* **132**(1), 435–483.

Edo, A. (2015), 'The Impact of Immigration on Native Wages and Employment', *The B.E. Journal of Economic Analysis & Policy* **15**(3), 1151–1196.

Faggian, A., Gemmiti, R., Jaquet, T. & Santini, I. (2018), 'Regional Economic Resilience: The Experience of the Italian Local Labor Systems', *The Annals of Regional Science* **60**(2), 393–410.

Farré, L., González, L. & Ortega, F. (2011), 'Immigration, Family Responsibilities and the Labor Supply of Skilled Native Women', *The B.E. Journal of Economic Analysis & Policy* **11**(1).

Flisi, S., Goglio, V., Meroni, E., Rodrigues, M. & Vera-Toscano, E. (2014), Occupational Mismatch in Europe: Understanding Overeducation and Overskilling for Policy Making, Technical report, JRC Science and Policy Reports. Joint Research Centre, European Commission. Luxembourg.

Foged, M. & Peri, G. (2016), 'Immigrants' Effect on Native Workers: New Analysis on Longitudinal Data', *American Economic Journal: Applied Economics* **8**(2), 1–34.

Forlani, E., Lodigiani, E. & Mendolicchio, C. (2015), 'Impact of Low-Skilled Immigration on Female Labour Supply', *The Scandinavian Journal of Economics* **117**(2), 452–492.

Fullin, G. & Reyneri, E. (2011), 'Low Unemployment and Bad Jobs for New Immigrants in Italy', *International Migration* **49**(1), 118–147.

Gavosto, A., Venturini, A. & Villosio, C. (1999), 'Do Immigrants Compete with Natives?', *Labour* **13**(3), 603–621.

Giuntella, O. (2012), 'Do Immigrants Squeeze Natives out of Bad Schedules? Evidence from Italy', *IZA Journal of Migration* **1**(7), 1–21.

Glitz, A. (2012), 'The Labor Market Impact of Immigration: A Quasi-Experiment Exploiting Immigrant Location Rules in Germany', *Journal of Labor Economics* **30**(1), 175–213.

Goldsmith-Pinkham, P., Sorkin, I. & Swift, H. (2020), 'Bartik Instruments: What, When, Why, and How', *American Economic Review* **110**(8), 2586–2624.

González, L. & Ortega, F. (2011), 'How do Very Open Economies Adjust to Large Immigration Flows? Evidence from Spanish Regions', *Labour Economics* **18**(1), 57–70.

González, S. (2011), 'The North/South Divide in Italy and England: Discursive Construction of Regional Inequality', *European Urban and Regional Studies* **18**(1), 62–76.

Hanson, G. & McIntosh, C. (2016), 'Is the Mediterranean the New Rio Grande? US and EU Immigration Pressures in the Long Run', *Journal of Economic Perspectives* **30**(4), 57–82.

Hunt, J. (1992), 'The impact of the 1962 Repatriates from Algeria on the French Labor Market', *ILR Review* **45**(3), 556–572.

Jaeger, D. A., Ruist, J. & Stuhler, J. (2019), Shift-Share Instruments and Dynamic Adjustments: The Case of Immigration. *NBER Working Paper No. 24285.*

Kerr, S. P. & Kerr, W. R. (2011), 'Economic Impacts of Immigration: A Survey', *Finnish Economic Papers* **24**(1), 1–32.

Labanca, C. (2020), 'The Effects of a Temporary Migration Shock: Evidence from the Arab Spring Migration through Italy', *Labour Economics* **67**, 101903.

Lemos, S. & Portes, J. (2014), 'New Labour? The Effects of Migration from Central and Eastern Europe on Unemployment and Wages in the UK', *The B.E. Journal of Economic Analysis & Policy* **14**(1), 299–338.

Lewis, E. & Peri, G. (2015), Immigration and the Economy of Cities and Regions, *in* G. Duranton, J. V. Henderson & W. C. Strange, eds, 'Handbook of Regional and Urban Economics', Vol. 5, Elsevier, pp. 625–685.

