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**Do Firms Follow Immigrants? Empirical Evidence From Italy**

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# **Do firms follow immigrants? Empirical evidence from Italy**

## **Abstract**

This paper investigates the relationship between immigration and firms for Italy at NUTS 3 level, during the period 2012-2015. The main contribution to the existing literature is to provide results disaggregated at the sectoral level, taking into account the important heterogeneities existing across both provinces and sectors. At the aggregate level, the main result is the positive effect of immigrants on both the number of local units and employees. The analysis on employees by citizenship suggests that there are no displacement effects of immigrants relative to both Italian and foreign employees. When moving to the sectoral perspective, the results display a highly heterogeneous picture. However, sectors showing a statistically robust link for both establishments and employees sum up to 52% of total value added and 48% of total employment, whilst for five out of 19 sectors, immigrants do not exert any impact neither in terms of local units or employment.

**Keywords:** firms, migration, employment, Italy.

**JEL Codes:** R1, J61

## 1. Introduction

Economists have traditionally looked at immigration as an increase in the labor supply, focusing on the impacts of immigration on wages and employment (see Edo, 2019, for a recent survey). With some exceptions, the prevailing empirical result is that immigration has substantially no effect on the wages of native workers. The main explanation for this outcome is that immigrants are not perfect substitutes of natives (Ottaviano and Peri, 2012) and, therefore, they may contribute to create favorable conditions for firms to improve their economic performances in terms of productivity, investment, export and employment growth (Mitaritonna *et al.*, 2017). This environment can, among other things, stimulate firms to expand their economic activity by opening new establishments or re-locating existing ones in regions with high immigrants' population shares (Olney, 2013).

More in detail, the relationship between immigrants and the number of establishments at the local level can be discussed according to the following four main channels. The first regards the supply side of the market and builds on the skill-mix diversity favored by immigrant workers. The literature has extensively discussed how the competitiveness of an economy can be enhanced through the exploitation of immigrants' skill diversity, which represents a source of complementarity between immigrant and native workers (Alesina *et al.* 2016; Foged and Peri 2015). Under this perspective, this highly differentiated mix of skills held by immigrants can be exploited by firms with advantages for native workers as well. The latter can benefit from being assigned tasks requiring skills in which immigrants usually lack (e.g., communication skills) without losing job opportunities. Besides, firms can cut their costs by hiring (low-skilled) immigrant workers willing to accept lower wages than native workers. More in general, skill diversity can stimulate efficiency (Lewis and Peri, 2015), changes in specialization, production technology and firm creation (Peri and Sparber, 2009; Dustmann Gltz, 2015; Lewis, 2013). One of the most persuasive contributions in this new strand of research is provided by Foged and Peri (2015). Exploiting a unique data set comprising the entire universe of Danish workers during the 1991-2008 period, they provide compelling evidence that an increase of immigrants led less educated native workers to change occupation towards nonmanual occupations.

The second channel, also related to the supply side, deals with the entrepreneurship effect of immigrants. On the one hand, it might be the case that immigrants are less risk averse than natives and more willing to start a new business. On the other hand, immigrants might find convenient to start their businesses when facing unfavorable labor market conditions. These effects are not homogeneous across sectors because they strictly depend on the immigrants' skills level and other country specific characteristics (Hunt, 2011; Fairlie and Lofstrom, 2015). The third channel operates on the demand side and depends on the consumption behavior of immigrants that can stimulates firms

to produce or to start producing locally. Finally, the fourth channel regards the relationship between immigration and trade at the core of a well-established literature (Bratti *et al.*, 2014; Genç *et al.*, 2012). In particular, increasing interest is on the role played by ethnic networks in alleviating the transaction costs. Immigrants possess knowledge of both hosting and home country and their mediation can be exploited by both sides, thus favoring business creation (Egger *et al.*, 2012). Thus, trade-oriented economies can exploit these ethnic networks better than others since, all other things being equal, international trade contributes to boosting the economic positive effects of immigrants. Though it is difficult to disentangle the contribution of each channel, this task goes beyond the scope of this paper which on the contrary is to focus on the observable final effect, which is the decision of firms to open new local units<sup>1</sup> (i.e. establishments) or re-locating existing ones (Olney, 2013). In this respect, however, the effect observed on local units can be very sensitive to the existence of heterogeneities at both geographic and sector level. In particular, all else being equal, trade-oriented sectors might be more favored by the presence of immigrants, in that they can exploit both the supply and the demand side channels.

In the footsteps of Olney's investigation, the present paper provides a further contribution to this field of research. Along with an aggregate analysis, we develop a disaggregated sectoral level investigation of the impact that the recently recorded upward trend of immigration in Italy has had on the number of local units at the provincial level (NUTS 3). In addition, we also estimate the impact of immigrants on employment, disentangling the total effect into the effect on native and foreign workers. Due to data availability, the analysis is performed for the period 2012-2015. We focus on Italy since this country represents a very interesting case to be investigated. The high Italian immigration rates, which during the last decades characterized also the less developed Southern areas of the country, raised the number of foreign citizens up to five million at the beginning of 2015 (they were 1,3 million in 2001). As for foreign workers, they are relatively less educated than natives and they are unevenly distributed both across sectors and provinces.

We apply the instrumental variable (IV) estimator to correct the potential endogeneity of the migration variable. Following Altonji and Card (1991) and Card (2001) the instrument is constructed by exploiting the correlation between the actual flows of immigrants from a source country and the historical persistence of communities from the same country in the destination province.

The empirical results show that at aggregate level an increase in the share of immigrants leads to an increase in both the number of establishments and employees. However, when moving to the sectoral

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<sup>1</sup> In this paper "local units" and "establishments" are used interchangeably and refer to an enterprise or part thereof (e.g. a workshop, factory, warehouse, office, mine or depot) situated in a geographically identified place. This is the definition given in The Council of the European Communities, Council Regulation (EEC) no. 696/93 of 15 March 1993 on the statistical units for the observation and analysis of the production system in the Community.

perspectives, the outcomes are highly heterogeneous across the nineteen sectors considered in our analysis. Interestingly, we find a positive association between the impact of immigrants on local units and the trade-oriented sectors. Ultimately, these effects indicate that capital (in the form of new local units) adjusts quickly to immigration and that this adjustment brings positive effects to the economy in terms of investments and employment, without immigrants displacing native workers<sup>2</sup>.

The paper is structured as follows. Section 2 reviews the relevant empirical literature dealing with the relationship between immigration and firms in Italy. Section 3 discusses the main features of local units, immigration, and employment. Section 4 describes the econometric model, variables and data. Sections 5, 6 and 7 present and discuss the main empirical results. Finally, the concluding Section proposes a summary of key findings and some policy implications.

## **2. Immigration and firms in Italy: a selective review of the empirical literature**

This section discusses the recent literature on the relationship between immigration and firms in Italy.<sup>3</sup> Accetturo et al. (2012) focus on the impact of immigration on Italian firms at both the theoretical and empirical level. They limit their analysis to a subsample of firms with at least 50 employees located in the Centre and North of Italy during the period 1996-2007. The authors estimate how investment in machinery and equipment responds to an increase in the relative abundance of low-skilled immigrant workers and find a positive relationship that tends to be stronger for large firms and in skill-intensive sectors. The Italian manufacturing firms are investigated by Bettin et al. (2014). They analyze the 2001-2003 period to shed light on the impact of extra-EU workers on Italian manufacturing output, on the skill intensity of the production techniques and the demand for labor of native workers. They find that output elasticities of foreign workers are very small and that extra-EU immigrants have more chances to contribute to output in low-skill intensive sectors. Accordingly, the authors warn that a sharp increase in the availability of immigrant workers could promote the adoption of less skill intensive techniques (Bettin et al., 2014). De Arcangelis et al. (2015a, b) use firm-level data that cover two different time periods, the former from 1995 to 2006, the latter from 2001 to 2010. The authors find that immigrants positively affect the firms' performance, but that this effect is uneven across sectors. The positive impact is confirmed when averaging firm-level variables across

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<sup>2</sup> An important caveat is in order, however, since the time span of our data is limited to four years, our analysis is not able to capture possible long-run impacts of immigration that might affect our results (i.e. changes in aggregate real income, relative sectoral prices, skill composition of labor and technology adoption).

