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The global economic crisis and the effect of immigration on the employment of native-born workers in Europe

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Abstract:

The debate regarding the economic effects of immigration has attracted renewed interest in European countries since the economic crisis. We provide an approximation for the labor market effects of immigrants in four European countries during the global economic crisis after briefly analyzing the situation of native- and foreign-born workers for the recent period. Our analysis focuses on the correlation between the stock of immigrant workers and the number of local labor market workers across several segments of the labor market using a simple model approach. Based on data from Eurostat and the LFS (Labour Force Survey), we estimate a structural dynamic model using the Generalized Method of Moments (GMM) to take into account the adjustment dynamics in the labor market and labor market segment, educational level, country of origin and gender of the workers. Overall, the empirical results suggest that the immigration shock on the employment rates of native-born workers is persistent and very weak over the business cycle. The effect is globally positive and the origin of immigrants does not appear to change the nature of the impact. We offer some explanations for these findings that are linked with the dual labor markets and the differences in the degree of substitution between native and immigrant workers.

Keywords:

Immigration; Employment rates; European countries; dynamic panel analysis

1. Introduction

The current economic crisis, which broke out in the third quarter of 2008, has had devastating consequences for national economies and workers in industrialized and developing countries. Employers have begun to revise their recruitment plans and several governments have already taken measures to adapt labor migration to the evolution of the market. In addition, EU Member States have adjusted their integration policies in response to the crisis. Given the depth of the downturn, many destination countries have tightened immigration policies (Green and Winters, 2010).

In the European Union, laws differ across member countries and the selection of immigrants is often based on their labor market characteristics. Some migrants will be granted entry specifically to work, while others may be granted entry to join family members or as asylum-seekers. In countries where migration streams are strongly linked to family reunification and humanitarian criteria, an economic downturn may have less impact on migration flows than in countries where the primary form of migration is economic migration. Moreover, migrant workers may be especially vulnerable because they often do not enjoy the same rights and protection as the nationals of destination countries.

The debate about the economic effects of immigration has received renewed interest in traditional immigration countries (like France, Germany and the United Kingdom) and in new immigration countries (like Italy, Ireland and Spain) since the economic crisis. Overall attitudes towards immigration in the target countries remained relatively stable between 2008 and 2009, although there was a slight trend toward more respondents in Europe and the USA describing immigration as "more of a problem than an opportunity" (The Transatlantic Trends: Immigration 2009 report; German Marshall Fund of the United States et al., 2009). Economic considerations do appear to play a systematic role in shaping public opinion (Facchini and Mayda, 2012).

Therefore, it is important to assess the impact of migrants on the employment rates of native workers in Europe at a time when Europe has recognized the importance of migration for the future competitiveness of the Union (The EU Stockholm Programme and Europe 2020 Agenda). The labor market performance of migrant workers is of major interest for public policy. During the last decade, many European countries have become recipients of immigrants. Thus, the demand for information on the impact of immigration into Europe has notably increased. The impact of immigration on the host country's labor market is a topic of major concern for many immigrant-receiving nations.

Several economic studies have attempted to analyze and evaluate the effects of immigration on the labor market of host countries. The empirical studies, conducted mainly in Anglo-Saxon countries, conclude that the effects of migrations on wages or on unemployment of natives are very limited (Okkerse, 2008; Longhi et al., 2010; Ottaviano and Peri, 2012, Damette and Fromentin, 2013). In the European countries, Angrist and Kugler (2003) find that immigration slightly reduce the employment rate of native-born workers, although this effect is larger in countries with "rigid" institutions.

Moreover, some recent studies analyze the impact of recessions on migration (Ahearne et al., 2009; Beine et al., 2013; Borjas, 2006; Dustmann et al., 2010; Findlay, 2010; Fix et al., 2009; Papademetriou et al., 2009) and demonstrate that, globally, immigrants react more than the resident population to economic shocks such as recession. Ahearne et al. (2009) explore the influence of the economic cycle on labor mobility within the EU using an econometrically calibrated simulation and focusing on the case study of Ireland. Dustmann et al. (2010) analyze differences in the cyclical pattern of employment and wages of immigrants and natives for Germany and the UK using data from the Institute for Employment Research in Nuremberg and from the British Labour Force Survey. These authors show that there are similarities and significant differences in the cyclical responses between immigrants and natives in both countries, especially for non-OECD immigrants and for low-educated immigrants. Borjas (2006) shows that wage trends for low-skill minorities are particularly sensitive to business cycle fluctuations, with wages being more cyclically sensitive for low-skill immigrant men than for other groups. Beine et al. (2013) show that relative aggregate fluctuations and employment rates affect the intensity of bilateral migration flows. Papademetriou et al. (2009), Findlay (2010) and OECD (2012) offer a very detailed descriptive analysis of the relationship between migration and economic conditions in countries around the world and investigate whether the labor market situation of migrants has changed during the crisis.