Mayda, A. M. (2006), 'Who Is Against Immigration? A Cross-Country Investigation of Individual Attitudes Toward Immigrants', *The Review of Economics and Statistics* **88**(3), 510–530.

Mayda, A. M., Peri, G. & Steingress, W. (2018), The Political Impact of Immigration: Evidence from the United States. *NBER Working Paper No. 24510.*

Michelangeli, A., Pontarollo, N. & Vittucci Marzetti, G. (2019), 'Ethnic Minority Concentration: A Source of Productivity Growth for Italian Provinces?', *Papers in Regional Science* **98**(1), 17–34.

Mitaritonna, C., Orefice, G. & Peri, G. (2017), 'Immigrants and Firms' Outcomes: Evidence from France', *European Economic Review* **96**, 62–82.

Mocetti, S. & Porello, C. (2010), 'How Does Immigration Affect Native Internal Mobility? New Evidence from Italy', *Regional Science and Urban Economics* **40**(6), 427–439.

Moreno-Galbis, E. & Tritah, A. (2016), 'The Effects of Immigration in Frictional Labor Markets: Theory and Empirical Evidence from EU Countries', *European Economic Review* **84**, 76–98.

OECD (2017), OECD Economic Surveys, Technical report, OECD.

Ottaviano, G. I. & Peri, G. (2012), 'Rethinking the Effects of Immigration on Wages', *Journal of the European Economic Association* **10**(1), 152–197.

Ottaviano, G. I., Peri, G. & Wright, G. C. (2013), 'Immigration, Offshoring, and American Jobs', *American Economic Review* **103**(5), 1925–59.

Peri, G. (2016), 'Immigrants, Productivity, and Labor Markets', *Journal of Economic Perspectives* **30**(4), 3–30.

Peri, G. & Sparber, C. (2009), 'Task Specialization, Immigration, and Wages', *American Economic Journal: Applied Economics* **1**(3), 135–69.

Peri, G. & Sparber, C. (2011), 'Assessing Inherent Model Bias: An Application to Native Displacement in Response to Immigration', *Journal of Urban Economics* **69**(1), 82–91.

Romiti, A. (2011), Immigrants-Natives Complementarities in Production: Evidence from Italy. *CeRP Working Paper No.105/11.*

Stock, J. H. & Yogo, M. (2005), Testing for Weak Instruments in Linear IV Regression, *in* D. W. K. Andrews & J. H. Stock, eds, 'Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg', Cambridge: Cambridge University Press, chapter 5, pp. 80–108.

Venturini, A. (1999), 'Do Immigrants Working Illegally Reduce the Natives' Legal Employment? Evidence from Italy', *Journal of Population Economics* **12**(1), 135–154.

Venturini, A. & Villosio, C. (2006), 'Labour Market Effects of Immigration into Italy: An Empirical Analysis', *International Labour Review* **145**(1-2), 91–118.

Wooldridge, J. M. (2002), *Econometric Analysis of Cross Section and Panel Data*, MIT Press.

Zimmermann, K. F. (2009), Labor Mobility and the Integration of European Labor Markets, *in* E. Nowotny, P. Mooslechner & D. Ritzberger-Grünwald, eds, 'The Integration of the European Labour Markets', Edward Elgar Publishing Limited, chapter 1, pp. 9–23.