<sup>3</sup> Other recent papers on the role of immigration on the Italian economy, somehow linked with our analysis, are Brücker et al (2011), Mocetti and Porello (2010) and Barone and Mocetti (2011). Brücker et al (2011) and Mocetti and Porello (2010) study whether foreign migration affected the internal migration of natives and find mixed results. Barone and Mocetti (2011) look at the impact of female immigrants on the labor supply of Italian women. Their results suggest that a higher concentration of female immigrants who provide household services induces native women, mostly high-skilled, to work more.

provinces, whilst the magnitude of these effects does not change when immigrants are differentiated by income level (of the origin country) and by educational level. Conversely, the distinction between high- and low-skill receiving sectors matters and it proves that an increase in the weight of relatively low-skilled immigrants tends to favor low-skill versus high-skill sectors and therefore to impact on the relative composition of the production system. Massidda et al. (2017) investigate the relationship between immigration and tourism firms in Italy. They analyze the impact of the foreign labor supply on the number of establishments and employment in the Hotel and restaurant sector at the provincial level (NUTS 3) for the period 2004-2010. Their results show a positive effect of immigrants on both the number of establishments and employment. Interestingly, they find a stronger impact for the Southern provinces than for the Northern ones for both establishments and employment. Bratti and Conti (2018) investigate the causal effect of foreign immigration on innovation at provincial level during the period 2003-2008 and find that an increase in the share of low-skilled immigrants over population reduces patent applications, whereas the impact of high-skilled immigrants on innovation is not significant. They conclude that this is the consequence of the specific immigration pattern of Italy, which is characterized by a large majority of low-skilled immigrants and where the immigrants' human capital is underutilized. Finally, Bettin et al. (2019) examine the relationship between migration and firm entry rates across Italian regions in low- and medium-tech industrial context mostly characterized by low-skilled migration inflows. They analyze data from 2002 to 2015 and find an overall positive relationship between migration and entrepreneurship, which, however, does not appear to be homogeneous when the legal status of firms and the sector of activity are considered. In particular, it is positive with self-employment and firm's creation in the manufacturing sector.

### **3. Immigration, employment and local units in Italy**

In the last decades, immigration has become increasingly important for Italy. Foreign citizens, 1,3 million in the 2001 census (2.2% of the total population), more than tripled in the subsequent ten years reaching 4 million in 2011 (7.5% of the total population) and up to 5,2 million in 2018 (8.7% of the total population).<sup>4</sup> The first waves of immigrants were directed mainly at the Centre-North of Italy, while since the second half of the 2000s the highest immigration rates are registered mainly in the southern regions of Italy. Figure 1 reports the share of the foreign population (working-age) by province. It is clear the uneven distribution across provinces, with the highest shares mainly concentrated in the Centre-North provinces.

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<sup>4</sup> Tables A1-A3 in the on-line Appendix report further descriptive statistics.

As a consequence of the immigrant-induced increase in foreign labor supply, foreign workers grew at high rates as well during the last decade. The share of foreign workers in total employment grew from 5.2% in 2005 to 10.6% in 2018.

[Figure 1]

As for the educational level, Table 1 shows that, at lower educational levels, the shares of foreign workers are higher than native ones.<sup>5</sup> Conversely, at higher educational levels, the shares of native workers are higher than those reported by foreign workers. In particular, regarding workers holding a university degree or more, the percentage of foreign workers (12.32%) is about ten points less than the percentage of high skilled native workers (22.05%). Overall, Table 1 shows that, on average, immigrants are relatively less educated than natives.

[Table 1]

Table 2 shows the distribution of employees on local units (i.e., excluding self-employed workers) across sectors and nationality in 2015. As we can see, foreign employees are concentrated in six main sectors, namely Manufacturing (23.7%), Accommodation and food services activities (14.5%), Wholesale and retail trade (14.1%), Administrative and support service activities (11.9%), Construction (11%) and Transporting and Storage (9.5%), that together account for 85% of total foreign employees (column 6). As for Italians, the largest share is employed in Manufacturing (22%), Wholesale and retail trade (21%) and Professional, scientific and technical activities (8%). The last column of Table 2 shows that the percentages of immigrant employees over Italian employees sharply differ across sectors ranging from 2.2% in Financial and insurance activities up to 25.4% in Accommodation and food services activities. This fact suggests that an immigrant-induced increase in the foreign labor supply is likely to have different impacts on each sector.

[Table 2]

Turning the attention to the number of local units, Table 3 reports data disaggregated by sector of economic activity (NACE rev. 2 first level classification). In 2015, there were about 4,7 million of local units heterogeneously distributed across sectors. From column 2 it emerges that local units are

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<sup>5</sup> The source of the data is the Statistical Register of Active Enterprises (ASIA), the same source used for the empirical analysis, data on Agriculture and Public Administration are not available (see section 4.3 for more details).

particularly concentrated in Wholesale and retail trade (26.1%), Professional, scientific and technical activities (15.6%), Construction (11.2%) and Manufacturing (9.2%). Looking at their geographical distribution, Figure 2 shows that they are also unevenly distributed across the 106 Italian provinces (NUTS 3).

[Table 3]

[Figure 2]

A further interesting aspect for the present analysis refers to the ownership. Unfortunately, data on local units from ASIA do not allow us to distinguish firms by ownership. This information, however, can be retrieved from Unioncamere data. Table 4 reports shares (in 2015) and growth rates of foreign firms during the period 2012-2015. The incidence of foreigner-owned firms differs across sectors with Administrative and support services (15.9%), Construction (15.1%) and Wholesale and retail trade (12.8%) in the lead. Very interestingly, when comparing growth rates of foreign- and Italian-owned firms, the overwhelming role of immigrant-owned firms emerges. On average, the growth rate of immigrant-owned firms is 10.3% whereas for the Italian-owned ones it is negative (-0.8%). These aggregate growth rates hide very differentiated figures at the sectoral level, suggesting that foreign ownership is increasing at different speeds among sectors. It is worth noticing that immigrant-owned firms always display positive growth rates even in those sectors in which Italian-owned firms have negative growth rates. This might also be the result of the crisis which has hit more foreign workers than the native workers in terms of job losses. Thus, many foreign workers who have lost their job might have preferred to open their businesses.

[Table 4]

Having shown the main patterns characterizing migration, employment and local units in Italy, this section ends by discussing the openness to trade at sectoral level. As already highlighted in the Introduction, more trade-oriented sectors are likely to better exploit the advantages offered by immigration through the ethnic network effects (i.e. reduced transaction costs). Table 5 shows for each sector the average openness ratio over the period 1994-2014. The ratio is equal to the sum of total import plus total export to total production<sup>6</sup>. The highest openness ratios are those of Mining

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<sup>6</sup> We thank Sophie Piton for sharing her data with us. For more details on the computation of the openness ratio, see Piton (2017).



and quarrying (396.9), Manufacturing (61.0), Accommodation and food service activities (22.9) and Transporting and storage (19.2). All the remaining sectors report a value which is below ten.