However, the empirical evidence in this matter is not totally conclusive. Empirical results appear to be time and country dependent. A variety of studies find different estimates of the labor market impact of immigration on employment (Carrasco et al., 2008). The conclusions can diverge according to the context of analysis (geographical, temporal and methodological). Borjas (1994) emphasizes that "the most important lesson is that the economic impact of immigration varies by time and place and can be beneficial or harmful".

These premises lead us to the main motivation of this paper. This paper supplements the literature by analyzing the impact of immigration on employment of the native-born during the global economic crisis in European countries. The aim is to investigate whether this impact is differentiated by skill levels (three levels), gender and country of origin (immigrants from European and non-European countries) in several sectors. The reasons that explained the native response to an increase in the share of foreign-born workers can be very different according to the countries.

In this sense, we expect the following:
- The impact will differ according to the type of country (France, Germany, Spain and the United Kingdom). The link between immigration and the labor market outcomes of native-born workers may vary across countries due to differences in labor market dynamics, institutions and immigration policies.
- The impact will differ according to the characteristics of foreign workers (level of qualification (high, medium and low skill), country of origin (from EU countries or from non-EU countries) and gender. Note that the literature has traditionally treated male and female natives as a homogenous group (Amuedo-Dorantes and De la Rica, 2011).

In this paper, we chose four European countries (France, Germany, Spain and the United Kingdom) based on differences in their migration policies, migration history, origin composition and educational backgrounds, the sectoral distribution of foreign workers and the differences in the repercussions of the crisis. Furthermore, the majority of EU15 foreign nationals resided in these countries. Finally, we provide an approximation for the labor market effects of immigrants in these four European countries during the global economic crisis.

The rest of the paper is as follows. Section 2 provides information regarding the stylized facts and data on immigration and the crisis. Section 3 describes the model and the econometric methodology. The results are discussed in Section 4, and concluding remarks are presented in Section 5.

2. Stylized facts and data

2.1. Background and stylized facts

A brief analysis of immigration data for the recent period (2007-2012) shows that the recession has implied negative effects on migration flows in most cases. However, if we focus on the case of some

singular countries, we conclude that recession has generated varied effects on migratory flows across countries. Immigration in Spain started to fall in 2007 and continued through 2009: between 2007 and 2011, net migration fell from +1.6% to –0.8% of total population (OECD, 2012). To the contrary, postcolonial immigration countries, such as the UK, France and Germany, experienced stable paths and even slowing increases in 2009. In general, traditional immigration countries' laws give preference to individuals with family members already living in the country. We also note that migrant flow is less related to job opportunities and employability in traditional immigration countries, where strong network effects exist associated with the presence of compatriots in the host country (Aleksynska and Peri, 2014).

The labor market situation of migrants has worsened over the past four years. The unemployment rate of the foreign-born rose by 5 percentage points between 2008 and 2012 in OECD countries, compared with 3 percentage points for the native-born (OECD, 2013). In the majority of European countries, the crisis has had a substantial negative impact on the labor force and even more so on foreign-born persons: both foreign- and native-born saw their employment drop by approximately 2.5% between 2008 and 2009. The boom in unemployment rates for foreign workers compared to those for native workers between 2008 and 2009 was most marked in Estonia, Spain, Portugal, Latvia, Ireland, France and Austria (IOM, 2010). This statement is intuitive: those countries (except France) were strongly hit by the recent economic crisis. Yet, the native-born have experienced constant declining employment (figure 1) and the decline ended in late 2009 for the foreign-born. Approximately 222 000 more migrants were employed across European countries between the third quarter of 2011 and that of 2012 (OCDE, 2013). Note that this trend can be explained by different evolutions in population growth for the native-born (working-age population has been declining) and the foreign-born (working-age population has been growing). Moreover, this global trend differs across European countries. The situation is particularly dramatic in Spain and Greece, considering the greatest inflation in overall unemployment in those countries. Before the crisis, in these countries, migrants were showing higher employment rates than natives.

Figure 1: Quarterly employment rates by place of birth in European OECD countries
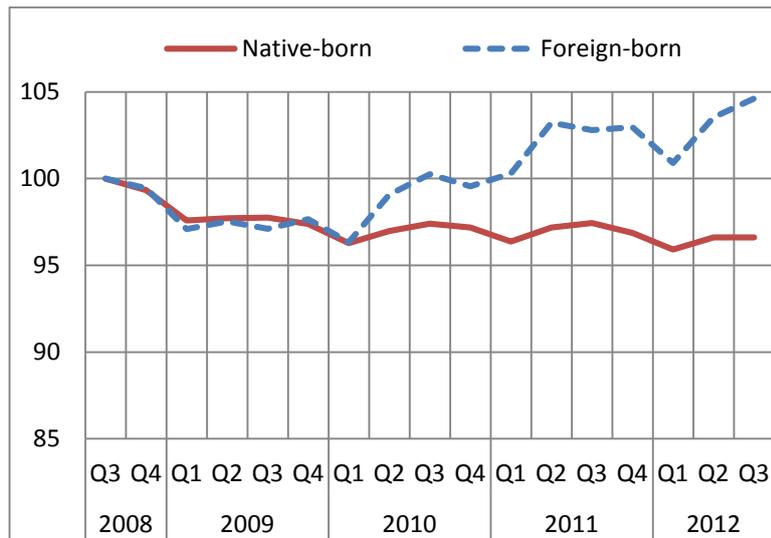
Notes: Population refers to the working-age population (15-64).

