Do Immigrants Compete with Natives in the Greek Labour Market? Evidence from the Skill-Cell Approach Before and During the Great Recession

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Do Immigrants Compete with Natives in the Greek Labour Market? Evidence from the Skill-Cell Approach Before and During the Great Recession[*]

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Abstract: This study applies the skill-cell approach introduced by Borjas (2003) in order to identify the causal impact of immigration on the employment opportunities of resident workers, using data from two different samples, namely two waves of the Census of Population (1991 and 2001) and the Greek Labour Force Survey (1998-2015). Grouping workers in three education and eight experience classes at the national level, we find small adverse effects on the employment outcomes of natives in the short-run, that are generally not sensitive to alternative education and experience classifications and when accounting for the effective experience of immigrants. However, as for the period between 1998 and 2015, our findings appear to be driven by the negative influence of immigration ascertained in the sub-period during the Great Recession. Remarkably, there is some evidence of complementarity when the pre-recession period (1998-2007) is considered. The less-skilled natives, appear to be the group of workers which is more vulnerable to immigration. Our results also indicate that the effects of immigration are significantly weaker in the long-run. Finally, contrary to earlier studies, we do not find evidence consistent with the idea that migrants push natives towards complex tasks.

JEL: Immigration employment, earnings

Keywords: F22, J15, J31

"Population must always be kept down to the level of the means of subsistence."

Thomas Malthus, An Essay on the Principle of Population (1798)

1. Introduction

Studies analyzing public attitudes towards immigration, indicate that the less-skilled natives in the United States and Europe are more likely to stand in favour of policies aiming at limiting the number of migrants, because they anticipate that foreign-born competitors will deteriorate their labour market opportunities (see e.g. Scheve and Slaughter, 2001) and Gang, Rivera-Batiz and Yun, 2002)[4]. More recently, the global recession and the refugee crisis of 2015 has revived Malthusian fears and further fueled negative sentiments against migrants, among natives. Likewise, the public debate over immigration has heated up in recent years in Greece, as national unemployment rate has reached a record high[5], while at the same time thousands of migrants seeking to move towards Western Europe are trapped in the country.

As one might expect, most research focuses on the effects of immigration on traditional migration countries in North America (Australia, Canada, and the United States) and Europe (France, Germany, and the UK). There is also a growing literature about countries with a short experience in immigration (Italy and Spain)[6]. The main message conveyed by the vast empirical literature is that the effects of immigration are close to zero (see e.g. Longhi, Nijkamp and Poot, 2005; Card, 2009). A notable exception involves the recent work of Borjas (2003, 2006, 2015); Aydemir and Borjas (2007) and Borjas, Grooger and Hanson (2008) who report large adverse effects on the earnings of the less-skilled natives.

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[4] By contrast, Hainmueller and Hiscox (2007) report evidence that the negative attitudes of less-skilled natives towards immigration are driven by racial prejudice rather than due to fears about labour market competition. On the other hand, high-skilled natives tend to believe that immigration generates benefits for the host economy. These findings are consistent with the empirical literature that shows that the effect of immigration on the labour market outcomes of natives is negligible or even beneficial (see e.g..Peri and Sparber, 2009; Peri, 2012; D' Amuri and Peri, 2014).

[5] Greece has been in deep recession since 2008.

[6] See section 3 for a brief view of this literature.

Surprisingly, little attention has been devoted to this subject in Greece, although the country has experienced very large immigration flows since the end of socialism in Eastern European countries in the late 1980s[7]. Specifically, the first major immigration episode took place in 1990 where mostly unskilled immigrants driven by push factors, mainly from Albania, followed by immigrants from Bulgaria, Romania, Georgia, Russia and Ukraine entered the country. The second massive wave of immigrants arrived in 1997 with the collapse of the pyramid schemes in Albania[8]. Immigration then continued with undiminished intensity during the 2000s. However, the number of migrants has stabilized since the onset of the global credit crunch in 2008, which ended abruptly a long period of economic expansion in the Greece.

Greece offers a unique environment for examining how immigration can affect the labour market outcomes of natives. First, the Greek product and labour markets abounds in institutional features (i.e. minimum wage laws, rigid wage bargaining, strict employment protection regulations, inflexible working time arrangements, entry barriers), that prevent wages from adjusting downwards in response to supply and demand shocks and deter new entrants to enter the market (OECD, 2011; IMF, 2013)[910]. It is well documented in the literature that the interaction of entry barriers with other labour market rigidities aggravates the employment impact of immigrants on natives (e.g. Angrist and Kugler, 2003). Second, contrary to other traditional immigration countries, Greece attracts very few high-skilled migrants. On top of that, its foreign population is relatively homogeneous, given that

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[7] We are aware about two simulation-based studies. Sarris and Zografakis (1999) using a computable general equilibrium approach show that illegal migrants adversely affect the real disposable incomes of households headed by an unskilled person. On the other hand, they find that households that are headed by skilled workers or by inactive individuals such as pensioners benefit from illegal immigration. Chassamboulli and Palivos (2013) employing a search and matching framework report evidence that immigration generates gains for skilled natives in terms of wages and employment, while its impact on unskilled natives is ambiguous.

[8] Kasimis and Kassimi."Greece: A History of Migration." Migration Policy Institute. June, 2004.
 http://www.migrationinformation.org/Profiles/display.cfm?id=228

[9] Evidence of limited wage flexibility in Greece is also reported by Clar, Dreger and Ramos (2007), Babecky, Du Caju, Kosma, Lawless, Messina and Rõõm (2010), Fabiani, Kwapil, Rõõm, Galuscak and Lamo (2010). On the other hand, Livanos (2008) provides empirical evidence that contradicts with the policy recommendations of the OECD, i.e. wages are not rigid.

[10] Standard economic theory implies that the short-run adjustment to immigration in flexible labour markets involves changes in wages rather than in employment. By contrast, if wage flexibility is limited, one would expect significant adverse effects on the employment of competing natives.

almost 45% of immigrants stem from Albania (Population Census, 2011). Several theoretical studies suggest that if immigrants are over-represented in one skill group relative to natives, this group losses in terms of wages and employment (see e.g. Gaston and Nelson, 2000; Dustmann, Fabbri and Preston, 2005; Card, 2009). Moreover, recent empirical evidence by Ottaviano and Peri (2006) and Alesina, Harnoss and Rapopor (2016) shows that the benefits from immigration in terms of complementarity and productivity are less pronounced in the case of lower cultural and birthplace diversity. Based on these considerations, it is not implausible to expect that the impact of immigration might be different from countries with a more flexible institutional setting and more diverse foreign population.

In addition, it is important to highlight that: (i) Greece was unprepared to absorb the large and sudden migration waves arrived between 1991 and 1997. (ıı) after adopted the euro in 2001, the Greek economy expanded, mainly due to low interest rates. (ııı) imprudent borrowing eventually resulted in losing capital market access in 2009. As a result, Greece entered into a prolonged depression and successive economic adjustment programmes with EU, ECB and IMF.

Our contribution is fourfold. First, unlike most of the existing studies, we address the nexus between immigration and the employment market outcomes of natives, focusing on a country characterized by institutional features that prevent labour market clearing. Second, we offer quasi-experimental evidence, exploiting information from the exogenous supply shocks stimulated by the collapse of socialism in the early 1990s. Third, to the best of our knowledge, with the exception of D' Amuri and Peri (2014), this paper is the first attempt to study the labour market impact of immigration during contraction. Fourth, following a promising strand of the literature (see e.g. Peri and Sparber, 2009; D' Amuri and Peri, 2014), we examine whether immigration triggers a positive reallocation of natives towards complex and language-intensive tasks, complementary to manual tasks in which immigrants have comparative advantage.

To this end, we employ the national skill-cell approach, introduced by Borjas (2003), using information from two sources. In particular, we use Census data for 1991 and 2001 from IPUMS-I

(2015) and the latest available data from the Greek Labour Force Survey (GRLFS), over the 1998-2015 period. We then *slice* the Greek labour market into education and work experience segments and examine the short-run, partial effect of immigration, by regressing four measures of the labour market performance of natives, namely unemployment to labour force, employment to population, average hours worked, and monthly earnings on immigrant share across skill-cells. Contrary to earlier spatial correlations studies of immigration, the skill-cell analysis is a robust way to identify the causal impact of immigration, as long as the participation of natives across cells is unaffected by the presence of immigrants. Moreover, we also control for the possibility that the pre-immigration labour market experience is not valued in the Greek labour market.

