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THE LABOUR MARKET IMPACT OF IMMIGRATION: EVIDENCE  
FROM ITALY

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ACADEMIC YEAR

2017 - 2018

## **Abstract**

Due to the increasing relevance of immigration as a labour market determinant, it is necessary to study it with an empirical approach, trying to make an assessment about its quantitative impact. The empirical analysis we carried out is based on the Italian Labour Force Survey for the period 2007-2017, and it is aimed at capturing the impact that migratory flows have on the probability of a worker to be employed, inactive or to have a temporary rather than a permanent job. Our findings show that on average immigration makes people more likely to be non-employed, inactive or with a temporary job. A further result is that the effect of immigration is generally stronger for younger workers, while we see no clear evidence of differential effects for two more groups of people that usually are disadvantaged on the labour market, namely female and unskilled workers. Finally, we make some proposals that entail a more sophisticated analysis on the one hand, and some policy actions towards integration on the other, with the aim of reverting the current negative picture.



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## *Introduction*

The potential harmfulness or the potential benefits of the presence of immigrants in our society has been in recent years one of the most controversial and discussed issues in the political debate at worldwide level. Very often, considerations about this topic have not been based on empirical evidence whatsoever, so it is not straightforward to state with certainty whether immigration is beneficial or detrimental (and how much).

The aim of this dissertation is to capture in a fairly precise way what is the impact of an increase in the number of immigrants with respect to the native population on a geographical area's labour market conditions, focusing in particular on the effects that migratory flows have on employment conditions of native workers; the idea is to find out whether immigrants, by competing with natives, change the likelihood of being employed for a native worker in a significant way. If this is not detected empirically, what we may consider is that immigration has no relevant effects on the domestic labour market, leaving its indicators unchanged. Moreover, we might also find out that sometimes the presence of immigrants can be beneficial to our society in economic terms, as economic integration is likely to enlarge the amount of resources available in a country.

Despite the results that the analysis will provide, the purpose of the paper is to give a contribution to the already existing evidence on the literature, with the ultimate aim of getting to a common ground of discussion in the public debate, based on robust evidence from economic research, hoping to reduce the amount of "political speculation" that often characterizes this topic. The labour economics literature about this issue is huge, and concentrates not only on employment conditions, but also on the effect that immigration has on several other labour market indicators such as wages. This is actually a crucial indicator for detecting how the labour market mechanics adjust in response to an immigration inflow. Whether salaries augment or decrease tells us a lot about the nature of the labour market reaction to an increase in the size of the labour supply.

Furthermore, considerations must be made not only on average effects of migration, but also looking at how people belonging to different social groups are affected; in particular, in our analysis we will focus on the weakest individuals of the society, namely female, youth and unskilled workers.

Throughout the dissertation, we will discuss these issues based on what economic research has found out up to now. Most of it comes from the United States, where immigration from Europe has been an issue since the very beginning of the last century, when due to Heckscher-Olin forces immigration severely hit the American labour market, as they caused a fall in unskilled wages. Way less research exists for Europe, and it is much concentrated on the United Kingdom. Even less empirical analysis exists for Italy, which, as we are going to see, is one of the countries that has been

majorly involved in the most recent migratory flows occurring in the context of the European Migrant Crisis. For this reason, we will try to fill this gap by providing a simple econometric model using data from Italy, analysing how labour market outcomes vary as the size of a migratory inflow increases in a given Italian region.

The dissertation is divided in four sections: in the *first* one, after showing some Eurostat figures and a brief historical introduction, a theoretical framework is provided, in order to have an idea of what are the micro and macroeconomic foundations of the labour market dynamics that take place when immigration is there. In particular, we will look at what is the role of skills in the native and the immigrant population, and what are the implications of having a different skill distribution. We will also see how immigrants' skills are modified once they enter the destination country, therefore analysing the issues of upgrading and downgrading of skills. Another point in question is the consideration about whether immigrants, as a factor of production, are complement or substitute to native workers. The last part of the theoretical analysis is based on the application of the Factor Price Insensitivity theorem to the immigration framework.

In the *second* section the approach is quite different, as more technical econometric issues are discussed. In its initial part, we point out several potential threats to a correct estimation, focusing in particular on omitted variables (for instance related to regional-specific effects), small sample size and problems arising from endogeneity and simultaneous causality between the settlement choice of immigrants and the economic conditions of a specific region. To this last problem a solution is proposed, that is the one of instrumental variables. We discuss both the validity and exogeneity of the instrument, with the support of existing empirical research. Afterwards in the chapter, we analyse existing work done by some scholars that makes up the literature about the topic, looking at the specific methodology used in their models, the approach they have followed and finally the results they have obtained.

The *third* part of the dissertation is devoted firstly to a description of the data we are going to use in the econometric model. Then some descriptive statistics will be provided, so to make clearer the context of our analysis and to give precise information about the Italian labour market situation. Finally, we will present the regression equation and the description of the variables involved and the controls we are going to put; the results of the analysis are therefore shown and interpreted. In addition to this, we will provide some quantitative estimates considering cross-regional average effects.

In the last and *fourth* section we will comment the regression results, trying to explain their causes and implications. In summing up our findings, we will attempt to suggest a more efficient approach to the issue both in a methodological and in a pure policy measure framework.

## **European Immigration figures and facts in a nutshell**

In recent years, Europe has experienced a continuously increasing inflow of immigrants from various regions of the world, both for political and economic reasons. According to the Eurostat, it is estimated that 2.7 million people moved from non-member countries to EU-28 countries in 2015; considering also internal migration, between two EU Member States, the figure is 4.7 million. The countries that hosted the largest number of migrants were Germany (1 543.8 thousand), United Kingdom (631.5 thousand), France (363.9 thousand), Spain (342.1 thousand) and Italy (280.1 thousand). Most migrants are working-age (the average age of migrants to EU Member States was 27.5 years), and they are much younger than the total population average in their host countries, that is 42.6 years. This fact deserves major attention for our study since it may be a cause of competition between immigrants and natives in the domestic youth labour market. The main countries from which migrants come, according to UNHCR (United Nations High Commissioner for Refugees), are Syria (59% in 2015), Afghanistan (21%), Iraq (8%) and Eritrea (4%). Most of them are refugees, escaping from war and persecution. On the other hand, migrants coming Balkans and parts of West Africa are mostly “Economic Migrants”, who decide to move towards Europe in search of better rewarding job positions and thus an improved lifestyle. Actually, it is thought that among the most relevant factors that exert a pull effect on migrants there are the social benefits that characterize especially northern European countries, together with the presence of several already established immigrant communities. Taking a step back, it is possible to see that immigration to Europe has a long and varied history. To be more precise, rather than immigration we should talk about emigration, since many European countries, until the 60’s and the 70’s such as Ireland, Spain, Italy, Norway and United Kingdom were emigration countries. After living conditions improved though, the trend was switched, leading immigrants from poorer parts of the world to move towards Europe. As we have seen above, the issue of immigration in Europe has become of paramount importance in the last few years, especially and more severely in the Southern part of it. The phenomenon of mass migration that has characterized Europe since the beginning of 2015 is known as the European Migrant Crisis, and according to UNHCR it is the worst crisis of this type since after World War II. This huge displacement has been undoubtedly caused by political tensions and conflicts, wars and persecutions that have taken place in refugees’ home countries; actually, the definition of refugee provided by UNHCR is “Someone who has been forced to flee his or her country because of persecution, war, or

violence”<sup>1</sup>. The European Parliament instead provides the definition of refugees as “people with a well-founded fear of persecution for reasons of race, religion, nationality, politics or membership of a particular social group who have been accepted and recognised as such in their host country”<sup>2</sup>. An asylum seeker is instead defined as a person who applies for asylum in a country different from the one he comes from for fear of having his life at risk in the domestic country. Looking at European Parliament figures, in 2015 (so in correspondence of the European Migration Crisis) there was a peak in the number of applications for asylum at 1.26 million, of which 593,000 were accepted and actually issued. The issue of acceptance of refugees in the European Union is governed by the Dublin Regulation: In its last version, entered into force in July 2013, the criteria for deciding which Member State should follow admission procedures of asylum seekers and refugees are outlined, basically posing a large burden of the task on border countries like Italy and Greece. In subsequent years up to the present, a reform of this type of regulation has been proposed, according to which the responsibility for immigration procedures should be shared among Member States so that to avoid that some countries have a disproportionate number of asylum applications to handle with respect to its size and wealth, mainly through a system of quotas. Speaking of European Migrant Crisis, it is impossible not to mention the tragedy that in these years has been going on in the Mediterranean Sea. The figures reported by the European Parliament are impressive: in 2015 3,771 people lost their lives in the attempt of crossing the Mediterranean, while this number increased to 5,022 in 2016. The trend does not slow down even in 2017, as in its first half approximately 2,257 people died on the boats sunk while trying to get to Lampedusa. Among the huge list of tragedies that have occurred in these last years, it is worth mentioning the shipwreck of Lampedusa on the 3<sup>rd</sup> October 2013: more than 360 people died and only 155 migrants were saved, all carried on a single boat that had sailed from Libya two days before. After this event, several operations have been undertaken in order to deal with this unsustainable problem, first “Operation Mare Nostrum”, a rescue operation started right after the shipwreck and led by the Italian Navy, and then “Operation Triton” led instead by Frontex, the European Border and Coast Guard Agency, which was aimed at ensuring border security.

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<sup>1</sup> What is a Refugee? Definition and Meaning | USA for UNHCR. (n.d.). Retrieved April 17, 2018, from <https://www.unrefugees.org/refugee-facts/what-is-a-refugee/>

<sup>2</sup> EU migrant crisis: Facts and figures. (n.d.). Retrieved April 17, 2018, from <http://www.europarl.europa.eu/news/en/headlines/society/20170629STO78630/eu-migrant-crisis-facts-and-figures>



## **Skill composition**

The way in which immigrants take part and have an influence on the domestic labour market depends on several factors, among which the one that deserves major attention is the skill composition of the migrating population. It is convenient indeed, to consider the fact that different skill groups in the domestic population may respond differently to any external shock. More specifically, what must be observed is by how much the proportion of skilled and unskilled workers changes between natives and immigrants (Altonji Card 1991). According to several papers based on the UK labour market (Dustmann, Glitz, Frattini 2008; Dustmann, Fabbri, Preston, Wadsworth 2003), the presence of migrants, by changing the skill composition of the labour force, causes a labour supply shock, thus inducing changes in wages. These changes differ in magnitude and direction among skill groups, and what is generally observed is that less skilled groups end up experiencing a decrease in their wages, while for high skilled workers, the presence of migrants tends to drive those wages up. However, if the skill composition (i.e. the proportion of low skilled and high skilled workers relative to the entire population) does not differ between the native and the migrating population, no distortive effect should take place on domestic workers' wages. This in fact would only imply an increase in the scale of production., therefore representing a potential benefit for the economy. However, as we learn from data, the majority of immigrants tend to compete mostly for low-skill jobs, therefore increasing the supply of that specific category of workers. The effect of this increase in the supply of unskilled workers may vary at different points of the native wage distribution; in other words, the direction of the change in native wages is different between skilled and unskilled workers.

## **Complementarity and substitutability**

Borrowing from the Migration Observatory briefing by the University of Oxford “The Labour Market effects of immigration”, we may point out one major aspect of the interaction between natives and foreign-born people in the labour market, namely the issue of substitutability and complementarity of skills. As we learn from microeconomic theory, when the price of a good goes down, the demand for the substitute good decreases. This is what happens with unskilled natives and immigrant workers: if the latter are willing to accept lower wages than the former, then competition will drive wages down. This effect is more intense as the degree of substitutability increases.<sup>3</sup>

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<sup>3</sup> Specifically, the degree of substitutability is referred to as elasticity of substitution. A good whose demand changes largely after its price changes is said to be price elastic. In our case the “good” is labour and its “price” is the wage.

Conversely, if the skills of migrants are complement to the ones of natives, what happens is that productivity increases for everyone therefore causing an increase in the wage level. In their paper of 2008, Dustmann, Glitz and Frattini have developed a simple model to explain analytically what happens in different segments of the labour market as immigration occurs. The underlying assumption is that all migrants are unskilled workers. Though extreme, this premise is necessary to clearly observe the effect of a migratory flow.