Tables & Figures

Table 1: *Overall impact of immigration on native employment.*

	OLS		**2SLS**								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
$\Delta(m_{p,t})$	0.307***	0.268**	0.305	0.323	0.198	0.295	0.211	0.331	0.301	0.505	0.281
	(0.092)	(0.129)	(0.227)	(0.395)	(0.213)	(0.212)	(0.235)	(0.232)	(0.288)	(0.510)	(0.215)
$\Delta(m_{p,t-1})$					0.021						
					(0.321)						
$\Delta(m_{p,t-2})$					-0.248						
					(0.162)						
$B_{p,t}$		0.074	0.073	0.015	0.073	0.070	0.104	0.092	0.134	0.033	0.058
		(0.168)	(0.156)	(0.206)	(0.156)	(0.154)	(0.153)	(0.158)	(0.162)	(0.193)	(0.158)
$IM_{p,t}$		0.017	0.020	-0.121	0.020			0.006	-0.000	-0.062	0.034
		(0.091)	(0.088)	(0.089)	(0.093)			(0.088)	(0.083)	(0.097)	(0.095)
$\Delta(A_{p,t}^{NAT})$							-0.017				
							(0.024)				
$\Delta(A_{p,t}^{IMM})$							0.006*				
							(0.004)				
$\Delta(\Pi_{p,t}^{HL})$							0.014**				
							(0.007)				
$\Delta(\Pi_{p,t}^{IL})$							-0.005				
							(0.007)				
$E_{p,t}^{white}$								0.114**			
								(0.053)			
$E_{p,t}^{skm}$								0.069*			
								(0.040)			
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Prov FE	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year x Pop-Density FE	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO
Weights	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES
First-st. F-stat	-	-	128.4	51.7	46.6	137.6	145.1	128.9	57.5	71.2	97.1
R^2	0.080	0.110	0.110	0.084	0.112	0.110	0.127	0.116	0.131	0.100	0.107
Observations	816	816	816	816	816	816	816	816	816	792	816

Note*: The dependent variable is the change in native employment as share of the initial working-age population, while the main independent one is the change in immigrant population as share of the initial working-age population. Columns (3) to (11) refer to the 2SLS using as instrument the change in the shift-share variable based on the residence permits issued in 1995. All regressions, except the one of column (4), are weighted by the total number of working-age individuals in the province at the beginning of the period. The R-squared reported in columns (3) to (11) is the centered R-squared. First-stage F-statistics of column (3) to (11) are always above the 10% maximal IV size critical value of the Stock & Yogo (2005) weak identification test. Standard errors, in parentheses, are clustered at the province level.* *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 2: *Impact of immigration on native employment by skills.*

	by Education		by Occupation		
	(1) **Highly Educated**	**(2)** **Low Educated**	**(3)** **White Collars**	**(4)** **Skilled Manual**	**(5)** **Blue Collars**
$\Delta(m_{p,t})$	0.371**	-0.066	0.095	0.239	0.070
	(0.170)	(0.142)	(0.149)	(0.147)	(0.105)
$B_{p,t}$	-0.237**	0.310**	-0.145*	0.249*	-0.022
	(0.101)	(0.153)	(0.087)	(0.151)	(0.090)
$IM_{p,t}$	-0.038	0.058	0.031	-0.050	0.041
	(0.051)	(0.100)	(0.045)	(0.089)	(0.039)
Year & Prov FE	YES	YES	YES	YES	YES
Centered R^2	0.077	0.098	0.195	0.122	0.039
Observations	816	816	816	816	816