Our main results can be summarized as follows. Overall, immigration appears to deteriorate the employment opportunities of natives in the short-run, either when the Census or the GRLFS data are used. By contrast, there is no significant correlation between immigration and natives' earnings. These findings survive several robustness tests. Yet, when splitting our GRLFS sample in two (1998-2007 and 2008-2015), there is stark contrast in the results. In particular, there is robust evidence that immigration deteriorates the labour market opportunities of natives (earnings included), during the period of the Great Recession. On the other hand, the results for the pre-recession period imply complementarity between natives and immigrants. Interestingly, our findings also suggest that the impact of immigration is significantly weaker in the long-run. Finally, contrary to previous studies, we do not find evidence consistent with the idea that immigrants trigger a positive reallocation of natives towards complex tasks. Instead, we find that natives respond to immigration by moving towards routine-intensive tasks.

The remainder of the paper is organized as follows: In the next Section we offer some key statistics about immigration in Greece. In Section 3 we present the theoretical considerations and make a brief review of the relevant empirical literature. Section 4 describes the data. In Section 5 we discuss the methodology followed in order to estimate the impact of immigration. Also, we offer

some preliminary evidence about the occupational distribution of immigrants and natives. Section 6 reports and discusses the empirical results of the skill-cell analysis. Finally, Section 7 concludes the paper.

2. Immigration to Greece: a summary of key statistics

In this section, we will present some key statistics about immigration in Greece, based on Census and Labour Force Survey data. Since the end of 1980s, push (the collapse of the Communist regimes in Eastern Europe) and pull factors (economic stability until 2008) has transformed Greece from an emigration to an immigration country. Though the absolute number of foreign population (912 thousand) is considerably smaller than it is in traditional migration countries, the ratio of immigrant to native population is highly comparable (9.2%)[11]. In 2011, the largest immigrant group was citizens of Albania (480 thousand), followed by citizens of Bulgaria (76 thousands), Romania (47 thousand), Pakistan (34 thousand) and Georgia (27 thousand).

Figure 1 reports the share of immigrant in total labour force (age 15-64) across the 13 administrative regions of Greece, namely, Attiki[12], Central Macedonia, Sterea & Evoia, Crete, Peloponnesus, Thessaly, Western Greece, Eastern Macedonia, Ionian Islands, Southern Aegean, Epirus, Northern Aegean and Western Macedonia[13]. GRLFS data show a pronounced expansion of the labour force due to immigration in Greece's largest metropolitan centres, that is, Attiki and Central Macedonia. For instance, in Attiki, there are about 15 immigrants for every 100 native-born labour force participants. High immigrant concentrations can also be seen in Crete and South Aegean. On the other hand, the lowest concentration can be observed in Western Macedonia (marginally below 5%). In the rest administrative entities, immigrant concentrations range between 5% and 10%.

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[11] Source: Census of Population.
[12] Attiki is the region which involves the capital of Greece, Athens, and the wider Athens area.
[13] Source: Greek Labour Force Survey.
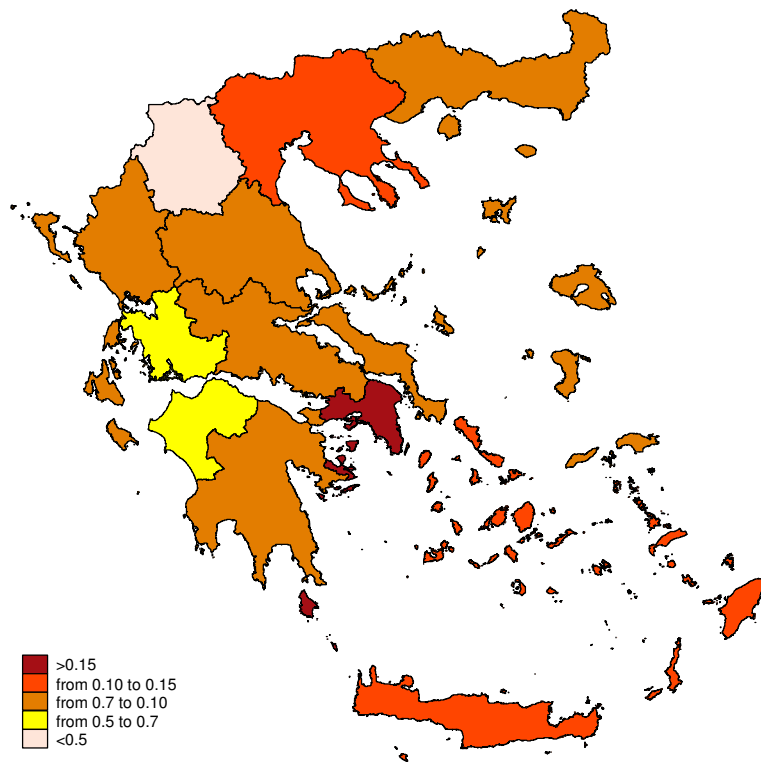
Figure 1. Immigrant share in total labour force by region (2015). Authors' calculations on GRLFS data

Another important feature regarding foreign population in Greece is that about half of immigrants (48%) have lower secondary or less education, compared to 37% of native population. On the other hand, the share of immigrants with university education (14%) falls short of the native share (24%) by about ten percentage points. Moreover, as can be seen in Figure 2[14], (on average) immigrants appear to specialize in routine tasks, while natives tend to specialize in complex tasks [15]. Interestingly recent immigrants (i.e. those with 10 or less years of residence in Greece) appear to be more involved in routine tasks than veteran immigrants (i.e. those with more than 10 years of residence in Greece). Finally, pairwise correlations (reported in the Appendix Table A1) suggest that routine task intensity declines with years of work experience, albeit the correlation between the variables is very low. On

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[14] Source: GRLFS data matched with data reported by Goos, Manning and Salomons (2010)

[15] Using the terminology in Goos, Manning and Salomons (2010), routine tasks require repetitive physical strength or non-complex cognitive skills. Complex tasks are defined as the sum of abstract and service tasks. Abstract tasks are complex problem solving. Service tasks are non-routine tasks, usually performed by workers with lower levels of education

the other hand, there is a strong negative correlation between routine task intensity and the high

education dummy. A similar pattern emerges in D'Amuri and Peri (2014) for a panel of 15 Western

European countries.
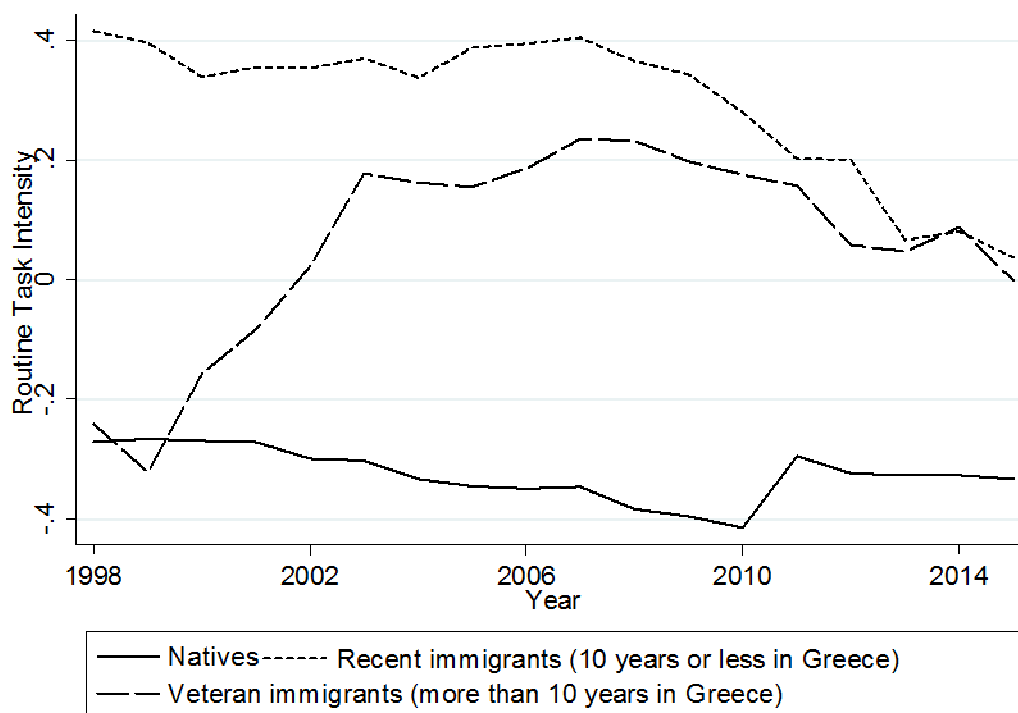
Figure 2. Routine task intensity, natives and immigrants. Authors' calculations on GRLFS data matched with data reported by Goos, Manning and Salomons (2010). Routine task intensity is defined as Routine task importance divided by the sum of Abstract and Service task importances.