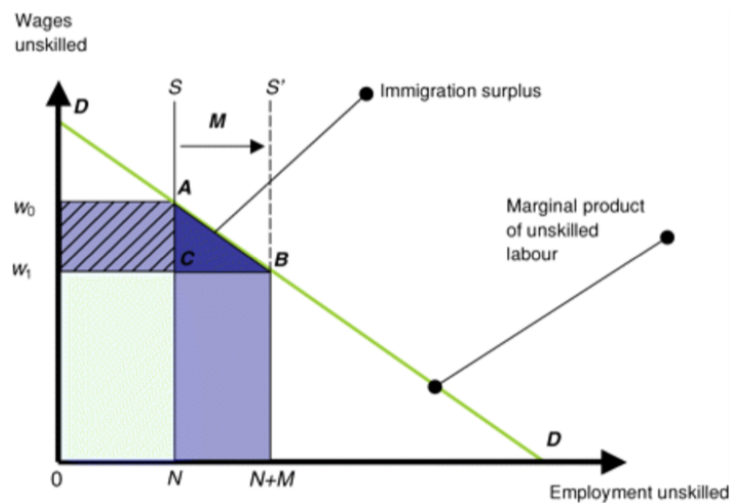


Figure 1; Source: *The labour market impact of immigration*  
*Oxf Rev Econ Policy*. 2008;24(3):477-494. doi:10.1093/oxrep/grn024  
*Oxf Rev Econ Policy* | © The Authors 2008. Published by Oxford University Press.

The model represented in the graph shows the change in the equilibrium level of wages of unskilled workers after the increase in the supply of workers of size  $M$  due to the inflow of migrants. It is possible to observe how, from  $w_0$ , that is the wage level of all the  $N$  workers before the migration, the new equilibrium wage for unskilled workers decreases to  $w_1$ . Due to the fact that the supply of unskilled workers is perfectly inelastic and that the number of skilled workers remains constant, the migratory flow creates an excess supply of unskilled workers, that is cleared by a fall in the wage level. However, this is not the only consequence of migration: as it is possible to observe in the graph, part of the output previously produced by unskilled workers has now fallen on skilled workers, who therefore gain from this change<sup>4</sup>. Moreover, the fact that also immigrants work at the new (lower) marginal product, creates a surplus (the triangle  $ABC$ ) that goes again to skilled workers. A similar analysis has been made by Borjas in his 1999 paper, in which he gave a different interpretation to the immigration surplus: he started from a simplified model in which income depends only on labour and capital; the excess supply of workers, by decreasing the wage level, drives income from labour to

<sup>4</sup> This part of output is represented by the rectangle  $w_0-A-C-w_1$ , that is the integral of the marginal product function.

capital. Thus, a redistribution of income takes place from people who work to the employers. Capitalist actually not only gain that part of income that in the pre-immigration period used to belong to worker, but also the net gain in income due to the presence of migrants (the immigration surplus) accrues to them. Borjas has also made a quantitative estimation of these facts using US data: by considering the wage differential, the share of labour national income, the size of migration and with an elasticity of factor price estimated around -0.3, he predicts a decrease in native labour earnings of 1.9% of GDP and an increase in capital gains for natives of 2.0%. The difference is a net 0.1% of GDP that corresponds to the immigration surplus described above.

In order to have a more realistic model that could better approximate what happens to the labour market equilibrium after the arrival of new immigrants, we should relax one important assumption that we have made in the previous model. In fact, one of the main reasons for which an excess supply of workers arises, is that the supply of unskilled workers is set to be perfectly inelastic; this means that all unskilled workers are always employed no matter what their wage level is. If we instead let some workers the possibility to choose not to work, the situation changes because a fraction of workers decides to stay voluntary unemployed. Thus, wages are no longer the only labour market indicator on which migrants have an impact, since also the employment rate is affected.<sup>5</sup>

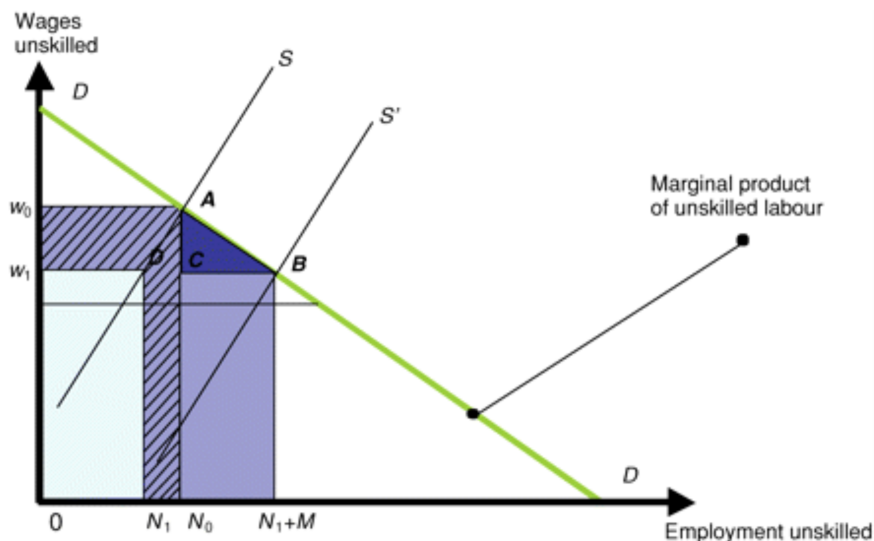


Figure 2; Source: *The labour market impact of immigration*  
*Oxf Rev Econ Policy*. 2008;24(3):477-494. doi:10.1093/oxrep/grn024  
*Oxf Rev Econ Policy* | © The Authors 2008. Published by Oxford University Press.

Analytically, we can observe in the model that unskilled labour supply is no longer vertical, but upward sloping. At the initial wage rate  $w_0$ ,  $N_0$  unskilled workers are employed. When the migratory flow comes in, the supply curve shifts rightwards, increasing the total number of workers. However, since the wage rate decreases to  $w_1$ , some workers decide to exit the labour market, namely the

<sup>5</sup> Since the model assumes full employment, that is no structural unemployment, this feature is not considered here.

fraction  $N_0-N_1$ . The share of output  $N_1-N_0-C-D$ , which previously was produced by native unskilled workers, now falls on immigrants, who have replaced the unskilled natives who have become voluntary unemployed; in addition, the immigration surplus (represented by the triangle ABC), which falls to skilled natives, is smaller than in the framework with inelastic supply. It is important to notice that the change in the wage level is now smaller; from this fact we can infer that the more an economy is flexible in terms of labour supply elasticity, the smaller will be the impact of migratory flows on wages; on the other hand, the adjustment that occurs in the elastic supply framework goes through the reduction in the employment rate for unskilled workers, which, of course, may not be desirable.

### Downgrading and upgrading

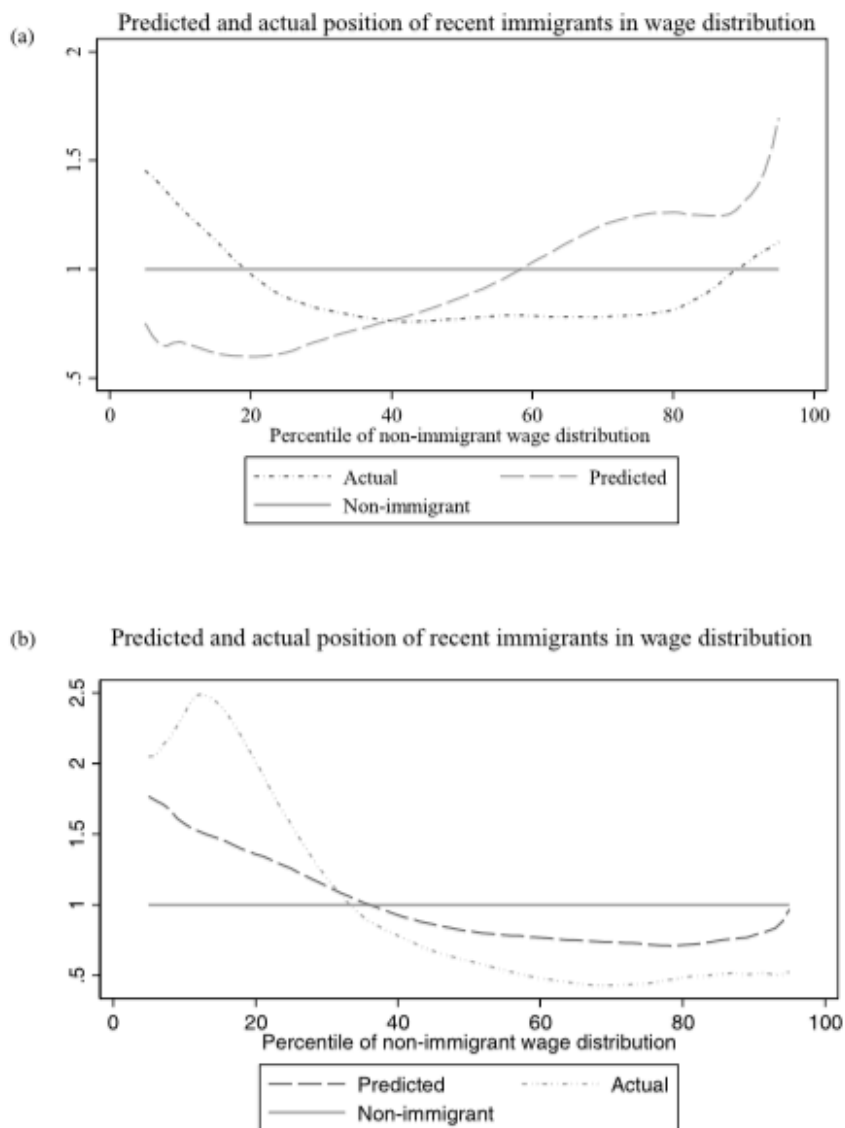


Figure 3: Recent immigrants, arrived in (a) the UK and (b) the United States within the last two years. Source: (a) LfS, 1997–2007, (b) CPS, 1997–2007

Further explanation to differentiated effects of immigration on different classes of workers may be found by analysing the imperfect transferability of human capital (Dell’Arringa, Lucifora, Pagani 2012): although an immigrant may have either previous education or work experience, he would find it more difficult to employ his own resources in the host country, therefore implying a *downgrade* in his job position. Evidence of this issue may be found in the study conducted by Dustmann and Preston in 2012: by using data from the English LFS (Labour Force Survey) and the CPS (Current Population Survey) for the US between 1994 and 2004, they found that along the wage distribution in both countries, immigrants are positioned differently from where they were predicted to be if their returns from education were the same as the ones of natives. In particular, the higher the percentile of the wage distribution, the larger is the gap between actual and predicted earnings.

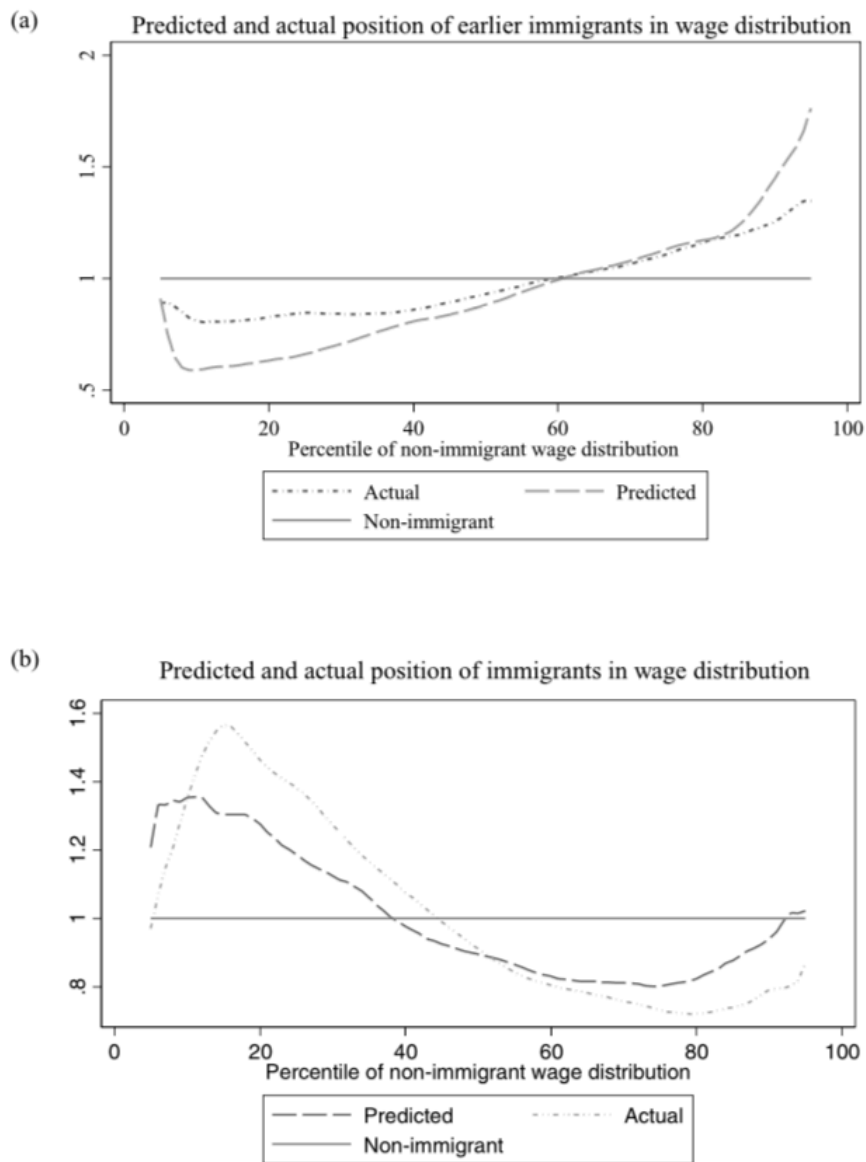


Figure 4: Earlier immigrants, in (a) the UK and (b) the United States for more than 10 years. Source: (a) LfS, 1997–2007, (b) CPS, 1997–2007