[Table 5]

## 4. Estimating the impact of immigration on local units and employment

### 4.1 The empirical specification

This study investigates if an increase in the share of working age foreign-born population resident in province  $p$  in year  $t$  ( $Sh\_Imm_{p,t}$ ) rises the number of local units and their employees. This analysis is carried out using a panel of 106 Italian provinces (NUTS 3) observed during the period 2012-2015 at both aggregate and sectoral level.

At aggregate level the model is specified as follows:

$$(1) \quad \ln y_{p,t} = \gamma_1 Sh\_Imm_{p,t} + \beta_1 g\_vapc_{p,t} + \beta_2 \ln Dens_{p,t} + \beta_3 Unemp_{p,t} + d_p + d_t + \varepsilon_{p,t}$$

where the dependent variable is, alternatively, the log of the number of establishments or employees. In equation (1), besides  $Sh\_Imm_{p,t}$  other covariates are included following a well-established literature on new firms' creation (Delfmann *et al.*, 2014; Nyström, 2007; Armington and Zoltan, 2002). According to this strand of literature, population density ( $Dens_{p,t}$ ) and unemployment rate ( $Unemp_{p,t}$ ) should be included as explanatory variables. Population density is intended to capture positive agglomeration (spillover) effects and it is often significant in models analyzing the determinants of new firms' creation. This positive role, however, has been disputed, among others, by Verheul *et al.* (2002) and Nyström (2007) who highlight that agglomeration might have negative effects on new firms' formation because economies of scale could lead already established firms to expand, curbing or hampering new firms' creation. Another (possibly) negative effect due to proximity to other firms might be that the rise of the labor demand, as well as the demand for other inputs if firms belong to the same sector, and this might cause an increase in production costs (Nyström, 2007). The unemployment rate is usually included to control for province-specific time-variant labor demand shocks and its impact is not univocally defined. As a matter of fact, it could be the case that high unemployment negatively affects the number of local units because it increases the risk of starting new businesses. Conversely, it cannot be excluded that an increase in unemployment raises the number of local units because more people are willing to begin new economic activities (Storey, 1991). We also include the growth rate of value added per capita,  $g\_vapc_{p,t}$ , which should proxy

global productivity shocks at the provincial level. Similarly, to population density and unemployment rate, its effect is not defined a priori. Higher growth rates of value added per capita bring about positive expectations about the future prospects of the economy; these positive expectations, on the one hand, could induce individuals to start their own business, on the other hand could offer them greater possibilities to find a job in already established firms. To complete the model specification, differences in provincial characteristics, which are time invariant during the period considered, are captured by the provincial fixed effects  $d_p$  and, similarly, the effects of common temporal shocks that affect all provinces and all sectors simultaneously are captured by including the temporal dummies  $d_t$ . Finally,  $\varepsilon_{i,p,t}$  is the error term uncorrelated with the covariates.

Moving to the sectoral perspective, the panel is composed by 106 provinces, 19 sectors and 4 years and estimated as follows:

$$(2) \quad \ln y_{i,p,t} = \gamma_1 Sh_{Imm_{p,t}} + \sum_2^{19} \gamma_i \left( Sh_{Imm_{p,t}} \times d_i \right) + \\ + \beta_1 g\_vacc_{p,t} + \beta_2 \ln Dens_{p,t} + \beta_3 Unemp_{p,t} + d_i + d_p + d_t + \varepsilon_{i,p,t}$$

where, along sectoral fixed effects  $d_i$ , the interaction terms  $\sum_2^{19} \gamma_i \left( Sh_{Imm_{p,t}} \times d_i \right)$  are included to get the point estimate for each sector. More precisely, equation (2) is estimated using Mining and quarrying as the reference sector, while the impact of immigration share on the  $i$ -th sector is given by the linear combination  $\gamma_1 + \gamma_i$ . In the empirical analysis, equation (2) will be estimated both with and without the interaction terms.

## 4.2 The econometric approach

The endogeneity of the migration variable is a potential problem to cope with when studying its impact on the host economies. In our case, endogeneity might depend on the omission of relevant variables that could affect both the immigrants' decision to move in a province and our two dependent variables (establishments and employees). Another possible source of endogeneity is reverse causality. For instance, provinces experiencing a rise in economic growth attract firms' investments, new firms' creation, and employment growth. Thus, immigrants might also be attracted by the rise in the number of establishments as long as this translates into more job opportunities and economic growth. To overcome this problem, our identification strategy follows Altonji and Card (1991) and Card (2001) and exploits the spatial correlation existing between current immigrants flows and the past geographical distribution of immigrants by country of origin. Although this instrument is widely applied in the migration literature, its validity has also been disputed by the recent literature (see

Jaeger et. al, 2018, for a discussion). In particular, when using the shift-share instruments, it is important to remember that the exclusion restriction requires that national shifts are not serially correlated. This potential problem is usually solved by using long lags for the share of pre-existing immigrants by country of origin. However, it is the overtime stability degree of the immigrant inflows more than the lag length that matters for the validity of the instrument. Due to data availability, we are forced to use a ten years lag to construct our instrument, which is not a long lag length. However, some important immigration shocks occurred after our base year (i.e. 2002) affected both the paths and trends of international immigration in Italy. The most important source of these shocks is the enlargement of the EU to central and eastern European countries. Moreover, during the second half of 2000' the highest increase in immigrant population shares have been observed in the southern regions, albeit these regions are economically much less attractive than the northern ones. Thus, not only the intensity of immigrant inflows, but also the composition of immigrants by country of origin and their geographical distribution seem to have been affected considerably by non-economic factors<sup>7</sup>.

We apply the Two Stages Least Square Estimator (2SLS) where the instrumental variable is computed as follows:

$$(3) \quad p\_sh\_imm_{p,t} = \frac{\sum_p (sh\_imm_{j,p,2002} * imm_{j,t})}{pop_{p,t}}$$

where  $p\_sh\_imm_{p,t}$  is the predicted share of (working age) foreign-citizens in each province,  $sh\_imm_{j,p,2002}$  is the share of (working age) foreign citizens from country  $j$  residing in province  $p$  in 2002 over the total number of immigrants from country  $j$  residing in Italy in 2002<sup>8</sup>,  $imm_{j,t}$  is the total number of immigrants from country  $j$  residing in Italy in year  $t$  and  $pop_{p,t}$  is the total (working age) population resident in each province. The rationale behind the above definition is to take advantage of the correlation between the decision of people to migrate from country  $j$  to province  $p$  and the presence of previously settled communities in province  $p$  coming from the same country  $j$ .

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<sup>7</sup> A possible concern might be related to the presence of selection bias with respect to the country of origin and the sector(s) in which the province is specialized. In fact, immigrants from different countries (or regions) might cluster in different sectors. As a result, immigrants might self-select their destinations according to their sector specialization. The extent to which the shift-share instrument can overcome this source of endogeneity depends on whether past and present immigrants are different with respect to their sector specialization (if they possess any).

<sup>8</sup> 2002 is the first year for which data of immigrants by country of origin are available at provincial level.