3. Theoretical considerations and previous literature

In this section, we discuss the mechanisms proposed in the economic literature by which

immigration can affect the labour market opportunities of native-born population[16]. We also review

the relevant empirical literature. As is common, we distinguish between first-round and second-round

effects. The former entail the short-run adjustments to immigration, based on the supply and demand

model of the labour market, while the latter refer to a set of secondary adjustments (such as

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[16] For extensive reviews of the literature, see, among others, Borjas (1994); Friedberg and Hunt (1995), Okkerse (2008); Dustmann, Frattini and Glitz (2007). Kerr and Kerr (2011); Bodvarsson and van den Berg (2013).

specialization of natives in manual and language intensive tasks, capital responses, changes in output mix, internal migration, to name a few).

The standard textbook model of the labour market, assuming labour homogeneity, predicts that immigration lowers the earnings of natives, pushing some of them out of the labour force, because at the new equilibrium the offered wage falls below their reservation wage[17]. On the other hand, if there is skill diversity within working population, the impact of immigration hinges on whether it changes the balance of skills in the host country. For instance, if the ratio of unskilled versus skilled immigrants is higher than that of natives, immigration is expected to exert a negative influence on the labour market outcomes of the less-skilled natives. By contrast, the more educated natives gain from immigration in terms of wages and employment (see e.g. Alntonji and Card, 1991; Gaston and Nelson, 2000; Dustmann, Fabbri and Preston, 2005, Card, 2009).

However, economists have identified several mechanisms, which can attenuate the initial adverse effects of immigration, implied by the standard model of the labour market. First, the seminal paper of Peri and Sparber (2009) provides theoretical and empirical evidence for the United States that the most vulnerable group of natives (i.e. the less-skilled) respond to immigration by moving into occupations that require communication skills, in which they have comparative advantage[18]. At the same time, immigrants with the same educational attainment concentrate in occupations that require manual skills. Likewise, D'Amuri and Peri (2014); Amuedo-Dorantes and de la Rica (2011), and Ortega and Verdugo (2014) also report evidence consistent with the idea that natives reallocate towards complementary occupations.

Second, Ottaviano and Peri (2005, 2008, 2012) emphasize on the importance of physical capital adjustment. Initially, the decline in capital-labour ratio drives wages down. However, the higher

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[17] Johnson's (1980) elaborate model implies that the magnitude of the effects of immigration depends upon the degree of elasticity of labour supply and demand. When the labour supply or the labour demand is more elastic, wages and employment are expected to change less.

[18] Besides the positive occupational reallocation, natives also tend to acquire more education in response to immigration. Several previous studies support the idea of endogenous skill upgrading (see e.g. Hickman and Olney, 2011; Jackson, 2011; Hunt, 2012; and Eberhard, 2012).

profitability of capital in the short-run attracts investments and hence mitigates the first-round effects of immigration. In this setting, the degree of capital mobility determines the extent to which wages are restored to the pre-immigration levels[19].

Third, immigrants except for workers are also consumers and increase the demand for domestic goods and services. Subsequently, immigrants' participation in the goods market increases the prices of non-traded goods, thereby stimulating the demand for labour. Hence, the short-run adverse effects, likely to ensue from the excess labour supply, might be attenuated in the long-run. (see e.g Hercowitz and Yashiv 2002; Bodvarsson, Van den Berg and Lewer, 2008).

Fourth, as summarized in Edo (2015), immigrants are generally considered to accept lower wages, either because of lower bargaining power (see e.g. Battisti, Felbermayr, Peri and Poutvaara, 2014) or due to lower reservation wage (see e.g. Constant, Krause, Rinne and Zimmermann, 2010). As a result, firms tend to create more jobs since the expected wage they have to pay is lower than it would haven without immigration (see e.g. Chassamboulli and Palivos, 2013).

A fifth adjustment mechanism involves natives' internal migration in response to immigration from abroad. By moving out, natives counterbalance the supply shock induced by immigrants and the effect is dissipated across the country (see e.g. Friedberg and Hunt, 1995). However, The results of the few studies on migrants and natives inter-regional mobility are mixed. For example, Frey (1995) and Borjas (2006) find a significant positive correlation between immigrant inflows and native outflows. By contrast, Card and DiNardo (2000) and Card (2001) document that natives and immigrants are attracted by the same cities[20].

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[19] Capital mobility hinges, to a large extent, on product market flexibility. For instance, barriers to entry are expected to aggravate the negative effects of immigration on natives employment (see e.g. Angrist and Kugler, 2003).

[20] As for Europe, Pischke and Velling (1997), and Glitz (2012) find that native outflows are not associated with higher immigration in German counties. Likewise, little evidence for inter-regional mobility of natives is reported by Hatton and Tani (2005) for the UK.

Last and less important, trade theory[21] implies that the supply shock can be absorbed through changes in output mix rather than changes in factor prices (Rybczynski Theorem, 1955). Most studies however, find no empirical evidence that immigration causes changes in industry mix. Instead, they document that industries respond to migration by using unskilled labour more intensively (see e.g. Lewis, 2003; Dustmann and Glitz 2008; Gonzalez and Ortega, 2011).

Beginning with Grossman's (1982) seminal paper, there is a voluminous empirical literature. Until the early 2000s, the spatial correlations approach, pioneered by Altonji and Card (1991), was the dominant method in identifying the causal of immigrants on the labour market outcomes of natives. Spatial correlations build on the premise that the host economy can be divided in two regional labour markets, and that only one of the two receives immigrants, who are considered perfect substitutes for natives. The impact of immigration is then measured by comparing the labour market performance of natives between the regions (see e.g. Dustmann, Frattini and Glitz, 2007; Bodvarsson and van den Berg, 2013). Empirically, this is done by regressing changes in labour market outcomes of resident workers (wages, employment, participation and so forth) on regional variation of the immigrant share.

However, the fact that immigrants tend to cluster into regions with booming economic conditions gives rise to reverse causality (see e.g. Borjas, Freeman and Katz, 1997; Borjas, 2003)[22]. To address this issue, most studies employ an instrumental variables approach using lagged immigrant concentrations[23]. Nevertheless, the vast majority of the spatial correlations studies fail to detect large adverse effects on resident workers (see e.g. Altonji and Card, 1991; LaLonde and Topel, 1991;

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[21] See Friedberg and Hunt (1995) and Gaston and Nelson (2000 and 2002) for a detailed discussion of how trade theory approaches immigration.

[22] A second problem of the spatial correlations is that natives may respond to immigration from abroad by moving out from regions with high immigrant concentrations. However, as we discussed earlier in this section, most of the empirical studies do not find evidence consistent with this hypothesis.

[23] The idea is that immigrants tend to go in the same cities as old co-nationals (e.g. Bartel, 1989). The main aim of the instrumental variables strategy is to isolate the exogenous (supply-push) component of immigration in order to capture its causal effect (see e.g. Dustmann, Frattini and Glitz, 2007).

Pischke and Velling, 1997; Card, 2001; Lewis, 2003; Dustmann, Fabbri and Preston, 2005; Gonzalez and Ortega, 2011)[24].

Borjas (2003) introduces a new methodological approach to measure the labour market impact of immigration that is not contaminated by the endogeneity bias of the spatial correlations. Instead of using regional variation of migrant concentrations, Borjas focuses on the national labour market and groups workers in education and experience cells[25]. Hence, as summarized in Dustmann, Frattini and Glitz (2007), this method excludes the possibility that immigrants are self-selected into cells where wages or the probability of employment are higher, since only educational upgrading allows workers to switch between skill-cells. Equally important, individuals are considered imperfect substitutes within education groups if they have different levels of labour market experience. Borjas using Census data for the 1960-2000 period finds that a 10% rise in immigration reduces on average weekly earnings by about 4%. Estimations within schooling groups imply large adverse effects on those workers with at most high school education and positive effects on college graduates. Nevertheless, this methodology is not immune to criticism. Ottaviano and Peri (2012) challenged Borjas findings by allowing for imperfect substitutability across and within skill-cells. In this framework, Ottaviano and Peri find a positive effect on native wages and a negative effect on the wages of previous immigrants.