However, this gap shrinks a lot by considering only earlier immigrants, namely the ones who have lived in the two host countries for more than 10 years. This implies that what is really taking place is an *upgrading* of immigrants' position during years. The reason of this phenomenon, according to Dustmann and Preston, may be found in the integration between immigrants' existing skills and complementary skills learnt in the host country. The reason of the initial downgrading, instead, may be related to discrimination or to the slow integration in the host country Labour Market, possibly due to either the lack of knowledge of the host country language or to the entry level job positions that could be unsuited to immigrants' skills. Further evidence of this phenomenon has been found in a similar study conducted by Dustmann, Frattini and Preston in 2013 in UK: it has been estimated that while immigration has a depressing effect on wages below the 20<sup>th</sup> percentile, it instead boosts wages above the 40<sup>th</sup> percentile. The methodological difference with respect to the previous analysis lies in the way of allocating immigrants to skill groups: instead of placing an immigrant in a particular skill group according to the observed features, the allocation occurs according to the position that migrants have in the native wage distribution: it turns out in fact that even if some immigrants have higher degree of education than the average, their position in the wage distribution is below the predicted one according to their skills. This explains the decreasing effect on wages at the lowest end of the wage distribution showed above.

### **Factor price insensitivity**

As we have seen before, one major determinant of the effects of immigration on wages is the differences in the skill composition of the migrating population and the native one. However, this is not sufficient to obtain a clear and complete analysis of the phenomenon. Actually, the importance of any change in wages, both in the short and in the long run, depends on the degree of substitutability of inputs and on the flexibility to change of the output mix of the receiving country. Nevertheless, the openness of a country to international trade is crucial for the adjustment of output as a response to the immigration shock. In the literature, several different approaches have been followed about this issue: in cases in which it was assumed limited flexibility and scarce openness to trade, the long run effects of immigration have appeared to be persistent both at an employment and wage level. Conversely, when countries were assumed to be open to international trade and with higher flexibility in the output mix, the long run effects of migratory flows appeared to be smoothed, especially with small size migration. This issue has been analysed by Leamer and Levinsohn in their 2005 paper and was named "Factor price insensitivity" (FPI). The *Factor price insensitivity theorem* states that "Within a country, factor prices are altogether insensitive to changes in factor supplies, holding

product prices fixed”. For the purposes of our analysis of immigration, this implies that a country responds to an increase in the supply of workers due to the migratory flows by modifying the output mix accordingly through international trade; although in the short run it may be difficult to make such structural changes, in the long run firms are able to adjust their production, bringing wages to their initial level. What actually happens is that initially firms choose to exploit the depressing effect that immigration has on wages by employing more labour-intensive production factors; the consequent increase in profits attracts new firms to join the industry or induces other firms to move towards a more unskilled labour-intensive production mix. This causes an increase in the demand for unskilled labour that drives wages up, therefore compensating the initial reduction. Leamer and Levinshon themselves define this process as “factor price adjustment” (FPA). This is nothing different from the application of the Rybczynski theorem in the Heckscher-Olin model framework: as the supply of a factor increases, the quantity of the good whose production is relatively more intensive in that factor increases more than proportionally, while keeping factor prices fixed. Putting it in our immigration context this implies that the more open a country is to international trade, the higher will be the capacity to modify the output mix in order to offset the supply shock in the unskilled labour factor.<sup>6</sup> In addition to this, according to Dustmann, Glitz and Frattini’s 2008 paper, a similar way to absorb a migrant inflow goes through the change not only in output mix, but also in the kind of technology used for production. Capital owners indeed do not take technology exogenously, but rather choose it in an endogenous way in order to adapt to the pool of inputs available in the factor market. In order to respond to an increase in the proportion of unskilled labour due to the migratory flow, producers will choose that kind of technology that employs unskilled labour relatively more intensively. As a remark, it is inevitable that all this process will have an effect, in the short run in particular, on the income distribution of a country: the initial decrease in unskilled wages undoubtedly causes an increase in the level of inequality of a country, especially if other factor prices as the rental rate increase. The backlash consequent to the change in relative prices that, as we have seen, leads to the conclusion of a long run insensitivity of factor prices, may thus be seen as a determinant of lower inequality in the longer run.

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<sup>6</sup> Evidence of this phenomenon has been found by Hanson and Slaughter (1999) analyzing the issue with US regional data in the period 1980-1990. They actually found supporting evidence to Factor Price Equalization (FPE) across American states.

## **Methodologies and approaches**

Most of the literature about the impact of immigration on a country's labour market, although relying on the underlying theoretical dynamics presented above, usually provides an econometric model to support theory with empirical evidence. Many of these models involved the studies of regional differences in the fraction of migrants and the labour market outcomes such as employment rates and wage level of that specific region or area. Of course, these elements are not exclusively influenced by the presence of migrants, so a regression analysis must include a set of controls in order to control for regional-specific determinants of labour market indicators. Moreover, in order to overcome potential omitted variable bias problems, one of the most commonly used techniques is the First-difference approach: by taking the difference between two periods we rule out any bias that arises from any determinant of labour market outcomes that is constant over time in a particular territory. Doing this way, we do not consider the stock level of immigrant share in native population or the level of labour market indicators, but we look at the changes that take place in these variables in the periods we take into consideration. A similar and equivalent approach consists of using  $n-1$  dummy variables that take into account regional-specific effects; this approach is denominated "within groups estimation". But omitted variable bias is not the only threat to an appropriate econometric analysis: what may happen is that immigrants, when possible, try to choose to settle in the regions with better economic conditions, such as particularly high labour demand or areas that are experiencing high economic growth. This implies that causality may be reversed, so that immigrants are not the cause of good economic conditions of a particular region, but their presence would be a consequence of them. For this reason, their effect on the local labour market outcomes resulting from empirical analysis may turn out to be reduced with respect to the actual one. In order to circumvent this kind of problems, the preferable approach consists in using Instrumental Variables. This is done by regressing our variables of interest on other possible explanatory variables that are both correlated with our regressor and uncorrelated with the dependent variable of the regression, that is correlated with the fraction of newly arrived immigrants and uncorrelated with the labour market indicator that we consider in the model. One such instrument, as we can observe in Altonji and Card 1991, may be the fraction of migrants already present in a specific place. This factor may be considered to be uncorrelated with labour market indicators, but it could also be a good predictor of the change in proportion of immigrants in a specific area. As we argued in the introduction, the presence of already established migrant communities in a particular region may increase the



probability of other migrants to join them, mainly for networking reasons, in order to be more likely to find jobs in the host country. Therefore, by using instrumental variables we are able to “isolate” the effects of the arrival of new immigrants on the receiving country labour market from the threat of simultaneous causality that this possibility may cause. Instrumental variables are also useful to solve estimation problems different from endogeneity; as argued by Dustmann *et al.* (2003), one source of mismeasurement may be due to small sample size. This could lead to the detection of reduced or no effects, in the sense that the estimated coefficients are lower, in absolute value, than the true ones. This bias towards zero is called “attenuation bias”. The larger the sample size, the weaker will be the threat of this problem.

### **Altonji and Card 1991**

Here we analyse the model used by Altonji and Card in their 1991 paper, looking at how the regression model was conceived and how they dealt with omitted variable bias and endogeneity issues. The estimated equation is the following:

$$\hat{Y}_{Nj} = X_{Nj}b + f_jc + e_{Nj}$$

The regressor we are interested in is  $f_j$ , that represents the fraction of newly arrived immigrants in the city  $j$ . The dependent variable  $\hat{Y}_{Nj}$  is the labour market indicator that is taken into consideration, while  $X_{Nj}$  is a vector of controls for several factors that may have an influence on  $\hat{Y}_{Nj}$ , like race, gender etc. The term  $e_{Nj}$  is the error term. By considering the changes in these variables between two periods (using the First-difference technique) we eliminate any sources of bias coming from variables that stay constant over time. The instrumental variable used here to smooth the effects of potential endogeneity due to simultaneous causality is, as anticipated, the fraction of immigrants already present in a specific area. The findings of this analysis are not so consistent: considering only the cross-sectional analysis, what has been found is that an increase of ten percentage points in the share of immigrants in a specific area has a negative effect on the employment and participation rates of about -2%, but on the other hand the effect on weekly earnings is positive (around +5%). Almost the opposite occurs if we consider the First-differenced coefficients, as the effect on employment and participation rates is positive while there is a negative (but not significant) effect on wages. Finally, the Instrumental variables coefficient are still more vague: while we observe a 1% decrease in the participation rate, the effect on the employment rate is significantly positive (around +0.9%). The coefficient on weekly earnings is instead negative and bigger in absolute value with respect to the

first-differenced one, consistently with the predicted upward bias in the latter due to endogenous causality.

### **Dustmann Fabbri Preston Wadsworth 2003**

A similar analysis has been conducted in 2003 by Dustmann, Fabbri, Preston and Wadsworth; they used micro data from UK Labour Force Survey (LFS), adopting a similar approach to the one of Altonji and Card, especially regarding instrumental variables, in order to circumvent the potential threats described above. They run a series of regressions, each time regressing a specific labour market outcome on the proportion of immigrants in the native population; what changes in each regression is the way in which workers are each time classified, in order to observe the different effects among demographic and skills groups. Here we focus on their findings on unemployment, paying particular attention to the differential impact that the proportion of immigrants has among different skill groups. The equation is estimated as follows:

$$U_{it} = \beta_0 + \beta_1 \pi_{it} + \beta_2 \ln \mathbf{n}_{it} + \beta_3 \mathbf{a}_{it} + \lambda_t^U + \mu_i^U + u_{it}^U$$

The unemployment rate  $U$  is regressed against the fraction of immigrants  $\pi$ , a vector of skill groups of the native population  $\mathbf{n}$ , the age vector  $\mathbf{a}$  and the controls for specific variation in year  $t$  and in region  $i$ ; the last term is the residual. Starting from a general framework, the most accurate analysis<sup>7</sup> on the general unemployment rate yields a positive (but not significant) result. Across age categories, the effects appear to be not significant as well. However, looking at skill groups specifications, we have some significant evidence: the authors have divided native population in three skill groups, skilled, unskilled and semiskilled. For the former two categories the coefficients are not significant, while instead by looking at the coefficient of the semi-skilled group, we observe a positive and significant coefficient of 0.39<sup>8</sup>. This means that a one percent increase in the immigrant share in the population increases on average the domestic unemployment rate by 0.39 percentage points. Of course, the estimation is still subject to endogeneity and simultaneity issues.