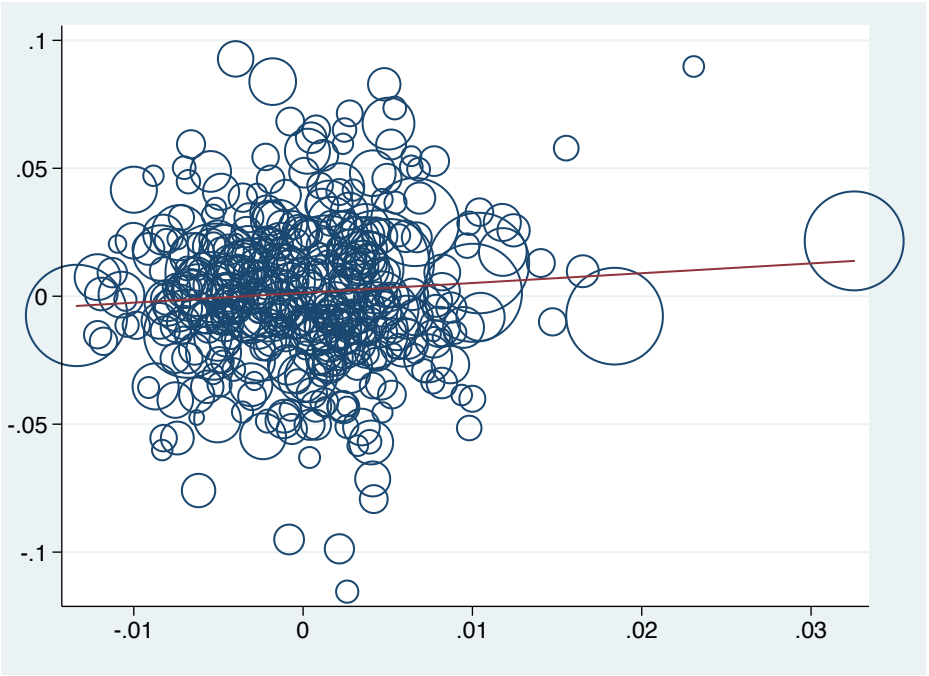
Note*: IV estimates using as instrument the change in the shift-share variable based on the residence permits issued in 1995. Each column refers to a different sample of the native population as indicated at the top of the column. All regressions are weighted by the total number of working-age individuals in the province at the beginning of the period. In all cases the value of the first-stage F-statistic is 128.4, well above the 10% maximal IV size critical value of the Stock & Yogo (2005) weak identification test. Standard errors, in parentheses, are clustered at the province level.* *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3: *Impact of immigration on native employment by gender and skills.*

		by Education		by Occupation		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	All Workers	**Highly Educated**	**Low Educated**	**White Collars**	**Skilled Manual**	**Blue Collars**
Panel A: Only Women						
$\Delta(m_{p,t})$	0.302**	0.197***	0.106	0.023	0.220**	0.055
	(0.123)	(0.069)	(0.091)	(0.097)	(0.093)	(0.045)
$B_{p,t}$	0.096	-0.078	0.173*	-0.029	0.151	-0.067
	(0.103)	(0.075)	(0.103)	(0.066)	(0.101)	(0.058)
$IM_{p,t}$	0.012	-0.020	0.032	0.042	-0.020	-0.008
	(0.053)	(0.033)	(0.049)	(0.036)	(0.051)	(0.018)
Year & Prov FE	YES	YES	YES	YES	YES	YES
Centered R^2	0.082	0.073	0.068	0.324	0.163	0.044
Observations	816	816	816	816	816	816
Panel B: Only Men						
$\Delta(m_{p,t})$	0.002	0.175	-0.172	0.073	0.018	0.017
	(0.140)	(0.116)	(0.106)	(0.070)	(0.128)	(0.089)
$B_{p,t}$	-0.022	-0.160***	0.137	-0.116*	0.098	0.045
	(0.104)	(0.057)	(0.105)	(0.061)	(0.116)	(0.072)
$IM_{p,t}$	0.008	-0.018	0.026	-0.010	-0.030	0.051
	(0.064)	(0.027)	(0.074)	(0.028)	(0.053)	(0.034)
Year & Prov FE	YES	YES	YES	YES	YES	YES
Centered R^2	0.090	0.052	0.093	0.084	0.067	0.042
Observations	816	816	816	816	816	816

Note*: IV estimates using as instrument the shift-share variable based on the residence permits issued in 1995. Each column refers to a different sample of the native population as indicated at the top of the column. All regressions are weighted by the total number of working-age individuals in the province at the beginning of the period. In all cases the value of the first-stage F-statistic is 128.4, well above the 10% maximal IV size critical value of the Stock & Yogo (2005) weak identification test. Standard errors, in parentheses, are clustered at the province level.* *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Figure 1: *Scatterplot of change in native employment and change in immigrants in the Italian provinces (2009-2017).*



Note*: Variables are expressed in changes over the entire period and are cleaned from the time average. The size of the circle is proportional to the initial working-age population in the province.*