Regarding empirical evidence for European labour markets, Bonin (2005) finds that the less-qualified workers is the group of natives more vulnerable to immigration. Carrasco, Jimenez and Ortega (2008) find no significant effects during the second half of the 1990s in Spain. Likewise, D'

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[24] Some other studies deal with endogeneity by looking at natural experiments, that is, exogenous, supply push immigrant inflows (Okkerse, 2008). For instance, Card (1990) analyzes the impact of Cuban immigrants in Miami. Another examples are Algerian "repatriates" in France (Hunt, 1992), Russian immigrants in Israel (Friedberg, 2001), and "retornados" from African colonies in Portugal (Carrington and de Lima, 1999). Surprisingly, these studies also report negligible effects. Recently, Borjas (The wage impact of Marielitos: A Reappraisal, forthcoming at the Industrial and Labor Relations Review) re-evaluates the impact of Cuban refugees in Miami and finds evidence that contradicts with Card's findings. More precisely, he concludes that the average drop experienced by the less-skilled Miamians was between 10 and 30 percent.

[25] Some other studies examine the effects of immigration in occupations instead of education-experience cells. See for instance, Friedberg (2001) and Orrenius and Zavodny (2007).

Amuri, Ottaviano and Peri (2010) investigating the impact of immigration in Western Germany for the 1987-2001 period find little evidence of adverse effects on natives. Instead, they report large adverse effects on the employment of previous immigrants. Manacorda, Manning and Wadsworth (2012) find evidence consistent with the idea of imperfect substitution between immigrants and natives in the UK. Ortega and Verdugo (2014) report positive effects of immigration on the wages and employment of resident workers on the French labour market, partially explained by the positive re-allocation of natives towards (better paid) complex tasks. By contrast, Edo (2015 and 2016) provides empirical evidence that immigrants displace native in France.

4. Data

Our examination of the impact of immigration on the labour market outcomes of natives relies on data drawn from two different samples. In particular, we use data from two waves of Census of Population for 1991 and 2001; and data from the Greek Labour Force Survey (GRLFS) over the 1998-2015 period. The dependent variables are the log of monthly wage[26][27], deflated to 2010 euros by using the CPI series (downloaded from the AMECO database, available at: http://ec.europa.eu/economy_fi-na-nce-/ameco/user/serie/SelectSerie.cfm) the unemployment to labour force ratio, the employment to population ratio and the weekly average hours worked.

In line with existing studies, when we aggregate microdata to construct the employment variables and immigration share, we use the personal weight provided by the GRLFS (variable *COEFF*). As for wages, we pre-multiply the personal weight by the actual number of weekly hours worked

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[26] We follow Borjas (2003) and Borjas, Grogger and Hanson (2012) and take the mean of the log wages of natives when aggregating the LFS data for native workers instead of the log of the average wages.
[27] Since the GRLFS asks individuals to report their wage in bands, rather than precise figures, we follow the common practice and use the median wage per band in our estimations. For some recent applications with GRLFS wages see among others Livanos (2008) and Christopoulou and Monastiriotis (2014, 2016).

(variable *or_rR*) and then we take the weighted average across skill-cells using the above product as the weight.

The analysis focuses mainly on male individuals aged 15-64[28]. We classify natives into three education categories, those with lower secondary education or below, those with upper secondary educational attainment, and college graduates. As it is common in the relevant literature, we define immigrants all those individuals born outside Greece. Labour market experience is calculated as age minus age of entry in the labour market[29]. We assume that individuals with lower secondary education or below, secondary education, university education, post-tertiary education enter the labour market at 17, 19, 23 and 27 years of age respectively. Following Borjas (2003) we restrict our analysis to individuals with 1 to 40 years of labour market experience. The three skill categories are grouped into 5 year experience intervals, that is, 1-5, 6-10, 11-15, 16-20, 21-25, 26-30, 31-36, 36-40. Consequently, we end with twenty four education by experience cells in each calendar year.

Our key independent variable is the ratio of immigrants in the labour force to the total labour force. More precisely, the immigrant supply shock in each skill cell is given by:

$$p_{ijt} = \frac{M_{ijt}}{N_{ijt} + M_{ijt}}$$

where N_{ijt} and M_{ijt} denote respectively the number of natives and immigrants in the education-experience cell.

Figure 4 shows the supply shocks experienced by different skill groups between 1998 and 2015. As can be seen, the group experienced the largest supply shock is that of the less-skilled natives. However, the share of immigrants declines with experience in 1998 and 2006. On the other hand, it follows an inverted U-shaped pattern in 2015. As for the groups of high school and university

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[28] Nevertheless, we offer some results for female workers as well.
[29] Because it is not possible to account for the workers' actual experience in the labour market, and since potential experience is prone to errors, we check the robustness of our baseline results by assigning workers into age instead of experience classes.

graduates, the largest immigrant concentrations are generally observed in the middle experience classes.
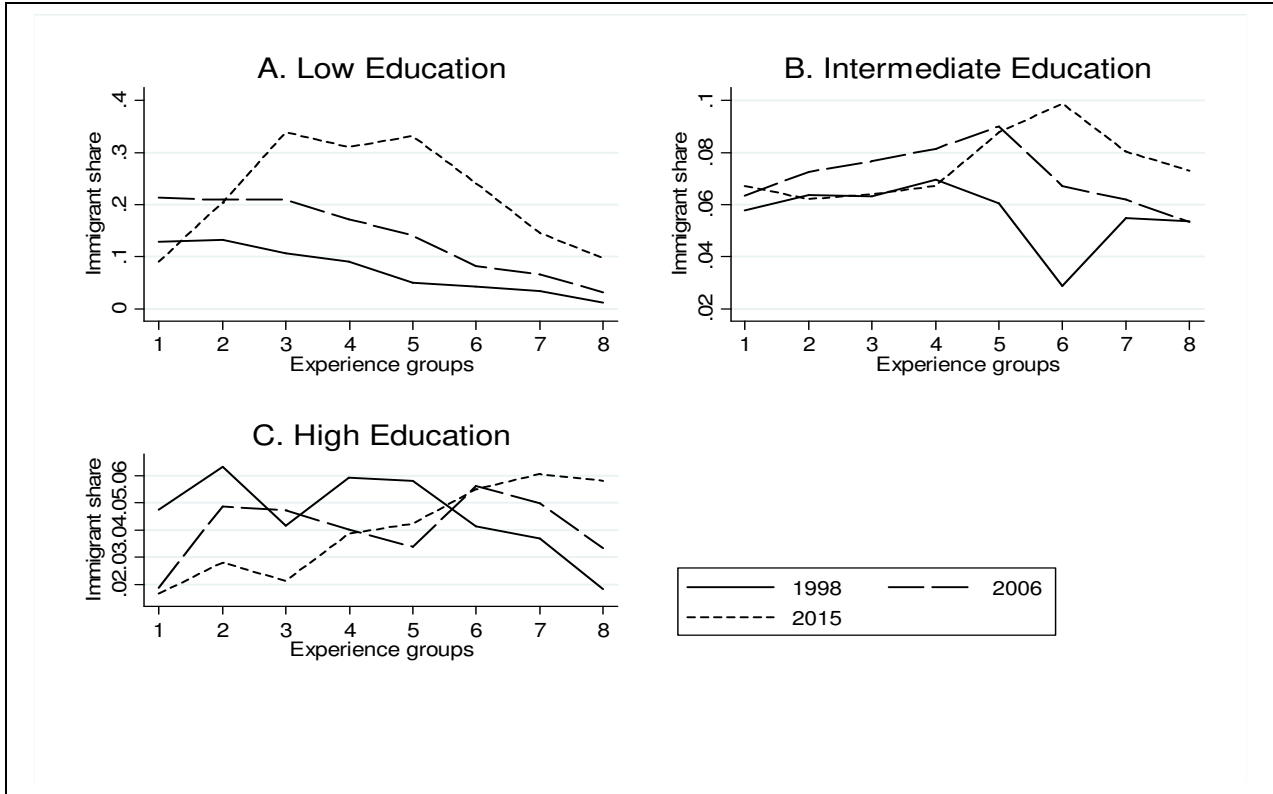
Figure 3. The Immigrant Supply Shock (1998-2015). Experience groups are defined in five-year intervals. Low education corresponds to lower secondary education or below education. Medium education corresponds to upper secondary or post-secondary non-tertiary education. High education corresponds to tertiary or post-tertiary education.