### **Borjas 2003**

The approach followed by Altonji of using geographical clusters to control for differences in labour market outcomes due to region-specific factors may be subject to several weaknesses. Apart from the self-selection of the areas in which migrants decide to move, an equally important source of

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<sup>7</sup> In this regression instrumental variables are used, namely the share of immigrants already there in the native population

<sup>8</sup> The  $t$  value is 2.219

potential bias for a good econometric analysis is the way in which native workers decide to respond to inflows of migrants in the area they work in. As argued by Borjas (2003), after an inflow of migrants and therefore after an increase in the local labour force, in order to respond to the depressing effects that this has on wages, both native workers and native capital owners could decide to transfer their production factors (namely, labour and capital) to other cities. This in-migration would consequently have the effect of offsetting the initial change in labour market outcomes, thus smoothing the impact of migrants in a specific area. This implies that the effects of immigration are felt not only in the region in which migrants arrive, but also across the areas towards which natives decide to move. That is the reason why even controlling for region-specific determinants of labour market outcomes might not be useful for detecting the true effect of an inflow of immigrants. As a counterargument, Borjas suggests a different way of clustering the sample population of the analysis: rather than considering the “spatial correlation” between the fraction of immigrants and the labour market outcomes of a specific area, he decides to classify immigrants by skill groups. In the literature, the main discriminant of different skill groups has usually been educational attainment. However, according to Borjas, the differences among immigrants in the level of education are too little to obtain a clear picture of the effects that the supply shock occurring in a particular native skill group has. Therefore, in order for the skill differences of immigrants to be more discernible, an additional factor that contributes to a person’s ability has to be considered, namely work experience. This feature is calculated as the number of years worked. In particular, Borjas first defines four educational groups (high school dropouts, high school graduates, college and college graduates); then, in order to combine educational attainment and work experience, he calculates the difference between a person’s age and the labour market entry age for the particular educational group of the individual (17,19,21,23 years respectively). On the other hand, also this method is not drawback-free: one important criticism, pointed out by Borjas himself, is that this method does not detect work experience from a “qualitative” point of view: moreover, it does not distinguish between work experience gained in the domestic country (the United States in Borjas’ paper) and acquired abroad, that is in the immigrant’s home country. Given these premises, using data from the PUMS (Public Use Microdata Samples) and from the Current Population Survey (CPS) for years from 1960 to 2001, Borjas estimated the following model:

$$y_{ijt} = \theta p_{ijt} + s_i + x_j + \pi_t + (s_i \times x_j) + (s_i \times \pi_t) + (x_j \times \pi_t) + \varphi_{ijt}$$

The indexes  $i, j$  and  $t$  represent respectively the educational group, the level of experience (computed as explained above) and the time (year) in which the observation has been drawn. The dependent variable  $y$  is the average value of different labour market outcomes in the “cell”  $ijt$ , namely the logarithm of annual earnings, weekly earnings and the fraction of weeks worked. The controls

instead consist of: a vector controlling for fixed effects due to the educational level ( $s_i$ ), a second vector that controls for effects due to an individual's work experience ( $x_j$ ) and a time fixed effects vector ( $\pi_t$ ). In addition to these, three interaction terms have been added: the last two ( $s_i \times x_j$  and  $x_j \times \pi_t$ ) control for the possibility that the effects of respectively schooling and work experience have been altered over time, while the term  $s_i \times x_j$  controls for the different effect that work experience has among people with different educational attainment. By using this model, Borjas obtained results that generally confirmed the initial expectations: by computing the elasticity of wages with respect to the change in the supply of labour, Borjas obtained that a 10% increase in the quantity of immigrant workers reduces weekly wages by 4 percent. By looking at annual earnings, the effect is even stronger, as the percentage reduction in annual earnings after a 10% supply shock amounts to 6.4 percentage points, while the fraction of time worked reduces by 3.7 percentage points.

### **Dustmann Frattini Preston 2013**

A slightly different approach entailing a focus on skills has been followed by Dustmann, Frattini and Preston in their 2013 paper, aimed at analysing the effect of immigration along the distribution of wages. The dataset they use is drawn from the Labour Force Survey, covering eight years (1997-2005) and 17 regions of UK. Their empirical model regresses the change in wages on changes in the share of immigrants relative to the native population. It includes time and age dummies as usual, and in addition it includes a variable describing the proportion of high to low educated natives in a particular region, useful to control for variations over time of the native skill group. Spatial correlation is actually the approach used here, and as we have seen in Altonji and Card 1991, the historical settlement of immigrants in a specific region is used as an instrument to try to overcome the problem of endogeneity and of internal movements that could potentially offset the actual effect. The empirical equation is:

$$\Delta \ln W_{prt} = \beta_t + \Delta X_{prt} + \gamma_p \Delta m_{rt} + \Delta \varepsilon_{prt}$$

Coherently with what was stated in section I.4, in this analysis immigrants are not assigned *a priori* to any particular skill group. The results of the immigration effect on wages has been computed in a differentiated way for different ranks of the wage distribution: generally speaking, the results somewhat confirm the theoretical predictions made above, namely that people at the bottom of the wage distribution experience falling wages after a migration inflow, while for workers earning a wage close to or higher than the median one, the migration effect is positive (and significant as well). In particular, looking at the IV estimates we can infer that at the 10<sup>th</sup> percentile a 1% immigrant share increase in the native population results in a 0.5% decrease in wages; conversely, at the 90<sup>th</sup> percentile

the impact on wages is positive and corresponds to a 0.4% increase. At the 50<sup>th</sup> percentile (median wage) the effect is positive and even bigger than at the 90<sup>th</sup>, as it amounts to an increase of 0.66%. From these figures it is clear that, as predicted in the theoretical model, those who actually suffer from immigrants' competition in the labour market are those workers who represent the weakest part of the labour force. In the discussed paper, Dustmann Frattini and Preston also provided a graph from which it is possible to observe the trend of the coefficient at each percentile of the wage distribution:

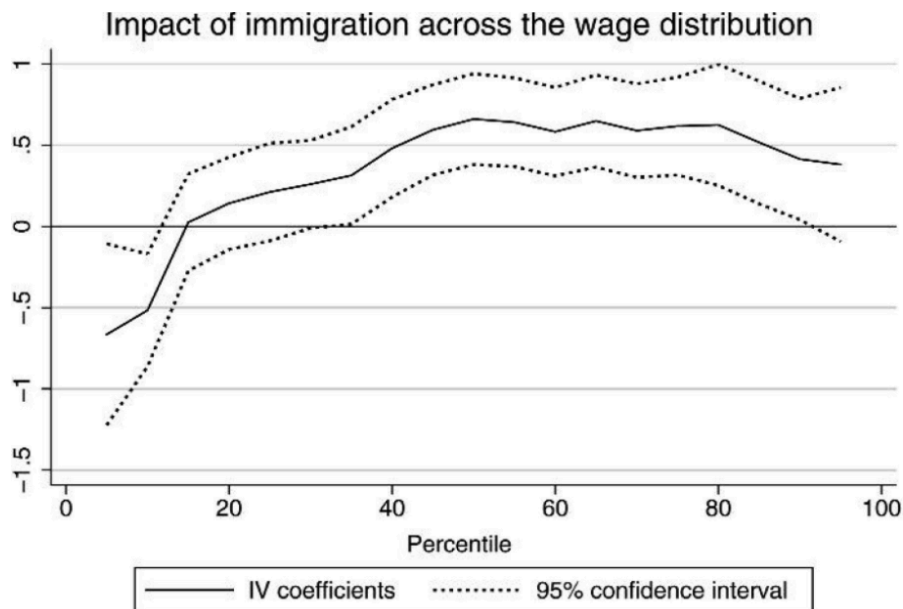


Figure 5; Source: Dustmann, Christian, Tommaso Frattini, and Ian P. Preston. "The effect of immigration along the distribution of wages." *Review of Economic Studies* 80.1 (2012): 145-173.

As we can see, the continuous line represents the estimated IV coefficient, while the dotted lines are the boundaries of the 95% confidence interval for the coefficient. As the coefficient trend line always lies within the dotted corridor, the coefficient is always significant along the whole wage distribution.

### Smith 2012: a more specific analysis

In the papers just analysed, and in most of the existing literature about the central topic discussed in this dissertation, emphasis has been put on what happens, on average, in the section of the labour force composed mainly by adults. But since we are interested not only on average effects of immigration, but also (possibly even more) on those who are in the weakest segment of the labour force, it is necessary to discuss empirical results going in this direction. In particular, one area of focus may be represented by the youth labour market, so in the analysis of how much more younger

workers suffer from immigrants' competition in the domestic labour market with respect to adults. For this reason, the 2012 paper by Christopher L. Smith, is extremely relevant to us, as it embraces this differential impact of immigration, taking into consideration as a starting base the idea that younger workers are more subject to competition in low-skilled jobs<sup>9</sup>. Smith uses data from the US decennial census from 1980 to 2000, and the ACS (American Community Survey) of 2007, in order to avoid biases coming from the Great Recession. He regresses two labour market outcomes, the fraction of people employed, and the average annual hours worked, against the change in the number of immigrants in a specific area; through the interaction with an age dummy, Smith manages to disentangle the differential effect of immigration on two age classes, teens (16-17) and adults (22-64), thus obtaining two different coefficients. Moreover, the estimation we will look at is a 2SLS (Two Stage Least Square) regression which, similarly to what we saw in Altonji and Card 1991, has an instrument related to the ethnic composition aimed at avoiding endogeneity issues. The results of this analysis are much in line with what we expected: the elasticity of substitution is always larger for young workers than for adults; in particular, a 10% increase in the number of immigrants reduces the number of teens employed by 3%, and the average number of hours worked by 4%; on the other hand, these two figures for adults are both 1%, so respectively one third and one fourth of the ones for teens. This means that adults are less likely to be affected in their employment patterns by immigration inflows with respect to young workers. In addition to the standard estimation, in order to ensure that the two coefficients for the two age groups are actually different, Smith runs an F-test whose resulting p-value is 0, which allows us to reject the hypothesis that the coefficients are equal. Since the idea of this analysis is observe not only the aggregate average impact of immigration on the labour market but also to see whether the weakest sectors of the society are more affected by it, it is worth mentioning additional findings of the Smith's paper regarding the distinct effects on male and female workers. The coefficients suggest not only that female employment is always subject to a higher elasticity of substitution with respect to males, as all the coefficient are higher in absolute value than the ones for males, but also that the gap between youngsters and adults is relevantly bigger. In particular, while the gap in the fraction of people employed coefficient between young and adult males is 1.8 p.p., for the female population it enlarges to 2.7 p.p. In a similar fashion, in the coefficient for the average annual hours worked the gap differential between female and males' coefficients amounts to 2.2 percentage points.

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<sup>9</sup> Competition resulting from the combination of a higher wage elasticity with respect to adults and a higher elasticity of substitution given by the fact that unskilled immigrants and young workers tend to do the same jobs.

## Data and data sources

For the purposes of our analysis we will use two types of data from different sources: we draw information about immigrants' flows (which we prefer to stock of foreign born people) from the ISTAT database, for a period covering a ten-year time span, from 2007 to 2017. For this information, we consider aggregate data at regional level, using therefore the "spatial correlation" approach discussed before. It is worth noticing that the years for which we have this kind of figure coincide with the ones in which Italy has experienced the Migrant Crisis, discussed in the first section. The second source of information is the Labour Force Survey (LFS) carried out by Eurostat. From this database we collect information under the form of micro data, collected annually for years from 2007 up to 2010. The survey is conducted on the resident population on a sample of 1'258'394 observations, for each of which we have specifications about age, gender, educational level and labour status. From the merge of these two data sources, we obtain a larger database that contains information regarding both immigration dynamics for each Italian region at aggregate level and individual characteristics of each single person included in the sample of the LFS. This quite large availability of information allows us to classify the sample according to their characteristics, in order to provide a clearer and more profound analysis; therefore, we create three classes for age, defining as "young workers" those ones with age from 15 to 29; then from 30 to 49 years old we have "middle-aged workers" and finally the older ones from 50 to 64. As well as for age, we defined three classes also for educational level, in order to assess the skills of individuals; for simplicity, the sample has been divided "low skilled", "medium skilled" and "high skilled" workers, similarly to what has been done in Dustman *et al.* 2003. In this way it is possible to achieve the objective stated at the beginning, that is disentangling the effect of immigration on those sectors of the labour force that are thought to be the weakest ones, that is women, youngsters and unskilled workers. As regards the indicators that we will use to assess the labour market impact of immigration, we are going to focus mainly on employment, participation to the labour force, and the nature of one individual's job, whether it is temporary or not. Since the micro observations of the Labour Force Survey have specific binary variables that indicate whether the individual is employed, inactive or on a temporary occupation, we will be able to estimate the impact of immigration as the average change in the probability of being employed, inactive or a precarious worker for an individual as the percentage of incoming migrants increases.

## Data description

### Aggregate data

Before directly addressing the issue of the immigration impact on the Italian labour market, it is first convenient to have an idea of how it looked like in the years of the survey, providing some descriptive statistics on its pattern of change and the differences from a geographical point of view. This will be done by using aggregate data taken from the ISTAT database, so to have a clearer picture of the macroeconomic outlook of Italy in the years the survey has been conducted.

Here we present a comparison between two reference years, 2012 and 2017, regarding the distribution of migrants in different regions of Italy and differences in unemployment rate. The first thing that it is worth considering, is that overall, both in terms of immigrants' distribution and labour market outcomes, there is a striking lack of homogeneity in the peninsula. In general, we observe that in the centre-north of Italy there is a much higher concentration of foreign-born people than in the south, in particular in Emilia Romagna, Lombardy and Veneto.