Sources: European countries: Labour Force Surveys (Eurostat)

In addition, the characteristics of foreign workers may also influence the impact of the current economic crisis. The origin of migrants is a key condition under the unemployment factor. Migrants from non-EU-27 countries are likely to be more affected by the crisis than EU-27 immigrants because they are less easily employed (at least in officially published jobs). The labor market outcomes of migrants from different world regions vary greatly and these differences are consistent across European countries. For example, migrants from North Africa in Europe have experienced enormous employment losses (unemployment of 26.6% in 2012). The dynamics of the business cycle in Spain are partly responsible for this change. Table 6 (in the appendix) outlines the over-representation of migrants from non-European countries (more or less skilled) in Spain compared to France, the UK or Germany. In general, the employment situation of migrant workers, especially of non-EU countries, deteriorated more rapidly than that of natives during the economic crisis. Foreign workers from non-EU countries were particularly affected by worsening employment conditions.

Furthermore, losses of employment have been unequally distributed across educational groups. The educational level of immigrant workers in European countries is also an important criterion to consider in analyzing the interactions between economic cycles, migrant workers and the labor market. The skill level of workers has also impacted the degree of vulnerability for workers depending on the economic sector. All in all, the composition of workers differs considerably between European countries in terms of origin composition and educational background (see table

1). For example, the low-skilled foreign-born have experienced higher employment losses relative to their native-born peers in Europe.

Table 1: Repartition of workers (in percentage) by origin and educational background

	Non-National			National		
	Low	**Medium**	**High**	**Low**	**Medium**	**High**
Germany	3.14	3.62	1.80	10.65	55.02	25.76
France	2.36	1.34	1.15	20.35	43.13	31.67
UK	1.01	3.64	3.28	18.02	40.92	33.13
Spain	5.55	4.78	3.06	34.44	19.04	33.13

Sources: Labour Force Surveys (Eurostat), calculations by the authors

In complement, the effect of the crisis appears to be more subdued for women relative to men despite the difficult labor market conditions and the limited opportunities in Europe. In terms of the participation rates of women between 2008 and 2012, the crisis has brought some women back to work through a possible added-worker effect (OECD, 2013). For example, in Spain, the employment rate of foreign-born men decreased by 20%, whereas for foreign-born women, the drop was two times smaller. That said, it is important to note that the employment rate of foreign-born women decreased by 10% versus 3% for their native-born counterparts (Figure 2).

Figure 2. Changes in employment rates by place of birth and gender between 2008-12
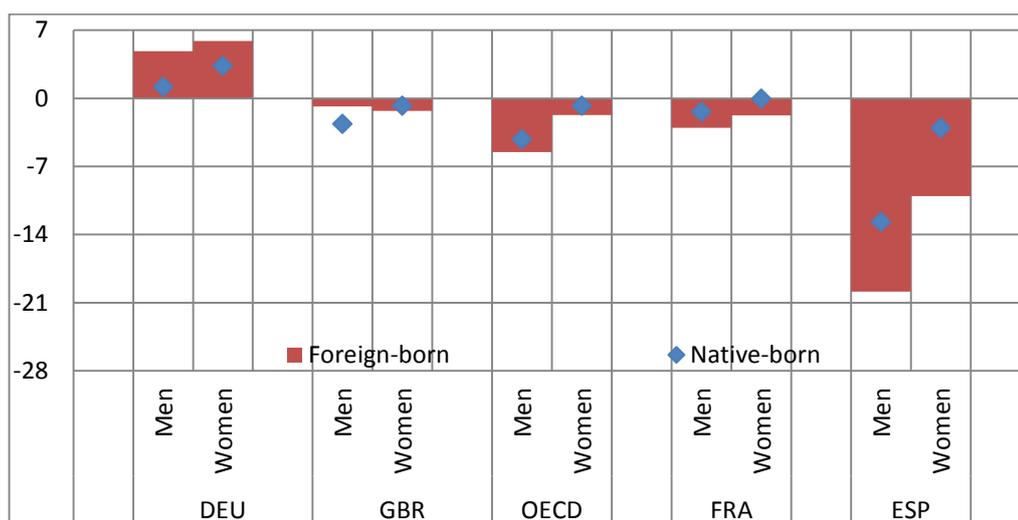
Notes: Data refer to changes between 2008 and 2012.