5. The skill-cell approach

To examine the effect of foreign-born workers on the employment opportunities of resident workers we use the national labour market approach introduced by Borjas (2003). In particular, we estimate the following empirical model[30]:

$$y_{ijt} = \theta p_{ijt} + s_i + x_j + \pi_t + \left(s_i \times x_j\right) + \left(s_i \times \pi_t\right) + \left(x_j \times \pi_t\right) + \varphi_{ijt} \qquad (1)$$

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[30] Except otherwise specified, we use analytic weights in STATA in order to down-weight cells with small number of observations. The weight is the sample size of the education-experience-period cell (see e.g. Borjas, 2003; and Borjas, Grogger and Hanson, 2008).

where y_{ijt} is the value of the mean labour market outcome for Greek workers in cell (i, j, t), namely the mean log monthly wage, the unemployment to labour force ratio, the employment to population ratio, and the average hours worked; s_i is a vector of dummies indicating the educational attainment, x_j is a vector of experience dummies, π_t is a vector of time dummies, $(s_i \times x_j)$ stands for the interaction between education and experience fixed effects, $(s_i \times \pi_t)$ is the interaction between education and year fixed effects, and $(x_j \times \pi_t)$ is the interaction between experience and year fixed effects.

This saturated model with the full set of fixed effects and their interactions reduces the risk of spurious correlation due to omitted variables bias and guarantees that the estimated coefficients represent a robust approximation of the causal impact of immigration[31]. However, one important concern to the validity of the skill-cell approach is that the distribution of natives and immigrants is not very similar. To consider this possibility, we follow Borjas (2003), Steinhardt (2011) and Ortega and Verdugo (2014), and compute Welch's (1999) index of congruence, which is similar to a correlation coefficient. That is, the higher the index, the more equal the occupational distribution is. The index is given by the following relationship:

$$C_{nm} = \frac{\sum_c (q_{nc} - \bar{q}_c)(q_{mc} - \bar{q}_c)/\bar{q}_c}{\sqrt{\sum_c (q_{nc} - \bar{q}_c)^2 \sum_c (q_{mc} - \bar{q}_c)^2/\bar{q}_c}} \tag{2}$$

where q_{hc} is the proportion of group h ($h = n, m$) employed in occupation c, and $\bar{q}_c$ is the labor-force average.

The results reported in Table 1 suggest that the less-skilled (lower secondary education or below) and the high-skilled (university graduates) native and foreign-born workers are generally clustered into similar occupations within education and experience cells. However, the correlation is significantly lower than the evidence from the United States and France indicates[32]. On the other

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[31] Ottaviano and Peri (2012) juxtapose that such a demanding model absorbs a very large part of panel variation and results in inflated standard errors.
[32] See Borjas (2003, table2, p. 1346) and Ortega and Verdugo (2014, table 5, p. 39). On the other hand, Steinhardt

hand, with the exception of the less experienced workers, natives and foreigners with a high school diploma work appear to work in different occupational segments. All in all, we can reasonably assume that, despite some discrepancies, natives and immigrants are relatively good substitutes in the labour market[33][34]

Table 1 Index of Congruence of Occupational Distributions within Education Group, 1998-2015

Education-experience of native groups:	Experience of immigrants			
	1-10 years	11-20 years	21-30 years	31-40 years
Primary and lower secondary education				
1-10 years	**0.483**	0.438	0.370	0.305
11-20 years	0.436	**0.439**	0.399	0.343
21-30 years	0.315	0.354	**0.372**	0.345
31-40 years	0.250	0.297	**0.331**	0.311
Upper secondary education				
1-10 years	**0.362**	0.046	-0.064	-0.117
11-20 years	**0.015**	-0.155	-0.200	-0.206
21-30 years	-0.199	-0.199	-0.189	**-0.166**
31-40 years	-0.262	-0.268	**-0.240**	-0.207
University graduates				
1-10 years	**0.556**	0.314	0.082	0.056
11-20 years	**0.529**	0.362	0.128	0.096
21-30 years	**0.513**	0.381	0.174	0.141
31-40 years	**0.527**	0.418	0.246	0.197

Note. The table reports the index of congruence across 52 occupations for the 1998-2015 period between natives and immigrants with the same educational background. The index is defined in equation (2). Authors' calculations on GRLFS data.

Before concluding this section, we follow Borjas (2003), and demonstrate the link between our key measures of the labour market performance of natives, namely monthly earnings, aggregate

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(2011) finds that natives and immigrants with comparable human capital work in different occupations in Germany (see table 2, p.14).

[33] We should however highlight that the majority of previous studies has largely ignored that natives and immigrants might have very dissimilar occupational distribution.

[34] One final concern is that natives' skill formation is not endogenous to immigration (Ortega and Verdugo, 2014). As we discussed in Section 3, some empirical studies provide evidence that supports the idea that immigration affects natives' educational attainment. If Greek workers invest in education as a response to immigration, our results will be biased towards zero.

employment and unemployment, and the immigrant share within our schooling-experience groups. More precisely, we use the GRLFS data, partially reported in Appendix Tables A2 A3, A4 and A5 and calculate annual changes for each skill group. In Figure 4 we report simple correlations between these annual changes over the period between 1998 and 2015. As can be observed, Panel A shows a strong positive relationship between changes in immigrant share and changes in natives' unemployment. On the other hand, Panels B and C indicate a significant negative correlation between changes in immigrant share and changes in natives' employment and earnings.

Altogether, the evidence reported in Figure 4 suggests that immigrants displace natives in the Greek labour market. Importantly, it is evident that the link between immigration and the labour market outcomes of natives is not driven by outlying observations.

Native unemployment and immigration
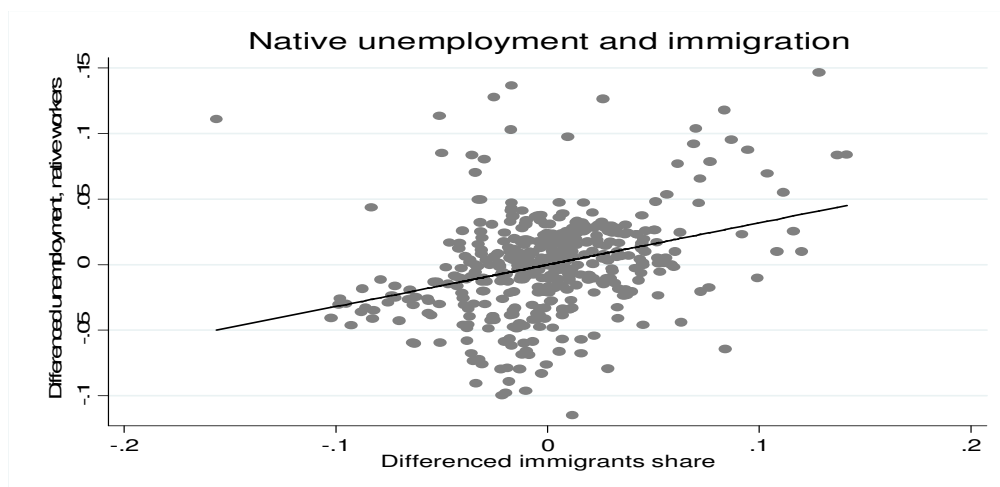
Panel B Slope of the regression line: -0.46, standard error 0.04