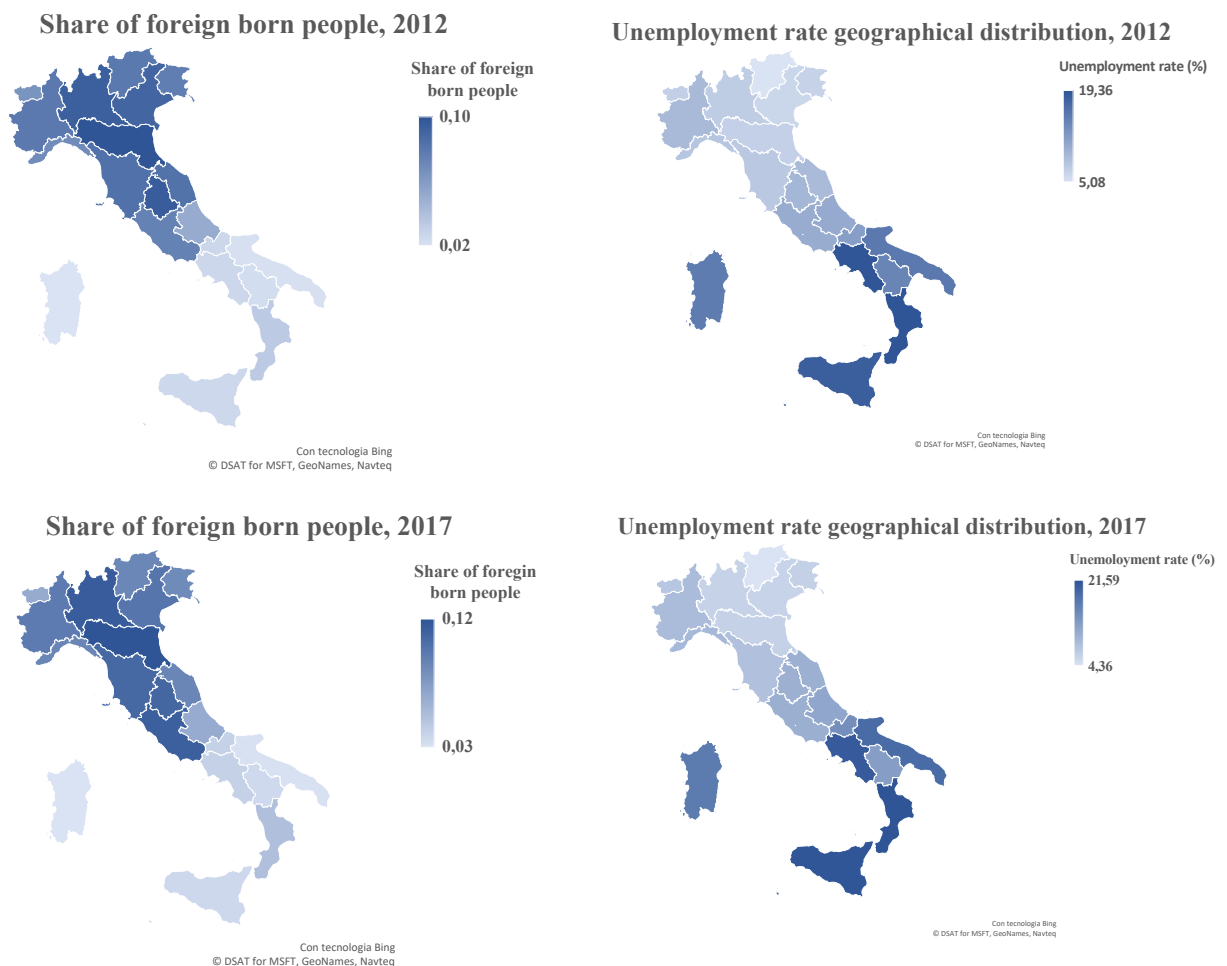


Figure 6; Source: own elaboration on data taken from ISTAT



Conversely, the unemployment rate increases as we move southwards, reaching peaks around 20% in regions like Sicily, Calabria and Campania. The pictures of 2012 and 2017 do not differ that much, neither in the geographical distribution of the two variables we are considering nor in their boundary levels. In order to better appreciate how labour market conditions changed in Italy we may look at the following graph, in which we have the clear picture of the spread between the north and the south: not only at the starting point of the series the south was in a much worse condition than the rest of Italy, but after 2011 the gap started increasing, going from about 7 to more than 12 percentage points of difference between the south and the average of northern areas.

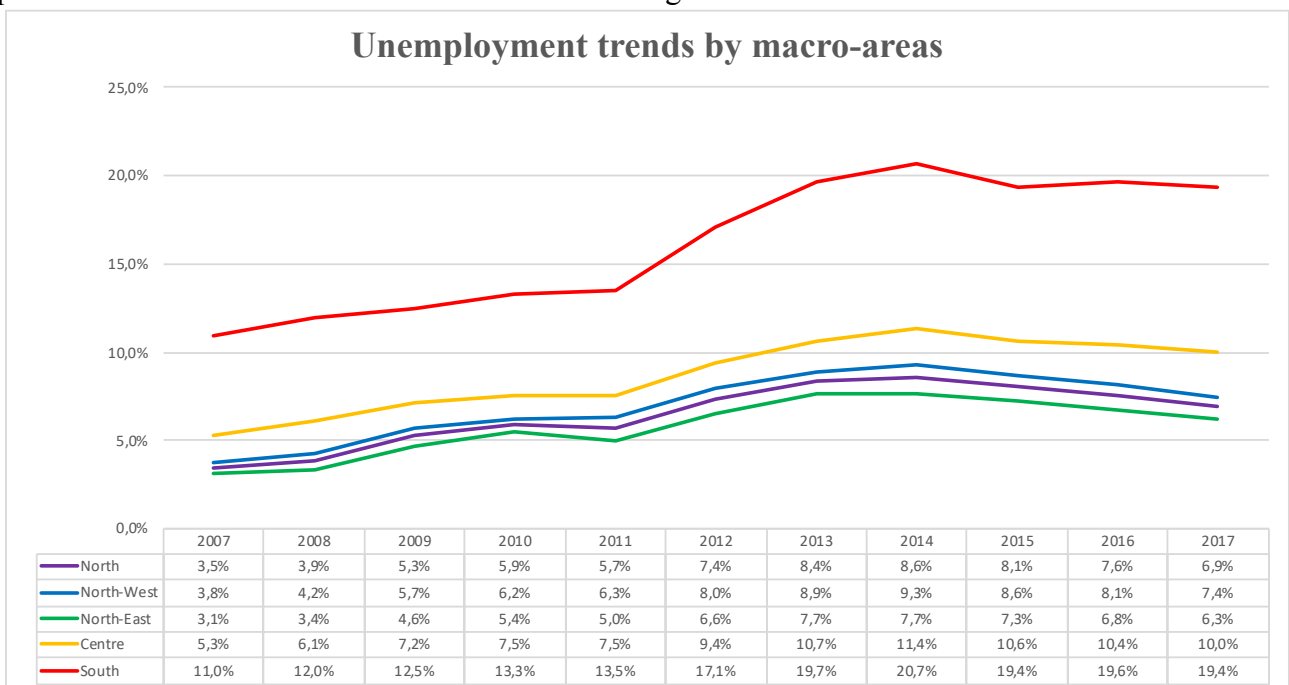


Figure 7; Source: own elaboration on data taken from ISTAT

By looking at these figures, it seems to be evident that the correlation between unemployment rate and immigrants' shares turns out to be negative. This would go exactly in the opposite direction of what we should expect, given the theory explained in the first section and the results that the literature has provided. However, several aspects other than the single figures must be considered. First of all, the Istat database comprehends only regular immigrants, so those ones who have actually registered and therefore are part of official statistics. So, the remaining part of the immigrant population remains uncounted, but still affecting labour market outcomes particularly of southern regions of Italy. This happens mainly because most migrants in the last few years came by the sea, landing after an extremely dangerous crossing of the Mediterranean in the harbours of Sicily, Calabria and Sardinia. It follows that many of them didn't undergo the standard admission procedures, becoming thus "irregular" by the law. It is estimated that in 2012 there were 35.872 irregular

immigrants in Italy, who became 491.000 on January 1<sup>st</sup> 2017, accounting for about a 1 percentage point of difference in the immigrants' total share on 2017 population (from about 8% to 9%)<sup>10</sup>.

A second, more technical aspect that deserves our attention refers to the potential endogeneity bias previously discussed: the charts are clear in showing that regions that are better off in terms of working conditions are the ones where immigrants make up a larger share of the total population, and the reason why this occurs is to be found in the settlement decision that immigrants make, as they decide to move towards areas in which is easier to find available jobs. As a support to this argument, the following graph provides a description of the distribution of wealth among Italian Regions. As we can notice, the northern part of Italy is characterized by higher GDP per Capita with respect to the south, so this may again be seen as a source of attraction of people in search of better living conditions as migrants are. This is the reason why regional GDP will be included as a control in our regression.



Figure 8; Source: own elaboration on data taken from ISTAT

Now that we have had a look to the general economic and labour market conditions, it is worth going a bit deeper on the characteristics of those sectors of the society that we are more interested in, that are female population, low skilled people and younger workers. In the graph below we show the trend of youth unemployment rate versus the general one (in percentage points): the picture that we obtain is extremely impressive: after the 2007-2008 financial crisis, the gap between the two rates (which was already of approximately 14 percentage points) becomes huge, reaching a peak in 2015

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<sup>10</sup> Data drawn from Fondazione ISMU (Iniziative e Studi sulla Multietnicità) database (<http://www.ismu.org/irregolari-e-sbarchi-presenze>).

of 30 percentage points. It is then clear that younger workers have suffered way more than average during the last recession.

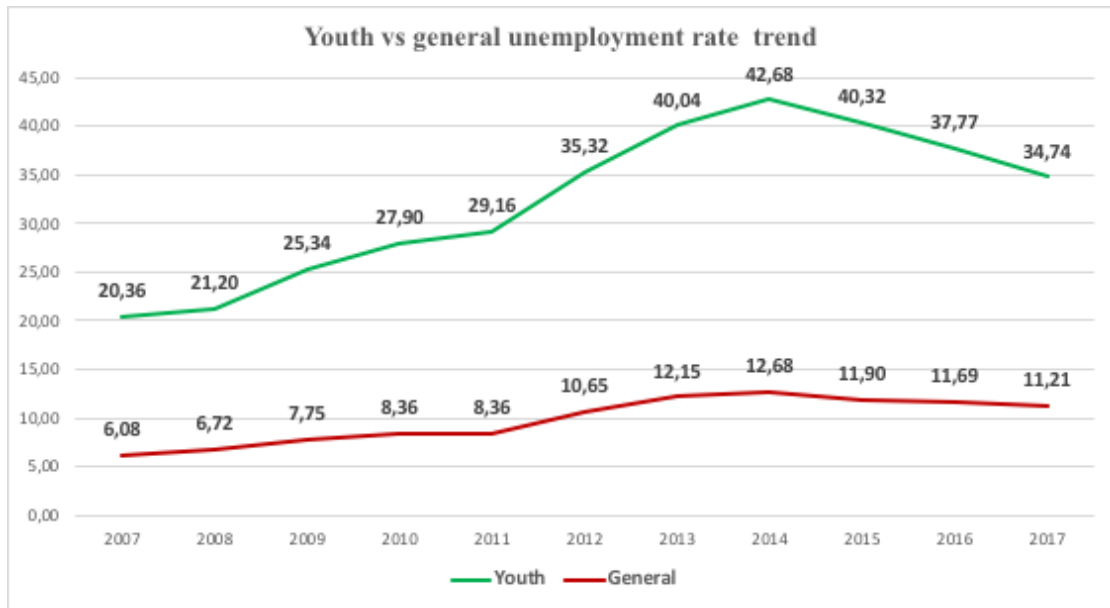


Figure 9; Source: own elaboration on data taken from ISTAT

Despite the decreasing trend that we observe, the youth unemployment rate remains at a worrying high level: we will actually investigate if the presence of immigration has given a significant contribution to this outcome, considering as an explanatory hypothesis the fact that youngsters, who are still not graduated or that are not studying, enter in the labour market sector of unskilled jobs, that is the one in which they may face tougher competition with immigrants.