Appendix

Table A1: *Descriptive statistics.*

Variable	Mean	S.D.	Min.	Max.
Change in native employment				
Whole population				
All workers	-0.0045	0.0258	-0.1082	0.1068
High-educated	0.0026	0.0157	-0.0459	0.0663
Low-educated	-0.0070	0.0250	-0.1018	0.0735
White collars	0.0009	0.0147	-0.0540	0.0424
Skilled manual	-0.0050	0.0255	-0.1321	0.0937
Blue collars	-0.0002	0.0140	-0.0422	0.0616
Only women				
All Women	-0.0010	0.0158	-0.0732	0.0705
High-educated women	0.0017	0.0010	-0.0345	0.0373
Low-educated women	-0.0027	0.0151	-0.0741	0.0882
White collars women	0.0016	0.0010	-0.0314	0.0360
Skilled manual women	-0.0023	0.0158	-0.1136	0.0670
Blue collars women	-0.0003	0.0071	-0.0283	0.0342
Only men				
All Men	-0.0035	0.0179	-0.1057	0.0654
High-educated men	0.0009	0.0101	-0.0325	0.0597
Low-educated men	-0.0044	0.0179	-0.0829	0.0542
White collars men	-0.0007	0.0098	-0.0325	0.0363
Skilled manual men	-0.0028	0.0180	-0.0707	0.0491
Blue collars men	0.0001	0.0116	-0.0361	0.0583
Change in immigrant population	0.0025	0.0066	-0.0289	0.0393
Controls				
Bartik variable	-0.0024	0.0131	-0.0368	0.0731
Internal migration	-0.0765	3.1367	-11.2624	7.9068
Natives' average age	41.4648	1.0664	38.5320	43.8006
Immigrants' average age	36.8774	1.0769	33.8902	39.9180
Log high/low educated natives	-0.6109	0.3993	-1.9667	0.6351
Log interm./low educated natives	0.3312	0.2940	-1.1513	1.3583
Employment shares				
High-educated	0.1875	0.0451	0.0725	0.3424
Low-educated	0.8125	0.0451	0.6576	0.9275
White collars	0.1675	0.0402	0.0464	0.3736
Skilled manual	0.6696	0.0489	0.4375	0.8434
Blue collars	0.1629	0.0383	0.0488	0.3226

Note*: Mean, standard deviation, minimum and maximum of the variables used in the analysis, using the observations of all provinces and years in the sample.*

Table A2: *First-stage estimates.*

	(1)	**(2)**	**(3)**
$\Delta(\widehat{m}_{p,t})$	0.441***	0.663***	0.506***
	(0.064)	(0.059)	(0.070)
Controls	YES	YES	YES
Year FE	YES	YES	YES
Prov FE	NO	YES	YES
Weights	YES	YES	NO
R^2	0.770	0.890	0.834
F-statistic	47.3	128.4	51.7
Observations	816	816	816

***Note**: The dependent variable is the change in immigrant population as share of the initial working-age population, while the main independent variable is the change in the shift-share instrument based on residence permits issued in 1995. Controls include Bartik and internal migration variables. Column (1) reports the first-stage estimates without the inclusion of province FE, column (2) corresponds instead to column (3) of Table 1 and column (3) to column (4). The first-stages corresponding to the other columns of Table 1 are available upon request. Standard errors, in parentheses, are clustered at the province level.*

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Online Supplemental Material

Descriptive Statistics

Table SM1: *Descriptive statistics on immigrant population.*

		Percentage	
Year	**Immigrant share**	**Males**	**Females**
2009	0.078	0.488	0.512
2010	0.084	0.482	0.518
2011	0.090	0.475	0.525
2012	0.082	0.460	0.540
2013	0.088	0.462	0.538
2014	0.100	0.466	0.534
2015	0.100	0.467	0.533
2016	0.101	0.468	0.532
2017	0.102	0.473	0.527

Note*: Evolution over the period 2009 to 2017 of the share of immigrants over the total working age population in Italy as a whole, as well as the gender composition of the immigrant population.* ***Source****: DP-ISTAT.*