Native employment and immigration
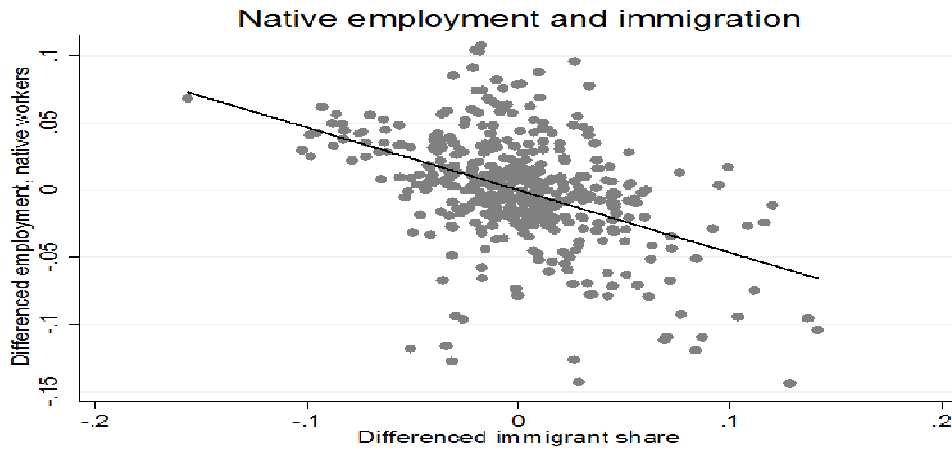
Panel C Slope of the regression line: -0.39, standard error 0.10
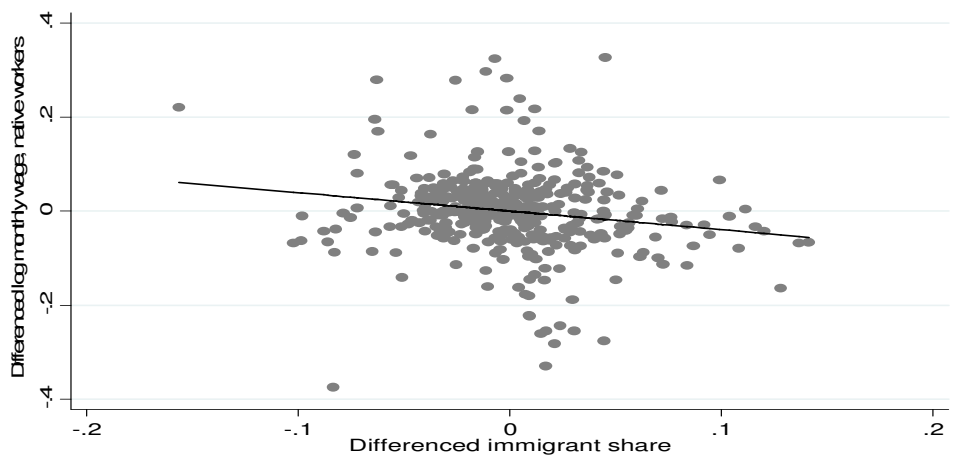
Figure 4. Scatter Diagram relating immigration and three measures of the labour market performance of natives

6. Results

Thus far, we have provided some preliminary evidence, that unskilled and skilled immigrants and natives of the same educational attainment have quite similar occupational distribution. In this section, we present the main findings of the present paper and several robustness checks of the results. The first set of empirical results are shown in Table 3. The dependent variable is the mean value of the employment outcomes of natives across education-experience cells, namely unemployment to labour force, employment to population and weekly average hours worked. The main explanatory variable is the immigrant share. All variables are calculated using the GRLFS data over the 1998-2015 period. As we discussed in Section 5, we follow Borjas (2003) and include the full set of possible fixed effects in order to control for omitted variables bias, that is, we use education, experience, and period fixed effects, as well as education by year, experience by year and education by experience fixed effects. We also report heteroscedasticity robust standard errors that are clustered within education-experience cells.

The first row of Table 3 indicates that immigration is negatively correlated with the employment and average hours, and positively with the unemployment of male workers. The estimated coefficients imply that a 10% increase in the labour supply due to immigration increases native unemployment by 1.8% and decreases native employment and average hours by 3% and 1.6%[35]. In the second row, we examine whether veteran immigrants (i.e. those with more than 10 years in Greece) are substitutes with recent immigrants. As it is evident, the positive correlation between immigration and the unemployment rate of veteran immigrants is stronger than it is for natives. However, the findings for the employment and average hours do not comport with the hypothesis that labour market competition is heavier among immigrants.

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[35] The results are converted into elasticities by multiplying the estimated coefficients by $1/\left(1 + m_{ijt}\right)^2$, where $m_{ijt} = M_{ijt}/N_{ijt}$ is the mean value of the share of immigrants during the period under consideration (8.98%). The elasticities reported in the main text are then given by 0.219×0.84, -0.365×0.84 and -0.196×0.84. See Borjas (2003) for more details.

In rows (3) and (4), we examine whether the impact of immigration is different before and during the Great Recession. Indeed, our findings indicate that immigration has a robust adverse effect on the employment outcomes of natives during the economic downturn. On the other hand, immigration appears to have been absorbed by the Greek economy over the course of the economic expansion (1998-2007) without negative effects on natives. Thus, the evidence suggests that the effect of immigration is closely related to the phase of the business cycle during which is analyzed.

In the fifth row, we follow Borjas (2003) and control for the possibility that the immigration is driven by changes in the native workforce. In particular, we add log native labor force as regressor. As can be seen, the results remain quantitatively intact, thereby pointing to the robustness of our baseline specification. The results also appear to be robust even when employing regressions without weights (Row 6). Row (7) uses hours instead of labour market participation as the key exogenous covariate. Again, the results suggest small adverse effects on the employment opportunities of native male workers.

Given that labour market participation may introduce some endogeneity, in Rows (8) and (9) we report evidence from an instrumental variables approach[36]. Besides addressing potential endogeneity, Two-Stage Least Squares Estimates are also considered to attenuate the consequences of measurement error in the key independent variable (e.g. Dustmann Fabbri and Preston, 2005). Specifically, we use the immigrant share one period before and the share in the working age population, assuming that there is significant correlation with contemporaneous immigrant share but no correlation with the employment outcomes variables. In Row (8), the estimated impact of immigration accounting for potential endogeneity is stronger and highly statistically significant. The results also suggest that measurement error in the key independent variable may also induce downward bias. By contrast, Row (9) returns parameter estimates, quite similar to those reported in the baseline specification.

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[36] Using the terminology in Borjas and Aydemir (2011), measurement error causes the so-called attenuation bias, which results in underestimation of the actual impact of immigration.

Specification (10) accounts for attenuation bias in a different way. Specifically, we merge years by pairs beginning with 1998/1999 and ending with 2014/2015, in order to increase the sample size per skill-cell as in Edo (2015). Evidently, the link between immigration and the employment outcomes variables appears to be stronger than in the baseline specification.

Next, pooling men and women (Row (11)), yields estimates very similar to those reported without including females. The twelfth specification, reports evidence of imperfect substitutability between female natives and immigrants. In Rows (13) to (16) we check the robustness of our baseline results by: (1) dropping from the sample those cells with less than 300 observations, (2) grouping workers into four, ten year experience bands, (3) using four education groups (primary education, lower secondary, upper secondary and university), (4) classifying workers into two education categories (high school education or below and university) and (5) using age bands instead of experience bands. As can be verified, the unemployment results remain qualitatively identical to those reported in Row (1). By contrast, the results regarding employment and average hours appear to be somewhat sensitive. Nevertheless the pattern of the coefficients is consistent with the hypothesis of imperfect substitution between immigrants and natives in the short-run.

In Rows (18) and (19), we move beyond average effects and estimate the regression model within schooling and experience groups[37]. The group of natives with ten years of experience and below and that of the less-skilled appear to be more adversely affected by immigration. In contrast, high-school and university graduates gain in terms of employment. Finally, in the fourth row of Specification 18, we eliminate individuals with less than ten and more than thirty years of experience[38]. Although the estimated impact appears to be slightly weaker, the results, once again suggest that immigration deteriorates the employment opportunities of natives in the short-run.

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[37] Note, however, that the within education groups estimations must be interpreted with some caution, since they include only experience and year fixed effects.