Sources: Labour Force Surveys (Eurostat)

The distribution of migrants and native-born across sectors is an important determinant to explain the differentiated impact of the crisis by country. During economic downturns, the migrant workers in developed countries bear a disproportionate risk of losing their jobs. Migrants' labor market prospects are more sensitive to a depression than natives' (Papademetriou et al., 2009) because of over-representation in the economic sectors or regions directly affected by economic crises. Migrant workers are overrepresented in sectors such as construction, manufacturing, accommodation and food services or human health and social work activities. Note that construction has been particularly impacted by the current crisis, both in terms of growth and employment. Therefore, the effects of the crisis vary depending on the migrants' profile and location in the economy (Fromentin, 2014). Migrants' strong presence in the construction and manufacturing sectors in certain European countries may explain these latest trends. In Ireland or in Spain, the construction sector has been heavily impacted by the crisis and foreign-born workers have been the most affected. Indeed, foreign-born men are 1.4 times more likely to work in construction than native-born men (Eurostat, 2011). To the contrary, there are few foreign-born workers in public administration and defense or in education, and these sectors are less marked by the crisis than construction or manufacturing. As underlined by the Eurostat statistical book on migrants in Europe (2011), for both genders, migrants are more likely than native-born persons to work in the food and accommodation service sector. So, heterogeneity in the consequences of the crisis on migration across countries might be explained by the sector-specific analysis.

Overall, migrants from European countries (relative to non-European countries) have been less affected by the crisis because they are less employed across the sectors exposed to the economic shock. Foreign-born men are more present that native-born persons in construction and are more likely to work in manufacturing, wholesale and retail trade, the repair of motor vehicles and motorcycles or transportation storage. Foreign-born women are more common in human health and social activities or in household activities than native-born.

Finally, the global impact of economic cycles on migrant workers varies depending on several factors: origin, skill level, gender and distribution of migrants and native-born across sectors.

2.2 Data

For the estimation of the labor market effects of immigration in France, Germany, the UK and Spain, we use data on migrant and native labor by origin, skill, gender and sector. Assessing the effects of immigration on employment requires labor force data. We obtain measures and the composition of migrant and native workers from Eurostat and the LFS (Labour Force Survey).

The available database provides the quantities of natives and migrants employed, in thousands, depending on their gender, skill levels and sectors of activity. The three skill levels are determined using the ISCED (International Schedule of Education) international nomenclature (low-skilled workers have a level of education falling between levels 0 and 2 in the ISCED nomenclature; intermediate-skilled workers have a level of education between 3 and 4; high-skilled workers have a level of education between 5 and 6). Employed workers are assigned a sector of activity depending on the statistical nomenclature of economic activities in the European Community, Nace Rev. 2. The panel dataset covers the period from 2008:1 to 2012:2 for 21 sectors (accommodation and food service activities; activities of extraterritorial organisations and bodies; activities of households as employers; administrative and support service activities; agriculture, forestry and fishing; arts, entertainment and recreation; construction; education; electricity, gas, steam and air conditioning supply; financial and insurance activities; human health and social work activities; information and communication; manufacturing; mining and quarrying; other service activities; professional, scientific and technical activities; public administration and defense; compulsory social security; real estate activities; transportation and storage; water supply (sewage, waste management and remediation activities); and wholesale and retail trade (repair of motor vehicles and motorcycles)) in 4 European countries.

All in all, we have a balanced panel dataset of 378 observations from 2008:1 to 2012:2 for France and Spain, and 357 from 2008:1 to 2012:1 for Germany and the United Kingdom. Our analysis focuses on the correlation between the stock of immigrant workers and the number of local labor market workers across several segments of the labor market using a simple model approach from Carrasco et al. (2008).

3. Model and estimation methodology

3.1.   Model

The foundation of our theoretical model is based on Carrasco et al. (2008) and Borjas (2003). Consider a sector where workers are a combination of native and immigrants. Following Borjas (2003), the immigrants supply shock is $X_{l,s,i,t}$ with i the subscript over sector, t the time measured in trimesters, l the education level and s the gender of workers. Then, at time t, denote native labor as $N_{i,j,l,t}$ and migrant labor as $M_{i,j,l,t}$.

Define, following Borjas (2003), the immigrant supply shock of skill group (l,s,i,t) as

$$X_{l,s,i,t} = \frac{M_{l,s,i,t}}{M_{l,s,i,t}+N_{l,s,i,t}} \ . \tag{1}$$

From Carrasco et al. (2008), we denote the employment rate of native workers at time t as

$$e_{l,s,i,t} = \frac{N_{l,s,i,t}}{P_{l,s,i,t}} \tag{2}$$

where $P_{l,s,i,t}$ is the total native population with the skill set at time t.

To estimate the effect of immigration rate $X_{i,j,l,t}$ on the native labor market rate, we perform the following regressions:

$$\ln\left(\frac{e_{l,s,i,t}}{1-e_{l,s,i,t}}\right) = \beta_{l,s,i,t}\, X_{l,s,i,t} + \delta_{l,s,i,t} + \varepsilon_{l,s,i,t} \tag{3}$$

where $\beta_{l,s,i,t}$ represents the impact of the migrant employment rate on the native employment rate of skill group, and $\delta_{l,s,i,t}$ is a fixed effect with $\varepsilon_{l,s,i,t}$ standard independent noises. This specification includes a vector of fixed effects to take into account the heterogeneity and the changes of level of qualification and gender in the sectors over time.