### 4.3 Data sources and description

Data on local units are taken from *Archivio Statistico delle imprese Attive* (Statistical Register of Active Enterprises, ASIA) managed by ISTAT. Information on local units at the provincial level is available since 2004. However, due to a change in the methodology of data collection that occurred in 2011, the time series released after 2011 are not comparable with the previous ones. Therefore, the present paper restricts the empirical investigation to the period 2012-2015. The ASIA database provides information also regarding the total number of employees is also available. Self-employed are included in the database as they are considered as a local unit of production. Starting from 2012 data on employees (excluding the self-employed workers) by citizenship and sector (excluding public administration and agriculture) are also available. Sectors considered in the analysis correspond to the NACE (rev. 2) first level (or sections) classification, as reported in Table 3<sup>9</sup>. Data on immigrants are taken from ISTAT archives and refers to the foreign-born population resident in Italy and not holding the Italian citizenship. Official data on resident population are collected from the Population Register Offices and updated from time to time with the last available year by ISTAT. Unfortunately, we do not have information on the educational attainment that is not available at this level of disaggregation, but we do have information on immigrants' age. Therefore, we can consider only the working age population (16-64 years old), which is a better proxy for the immigrant labor supply. Data on value added per capita, population density and unemployment rate have been taken by the data warehouse of ISTAT.

## 5 Results for local units and employment

### 5.1 First stage results

The first stage regression results are reported in Table 6. The dependent variable is the share of the working age foreign-born population. Column (1) reports the results for the aggregate model (equation (1)), while column (2) shows the results for the model specified at sectoral level (equation (2)). For both models the predicted share of immigrants,  $p\_sh\_imm_{p,t}$ , reports a positive and statistically significant coefficient. The Kleibergen and Paap (2006) underidentification test is computed for both models and the results are reported at the bottom of Table 6. The null of underidentification is strongly rejected for both models, thus suggesting that the instrument is relevant. For the aggregate model, we also report the heteroskedastic and clustering robust weak

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<sup>9</sup> In our empirical analysis section “G” Wholesale and retail trade; repair of motor vehicles and motorcycles, has been disaggregated into Wholesale and retail trade and repair of motor vehicles and motorcycles (G\_45), Wholesale trade, except of motor vehicles and motorcycles (G\_46) and Retail trade, except of motor vehicles and motorcycles (G\_47). This further disaggregation has been made to better detect the differences existing between the three types of sectors with respect to size (and thus mobility) and openness to trade (which is lower for retail than it is for the other two sectors).

identification test, which is the Kleibergen and Paap (2006) rank Wald F-statistics<sup>10</sup>. The result is above the critical value tabulated by Stock and Yogo (2005).

[Table 6]

## 5.2 Results for local units

Table 7 reports the results of the regressions (OLS and IV) for both the aggregate model in equation (1) and the model in equation (2) without the interaction terms. Starting from the aggregate model, the OLS coefficient estimated for the share of immigrants is not statistically significant (column (1)), but turns statistically significant in the IV estimate (column (2)). The reason might be that some provinces experienced a decrease in the number of local units due to the economic downturn, whilst the share of immigrants is characterized by a positive growth for all the provinces. In other words, the spurious correlation is likely to be negative for some provinces, thus biasing the estimates downwards. The outcomes from the estimation of equation (2) show a positive and statistically significant relationship between the number of local units measured at the province-sector level and the share of immigrants for both the OLS (column (3)) and IV estimates (column (4)). In the IV regression, the point estimate shows that a 0.01 increase in the share of immigrants (namely one percentage point increase in the share of immigrants) would lead to a 5.86 percent increase in the number of establishments.

[Table 7]

As for the impact of the other covariates on the number of local units, the unemployment rate exerts a positive impact on the number of local units throughout all the IV regressions. On the contrary, the effect estimated for the growth rate of value added per capita is negative, while population density is always statistically insignificant. This result suggests that agglomeration forces are, overall, irrelevant in terms of creation of new local units in Italy.

## 5.3 Results for employment by citizenship

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<sup>10</sup> The Stock and Yogo (2005) critical values are available only for models including up to two endogenous regressors. For this reason, the statistics has not been computed for the disaggregated models which include more than two endogenous variables.

An immigrant induced increase in labor supply might hide a change in the composition of the labor force between natives and immigrants. In particular, natives might respond to a rise of immigrants into a local labor market by moving to other localities (Borjas, 2006). As for Italy, Mocetti and Porello (2010) find a negligible effect of immigrants on overall native mobility during the period 1995 – 2005. However, our sample period is different from the 1995 – 2005 one in at least two important aspects. The first one is that it is characterized by higher levels of immigrants' population shares and the second one is the effect on local economies caused by the 2007 – 2008 Financial Crisis. Thus, it is still possible that the increase in local units exerts different effects on labor demand for natives and immigrants. Moreover, our data allows us to investigate the presence of both geographical and sectoral displacement effects. Therefore, we estimate equations (1) and (2) to investigate the impact of the share of immigrants on the total number of employees and natives and foreign workers separately. As previously specified, for the model in equation (1) the dependent variable is (the log of) the number of employees of local units by 106 provinces and four years, whilst for the model in equation (2) the number of employees of local units is measured for 106 provinces, 19 sectors and four years.

This section discusses the results for model (1) reported in Table 8, which, for the sake of space, shows only IV estimates obtained for total employees (column 1), natives (column 2) and foreign workers (column 3). The results show that an increase in the share of immigrants exerts a positive effect on total employment, as well as on Italian employees, while foreign employees are not affected. Therefore, no displacement effects seem to be registered neither for Italian nor for immigrant employees. These results can be interpreted in favor of some sort of complementarities existing between immigrant and Italian workers, which previous literature has already highlighted (Romiti, 2011).

[Table 8]

## **6. Results for local units and employment at sectoral level**

Having shown that both local units and employment are positively affected by the share of immigrants, our inquiry goes into deeper details to investigate whether and to what extent the impact differs across sectors. In fact, not only are immigrants heterogeneously distributed across the Italian provinces (see Figure 1), but the sectoral employment composition is also quite heterogeneous at the provincial level. Moreover, as already discussed in Section 3, sectors differ noticeably also in terms of the number of local units, the share of foreign workers, the foreign entrepreneurial propensity and

the openness to trade. All these heterogeneities, which arise with respect to the four channels discussed in the Introduction, can lead to differences in the effect that immigration might exert on each sector.

Estimates are now based on the model in equation (2) with the interaction terms, where the impact (on establishments and employment) of the share of immigrants on the *i*-th sector is obtained as namely  $\gamma_1 + \gamma_i$ , where  $\gamma_1$  is the estimated coefficient for Mining and quarrying used as the reference sector. These sector point estimates are shown in Tables 9 and Table 10 for establishments and employment, respectively.

[Table 9]

Let us start commenting results in Table 9. From the outset, we notice that a quite heterogeneous picture clearly emerges. In thirteen out of nineteen sectors, the impact of the share of working age foreign-born population on the number of establishments is positive and statistically highly significant. In our sample, these sectors account for 73.7% of total establishments and of 78.4% of value added. The three sectors that prove to be more sensitive to the immigrants' share are Real estate, Accommodation, and food services and Manufacturing. Conversely, the least affected are Transporting and storage, Professional, scientific and technical activities and Other services activities. The strong relationships detected for Accommodation and food services activities and Manufacturing do not come as a surprise. As a matter of fact, the Italian manufacturing sector has the highest employment share of both Italians and immigrant workers (see Table 2). As for Accommodation and food services, the existence of an important link has already been shown for Italy by Massidda *et al.* (2017). Conversely, it could appear a little puzzling that the strongest reaction to the share of immigrants is found for Real estate activities. However, this result could be explained by the increasing pressure exerted by immigrants on the demand for housing services (i.e., buying/selling and renting activities) in Italy, as it is highlighted also by Baldini and Poggio (2013). Data on the real estate market reveals that in the 2011-2015 time period, the market share related to immigrants was 9.6% (Scenari Immobiliari, 2017).