[38] The idea is to check the robustness of the baseline results by removing workers with low attachment to the labour market, that is, young and near retirement individuals (see e.g. Bratsberg, Raaum, Røed and Schøne, 2014)

Table 3 The Impact of the Immigrant Share on the Labour Market Opportunities of Native Education-Experience Groups

Dependent variable	Unemployment to Labour Force	Employment to Population	Average hours	Obs.
1. Baseline Regression	0.219***	-0.365**	-0.196*	432
	(0.039)	(0.153)	(0.097)	
2. Long term immigrants	0.380***	-0.328*	0.022	432
	(0.131)	(0.175)	(0.155)	
3. 2008-2015 subsample	0.219*	-0.702***	-0.457***	192
	(0.115)	(0.155)	(0.134)	
4. 1998-2007 subsample	0.020	0.082	-0.119**	240
	(0.050)	(0.138)	(0.056)	
5. Includes log native labor force as regressor	0.218***	-0.283***	-0.177**	432
	(0.039)	(0.093)	(0.084)	
6. Unweighted Regression	0.279***	-0.441**	-0.196	432
	(0.062)	(0.210)	(0.117)	
7. Hours instead of labour force.	0.239***	-0.343***	-0.232**	432
	(0.035)	(0.104)	(0.087)	
8. Immigrant share one period before. IV	0.691***	-1.112***	-0.448**	336
	(0.113)	(0.281)	(0.215)	
9. Immigrant share in working age population. IV	0.228***	-0.280**	0.0235	432
	(0.034)	(0.121)	(0.054)	
10. 9 years instead of 18	0.367***	-0.662*	-0.365	216
	(0.103)	(0.349)	(0.219)	
11. Men and women in the dependent variable and p_{ijt}	0.195***	-0.430***	-0.159	432
	(0.053)	(0.136)	(0.096)	
12. Only women in the dependent variable and p_{ijt}	-0.035	-0.178	-0.173	432
	(0.055)	(0.108)	(0.109)	
13. At least 300 observations per skill cell	0.208***	-0.373**	-0.172*	407
	(0.069)	(0.146)	(0.086)	
14. Four experience groups	0.209***	-0.111	-0.059	216
	(0.059)	(0.165)	(0.074)	
15. Four education groups	0.113***	-0.172**	-0.001	576
	(0.034)	(0.073)	(0.099)	
16. Two education groups	0.254***	-0.310	-0.210	288
	(0.035)	(0.181)	(0.126)	
17. Age instead of experience bands	0.120***	-0.130	-0.027	432
	(0.029)	(0.078)	(0.064)	
18. Heterogeneous effects by experience				
- experience [1-10]	0.271***	-0.803*	-0.026	108
	(0.061)	(0.324)	(0.054)	
- experience [11-20]	-0.018	-0.202	-0.207**	108
	(0.122)	(0.177)	(0.052)	
- experience [21-30]	0.240*	-0.263*	-0.185	108
	(0.107)	(0.119)	(0.106)	
- experience [31-40]	-0.118	-0.733*	0.027	108
	(0.077)	(0.355)	(0.178)	

(*Continued*)

23

Table 3 Continued

- experience [11-30]	0.192**	-0.182*	-0.049	216
	(0.066)	(0.091)	(0.0.72)	
19. Heterogeneous effects by education				
- low education	0.220***	-0.413***	-0.239**	144
	(0.054)	(0.069)	(0.096)	
- secondary education	-0.676*	0.231	0.169	144
	(0.294)	(0.539)	(0.099)	
- university education	-0.519**	0.353	0.024	144
	(0.204)	(0.308)	(0.082)	

Notes. Sample I: GRLFS data. The table reports the coefficient of the immigrant share variable from regressions where the dependent variable is the mean labor market outcome for a native education-experience group for the 1998-2015 period. Each cell contains estimates from a separate regression. Standard errors are reported in the parentheses below the estimated coefficients, and are adjusted for clustering within education-experience cells. All regressions, except for those reported in row 6, are weighted by the sample size of the education-experience-period cell. All regressions, except for those reported in row 19, include education, experience, and period fixed effects, as well as interactions between education and experience fixed effects, education and period fixed effects, and experience and period fixed effects. Regressions in row 19 include experience and year fixed effects.
***, **, and * denote statistical significance at the 1, 5, and 10% level, respectively.

In Table 4, we report similar estimates[39], using Census data for years 1991 and 2001. As can be observed, immigration bears a positive and significant coefficient when the dependent variable is native male unemployment. Remarkably, and contrary to the results shown in Table 3, there is also a positive correlation between the immigrant share and female unemployment. As for employment, we do not find statistically significant effects of immigration. In the last row, we estimate the impact of migrants on average hours worked. Again, our key independent variable enters with a negative and significant coefficient when the case of male workers is considered. In all other instances, immigration appears with a negative coefficient, but it is no significant at the standard significant levels.

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[39] In particular, we present results where the labour market is sliced into three education and ten age bands. We prefer this classification with Census data, given that it allows us to increase (slightly) the number of observations. Nevertheless, results (not reported) obtained via the usual education and experience bands are remarkably very similar to those in Table 3.

Table 4 Impact of Immigrant Share on the Employment Outcomes of Native Education-Age Groups

	Men	Women	Pooled Men and Women
Unemployment to labour force	0.275**	0.681***	0.408***
	(0.106)	(0.232)	(0.124)
Employment to population	-0.047	-0.148	-0.097
	(0.159)	(0.360)	(0.756)
Average hours worked	-0.182**	-0.072	-0.117
	(0.081)	(0.142)	(0.368)

Sample II: Census data 1991 and 2001. The table reports the coefficient of the immigrant share variable from regressions where the dependent variable is the mean labor market outcome for a native education-age group. Standard errors are reported in parentheses and are adjusted for clustering within education and age cells, All regressions are weighted by the sample size of the education-age-period cell. The regressions reported in the columns (1-2) have 60 observations. The regressions reported in the third column have 120 observations. All regressions include education, age, and period fixed effects, as well as interactions between education and age fixed effects, education and period fixed effects, and age and period fixed effects.

   ***, **, and * denote statistical significance at the 1, 5, and 10% level, respectively.

In Table 5 we regress the mean log monthly earnings of natives on immigration and the usual set of fixed effects, namely education, experience, year, education by year, experience by year and education by experience fixed effects. We report WLS and OLS estimates of equation (1) for the entire period by gender, as well as separate estimates for the period before and during the Great Recession[40]. In Columns (1-3), we report results for all workers, weighted for hours worked, while in Columns (4-6) we exclude workers with low attachment to the labour market, that is, workers with less than 35 weekly hours worked[41]. The idea is that if native workers with low attachment to the labour market respond to immigration by moving out of employment, the average native wage will increase, resulting in an upward bias in estimates of the direct effect of immigration on wages (e.g. Bratsberg and Raaum, 2012).

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[40] Wage results using data from the Survey of Income and Living Conditions (SILC), are remarkably similar to those shown in Table 5 and are available upon request from the authors

[41] In their empirical analysis, Borjas, Grogger and Hanson (2008), Ottaviano and Peri (2012) and Bratsberg, Raaum, Røed and Schøne (2014) also report separate estimates from samples including and excluding part-time workers.

Table 5 The Impact of the Immigrant Share on the Log Monthly Earnings of Native Education-Experience Groups

Specification	(1) WLS	(2) Unweighted	(3) Before GR	(4) During GR	(5) WLS	(6) Unweighted	(7) Before GR	(8) During GR
	All workers, weighted by hours				Full time workers only			
Panel A. Average effects								
Men	0.029	-0.296**	0.353**	-0.264*	0.043	-0.163**	0.276	-0.254*
	(0.072)	(0.107)	(0.153)	(0.135)	(0.057)	(0.061)	(0.169)	(0.126)
Women	0.099	0.216	0.097	-0.267	-0.118	0.041	0.243	-0.398
	(0.233)	(0.181)	(0.112)	(0.208)	(0.188)	(0.094)	(0.176)	(0.366)
Pooled Men and Women	0.100	-0.090	0.247*	-0.292*	0.102*	-0.016	0.200	-0.195
	(0.071)	(0.079)	(0.125)	(0.126)	(0.056)	(0.035)	(0.053)	(0.157)
Panel B. Heterogeneous effects by education group								
Men, Lower Secondary or below	0.001	-0.362***	0.280	-0.350**	0.017	-0.209***	0.232	-0.327**
	(0.064)	(0.104)	(0.207)	(0.152)	(0.055)	(0.053)	(0.230)	(0.144)
Men, High School Graduates	-0.055	0.076	-0.108	-0.053	-0.100	0.026	-0.219	-0.107
	(0.237)	(0.359)	(0.331)	(0.229)	(0.218)	(0.315)	(0.351)	(0.281)
Men, University Graduates	0.305	0.160	1.204***	0.148	0.402	0.211	1.119***	0.210
	(0.279)	(0.334)	(0.256)	(0.525)	(0.257)	(0.280)	(0.315)	(0.577)
Panel C. Heterogeneous effects by experience group								
Men 1-10 years of experience	0.206	-0.174	0.492	-0.288**	0.294**	0.228*	0.249	0.026
	(0.185)	(0.110)	(0.352)	(0.107)	(0.095)	(0.091)	(0.342)	(0.359)
Men 11-20 years of experience	0.249	0.348*	0.081	0.416	0.268	0.281	0.088	0.410
	(0.324)	(0.173)	(0.426)	(0.271)	(0.320)	(0.204)	(0.446)	(0.369)