This model reflects the effect of the immigrant shock on the native employment rates. The model takes into account the various points mentioned above (labor market segment, educational level, country of origin and gender) depending on the availability of data to differentiate the impact of groups of immigrants on the employment of native workers.

3.2. Estimation methodology

Considering the previous theoretical framework, we estimate a structural model to assess the responses of native employment for different groups. The model makes it possible to assess the groups' reactions to economic shocks and worker adjustments over time using an aggregate approach. As such, the previous model can be specified as follows:

$$\log(\frac{e_{it}}{1-e_{it}})_{l,s,i,t} = \beta_1 \log(\frac{e_{it}}{1-e_{it}})_{l,s,i,t-1} + \beta_2 \text{MigrEU}_{i,t} + \beta_3 \text{MigrEU}_{i,t-1} + \beta_4 \text{MigrNOEU}_{i,t} +$$

$$\beta_5 \text{MigrNOEU}_{i,t-1} + \gamma_i + \varepsilon_{i,t} \tag{4}$$

In detail, $\log(\frac{e_{it}}{1-e_{it}})_{l,s,i,t}$ is the employment rate of native workers, $\text{MigrEU}_{i,t}$ represents the EU migrant workers, $\text{MigrNOEU}_{i,t}$ represents the non-EU migrant workers. Let i be the subscript over the sector, let t be time measured in trimesters, let l be educational level and let s be the sex of workers. γ_i is an unobserved, sector-specific, time-invariant effect that may be correlated with the variables but not with $\varepsilon_{i,t}$. $\varepsilon_{i,t} \sim i.i.d(0, \sigma_{\varepsilon}^2)$.

The dynamic specification of the estimated model (4) might have two primary explanations. Firstly, it is important to account for the adjustment dynamics in the labor market (Cohen-Goldner and Paserman, 2004; Dustmann et al., 2008) to evaluate the impact of immigrants. Labor market adjustments are not immediate. The dynamics of this process come from immigrants' occupational mobility and from adjustments in local production factors (labor and capital). Note that we take into account one quarter in the adjustment process (i.e., one lag). Furthermore, it is possible that employers assign better workers than usual to particular jobs during recessions and searching workers obtain lower quality jobs than they would normally (Devereux, 2004). Assignment changes play a large role in labor market adjustments to changes in cyclical conditions. Secondly, this standard dynamic panel data employment equation includes lag structures to model the slow adjustment process (see Baltagi, 2008, or Lachenmaier & Rottmann, 2011).

In this way, we estimate our model using the Generalized Method of Moments (GMM). This approach is helpful to amend the bias induced by omitted variables and endogeneity problems. The use of instruments in the GMM is required to manage the correlation between the error term and the lagged dependent variable (the lagged employment rate of native workers). Furthermore, we take

into account the possible endogeneity of the explanatory variables (EU and Non-EU migrant workers and their lagged terms). Indeed, there is a reverse causality between labour market conditions – and thus unemployment and labor force – and immigrants' flows. Then immigrants are correlated to labour markets conditions and business cycles in double sense

We use two different GMM estimators in this paper for robustness purposes. Firstly, in the GMM difference estimator[1], the instrument matrix includes the previous level values of the lagged differenced dependent variable (Arellano and Bond, 1991). Secondly, the GMM system estimator extends the model by additionally considering the original equation in levels, instrumented by their own differences. This estimator combines the regression in differences with the regression in levels using a system of equations. This estimator performs better than the GMM difference estimator, especially if cross-sectional variability dominates time variability and if there is strong persistence in the time series under investigation (Blundell and Bond, 1998). This methodology is particularly appropriate when the time dimension T is small relative to the cross dimension N, as in our paper.

As an empirical matter, we use robust standard errors adjusted for panel specific autocorrelation and heteroskedasticity. We also use the Arellano and Bond (1991) test for residual autocorrelation. Indeed, the instruments are only valid in the case of no autocorrelation for $\varepsilon_{i,t}$. The validity of additional instruments can be tested using the standard Hansen test of over-identifying restrictions.

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[1] The estimation results are not reported in the paper to clarify the interpretation and the reading of the tables. However, the results can be obtained by contacting the authors.

4. Results and explanations

4.1.   Results

In this section, we report the results of the model estimations by country (Tables 2, 3, 4 and 5). We find statistically significant effects from the immigration shock on the employment rates of native-born workers between 2008 and 2012. We note that the effect is different depending on the country. Economic, social and cultural characteristics influence the transmission channel for the impact of migrants during the crisis.