As for employment, it is interesting to unfold the sectoral impact of immigrants. Moreover, native workers might move to sectors with low demand for immigrant workers, thus new immigrants might also affect the labor force composition across sectors. Table 10 reveals that the positive impact described above is due to the positive effects of immigration in six sectors: Manufacturing, Wholesale trade, except motor vehicles and motorcycles, Accommodation and food services activities, Financial and insurance services, Real estate activities and Professional, scientific and technical activities. In

these sectors, which account for 49.02% of total employment and 52.66% of value added, the positive effect of the immigrant share is strongly statistically significant for total employees, as well as for Italian employees. The estimated impact for total employees varies from 11.10 for Wholesale trade, except motor vehicles and motorcycles up to a very high 23.71 for Manufacturing. As regards Italian employees slightly higher coefficients are estimated (except for the Manufacturing sector that, anyway, records the highest estimated coefficient for Italian employees as well). Besides, the Manufacturing sector is the only one in which a positive impact of the immigration share on immigrant employees is also detected. These results suggest that, at least in the aforementioned six sectors, immigrants do not seem to displace Italian workers that, on the contrary, seem to benefit from immigration. At the same time, we are not able to detect hampering effects in the remaining sectors.

[Table 10]

## **7. Insights on local units, ethnic networks, and international trade**

In this section, we provide some insights useful to interpret the main findings of our empirical investigation. At this scope, in Table 11 we re-arrange the results of the 19 sectors into three groups based on estimated elasticities. The first group comprises sectors for which the impact of immigration is positive and statistically significant for both local units and employees. The second group gathers sectors that respond to immigration only concerning the number of local units. Finally, the third group includes sectors that respond neither in terms of local units nor in terms of employment. Notice that in this way, we let the empirical results speaking without imposing any aprioristic classification.<sup>11</sup> This partitioning helps us to look for possible common characteristics within each group of sectors that could deliver useful insights regarding the link between immigration and firms in Italy.

Keeping in mind the sector characteristics discussed in Section 3, we start by considering the openness ratio (reported in the last column of Table 11). As we can notice, with some exceptions, sectors in the first group tend to have higher ratios. Let us have a look, for example, at Manufacturing, a sector holding a key role in the Italian economy. This sector shows high estimated impacts of immigrants on both local units and employment (total, natives and foreign employees) and also the second highest openness ratio. Other interesting characteristics of this sector are the high shares of foreign firms and foreign employees which are mainly gathered within the low and medium educational levels (cf. Tables 1, 2 and 4). After putting together all these characteristics, it seems that

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<sup>11</sup> For example, as a measure to establish the mobility of local units Olney (2013) states a *priori* criteria based on the firm size. However, these criteria cannot be applied to the Italian case because the very small size Italian local units would make almost all sectors as “mobile”.



a trade-oriented sector, such as for example Manufacturing, is in the position to better exploit the increase in immigrants' population vis-à-vis other less trade-oriented sectors.

This interpretation compares with previous empirical literature that emphasizes the role played by immigrants in allowing Italian small manufacturing firms, active in the international markets, to keep the competitiveness and avoid delocalization in countries with lower labor costs (Murat and Paba, 2004). Trade oriented firms can find convenient to employ foreign workers with low-medium educational levels, but with skills directly tied with their country of origin (e.g., language, knowledge of market structure, regulations, and institutions). This, in turn, can rise complementarities between native and immigrant workers and improve the overall efficiency in production. Moreover, trade-oriented sectors are more likely to favor immigrants starting their own business by exploiting both their knowledge and their networks in the country of origin. As far as the second group of sectors, high heterogeneity is evident as well. What is interesting to observe is that a lower openness index comes along a statistically insignificant effect of immigration on employees. We interpret this result as demand-driven: firms expand to fulfill the increasing demand for services, housing, energy and education without the need to increase employment. Finally, sectors in the third group are characterized either by low shares of foreign employees (Sectors B, E and J) or by a low openness index (e.g. G45, G47 and Q).

[Table 11]

## **8. Conclusions**

In the present study, we have investigated the impact of immigrants on the number of establishments and employees at the provincial level in Italy. The hypothesis tested is that an increase in the share of immigrants can have a positive impact on the local economy by attracting new local units.

The main contribution of our analysis is that, to the best of our knowledge, this is the first time that such an investigation has been performed at the sectoral level (NACE rev. 2). Secondly, by proposing for the first time this novel approach for Italy, this paper contributes to the recent and growing literature focusing on the relation between immigration and firms in Italy.

We have detected a positive impact of the immigrant's share on the number of establishments and their employees. The results display a highly heterogeneous picture at the sectoral level. There is a group of sectors for which a statistically robust link for both the number of establishments and employees exists. In 2015, these sectors sum up to 52% of total value added and 48% of total employment. For a second group of sectors, representing the 25% of total value added and 27% of total employment, the relationship holds only for local units. Finally, the third group of sectors does

not seem to be affected by immigration. We have also highlighted a positive association between the first group and sectors that are more open to international trade.

As regards the effect of immigrants on natives' employment, we find no evidence of displacement between immigrant and native workers. In particular, we find that the share of immigrants exerts a positive and statistically significant effect on both total employees and Italian employees in the aforementioned first group of sectors. On the contrary, in the second and third groups of sectors, the relationship between immigrants and employees (total, natives, and foreigners) is never statistically significant. These results can be interpreted in favor of some sort of complementarities existing between immigrant and native workers, which previous literature has already highlighted (Romiti, 2011).

To conclude, the empirical results shown in this paper have also important policy implications and directions for future research. In fact, immigration policies could help to maintain flexible labor markets and enable firms to adjust their capital stock by moving (or opening new) establishments to those areas characterized by increasing immigrant population shares. The resulting rise in the share of foreign workers contributes to the expansion of firms with possible positive impacts on employment for both natives and immigrants.

## References

- Accetturo A, Bugamelli M, Lamorgese A (2012). Welcome to the machine: firms' reaction to low-skilled immigration. Banca d'Italia, Temi di discussione N. 846.
- Alesina A, Harnoss J and Rapoport H (2016). Birthplace diversity and economic prosperity. *Journal of Economic Growth*, 21():101–138.
- Altonji J G, Card D (1991). The effects of immigration on labor market outcomes of less-skilled natives. In: Abowd J M and Freeman R B (Eds) *Immigration, Trade, and Labor Markets*. Chicago, University of Chicago Press: 201-234.
- Armington C, Zoltan J A (2002). The determinants of regional variation in new firm formation. *Regional Studies*, 36(1): 33-45.
- Baldini M and Poggio T J (2014). The Italian housing system and the global financial crisis. *Journal of Housing and the Built Environment*, 29(2): 317-334.
- Barone G. and 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.
- Bettin G, Bianchi P, Nicolli F, Ramaciotti L and Rizzo U (2019). Migration, ethnic concentration and firms entry: evidence from Italian regions. *Regional Studies*, 53(1): 55-66.
- Bettin G, Lo Turco A, Maggioni D (2014). A firm-level perspective on migration. The role of extra-EU workers in Italian manufacturing. *Journal of Productivity Analysis*, 42(3): 305–325.
- Borjas G J (2006). Native internal migration and the labor market impact of immigration. *The Journal of Human Resources*, 41(2): 221-258.
- Bratti M and Conti M (2018). The effect of immigration on the innovation in Italy. *Regional Studies*, 52(7): 934-947.
- Bratti M, De Benedictis L and Santoni G (2014). On the pro-trade effects of immigrants. *Review of World Economics*, 150(3): 557-594.
- Brücker H, Fachin S and Venturini A (2011). Do foreigners replace native immigrants? A panel cointegration analysis of internal migration in Italy. *Economic Modelling*, 28(3): 1078-1089.
- Card D (2001). Immigrant inflows, native outflows, and the local market impacts of higher immigration. *Journal of Labor Economics*, 19(1): 22–64.
- De Arcangelis G, Di Porto E, Santoni G (2015a). Immigration and manufacturing in Italy. Evidence from the 2000s. *Economia e Politica Industriale*, 42(2): 163-187.
- De Arcangelis G, Di Porto E, Santoni G (2015b). Migration, labor tasks and production structure. *Regional Science and Urban Economics*, 53(C): 156–169.