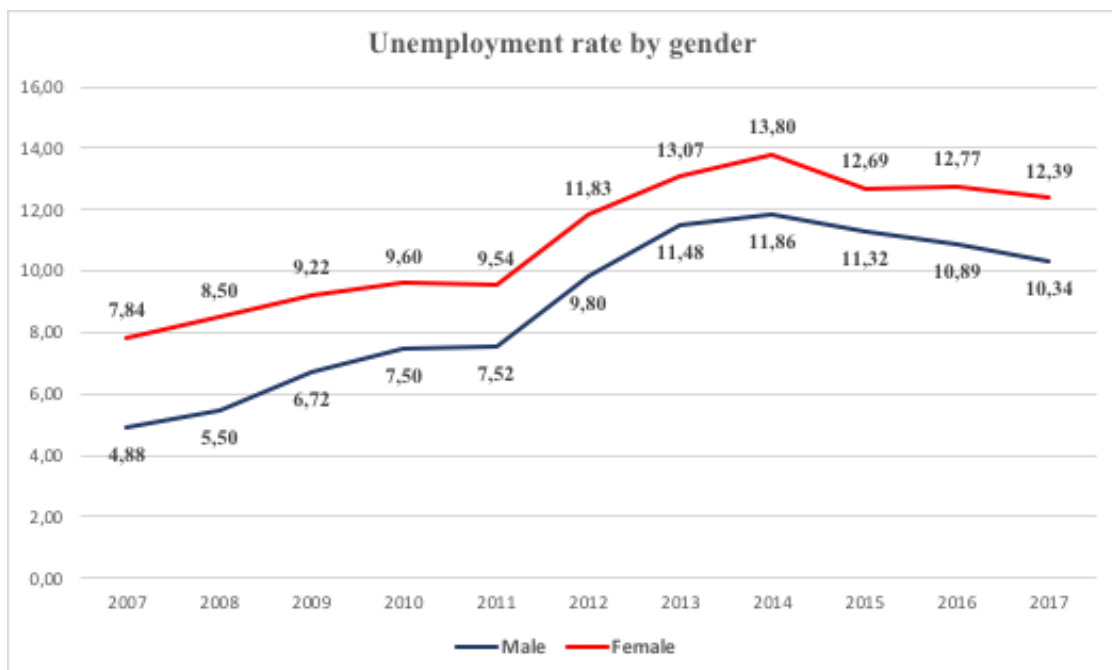


Figure 10; Source: own elaboration on data taken from ISTAT

A quite different picture is obtained when considering the gap between men and women: the gap between their respective unemployment rates not only stays always below 4 percentage points, but differently from before, it is possible to see a slight convergence in the two trends. What is constant in all the graphs we have provided is the prompt rise in the unemployment rate immediately after 2011, year in which Italy experienced the Sovereign Debt Crisis.

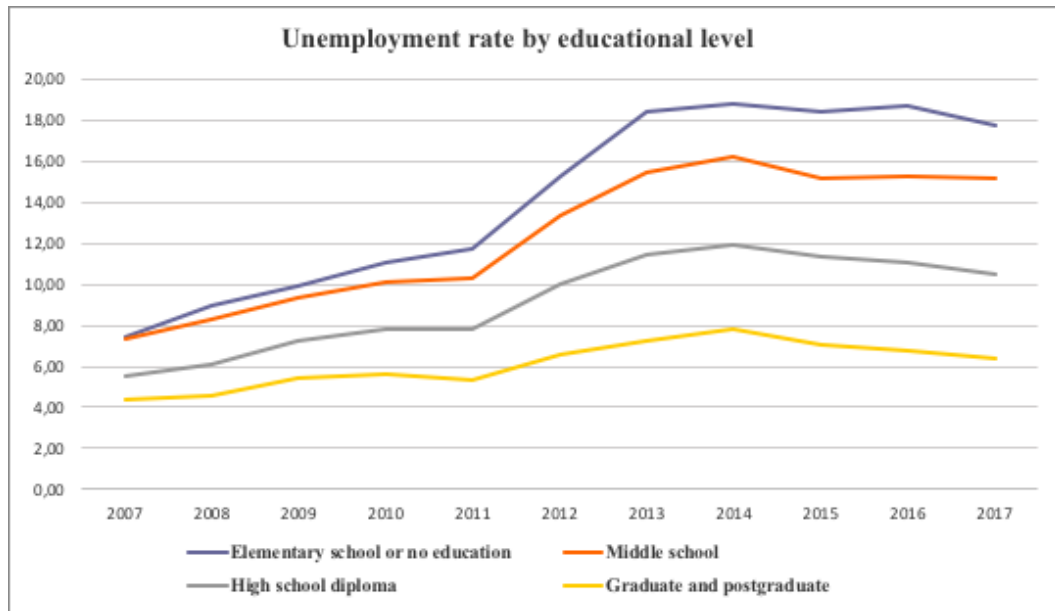


Figure 11; Source: own elaboration on data taken from ISTAT

Not differently from what we observe in these graphs, by looking at the trends that characterize unemployment rate dynamics for different levels of educational attainment, we observe a similar pattern; following the Istat definition of educational classes, we show four different lines that represent the change in the unemployment rate for people with a university degree, high school diploma, middle school license and with elementary school or no education at all. As anticipated, for all educational classes there is an increase in the unemployment rate from 2011 to 2014, after which we see a small improvement. As we can reasonably expect, the higher the educational level, the lower the unemployment rate that is observed. Moreover, the overall increase after 2011 is accompanied by an enlargement of the spread between the different classes, that entails an increase in the level of inequality.

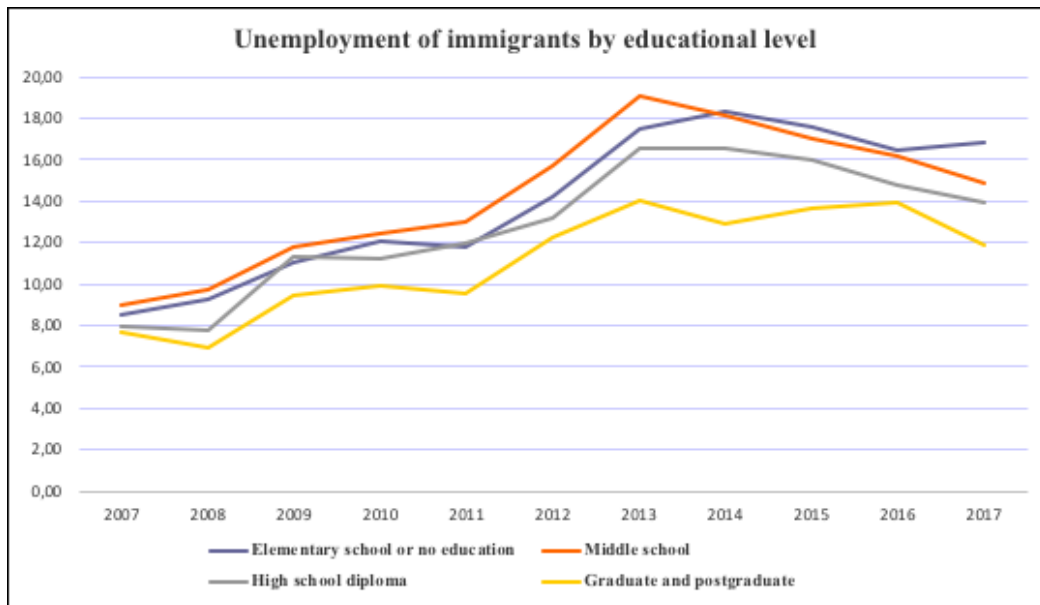


Figure 12; Source: own elaboration on data taken from ISTAT

This instead does not occur if we consider the unemployment trends only for immigrants: by the graph below we can infer that in correspondence of the general worsening of the unemployment rate after 2011, there is not any relevant divergence among different educational groups; moreover, it is quite impressive that for a considerable time span (until 2014 approximately) the unemployment rate of foreign born people with elementary school or with no education at all has been even lower than for people with middle school diploma. As we have just seen, the divergence between different educational groups entails changes in the degree of inequality in the society. It is interesting indeed to see how this feature is shaped in Italy, so that we have are able to make a parallelism between the different levels of income of Italian regions and the degree of inequality that characterizes them. In order to show this, the following graph presents a picture of how the Gini coefficient varies across Italian regions in 2015, that is the latest available year<sup>11</sup>.

<sup>11</sup> The Gini index is a coefficient based on the relation between the cumulative percentiles of the population and the corresponding cumulative income shares. It ranges between 0 and 1, where it indicates respectively perfect equality and complete inequality. Therefore, the higher it is, the more unequal the income distribution within a population group will be.



Figure 13; Source: own elaboration on data taken from ISTAT

The above picture is pretty clear in showing that the North-South gap in regional GDP per capita is accompanied by a net difference in the degree of inequality. In particular, regions with higher levels of per capita GDP show on average a lower degree of inequality, and they are concentrated in the northern part of the country, while regions like Sicily and Calabria are characterized by more inequality and lower GDP per capita.

Regarding instead the relation between inequality and immigration, the conclusions we may draw from this graph are not straightforward. Indeed, even though we are not presenting the relative picture, we are able to state that the distribution of immigrants' shares among Italian regions in 2015 does not differ in a significant way from the ones of 2012 and 2017 that are actually quite similar between them. Therefore, available data would suggest that regions with higher concentration of immigrants experience lower levels of inequality. However, if we recall what we discussed about complementarity and substitutability between immigrants and native population and the short-term dynamics regarding factor prices at industrial level, we can notice that the depressing effect that immigration has on unskilled wages, combined with the boosting one on salaries of skilled workers, entails a possible divergence in the two groups' incomes, and therefore an increase in the level of inequality. If these dynamics actually worked in this way, we should have found quite the opposite outcome from the one we got from the data. In order to provide an explanation to this mismatch, the main argument we may provide is the same we used in order to explain the puzzling picture regarding unemployment rate and immigrants' distribution, that is endogeneity. Again, it is not far from being reasonable that immigrants not only choose to settle in areas with a better economic status in terms of general wealth or more favourable labour market conditions, but also in regions in which the

distribution of income is more equal within the society, that is where people enjoy the same opportunities. On the other hand, it is more than a hypothesis the fact that although the difference in immigrants' share registered between the North and the South of Italy is significant, its impact is way smaller than the one of many other factors affecting the level of inequality as it is proxied by the Gini coefficient.

In conclusion to this section we may state that by a descriptive analysis of the Italian situation we find quite contrasting evidence not only with what we expected theoretically but also with the empirical evidence found by the scholars cited above. Therefore, we should foresee from that the evidence from our model will probably not fit the theoretical foundations described above; however it is anyway essential to address the issue in a more technical way, so that we are able to control for effects that are fixed in space and across years, in order to obtain clearer results also posing more attention on the possible differential effects that there may be on the three weaker sectors of the society presented above, that are female, young and unskilled workers.

### Microdata

Here we present briefly a description of the main features of the sample of the Eurostat Labour Force Survey: as we can see from *Table 1*, 44,23% of the observed individuals are men, while the majority of them are women (55,77%). Regarding education, the majority of the individuals belongs to the “low skilled” group, while around one tenth of them is a high skilled individual. Looking in detail at the gender distribution within each educational group, we observe that the overall proportion stays the same in both in the low and in the medium skilled subgroups. This distribution becomes instead disproportionate in the high skilled subgroup, in which women account for more than 60 percent.

Educational level	Gender		Total
	Male	Female	
<b>Low skilled</b>	295,805	363,129	658,934
	44,89	55,11	100
<b>Medium skilled</b>	210,401	259,407	469,808
	44,78	55,22	100
<b>High skilled</b>	50,272	79,256	129,528
	38,81	61,19	100
<b>Total</b>	556,478	701,792	1,258,270
	44,23	55,77	100

*Table 1: gender and educational composition of the sample*

Educational level	lab_unempl		Total
	0	1	
<b>Low skilled</b>	624,405	34,529	658,934
	94,76	5,24	100
<b>Medium skilled</b>	439,151	30,657	469,808
	93,47	6,53	100
<b>High skilled</b>	121,366	8,162	129,528
	93,7	6,3	100
<b>Total</b>	1,184,922	73,348	1,258,270
	94,17	5,38	100

Table 2: unemployment specification for educational group

In Table 2 we observe how the status of unemployed changes as we consider different educational subgroups. The variable “lab\_unempl” determines whether the individual is unemployed (in which case it takes value “1”) or not. It is important here to remind that a person who is not unemployed may be either regularly working (and thus characterized as “employed”) or he may not be neither working nor actively looking for a job (in which case he would be considered “inactive”). The figures that come out from this table are quite striking as they are not in line with our expectations: what we see indeed is that the group of people in the high skilled group has a higher fraction of unemployed workers than the low skilled group. Although it is difficult to provide an explanation for this result, the most plausible one we might bring is that people with low educational level, once they are not regularly working, often may become discouraged and go out of the labour force, becoming thus inactive. If this is the case, the fraction of unemployed people goes down in the low skilled group. More skilled workers instead (not only high skilled, but also medium skilled workers, whose fraction of unemployed individuals is above the average as well) are more likely to remain in the labour force trying to exploit the skills they have acquired to find another occupation.