For France (in table 2), it appears that the effect of immigration shock on the employment rates of native-born workers is slightly positive for migrant workers of the European Union (0.920 in t-1) and slightly negative and relatively persistent over time[2] for the non-European Union migrants (the sum of the estimated coefficient at the aggregate level is -0.227, with -0.920 in t and 0.693 in t-1).

In Germany (in table 3), the impact of immigration on the employment rate appears to be persistent over time and positive for European migrants. These results are consistent with D'Amuri et al. (2010): native and migrant workers appear to be imperfect substitutes. However, this conclusion is not obvious because German labor market institutions are characterized by generous unemployment benefits and wage rigidities, which increase the potential for negative employment consequences due to immigration. As against, those countries have more flexible labor markets, lower hiring and firing costs and less generous unemployment insurance, like the United Kingdom

For this country (in table 4), we find only statistically significant effects from the European Union migrant shock on the employment rate of native-born workers (with a global negative effect for all workers).

Finally, in Spain (in table 5), we do not find statistically significant effects from the immigration shock on the employment rates of native-born workers, similar to Carrasco et al. (2008). Nevertheless, Spain is one of the European countries where immigration flows have increased noticeably before the crisis.

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2 We appreciate persistence in interpreting the lagged variable (MigrEU(-1) and MigrNOEU(-1)).

It is essential to conduct the analysis taking into account the factors mentioned above, such as gender and level of qualification, to study the impact of immigration on the employment rate of different groups of native workers. To extend the analysis, we perform estimations that include the workers' educational backgrounds and gender. In detail, when the distinct group of workers is included as dependent variable, we observe a relatively strong heterogeneity in the results.

In France, we obtain significant results for groups of workers more or less qualified with disparities depending on the groups: high-skilled female workers are positively impacted (-2.218 in *t-1* and 3.215 in *t*) by EU migrant workers and low-skilled female workers appear to be 'complementary'[3] with non-EU migrants workers.

In Germany, we find statistically significant weak persistent effects from the EU immigration shock on the employment rates of men and women who are intermediate-skilled and low-skilled native-born workers. Note also that non-EU immigration positively influences high-skilled male workers and the EU immigration negatively influences low-skilled male workers.

In the UK by skill level, we observe a global negative effect on high-skill native-born workers for the EU immigration shock and a positive effect for the non-EU immigration shock. Moreover, we observe a global positive effect on medium-skill native-born women workers. The shock appears to only influence low-skilled women workers. The employment of low-skilled women is negatively impacted by immigrants.

In Spain, we find statistically significant effects from the migrant shock on the employment rate of all native-born workers. It appears that the variation in immigrant workers affects natives for all skill level workers regardless of gender.

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[3] This result is not complementary or substitutable in a strict sense, but we can evaluate the relationships among the groups of workers in the model, which is also an indicator of the degree of 'complementarity'.

4.2. Findings and possible explanations

From the empirical investigation, the following findings and possible explanations stand out:

4.2.1. Skill levels

The assumption that the workers' skill levels affect their degree of vulnerability is not verified in all countries. The sensitivity of employment does not decline across educational groups. This impact can be explained by the fact that immigrant workers have entered those sectors where the employment rate of native-born workers is lower.

However, the educational level in European countries is an important criterion to consider when analyzing the interactions among economic cycles, migrant workers and the labor market (Beine et al., 2007, Borjas, Grogger and Hanson, 2011, Gross and Schmitt, 2012). Higher skill levels tend to lessen the chances of being unemployed, partly because workers may move to a lower skilled occupation and partly because firms wait longer before laying off skilled workers, who will be more difficult to replace when business picks up.

Furthermore, Peri and Sparber (2009) have recently shown for the United States that less-educated natives adjust to an increase in less-educated migrant workers by changing their task specialization. In particular, less-educated natives appear to shift to occupations with a lower manual, as opposed to interactive, task content. The main idea behind the native response to an increase in the share of foreign-born workers rests on the comparative advantage of migrants, relative to natives, in manual tasks that do not require interactive and communication skills.

4.2.2. Origin

In European countries within educational groups, the effect of the immigration shock on the employment rates of native-born workers is similar to that for European and non-European migrants. Therefore, the origin of migrant workers does not appear to actually influence the employment of natives, which rejects the hypothesis that there is a different degree of assimilation and competition depending on the origin of immigrants. This result holds, particularly, in the traditional immigration

countries. Note that in the recent immigration countries, such as Spain, the coefficients are more significant for non-EU migrants.

4.2.3. Gender

We suggest that the impact of immigration is not really different across genders. We could think that the substitutability and complementarity relationships between immigrants and native workers might be different for males and females. It is possible that male immigrants have been more affected by the crisis than females because of their over-representation in the sectors hardest hit by the crisis. This division according to sector limits the degree of substitutability across natives and immigrants of different genders. If the occupational distributions of native men and women differ significantly, one would expect an increase in the share of immigrants to impact native workers differently. Native women display shorter job tenures than their native male counterparts (Amuedo-Dorantes and De La Rica, 2011). Note however that a change in the share of immigrants impacts native men and native women differently (for example, in Spain for high-skilled and intermediate-skilled workers).