Table SM2: *Immigrant share by origin countries.*

	Immigrant share				
Year	*Rumania*	*Albania*	*Morocco*	*China*	*Ukraine*
2009	0.210	0.110	0.102	0.044	0.041
2010	0.212	0.106	0.100	0.046	0.044
2011	0.206	0.111	0.101	0.049	0.044
2012	0.213	0.106	0.097	0.050	0.044
2013	0.220	0.101	0.092	0.052	0.045
2014	0.226	0.098	0.090	0.053	0.045
2015	0.229	0.093	0.087	0.054	0.046
2016	0.232	0.089	0.083	0.056	0.046
2017	0.231	0.086	0.081	0.057	0.046

Note*: Evolution over the period 2009 to 2017 of the immigrant share over the total immigrant population of the countries more represented.* ***Source****: DP-ISTAT.*

Table SM3: *Immigrant share over total population.*

	Immigrant share		
Country	2009	2013	2017
France	0.059	0.062	0.068
Germany	0.082	0.089	0.121
Italy	**0.058**	**0.073**	**0.083**
Spain	0.116	0.109	0.095

Note: *Evolution over time of the immigrant share over the total population in a set of European countries.* ***Source:*** *OECD.*

OLS Estimates

Table SM4: *Impact of immigration on native employment by skills.*

	by Education		by Occupation		
	(1) **Highly Educated**	**(2)** **Low Educated**	**(3)** **White Collars**	**(4)** **Skilled Manual**	**(5)** **Blue Collars**
$\Delta(m_{p,t})$	0.301***	-0.033	0.128	0.236*	0.009
	(0.102)	(0.141)	(0.109)	(0.130)	(0.083)
$B_{p,t}$	-0.235**	0.309*	-0.146	0.249	-0.020
	(0.110)	(0.165)	(0.095)	(0.162)	(0.097)
$IM_{p,t}$	-0.044	0.061	0.034	-0.050	0.036
	(0.056)	(0.108)	(0.050)	(0.095)	(0.043)
Year & Prov FE	YES	YES	YES	YES	YES
R^2	0.077	0.098	0.195	0.122	0.039
Observations	816	816	816	816	816

Note: *OLS estimates of Table 2.* *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table SM5: *Impact of immigration on native employment by gender and skills.*

		by Education		by Occupation		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	All Workers	**Highly Educated**	**Low Educated**	**White Collars**	**Skilled Manual**	**Blue Collars**
Panel A: Only Women						
$\Delta(m_{p,t})$	0.262***	0.155**	0.107	0.087	0.135	0.034
	(0.083)	(0.066)	(0.094)	(0.070)	(0.082)	(0.043)
$B_{p,t}$	0.097	-0.076	0.173	-0.031	0.154	-0.067
	(0.110)	(0.082)	(0.111)	(0.073)	(0.108)	(0.063)
$IM_{p,t}$	0.009	-0.024	0.032	0.047	-0.026	-0.009
	(0.056)	(0.036)	(0.052)	(0.040)	(0.054)	(0.019)
Year & Prov FE	YES	YES	YES	YES	YES	YES
R^2	0.083	0.074	0.068	0.325	0.163	0.044
Observations	816	816	816	816	816	816
Panel B: Only Men						
$\Delta(m_{p,t})$	0.006	0.146**	-0.141	0.042	0.100	-0.024
	(0.102)	(0.072)	(0.087)	(0.053)	(0.093)	(0.081)
$B_{p,t}$	-0.023	-0.159**	0.136	-0.115*	0.095	0.046
	(0.113)	(0.061)	(0.113)	(0.066)	(0.124)	(0.078)
$IM_{p,t}$	0.008	-0.020	0.028	-0.013	-0.024	0.047
	(0.068)	(0.028)	(0.079)	(0.030)	(0.056)	(0.037)
Year & Prov FE	YES	YES	YES	YES	YES	YES
R^2	0.090	0.052	0.093	0.085	0.068	0.043
Observations	816	816	816	816	816	816

Note: *OLS estimates of Table 3.* *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Maps

Figure SM1: *Immigration in the Italian provinces as percentage of the province population (2017).*