- Delfmann H, Koster S, McCann P and Van Dijk J (2014). Population change and new firm formation in urban and rural regions. *Regional Studies*, 48(6): 1034-1050.
- Dustmann C and Glitz A. (2015). How do industries and firms respond to changes in local labor supply? *Journal of Labour Economics*, 33(3): 711-750.
- Edo A (2019). The impact of immigration on the labor market, *Journal of Economic Surveys*, 33(3): 922–948.
- Egger P H, von Ehrlich M and Nelson D R (2012). Migration and trade. *The World Economy*, 35(2): 216-241.
- Fairlie R and Lofstrom M (2015): Immigration and entrepreneurship. In Chiswick B R and Miller P W (Eds) *Handbook of the Economics of International Migration*, Vol. 1B. Amsterdam, Elsevier: 877-911.
- Foged M and Peri G (2015). Immigrants' effect on native workers: New analysis on longitudinal data. *American Economic Journal: Applied Economics*, 8(2): 1-34.
- Genç M, Gheasi M, Nijkamp P and Poot J (2012). The impact of immigration on international trade: A meta-analysis. In: Nijkamp P, Poot J and Sahin M (Eds) *Migration Impact Assessment. New Horizons*. Cheltenham, Edward Elgar Publishing Limited: 301-337.
- Hunt J (2011). Which immigrants are most innovative and entrepreneurial? Distinctions by entry visa. *Journal of Labor Economics*, 29(3): 417-457.
- Jaeger D A, Ruist J and Stuhler J (2018). Shift-share instruments and the impact of immigration. IZA Discussion Paper N. 11307.
- Kleibergen F and Paap R (2006). Generalized reduced rank tests using the singular value decomposition. *Journal of Econometrics*, 133(1): 97-126.
- Lewis E G (2013). Immigration, and production technology. *Annual Review of Economics*, 5(1): 165–191.
- Lewis E G and Peri G (2015). Immigration and the economy of cities and regions. In: Duranton G, Henderson VJ, Strange WC, (Eds) *Handbook of Regional and Urban Economics*, Vol. 5. Amsterdam, Elsevier: 625-685.
- Massidda C, Etzo I and Piras R (2017). The relationship between immigration and tourism firms. *Tourism Economics*, 23(8): 1537-1552.
- Mitaritonna C, Orefice G and Peri G (2017). Immigrants and firms outcomes: Evidence from France. *European Economic Review*, 96(July): 62-82.
- Mocetti S and Porello C (2010). How does immigration affect native internal mobility? New evidence from Italy. *Regional Science and Urban Economics*, 40(6): 427-439.

- Murat M and Paba S (2004). International migration, outsourcing, and Italian industrial districts. In: AIEL Conference Paper, XIX National Conference of Labour Economics (AIEL), University of Modena (Italy), 23-24 September 2004.
- Nyström K (2007). An industry disaggregated analysis of the determinants of regional entry and exit. *Annals of Regional Science*, 41(4): 877–896.
- Olney W (2013). Immigration and firms expansion. *Journal of Regional Science*, 53(1): 142–157.
- Ottaviano G I P and Peri G (2012). Rethinking the effect of immigration on wages. *Journal of the European Economic Association*, 10(1): 152-197.
- Peri G and Sparber C (2009). Task specialization, immigration, and wages. *American Economic Journal: Applied Economics*, 1(3): 135–69.
- Piton S (2017). A European disease? Non-tradable inflation and real interest rate divergence. *CESifo Economic Studies*, 63(2): 210-234.
- Romiti A (2011). Immigrants-natives complementarities in production: evidence from Italy. CERP Working Paper N. 105.
- Scenari Immobiliari (2017). Rapporto 2017 “Immigrati e Casa”. Monitor Immobiliare.
- Stock J H and Yogo M (2005). Testing for weak instruments in linear IV regression. In Andrews D W K and Stock J H (Eds.). *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg*. Cambridge, Cambridge University Press: 80-108.
- Storey D J (1991). The birth of new firms—Does unemployment matter? A review of the evidence. *Small Business Economics*, 3(3): 167–178.
- Verheul I, Wennekers S, Audretsch D and Thurik R (2002) An eclectic theory of entrepreneurship: Policies, institutions and culture. In: Audretsch D, Thurik R, Verheul I and Wennekers S (Eds) *Entrepreneurship: Determinants and Policy in a European-US Comparison*. Economics of Science, Technology and Innovation, Vol. 27. Springer, Boston, MA.

**Table 1** – Natives and Foreign workers educational levels (2015).

	Natives (%)	Foreign workers (%)
Primary education (ISCED 1)	3.07	8.60
Lower-secondary (ISCED 2)	27.66	36.22
Upper secondary (ISCED 3, 4)	47.22	42.87
University degree and more (ISCED 5, 6)	22.05	12.32
<b>Total</b>	<b>100.00</b>	<b>100.00</b>

Source: own computation based on Istat data warehouse: <http://dati.istat.it/>.

**Table 2** – Native and Foreign employees by sector (2015).

NACE CODE	Total employees		Natives employees		Foreign employees		Foreign/ Natives (%)
	Units	%	Units	%	Units	%	
B - Mining and quarrying	31899	0.20	30095	0.21	1805	0.10	6.00
C – Manufacturing	3618368	22.21	3180178	22.02	438190	23.75	13.78
D - Electricity, gas, steam and air conditioning supply	89105	0.55	86603	0.60	2502	0.14	2.89
E - Water supply; sewerage; waste management and remediation activities	187111	1.15	173533	1.20	13578	0.74	7.82
F – Construction	1324428	8.13	1121734	7.77	202694	10.99	18.07
G – Wholesale and retail trade; repair of motor vehicles and motorcycles	3302141	20.27	3041098	21.05	261043	14.15	8.58
H - Transporting and storage	1089286	6.69	913340	6.32	175945	9.54	19.26
I - Accommodation and food service activities	1322399	8.12	1054556	7.30	267843	14.52	25.40
J – Information and communication	541972	3.33	521213	3.61	20759	1.13	3.98
K – Financial and insurance activities	570866	3.50	558425	3.87	12441	0.67	2.23
L - Real estate activities	298553	1.83	284993	1.97	13559	0.73	4.76
M - Professional, scientific and technical activities	1211331	7.44	1163140	8.05	48191	2.61	4.14
N - Administrative and support service activities	1164773	7.15	944584	6.54	220189	11.93	23.31
P – Education	96650	0.59	87950	0.61	8699	0.47	9.89
Q - Human health and social work activities	824407	5.06	736874	5.10	87532	4.74	11.88
R - Arts, entertainment and recreation	164067	1.01	143718	0.99	20349	1.10	14.16
S - Other services activities	452519	2.78	402876	2.79	49644	2.69	12.32
<b>Total</b>	<b>16289875</b>	<b>100.0</b>	<b>14444911</b>	<b>100.0</b>	<b>1844964</b>	<b>100.0</b>	<b>12.77</b>