## Regression Analysis

### Empirical specification

Now that we have shown what has been going on in Italy in the last ten years in terms of labour market trends, we have to study whether among all the causes that have determined these dynamics in the Italian labour market, immigration has given a significant contribution to their development, and if it is so we want to estimate the magnitude of these effects, no matter of whether they are positive or negative. We remind indeed that the purpose of the dissertation is mainly to quantify any potential economic impact that immigration has on the likelihood that an individual has of being employed, inactive or precarious on the Italian labour market. In particular, regarding the first specification, rather than considering the probability of being employed, we will capture the corresponding negative effect, therefore looking at the probability of being non-employed<sup>12</sup>. As anticipated we will provide specific information about the additional quantitative effect that immigration has on specific classes of workers, that are those ones that, as we as just seen, have suffered more than the average and that are therefore considered to be the weakest ones in the labour force. The availability of data about regional and yearly levels of the labour market indicators that we are considering allows us to create two sets of dummies that capture both regional-specific and year-specific effects. As far as the independent variable is concerned, differently from what we have seen in several models in the literature, we will not consider the stock of the share of immigrants over the total population, but we are going to use information about the flows of immigrants. More specifically, we will consider the natural logarithm of that variable; in this way, we will not see simply the effect of an immigrants' inflow in absolute terms, but rather its percentage change<sup>13</sup>. The estimated coefficients will therefore represent an elasticity, indicating by how many percentage points the dependent variable will change after a unitary percentage increase in the independent variable. Given all the information provided, we present a basic form for our econometric model:

$$Y_{irt} = \beta_0 + \beta_1 \ln(flows_{rt}) + \delta_r + \lambda_t + \varepsilon_{irt}$$

As we can notice, all variables are reported with the indicators for a specific region and a specific year, respectively  $r$  and  $t$ . Moreover, the dependent variable  $Y_{irt}$  and the error term have also the specification for the individual  $i$ . This happens because, as specified in section III.1, data about labour market conditions of individuals are collected at micro level, that is for each single individual who is

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<sup>12</sup> In order to do this, we will set a new variable “*nonempl*” to be equal to “1” when the individual is not employed.

<sup>13</sup> It can be shown that:  $\frac{\Delta x}{x} \approx \ln\left(1 + \frac{\Delta x}{x}\right)$ .

surveyed (even though such information are available from 2007 to 2010 only). Data about migratory flows are instead collected at regional level, which allows us to investigate their impact using the usual special correlation approach. The error term, which is also specific for each individual, contains all the other determinants of the dependent variable that here are omitted. The variables  $\lambda_r$  and  $\lambda_t$  are two vectors of dummies that are necessary to control for region-specific and year-specific effects on  $Y$ . These last ones are indeed crucial, as in this period the macroeconomic outlook of the whole European area has been far from being stable, and Italy in particular has been one of the countries which was most severely hit by economic downturns such as the recession due to the 2007-2008 financial crisis or the sovereign debt crisis of 2011 during which, as we have already seen, the unemployment rate has risen sharply at all levels.

However, region-specific and year-specific effects are not the only ones we must account for. Actually, there is a series of other determinants of the labour market status of an individual that we are going to introduce. The first and most simple control we are introducing is the gender specification, that will enter into our regression under the form of the dummy variable “*female*”, which takes value “1” if the individual is a woman and “0” otherwise.

The second variable that is omitted in the above regression is the specification for the age of the individual. In the database provided by the Labour Force Survey we have information for people up to 64 years old. However, for the purposes of our analysis we decided to drop all the observation on people below 15 years old, since such young people do not participate to the labour market. As anticipated, in order to obtain a clearer picture for this feature, we will divide population in three age groups by creating the following three dummy variables: *age\_1524*, *age\_2544* and *age\_4564*. They will take value “1” when the individual belongs to that specific age group. The first of these variables will be the one we will consider describing “*young workers*”. The choice of this classification of age groups has been done, among other things, with the aim to see whether immigrants tend to compete more with people who are working without having a degree: graduate students in fact typically start working after having completed their masters’ degree, that is around the age of 25, so in this age group we are going to find both people who are working during their studies and people who have decided not to study at university level and to start working right after having finished their high school.

In a similar way, we will introduce three dummy variables that describe the level of educational attainment of each individual, that are “*l\_skilled*”, “*m\_skilled*” and “*h\_skilled*”.

Finally, we are going to introduce several interaction terms in order to detect whether the effect of migratory inflows is augmented or reduced for particular population groups, looking with

particular attention to the groups of females, young and unskilled workers<sup>14</sup>. In this regard, in order to better capture the effects of immigration on these particular classes of the population, we will consider them as our control group. Thus, in order to overcome multicollinearity issues, we will show in our regression the differential effect that immigration has on middle aged and aged workers with respect to younger workers and on medium and high skilled with respect to unskilled workers.

As far as men and women are concerned instead, we will consider the formers as the control group and therefore we will observe the coefficient that describes the additional (or lower) impact of immigration on female workers with respect to their male counterparts. Once the said features are added, the basic regression equation we are going to estimate will take the following form:

$$\begin{aligned}
 Y_{irt} = & \beta_0 + \beta_1 \ln(flows_{rt}) + \beta_2 \ln(flows_{rt}) \times female \\
 & + \beta_3 \ln(flows_{rt}) \times age_{2544} + \beta_4 \ln(flows_{rt}) \times age_{4564} \\
 & + \beta_5 \ln(flows_{rt}) \times m_{skilled} + \beta_6 \ln(flows_{rt}) \times h_{skilled} + X_{irt} + \delta_r \\
 & + \lambda_t + \vartheta_s + \gamma_o + \varepsilon_{irt}
 \end{aligned}$$

In addition to the main independent variable and the interaction terms, we have added a vector  $X$  that contains all the non-interacted controls for gender, age and skill group, plus an additional control that may be useful, as announced in the previous section, to control for endogeneity issues, that is the log of the regional GDP. Finally, we have introduced as before regional and time dummies. A further issue we may want to control for is the type of occupation of a worker or the sector in which an individual works. This becomes extremely crucial when we turn to analyse the feature of temporary employment, as these two characteristics are strong determinants of the nature of a job. Since for the period 2007-2010 we have individual information about whether a worker is working temporarily or not, we will add the indexes  $s$  and  $o$  to our dependent variable and we will introduce the series of dummies  $\vartheta_s$  and  $\gamma_o$  in order to capture respectively sector-specific and occupation-specific effects. Moreover, for this specification only we will restrict the sample by considering only individuals who are employed.

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<sup>14</sup> Since these variables are in the form of dummies, the additional effect on the dependent variable when they take value “1” will be:  $\frac{\partial Y_{irt}}{\partial flows} = \beta_1 + \beta_x$ , where the “ $x$ ” corresponds to the index of the Beta of each interaction term.

## Results

From the tables below, we can draw some conclusion over the hypothesis we have made up to now. We will start by analysing the main effects of immigration, and in a second step we will look at the interaction coefficients that capture differential effects on the above-mentioned classes of workers. All the presented tables consist of four models where we have sequentially added several interaction terms in order to obtain more sophisticated results. Thus, we will focus on the coefficients shown in the last column.

As we can see from *Table 3*, the coefficient from the main effect of migratory inflows on the probability of not being employed is 0.035; therefore, an inflow of immigrants of 1%, increases the probability for an individual of not being employed by 0.035 percentage points. Since this coefficient is positive and significant at 1% significance level, this implies that the increase in the size of a migratory inflow has a negative effect on the Italian labour market. This outcome, although not being desirable, is quite in line with the findings we have analysed in the literature. Looking at *Tables 4* and *5*, the coefficients for the main effect are respectively 0.025 and 0.021, and they are both significant at 1%. Their interpretation is the following: a 1% migratory inflow would increase the likelihood of being inactive (and therefore out of the labour force) by 0.025 percentage points, while it would increase the probability of having a temporary rather than a permanent job by 0.021 percentage points. It is worth mentioning that in this last specification, in addition to dummies for region and year specific effects, also two set of controls that capture specific characteristics that are proper of different kinds of occupation or of different sectors were added.

Turning to the analysis of the coefficients regarding differential effects, we will start from observing whether there is any gender gap in the labour market response to immigration. In the tables below, this is captured by the coefficient *Inflows x female*: although being quite small, it is negative and significant at 1% in all the three cases we are presenting. This implies that the effect of migratory flows on women is smaller on average than the general one. The explanation for these results may not be so straightforward: the fact that the probability of being non-employed for women is lower than the one of men as a result of a migratory inflow may be explained with a potential tendency of the female population of exiting the labour force rather than becoming unemployed in case of job loss. This however is not matched by the effect of immigration on the inactivity rate, which is actually lower for females than for males. Finally, an unusual behaviour of female workers may be seen in the third and last specification: here we see that on average, a 1% inflow of migrants causes the probability of having a temporary rather than a permanent job to increase by 0.007 percentage points less for females than for males.

The second differential effect we will study is the one on different age classes. In our model, in which we included young individuals as our control group, we will look at differential effects on workers with age between 25 and 44 years and elderly individuals up to 64 years old. In the first specification, the coefficient for middle aged workers is -0.05. Since it is significant at 1%, it is reasonably possible to state that workers in this age class are less sensitive to immigrants' competition than younger workers are, so their probability of becoming non-employed after a migratory inflow is lower. The same conclusion can be drawn by looking at the other specifications, since their coefficients, although being lower in absolute value than the previous one (-0.041 and -0.025), are still significant at 1%. Therefore a 1% increase in migratory inflows decreases the probability of a worker between 25 and 44 years old of being inactive or of having a temporary job respectively by 0.041 and 0.025 percentage points with respect to workers with age between 15 and 24 years. A weaker but still appreciable differential effect is in place for workers who are supposed to having been in the labour market for a longer period on average. For the three specifications we are considering the coefficients are in fact -0.008, -0.009 and -0.014. Their interpretation is exactly the same as the one for the 25-44 age class. All these results are quite coherent with what was expected: it is not difficult to imagine that workers older than 24 might already have acquired some job experience or some higher education that makes them more skilled and thus less subject to substitutability with unskilled immigrants. Of course, the coherence stems from the assumption that most immigrants are unskilled, which might not necessarily hold.

The third and last feature we are going to analyse refers to the different skill groups, based on different levels of educational attainment. As for the age variables, we will analyse the different impact of immigration on medium skilled and high skilled workers for the three dependent variables considered. Starting from Non-employment, we see that the interaction coefficient for medium skilled workers is -0.012, which tells us that this category of workers suffers less after a migratory inflow than the one of unskilled workers (their probability of not being employed is lower by 0.012 percentage points). Turning to high skilled workers, the additional effect on them is positive, as the relative coefficient is 0.002. However, differently from the one for medium skilled, which is 1% significant, this coefficient is not statistically significant at any significance level, therefore we cannot draw robust conclusions. As far as Inactivity rate is concerned, from *Table 4* we can observe an outcome which is quite dissimilar from the one for Non-employment, in particular for high skilled workers: while the coefficient for medium skilled workers is -0.008, which although being small, is negative and significant as in the previous specification, the coefficient for high skilled, instead, is positive and statistically significant.

An even more puzzling outcome results from the “Temporary” specification: both coefficients about medium and high skilled workers are significant at 1% and positive. This implies that unskilled workers are less likely to be on a temporary employment rather than on a permanent one with respect to more skilled workers. It might seem strange if we assume that immigrants are more likely to be substitute of unskilled workers, since in that case there would be higher competition, and therefore a higher turnover rate, which would cause the nature of employment to be more temporary rather than permanent.

## Quantifications

In order to have a clearer framework about the phenomenon of immigration, in *Figure 14* we quantified average differential effects by considering the cross regional average of the natural logarithm of immigrants’ inflows, therefore obtaining a more realistic description of the real impact that immigration had on the Italian labour market in more recent years. In these graphs in particular, we focus on three subgroups, of which we observe differential average impacts of immigration with respect to the control group. Each effect is reported with the respective 95% confidence interval.

Looking at effects on female population, we observe that all the average differential effects are negative; in particular, effects on the Inactivity rate are on average smaller for women than for men, compared to the effects on the likelihood of being Non-Employed: they are respectively -0.005 and -0.012. The effect on the probability of a temporary employment is -0.009. So, women suffer less than men from immigration in all cases, in particular in their tendency to participate to the labour force.

As regards skill groups, we plotted differential effects on high skilled workers with respect to low skilled ones: all the effects for the three specifications considered are positive, although generally small in absolute value. The strongest average difference is to be found in the figure for the inactivity rate, which is 0.012: this implies that on average the change in the probability of being inactive for a high skilled individual is higher by 0.012 percentage points than for low skilled people. The smallest differential effect is instead the one on the probability of being Non-Employed (0.003). It is worth noticing that in this case the confidence intervals are much wider than in the other two comparisons.

The last effect we will analyse is the one on workers older than 45 years with respect to younger ones, with age between 15 and 24 years. The greatest differential effect (in absolute value) is the one on the probability of a temporary rather than a permanent job, which is -0.018. This implies that young workers’ probability of working temporarily is on average lower by 0.018 percentage points lower than the one of older workers, following a migratory inflow.