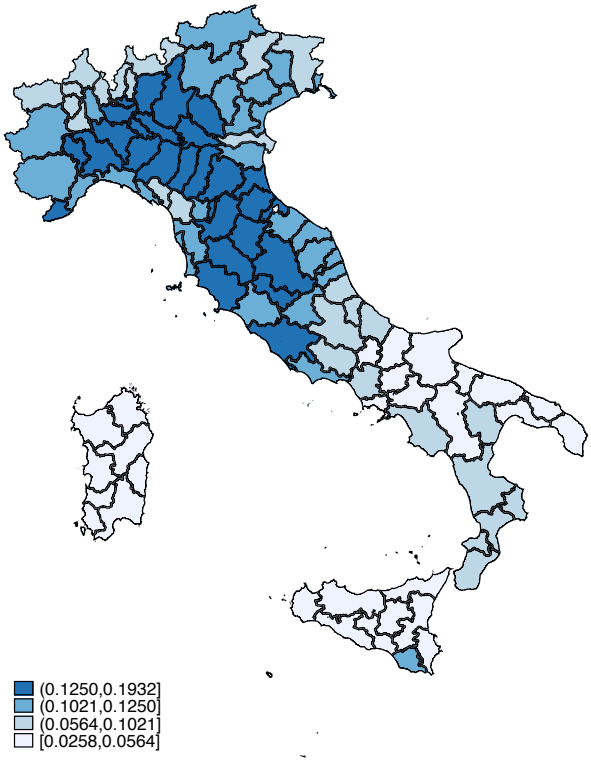


Figure SM2: *Spatial distribution of the change in native employment over the period 2009-2017.*

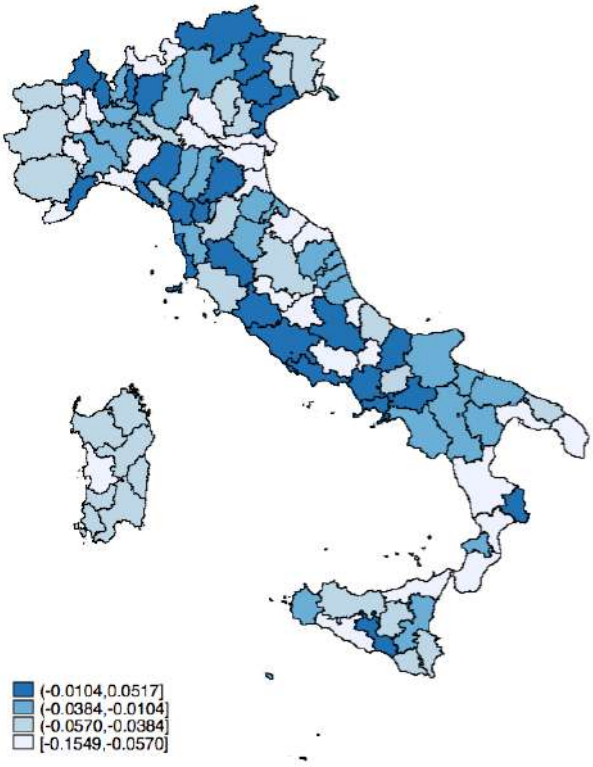
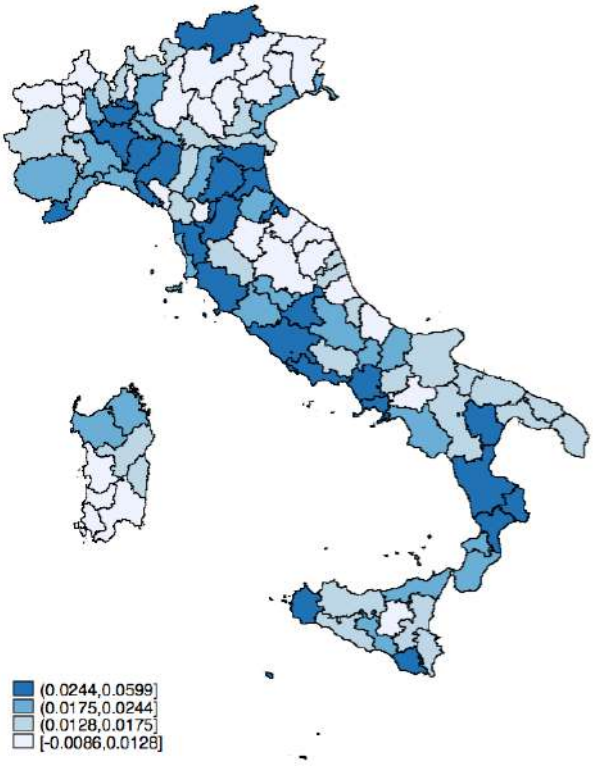