4.2.4. Substitutability and complementarity

Migrants and natives do not appear to be competing for the same jobs in France, Germany, the UK and Spain. The effect of immigration depends on the degree of substitution between native and immigrant workers. If immigrants are relatively close substitutes for native workers when they arrive in the host country, the impact should be immediate. Native and immigrant workers may not be perfectly substitutable.

Human capital is not fully transferable to the host country in the short term; after they acquire local labor market skills, immigrants can better compete with native workers. Native and migrant workers with the same (or different) educational levels can be complementary or substitutable. Several recent studies (Card, 2009, Ottaviano and Peri, 2012, Docquier et al., 2010) find imperfect degrees of substitution between natives and migrants. Less-skilled workers may also be displaced by high-skilled workers who move down the skill chain during a recession (Devereux, 2004).

4.2.5. Dual labor market

Migrant workers are disproportionately confined to secondary jobs with poor wages and little security or temporary jobs, and they face a higher turnover rate. The employment of migrants should therefore be more volatile than that of natives (Dustmann and al., 2010).The differences in the cyclical employment patterns of workers may be due to the potential selection of natives and migrants into industries that are disproportionately prone to cyclical fluctuations or temporary jobs. Migrants occupy the lowest strata in the labor market, receive the lowest average pay of all migrant groups and are the largest and fastest-growing group of 'vulnerable workers'. The majority of these workers are recruited through temporary employment agencies.

Additionally, the structure, occupation and labor market needs in European countries can explain the immigration shocks' differing results on the employment rates of native-born workers. The economic and labor market developments are, to a large extent, responsible for the increased unemployment during the crisis. Firms tend to lay off migrant workers first during economic downturns (Orrenius and Zavodny, 2010). The initial effects of a recession are generally felt in cyclically sensitive industries such as construction and manufacturing, where the last-hired and often migrant workers may be among the first to be laid off. Moreover, foreign workers are generally employed at smaller construction sites, by smaller subcontractors or by temporary work agencies or are self-employed. Migrants working in construction are often employed in low-skill jobs, those employed in manufacturing tend to hold semi-skilled jobs, and migrants employed in financial services typically hold high-skill jobs.

5. Conclusion

In this paper, we have analyzed the effects of immigration on four major European labor markets (France, Germany, Spain and UK) during the crisis that started in 2008. Specifically, we have searched for the effects of migrant workers (EU and non-EU) on the employment of native workers differentiated by gender and skill level, with a dynamic specification.

Overall, the empirical results suggest that the immigration shock on the employment rates of native-born workers is persistent and very weak over the business cycle. When distinguishing according to gender and level of qualification, we do find some large differences between countries. Unlike

France, it appears that the variation of immigrant workers in Germany, the UK and Spain affects natives for all skill level workers. In the details, we note that the effect is globally positive. Moreover, the country of origin and the gender for immigrants does not appear to change the nature of the impact. The results contribute to the more recent literature on the impact of immigration on employment of native workers.

We offer findings and possible explanations for these results. Migrants and natives do not appear to be competing for the same jobs in France, Germany, the UK and Spain. More generally, the differences in the cyclical employment patterns of natives may be due to potential selection into industries that are disproportionately prone to cyclical fluctuations or temporary jobs. We also note that the assumption "more educated workers are less vulnerable to the business cycle" is not verified in all of the countries studied. Similarly, the origin of migrant workers does not appear to influence the employment of natives, which rejects the hypothesis of a different degree of impact depending on the immigrants' country of origin. Finally, although the differences in results are low, we observe that a change in the share of immigrants impacts native men and native women similarly.

Overall, our findings have important implications when considering labor markets. First, this paper contributes to the analysis of the impact of migrant workers on the European labor markets during the economic crisis. Second, this analysis helps us to understand the apparently negligible impact of immigration on native employment levels in Europe (which is a geographical area little studied). Third, although the differences in the results are minimal, the findings emphasize the importance of accounting for gender, level of education, origin of migrants and host country differences in the impact of immigration on natives. In addition, the sign and the magnitude of the effect depend on the cyclicality of the period and the differences in the response of the natives. Finally, the conclusions provide a partial explanation for the composition changes in the labor market and emphasize the need to address this issue to avoid scarring effects and maintain social cohesion.