Source: own computation based on Istat data warehouse: <http://dati.istat.it/>

**Table 3** – Local units (2015).

NACE CODE	Local units	%
B - Mining and quarrying	2,937	0.06
C – Manufacturing	433,327	9.24
D - Electricity, gas, steam and air conditioning supply	13,821	0.29
E - Water supply; sewerage; waste management and remediation activities	13,474	0.29
F – Construction	527,101	11.24
G – Wholesale and retail trade; repair of motor vehicles and motorcycles	1,221,457	26.06
H - Transporting and storage	151,718	3.24
I - Accommodation and food service activities	348,635	7.44
J – Information and communication	108,648	2.32
K – Financial and insurance activities	131,902	2.81
L - Real estate activities	241,387	5.15
M - Professional, scientific and technical activities	729,972	15.57
N - Administrative and support service activities	155,441	3.32
P – Education	31,814	0.68
Q - Human health and social work activities	296,232	6.32
R - Arts, entertainment and recreation	69,685	1.49
S - Other services activities	210,340	4.49
<b>TOTAL</b>	<b>4,687,891</b>	<b>100.00</b>

Source: own computation based on Istat data warehouse: <http://dati.istat.it/>.

**Table 4.** Share of foreign firms and growth rates of foreign-owned and Italian-owned firms.

NACE CODE	Share (%) of foreign firms over total firms (2015)	Growth rate (%) of foreign-owned firms (average 2012-2015)	Growth rate (%) of Italian-owned firms (average 2012-2015)
B - Mining and quarrying	0.77	13.33	-5.74
C – Manufacturing	7.39	7.28	-4.32
D - Electricity, gas, steam and air conditioning supply	2.30	31.12	30.21
E - Water supply; sewerage; waste management and remediation activities	4.15	31.30	5.42
F – Construction	15.08	1.74	-5.38
G – Wholesale and retail trade; repair of motor vehicles and motorcycles	12.76	23.07	-2.43
H - Transporting and storage	7.09	6.53	-3.91
I - Accommodation and food service activities	9.57	28.66	4.31
J – Information and communication	5.94	5.90	3.82
K – Financial and insurance activities	2.18	9.27	4.44
L - Real estate activities	1.86	12.39	0.86
M - Professional, scientific and technical activities	4.65	11.63	0.71
N - Administrative and support service activities	15.92	50.40	7.96
P – Education	4.10	11.86	5.42
Q - Human health and social work activities	3.07	21.71	10.21
R - Arts, entertainment and recreation	4.59	25.74	4.79
S - Other services activities	7.55	28.80	10.59
<b>Total</b>	<b>9.01</b>	<b>10.34</b>	<b>-0.76</b>

Source: own computation based on *Unioncamere-Infocamere sul Registro delle imprese*.



**Table 5.** Openness ratio by sector (average 1995-2014)

NACE CODE	Openness ratio
B - Mining and quarrying	396.86
C – Manufacturing	61.03
D - Electricity, gas, steam and air conditioning supply	2.69
E - Water supply; sewerage; waste management and remediation activities	0.65
F – Construction	1.33
G - Wholesale and retail trade and repair of motor vehicles and motorcycles	3.38
H - Transporting and storage	19.25
I - Accommodation and food service activities	58.68
J – Information and communication	7.5
K – Financial and insurance activities	8.27
L - Real estate activities	n.a
M - Professional, scientific and technical activities	8.36
N - Administrative and support service activities	22.96
P – Education	0.19
Q - Human health and social work activities	0.08
R - Arts, entertainment and recreation	1.65
S - Other services activities	1.33

Source: Piton (2017)

**Table 6.** First stage results

Dependent variable: <i>share of working age foreign born population</i>		
	(1)	(2)
$p\_sh\_imm_{p,t}$	0.1198*** (0.035)	0.1929*** (0.026)
$g\_vapc_{p,t}$	0.0045* (0.002)	0.0057*** (0.001)
$ln\_dens_{p,t}$	0.0442 (0.033)	0.1211 (0.011)
$Unemp_{p,t}$	0.0002*** (0.000)	0.0004*** (0.000)
Province fixed effects	YES	YES
Sector fixed effects	-	YES
Year fixed effects	YES	YES
Observations	424	8056
Underidentification test (Kleibergen-Paap rk LM statistic) Chi-sq(1)	14.62***	38.63***
Weak identification test (Kleibergen-Paap rk Wald F statistic)	11.93	53.50
Stock-Yogo weak ID test critical values: 15% maximal IV size	8.96	

Notes: First stage results.  $p\_sh\_imm_{p,t}$  is the predicted share of working age foreign born population. Heteroskedasticity robust standard errors clustered by province and sectors (model 2) in brackets. Constant term included but not reported. The reported test statistics for under-identification and weak identification are robust to both heteroskedasticity and autocorrelation. See the main text for more details. \*\*\* significant 1%, \*\* significant 5%, \* significant 10%.

**Table 7.** Impact of migration on the number of local units. Dependent variable: Number of local units.

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
<i>Sh_imm<sub>p,t</sub></i>	0.1811 (1.620)	5.8581** (2.570)	2.5520*** (0.722)	5.8609*** (1.602)
<i>g_vapc<sub>p,t</sub></i>	-0.0307 (0.023)	-0.0630** (0.030)	-0.0722*** (0.021)	-0.1062*** (0.021)
<i>ln_dens<sub>p,t</sub></i>	-0.0833 (0.403)	-0.3355 (0.398)	-0.0132 (0.140)	-0.4307 (0.239)
<i>Unemp<sub>p,t</sub></i>	0.0056** (0.002)	0.0046*** (0.001)	0.0064*** (0.001)	0.0051*** (0.001)
Province fixed effects	YES	YES	YES	YES
Sector fixed effects	-	-	YES	YES
Year fixed effects	YES	YES	YES	YES
Observations	424	424	8056	8056

Notes: Heteroskedasticity robust standard errors clustered by province and sectors (columns 3 and 4) in brackets. Constant term included but not reported. \*\*\* significant 1%, \*\* significant 5%, \* significant 10%.

**Table 8** Impact of migration on employees by citizenship.

	(1)	(2)	(3)
	Total	Natives	Foreign workers
<i>Sh_imm<sub>p,t</sub></i>	10.793 *** (4.528)	8.963 ** (4.360)	13.732 (9.774)
<i>g_vapc<sub>p,t</sub></i>	-0.060 (0.042)	-0.055 (0.041)	-0.053 (0.081)
<i>ln_dens<sub>p,t</sub></i>	-0.492 (0.571)	-0.444 (0.515)	-0.435 (0.759)
<i>Unemp<sub>p,t</sub></i>	0.003 (0.002)	0.003 * (0.002)	0.001 (0.003)
Province Fixed Effects	YES	YES	YES
Year fixed effects	YES	YES	YES
Observations	424	424	424

Notes: IV regressions. Heteroskedasticity robust standard errors clustered by province in brackets. Constant term included but not reported. \*\*\* significant 1%, \*\* significant 5%, \* significant 10%.