	1	2	3	4
Dependent variable: Non-Employed				
Inflows	-0.017*** (0.00)	-0.001 (0.00)	0.029*** (0.00)	0.035*** (0.00)
Inflows x female		-0.005*** (0.00)	-0.004*** (0.00)	-0.004*** (0.00)
Inflows x age_2544			-0.051*** (0.00)	-0.050*** (0.00)
Inflows x age_4564			-0.007*** (0.00)	-0.008*** (0.00)
Inflows x m_skilled				-0.012*** (0.00)
Inflows x h_skilled				0.002 (0.00)
Constant	0.227*** (0.01)	2.266*** (0.15)	1.953*** (0.15)	1.875*** (0.15)
additional controls	Yes	Yes	Yes	Yes
region dummies	No	Yes	Yes	Yes
year dummies	No	Yes	Yes	Yes

Note: all specifications include controls for gender, age, education and regional GDP.  
Significance: \*\*\* 1%, \*\* 5%, \* 10%

Table 3: The effect of immigration on the probability of not being employed

	1	2	3	4
Dependent variable: Inactive				
Inflows	-0.016*** (0.00)	-0.004 (0.00)	0.021*** (0.00)	0.025*** (0.00)
Inflows x female		-0.010*** (0.00)	-0.009*** (0.00)	-0.009*** (0.00)
Inflows x age_2544			-0.040*** (0.00)	-0.041*** (0.00)
Inflows x age_4564			-0.008*** (0.00)	-0.009*** (0.00)
Inflows x m_skilled				-0.008*** (0.00)
Inflows x h_skilled				0.009*** (0.00)
Constant	0.334*** (0.01)	2.737*** (0.15)	2.477*** (0.15)	2.436*** (0.15)
additional controls	Yes	Yes	Yes	Yes
region dummies	No	Yes	Yes	Yes
year dummies	No	Yes	Yes	Yes

Note: all specifications include controls for gender, age, education and regional GDP.  
Significance: \*\*\* 1%, \*\* 5%, \* 10%

*Table 4: The effect of immigration on the probability of being inactive in the labour market*



	1	2	3	4
Dependent variable: Temporary (Restricted Sample)				
Inflows	-0.007*** (0.00)	0.007 (0.00)	0.026*** (0.01)	0.021*** (0.01)
Inflows x female		-0.007*** (0.00)	-0.006*** (0.00)	-0.007*** (0.00)
Inflows x age_2544			-0.025*** (0.00)	-0.025*** (0.00)
Inflows x age_4564			-0.015*** (0.00)	-0.014*** (0.00)
Inflows x m_skilled				0.007*** (0.00)
Inflows x h_skilled				0.006*** (0.00)
Constant	0.178*** (0.01)	0.383* (0.19)	0.198 (0.19)	0.245 (0.19)
additional controls	Yes	Yes	Yes	Yes
region dummies	No	Yes	Yes	Yes
year dummies	No	Yes	Yes	Yes
occupation dummies	No	Yes	Yes	Yes
sector dummies	No	Yes	Yes	Yes

Note: all specifications include controls for gender, age, education and regional GDP.  
The sample is restricted only to employed workers.  
Significance: \*\*\* 1%, \*\* 5%, \* 10%

Table 5: The effect of immigration on the probability of having a temporary rather than a permanent job

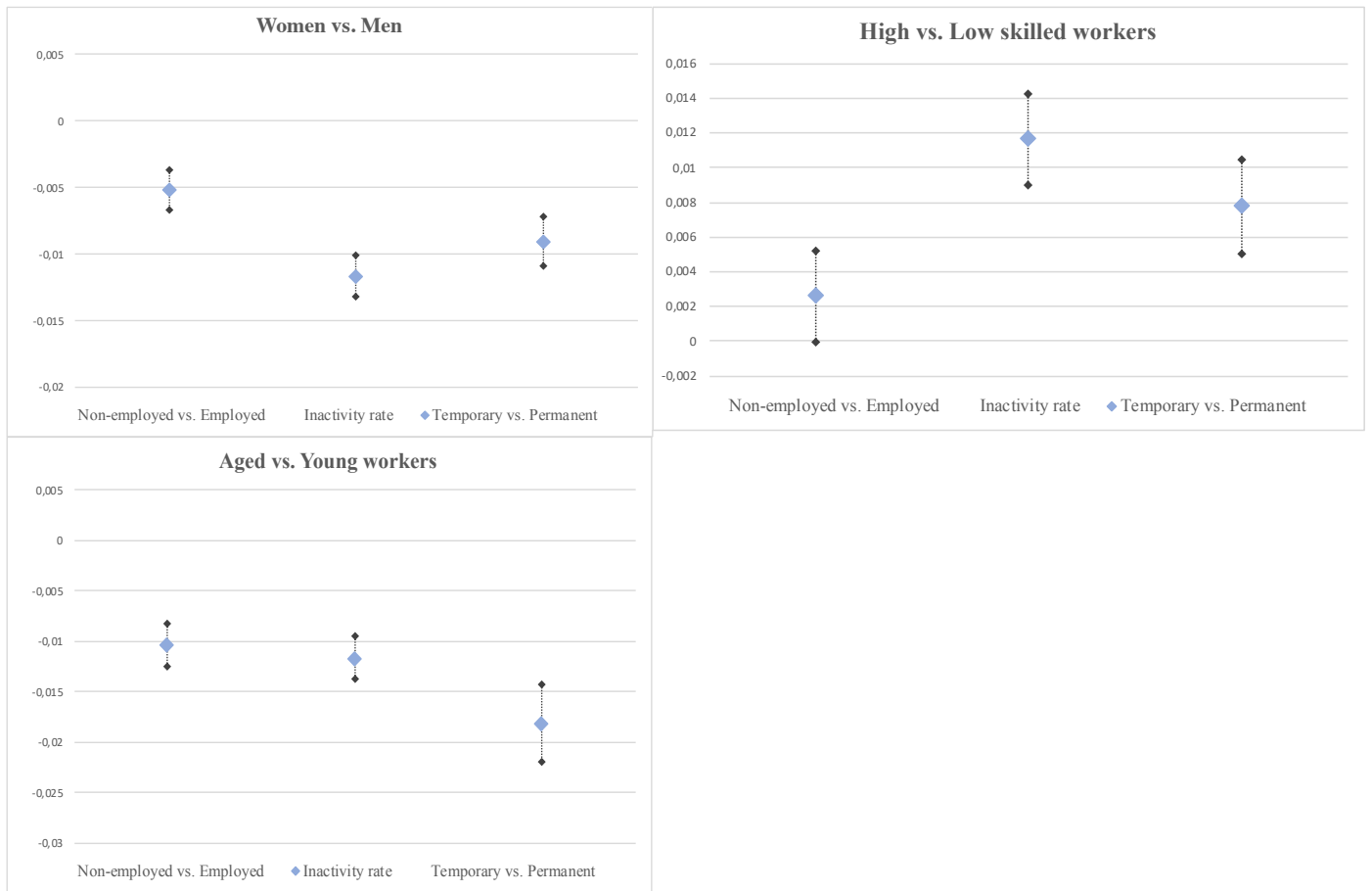


Figure 14: The differential effect of immigration on employment and inactivity rate and on the probability of having a temporary job by gender, age and skills.

## **Comments and conclusion**

The empirical analysis we carried out provides us with several interesting outcomes; the coefficients and the average effects we estimated may or may not be in line with what expected labour market dynamics could predict, and they may also be in accordance or in contrast with findings of previous studies. In this context, it should be kept as a general remark that our analysis is inevitably subject to the peculiarities that are proper of the Italian labour market, which may be a source of difference between empirical evidence and standard economic theory. In commenting our result, it is crucial, as we stated at the beginning of the dissertation, to interpret the reality with the aim of getting to some policy conclusions, making a critical evaluation of the observed phenomenon.

As we already observed, the main effect coefficients tell us that immigration has a negative impact on domestic labour market outcomes. From a technical point of view, several explanations may be provided: borrowing from the analysis of Dustmann and Preston 2012, the fact that early immigrants suffer a downgrade in their skills level may be a source of distortions, in the sense that they may tend to compete relatively more with unskilled rather than skilled natives. Given a higher elasticity of substitution in the former group, the tougher competition may lead workers out of the labour market, or in the best case to worsen their working conditions.

Although these dynamics may be difficult to revert, some deeper causes of them must be investigated: in particular, if the receiving country (Italy in our case) was strong enough in its reception and integration policies and actions, the predicted downgrade would not be a certain outcome. Failure to reinforce the integration process may therefore be a cause rather than a consequence of the negative impact of immigration that is perceived and sadly registered.

Turning to gender differences, we noted that women tend to be less affected than males from immigration. On the one hand, this may seem good news, especially referring to the issue of gender segregation; however, unfortunately this might not be an evidence of gender equality, but rather a consequence of the fact that female workers tend to be less subject to substitution than males, particularly if we assume that immigrants are mostly young men who therefore are unlikely to get jobs in which there is a predominance of female workers. In order to test for this feature, a more accurate analysis of immigrant population's composition is needed, which unlikely was not possible with available data in our analysis. Anyway, it would also be necessary to make an analysis that took into account differences in the behaviour of female and male workers, particularly focusing on the

anomalous dynamics that drive female workers choices in terms of unemployment, which may not be always in line with standard economic theory.

As far as age differences are concerned, we have found general support to the hypothesis younger workers suffer competition with immigrants more than their older colleagues. This may be due to the fact that since the range of years for which we defined workers as “young” is 15-24, it automatically excludes graduated people, making it more likely younger workers to be unskilled. As we did for women, if we assume that the majority of immigrants is unskilled, this argument may hold. However, this does not imply that generally immigrants tend to hurt youth, as the condition we stated above may not be true at all, especially if we consider countries other than Italy. If in fact immigrants who get into a new country are educated or with previous work experience, we couldn't speak about tougher competition with younger workers. Therefore, the result we obtained cannot be easily generalized to episodes of immigration different from the Italian case.

Finally, by analysing skill differences, we have a rather differentiated picture for the three specifications we provided. Regarding Non-Employment, we observe a smaller effect on medium skilled workers and no significant difference for the high skilled workers' group with respect to unskilled workers. This is quite in line with our expectations; on the other hand, the greater effect of immigration on high skilled inactivity rate sounds rather strange. However, this may simply be the result of a tendency of skilled workers to exit the labour force for a certain period rather than continuing to look for a job after they have lost one, due to a possible attitude towards retraining. Finally, the effects on the “temporary” specification turn out to be higher for medium and high skilled workers than for the unskilled ones; the most suitable explanation we can provide about this result is related to the nature of medium and high skilled jobs: unskilled workers who lose from competition with other workers may already be on a temporary employment and therefore a worsening of their situation may result in becoming either unemployed or inactive; conversely, firms that hire medium or high skilled workers may tend not to fire their personnel but rather to modify their contracts' terms so that more workers can be hired but with less working hours or with worse employment status (temporary rather than permanent). The reason that allows us to make such a conjecture is that the analysis for this specification is supported by the presence of occupation and sector controls, which make it more robust and which might be responsible for capturing this specific feature.

As a final remark, with this dissertation we tried to get a deeper knowledge of what actually happens in the labour market after migratory inflows bring to the domestic country new labour force.

Firstly, we tried to analyse the issue from the perspective of wages, taking a theoretical perspective. We have seen that in the literature many scholars have developed analytical models in order to give a theoretical background to the prediction about the impact of immigration, taking into account the issues of skill composition, substitutability, downgrading and borrowing several concepts from international trade theories. Subsequently we went through several empirical models of several scholars that have studied and analysed the issue obtaining different result. In this section we have also become acquainted with the potential threats to the robustness of an empirical analysis about immigration, finding out what can be the possible methodological solution to solve these issues.

Then, we passed to an empirical analysis of labour market dynamics that entail the likelihood of changes in the working status of a certain worker. Through a Linear Probability Model, we tested whether individuals living in regions with greater migratory inflows tend to experience a worse (or better) working status on average. In addition to that, we also managed to point out how specific classes of workers tend to be affected by the phenomenon of immigration, focusing on those ones which typically experience worse working conditions (female, youth and unskilled workers). As we have already seen, the resulting picture is far from being optimistic, in particular concerning young workers.

We are therefore able to draw a couple of main conclusions from this dissertation; the first one regards the method: we are now aware that in order to get full knowledge about such delicate topics as immigration is, we need the most possible careful and sophisticated analysis, with the purpose of obtaining a fairly robust outcome. For this reason, more research is needed at a higher technical level (potentially entailing both some instrumental variables and a careful and precise analysis of the immigrating population's composition). A parallel conclusion is the direct consequence of our findings: it is clear evidence that immigration may represent a negative aspect for the domestic labour market; however, as we saw at the beginning, immigration to Italy is nothing else than the product of political and social instability and of the miserable economic conditions of many countries experience. This is the reason why from the point of view of the receiving country what must be done is to study better solutions, better methods that go in the direction of favouring the process of integration and education of the immigrant population, so to make the absorption of this shock feasible not only socially, but also on a labour market basis.

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