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Appendix

Table 2: GMM regressions - France

France	All	High level		Medium level		Low level	
		Males	Females	Males	Females	Males	Females
$\log(\frac{e_{it}}{1-e_{it}})(-1)$	1.148***	0.975***	1.008***	1.034***	1.031***	1.017***	0.925***
MigrEU	-0.416	-0.172	3.215***	0.203	1.103	0.484	-0.749
MigrEU(-1)	0.920*	-0.346	-2.218***	0.132	-0.207	1.120	0.207
MigrNOEU	-0.920***	-0.602	-0.370	-0.326	-0.009	0.720	1.030*
MigrNOEU(-1)	0.693***	0.264	0.049	0.363	0.173	-0.106	-0.677
Hansen Test	13.79	13.73	11.76	15.62	13.28	10.98	13.78
AR(1)	-2.66***	-1.63*	-2.27**	-3.16***	-3.69***	-2.86***	-2.07**
AR(2)	-1.36	1.21	0.65	-0.46	-1.14	-0.65	0.18

Table 3: GMM regressions - Germany

Germany	All	High level		Medium level		Low level	
		Males	Females	Males	Females	Males	Females
$\log(\frac{e_{it}}{1-e_{it}})(-1)$	1.036***	1.012***	1.000***	0.999***	1.002***	0.982***	0.986***
MigrEU	0.544***	-0.259	0.174	0.765***	0.498***	-2.761**	-0.042
MigrEU(-1)	-0.334*	-0.217	0.486	-1.135***	-0.733***	1.703*	-0.008
MigrNOEU	-0.058	-0.331	-0.259	0.827***	-0.106	-1.311	-0.800
MigrNOEU(-1)	-0.136	0.973**	-0.658	-0.840***	0.253*	1.449	0.695
Hansen Test	18.01	18.84	19.23	18.99	16.40	14.77	16.35
AR(1)	-1.66*	-2.61***	-2.41***	-1.69*	-1.81*	-2.73***	-1.85*
AR(2)	1.15	2.03*	1.46	1.12	1.31	1.63	1.30

Table 4: GMM regressions – the UK

UK	All	High level		Medium level		Low level	
		Males	Females	Males	Females	Males	Females
$\log(\frac{e_{it}}{1-e_{it}})(-1)$	1.004***	1.002***	1.003***	0.967***	1.016***	1.019***	0.908***
MigrEU	-1.142***	-1.070**	-1.924***	-0.736	-0.441	0.104	-1.007**
MigrEU(-1)	0.803***	0.558*	1.656***	0.388	0.442***	-0.156	0.602
MigrNOEU	0.404	-0.818*	-0.731*	0.792	-0.198	-0.531	0.899
MigrNOEU(-1)	0.141	1.230***	1.295***	-0.570	0.568**	0.608	-1.418
Hansen Test	14.48	11.71	15.05	14.59	11.69	13.88	10.54
AR(1)	-1.62*	-1.64*	-1.62*	-2.23**	-2.30**	-2.85**	-2.75**
AR(2)	-1.16	-1.15	-1.16	-1.27	0.94	-1.21	0.59

Table 5: GMM regressions – Spain

Spain	All	High level		Medium level		Low level	
		Males	Females	Males	Females	Males	Females
$\log(\frac{e_{it}}{1-e_{it}})(-1)$	0.998***	1.033***	1.088***	0.993***	1.001***	0.963***	0.987***
MigrEU	-0.341	-0.382	-0.614	1.114**	0.732	-0.139	0.525
MigrEU(-1)	-0.321	0.953	1.220**	0.617	-0.162	-0.803	-0.701
MigrNOEU	0.188	-1.090*	-0.165	-0.167	0.439	0.259	1.151***
MigrNOEU(-1)	-0.243	0.981*	-0.278	-0.009	-0.611**	-0.417	-1.240***
Hansen Test	15.15	11.66	12.81	12.77	14.91	13.06	11.04
AR(1)	-2.35**	-3.54***	-2.11**	-1.69*	-2.51***	-2.83***	-2.60***
AR(2)	-1.99	11.53	-0.99	0.73	-0.15	-0.96	0.25

Notes: *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. The dynamic panel GMM estimations were performed using Stata software (xtabond 2). Diagnostic tests used are Hansen test of over-identifying restrictions and Arellano-Bond LM test for autocorrelation of residuals AR(1) and AR(2). Instruments are lagged explanatory variables (2 to 3 Lags) and the proportion of immigrants in the total population.

Table 6: Repartition of the workers (in percentage) by origin, gender and educational background

| | EU27_NonNat | | | | | | National | | | | | | Non-EU27 | | | | | |
| | Low | | Medium | | High | | Low | | Medium | | High | | Low | | Medium | | High | |
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Germany	0,58	0,44	0,97	0,71	0,54	0,41	5,33	5,32	28,68	26,34	15,06	10,70	1,22	0,90	1,24	0,71	0,49	0,37
France	0,61	0,45	0,36	0,25	0,21	0,26	10,90	9,45	23,82	19,31	14,98	16,69	0,81	0,49	0,47	0,27	0,39	0,28
United K.	0,30	0,23	1,17	0,88	0,63	0,74	9,49	8,53	22,84	18,08	16,77	16,35	0,30	0,19	0,93	0,67	1,10	0,81
Spain	0,59	0,51	0,87	0,79	0,76	0,61	21,76	12,68	10,61	8,43	16,72	16,41	2,53	1,92	1,56	1,56	0,78	0,91