**Table 9.** Impact of migration on the number of local units by sector. Dependent variable: Number of local units (establishments).

Sectors	(B)	(C)	(D)	(E)	(F)	(G45)	(G46)
	-4.235	12.349 ***	9.397 ***	-2.640	8.286 ***	-1.184	10.159 ***
	(4.521)	(3.327)	(3.617)	(3.145)	(3.155)	(3.105)	(3.110)
Sectors	(G47)	(H)	(I)	(J)	(K)	(L)	(M)
	-4.303	7.315 **	14.410 ***	1.868	11.172 ***	32.079 ***	7.117 **
	(3.083)	(3.115)	(3.136)	(3.073)	(3.053)	(3.488)	(3.069)
Sectors	(N)	(P)	(Q)	(R)	(S)		
	8.794 ***	7.848 **	4.913	9.035 ***	6.735 **		
	(3.115)	(3.158)	(3.079)	(3.160)	(3.048)		

Notes: Observation, 8056. IV regressions. Heteroskedasticity robust standard errors clustered by province and sectors in brackets. Constant term included. The estimated coefficients for the other regressors are:  $g\_vapl_{p,t} = -0.092^{***}$ ;  $ln\_dens_{p,t} = -0.506^{**}$ ;  $Unemp_{p,t} = 0.005^{***}$ . For all coefficients: \*\*\* significant 1%, \*\* significant 5%, \* significant 10%.

**Table 10.** Impact of migration on employees by sector. Dependent variable: Total employees; Natives employees; Foreign employees

<b>Sectors</b>	<b>(B)</b>	<b>(C)</b>	<b>(D)</b>	<b>(E)</b>	<b>(F)</b>	<b>(G45)</b>	<b>(G46)</b>
Total	2.422 (7.839)	23.711 *** (5.682)	-3.329 (5.230)	-7.940 (5.004)	-3.670 (4.835)	5.003 (4.848)	11.099 ** (4.993)
Natives	3.612 (8.042)	23.215 *** (5.724)	-1.795 (5.279)	-7.528 (5.079)	-5.959 (4.893)	5.988 (4.906)	12.305 ** (5.023)
Foreign	7.106 (0.265)	22.256 *** (9.851)	-14.117 (9.674)	-7.014 (9.272)	2.002 (9.417)	-2.979 (9.289)	-1.798 (9.635)
<b>Sectors</b>	<b>(G47)</b>	<b>(H)</b>	<b>(I)</b>	<b>(J)</b>	<b>(K)</b>	<b>(L)</b>	<b>(M)</b>
Total	-0.448 (4.798)	1.525 (4.923)	13.044 ** (5.116)	0.400 (4.913)	13.406 *** (4.856)	13.735 *** (5.053)	13.973 *** (4.897)
Natives	0.808 (4.853)	-0.363 (4.965)	14.712 *** (5.160)	-1.716 (4.960)	15.182 *** (4.917)	14.170 *** (5.112)	15.575 *** (4.957)
Foreign	-12.882 (9.317)	9.073 (9.535)	-3.331 (9.630)	-2.090 (9.331)	-7.947 (9.438)	7.641 (9.487)	-0.863 (9.352)
<b>Sectors</b>	<b>(N)</b>	<b>(P)</b>	<b>(Q)</b>	<b>(R)</b>	<b>(S)</b>		
Total	5.246 (5.066)	-3.900 (5.659)	-0.386 (4.896)	3.118 (5.013)	6.370 (4.892)		
Natives	2.426 (5.117)	-3.094 (5.661)	-1.076 (4.957)	1.591 (5.075)	5.252 (4.953)		
Foreign	-0.386 (4.896)	-10.741 (10.220)	1.948 (9.332)	4.317 (9.410)	10.955 (9.250)		

Notes: Observation, 8056. IV regressions. Heteroskedasticity robust standard errors clustered by province and sectors in brackets. Sections are labeled according to NACE codes. See Table 11, equation (2) and the main text for more details. Constant term and other regressors included but not reported. \*\*\* significant 1%, \*\* significant 5%, \* significant 10%.

**Table 11.** Classification of sectors according their impact on local units and employments. Summary results.

Sectors	Local units	Employees (Total)	Employees (Natives)	Employees (Foreign)	Openness ratio
First group					
C – Manufacturing	12.349 *** (3.327)	23.711 *** (5.682)	23.215 *** (5.724)	22.256 *** (9.851)	61.03
<i>G46 - Wholesale trade, except of motor vehicles and motorcycles</i>	10.159 *** (3.110)	11.099 ** (4.993)	12.305 ** (5.023)	-1.798 (9.635)	3.38
I - Accommodation and food service activities	14.410 *** (3.136)	13.044 ** (5.116)	14.712 *** (5.160)	-3.331 (9.630)	58.68
K – Financial and insurance activities	11.172 *** (3.053)	13.406 *** (4.856)	15.182 *** (4.917)	-7.947 (9.438)	8.27
L - Real estate activities	32.079 *** (3.488)	13.735 *** (5.053)	14.170 *** (5.112)	7.641 (9.487)	n.a
M - Professional, scientific and technical activities	7.117 ** (3.069)	13.973 *** (4.897)	15.575 *** (4.957)	-0.863 (9.352)	8.36
Second group					
D - Electricity, gas, steam and air conditioning supply	9.397 *** (3.617)	-3.329 (5.230)	-1.795 (5.279)	-14.117 (9.674)	2.69
F – Construction	8.286 *** (3.155)	-3.670 (4.835)	-5.959 (4.893)	2.002 (9.417)	1.33
H - Transporting and storage	7.315 ** (3.115)	1.525 (4.923)	-0.363 (4.965)	9.073 (9.535)	19.25
N - Administrative and support service activities	8.794 *** (3.115)	5.246 (5.066)	2.426 (5.117)	-0.386 (4.896)	22.96
P – Education	7.848 ** (3.158)	-3.900 (5.659)	-3.094 (5.661)	-10.741 (10.220)	0.19
R - Arts, entertainment and recreation	9.035 *** (3.160)	3.118 (5.013)	1.591 (5.075)	4.317 (9.410)	1.65
S - Other services activities	6.735 ** (3.048)	6.370 (4.892)	5.252 (4.953)	10.955 (9.250)	1.33
Third group					
B - Mining and quarrying	-4.235 (4.521)	2.422 (7.839)	3.612 (8.042)	7.106 (0.265)	396.86
E - Water supply; sewerage; waste management and remediation activities	-2.640 (3.145)	-7.940 (5.004)	-1.795 (5.279)	-7.014 (9.272)	0.65
<i>G45 - Wholesale and retail trade and repair of motor vehicles and motorcycles</i>	-1.184 (3.105)	5.003 (4.848)	5.988 (4.906)	-2.979 (9.289)	3.38
<i>G47 - Retail trade, except of motor vehicles and motorcycles</i>	-4.303 (3.083)	-0.448 (4.798)	0.808 (4.853)	-12.882 (9.317)	3.38
J – Information and communication	1.868 (3.073)	0.400 (4.913)	-1.716 (4.960)	-2.090 (9.331)	7.50
Q - Human health and social work activities	4.913 (3.079)	-0.386 (4.896)	-1.076 (4.957)	1.948 (9.332)	0.08

Notes: the openness ratio is given by total trade (imports+exports) over total production. The reported values are averages over the 1995-2014 time period. n.a. = not available.