Figure SM3: *Spatial distribution of the change in immigrant population over the period 2009-2017.*



Provinces

In order to have a homogeneous dataset over the period analyzed and due to changes in the definition of some provinces, we have merged together the following provinces:

- Monza e della Brianza with Milano.
- Fermo with Ascoli Piceno.
- Foggia & Barletta-Andria-Trani with Bari.
- Olbia-Tempio with Sassari.
- Ogliastra with Nuoro.
- Medio Campidano & Carbonia-Iglesias[33] with Cagliari.

Industries

In order to homogenize the data relative to the industries classification, we have constructed 46 new industries that are defined as follows:

[33]In the LFS of the first quarter of 2017 these two provinces are merged together under the name "Sud Sardegna".

Table SM6: *Industries Classification.*

Industry in the Paper	**Ateco 2002** **LFS 2009**	**Ateco 2009** **LFS 2011 onwards**
1	ate2d=1	ate2d=1
2	ate2d=2	ate2d=2
3	ate2d=5	ate2d=3
4	ate2d=10, 11, 12, 13, 14	ate2d=5, 6, 7. 8. 9
5	ate2d=15	ate2d=10, 11
6	ate2d=16	ate2d=12
7	ate2d=17, 18, 19	ate2d=13, 14, 15
8	ate2d=20	ate2d=16
9	ate2d=21	ate2d=17
10	ate2d=22	ate2d=18, 58
11	ate2d=23	ate2d=19
12	ate2d=24	ate2d=20, 21
13	ate2d=25	ate2d=22
14	ate2d=26	ate2d=23
15	ate2d=27	ate2d=24
16	ate2d=28, 29, 30, 31, 32, 33	ate2d=25, 26, 27, 28, 33
17	ate2d=34	ate2d=29
18	ate2d=35	ate2d=30
19	ate2d=36	ate2d=31, 32

Table SM6: *Industries Classification (Continued).*

Industry in the Paper	**Ateco 2002** **LFS 2009**	**Ateco 2009** **LFS 2011 onwards**
20	ate2d=40	ate2d=35
21	ate2d=41	ate2d=36
22	ate2d=37, 90	ate2d=37, 38, 39
23	ate2d=45	ate2d=41, 42, 43
24	ate2d=50	ate2d=45
25	ate2d=51	ate2d=46
26	ate2d=52	ate2d=47, 95
27	ate2d=60	ate2d=49
28	ate2d=61	ate2d=50
29	ate2d=62	ate2d=51
30	ate2d=63	ate2d=52
31	ate2d=64	ate2d=53, 61
32	ate2d=55	ate2d=55, 56
33	ate2d=92	ate2d=59, 60, 90, 91, 92, 93
34	ate2d=72	ate2d=62, 63
35	ate2d=65	ate2d=64
36	ate2d=66	ate2d=65
37	ate2d=67	ate2d=66
38	ate2d=70	ate2d=68
39	ate2d=73, 74	ate2d=69, 70, 71, 72, 73, 74, 78, 80, 81, 82
40	ate2d=85	ate2d=75, 86, 87, 88
41	ate2d=71	ate2d=77, 79
42	ate2d=75	ate2d=84
43	ate2d=85	ate2d=85
44	ate2d=94, 96	ate2d=94, 95
45	ate2d=97, 98	ate2d=97, 98
46	ate2d=99	ate2d=99