(Continued)

Table 5 Continued

Men 21-30 years of experience	0.251	0.112	0.461	-0.656*	0.139	0.006	0.227	-0.674**
	(0.206)	(0.160)	(0.410)	(0.291)	(0.148)	(0.122)	(0.387)	(0.260)
Men 31-40 years of experience	0.732***	0.828***	1.302***	0.559*	0.777***	0.850***	1.398***	0.593*
	(0.161)	(0.128)	(0.147)	(0.241)	(0.146)	(0.141)	(0.174)	(0.257)

Notes. Sample I: GRLFS data. The table reports the coefficient of the immigrant share variable from regressions where the dependent variable is the log of monthly earnings for a native education-experience group for the 1999-2015 period. Standard errors are reported in the parentheses below the estimated coefficients, and are adjusted for clustering within education-experience cells. All regressions, except for those reported in rows 2 and 5, are weighted by the sample size of the education-experience-period cell. Except for specifications in Panel B, all regressions include education, experience, and period fixed effects, as well as interactions between education and experience fixed effects, education and period fixed effects, and experience and period fixed effects. The regressions reported in Panel B include experience and period fixed effects.

   ***, **, and * denote statistical significance at the 1, 5, and 10% level, respectively.

Usually, we find that there are no significant discrepancies between the all workers and full-time workers sample, a result implying that our estimates are immune to upward bias. WLS estimates indicate that the impact of immigration clusters around zero in male equations. Remarkably, regressions without weights indicate negative and significant effects on native wages, a result arguably driven by those cells with small number of observations. For instance, the implied elasticity for full-time workers is about -0.14, indicating that a 10% increase in labour supply due to immigration decreases the average wage of male workers by 1.4%. Yet, when we split our sample in two subsamples (1999-2007 and 2008-2015), we find that immigrants exert a positive significant influence on male earnings before the Great Recession, while a robust negative relationship is ascertained during the Great Recession[42].

As for women, we fail to establish a significant link with immigration, even during the Great Recession. For this particular period, however, the estimated coefficients become more negative. When we pool men and women, we find a positive and significant coefficient for the sample of full time workers. Again, there is evidence that the impact of immigration differs with the stage of the business cycle. That is, migrants complement natives during the phase of economic expansion, and exert a harmful effect during contraction.

In Panel B, we estimate the wage equations separately for each education group. The first row shows a negative significant effect on the wages of less-skilled natives during the Great Recession. On the other hand, the impact of immigration on the earnings of high-school graduates turns out to be statistically insignificant in all specifications. Interestingly, university graduates appear to gain from immigration in terms of wages during the 1999-2007 period.

Panel C reports estimates by experience groups. With the exception of the positive and significant relationship between the earnings of men with 31-40 years of working experience and

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[42] The fact that Greece has been in deep recession since 2008 can be a confounding factor for the negative effects. Yet, when we introduce stronger controls (i.e. the unemployment rate per skill-cell), the results remain unaffected (we thank Giovanni Peri for bringing this fact in our attention).

immigration, we usually do not find significant results. There is, however, some evidence consistent with idea that immigration is harmful for the less-experienced native males and those with 21-30 years of working experience during the Great Recession.

Accounting for effective experience

Thus far, we have assumed perfect transferability of human capital between Greece and the sending countries, that is, natives and immigrants pre-immigration experience is equally valued in the Greek labour market. However, given that immigrants upon arrival lack country-specific human capital (i.e. knowledge of language, host-country norms, nature of the labour market) (Chiswick, 1978) an instructive exercise involves calculating "effective experience" before assigning them into education-experience cells and then compare the results to those obtained using the actual experience. Hence, following Borjas (2003)[43], we assume that effective years of experience for immigrant workers are given by:

$$X = \begin{cases} \alpha(A_m - A_T) + \beta(A - A_m), & if \; A_m > A_T \\ \gamma(A - A_T) & if \; A_m \leq A_T \end{cases}$$

where A_m denotes the age of entry in Greece and A_T the age of entry into the labour market. Parameters α and β (using the nomenclature in Borjas, 2003) translate experience acquired abroad and in Greece respectively by immigrants who migrated as adults (i.e. $A_m > A_T$), into equivalent value of experience acquired by natives. Likewise, γ rescales experience of immigrants who migrated as children (i.e. $A_m \leq A_T$).

Next, we estimate the following generic assimilation regressions for immigrants who entered Greece as adults and children respectively[44]:

$$logw = s_i + \phi_1^A Experfor + \phi_2^A Expergr + \delta Y + \rho\pi + \phi \quad if \; A_m > A_T \tag{3}$$

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[43] See also Cohen-Goldner and Paserman (2011). On the other hand, Bratsberg, Raaum, Røed and Schøne (2014) account for effective experience by simply ignoring any pre-arrival experience for Norway.
[44] Because in the GRLFS the variable years since immigration takes value 11 for immigrants with more than 10 years of residence in Greece for the 1999-2007 period, we cannot distinguish between adult and child immigrants for that period. Hence, the analysis is restricted to data drawn from 2008 to 2015 cross-sections.

$$logw = s_i + \phi_1^C Expergr + \delta Y + \rho\pi + \phi \qquad\qquad if\ A_m \leq A_T \qquad (4)$$

where s_i denotes education fixed effects, Y are cohort of immigration dummies and π are year fixed effects. As for native workers, we estimate the following standard Mincerian specification:

$$logw = s_i + \phi_1^N Expergr + \rho\pi + \phi \qquad\qquad\qquad\qquad (5)$$

Effective experience is then calculated using the following weights.

$$\alpha = \frac{\phi_1^A}{\phi_1^N},\ \beta = \frac{\phi_2^A}{\phi_1^N},\ \gamma = \frac{\phi_1^C}{\phi_1^N}. \qquad\qquad\qquad (6)$$

The results (reported in Appendix Table A7) for the relevant coefficients from the above equations[45] indicate that the experience of natives and child immigrants is almost equally valued by Greek employers (as in Borjas, 2003). This implies that the weight γ is estimated to be 1. Similarly, the implied weight β is also 1. On the contrary, given that the payoff to pre-immigration labour market experience is insignificant and close to zero, the implied weight α is 0.

Consequently, we have to eliminate pre-immigration experience for adult immigrants and assign them into skill-cells accordingly. Since the mean value of source country experience is about 9.7 years, the adjustment for effective experience reallocates adult immigrants into lower experience cells and the supply shock in these cells becomes heavier than it is when actual experience is considered as in Bratsberg, Raaum, Røed and Schøne (2014).

In Table 6, we present immigrant share coefficients, after having adjusted the sample for the effective experience of adult immigrants. Given that the estimates for effective experience cover the 2008-2015 period, the comparison with the estimates from the actual experience involves the entries in the third Row of Table 3 and the eighth Column of Table 4. As can be observed, the sign and the significance of the immigrant share remain unchanged. However, with the exception of male earnings, the effect appears to be weaker when immigrants are assigned into skill-cells after having eliminated any pre-immigration work experience.

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[45] We have also checked the robustness of the experience coefficients using interval regressions. The results are qualitative similar to those reported in Table 6.

Table 6 The Impact of the Immigrant Share Adjusted for Effective Experience

	Dependent Variable			
	Log Monthly Earnings	Unemployment to labour Force	Employment to Population	Average Hours Worked
Immigration Share	-0.254*	0.226**	-0.443***	-0.274*
	(0.116)	(0.082)	(0.154)	(0.154)

Notes. . Sample I: GRLFS data. The table reports the coefficient of the immigrant share variable from regressions where the dependent variable is the mean labor market outcome for a native education-experience group for the 2008-2015 period. Each cell contains estimates from a separate regression. Standard errors are reported in the parentheses below the estimated coefficients, and are adjusted for clustering within education-experience cells. All regressions are weighted by the sample size of the education-experience-period cell. All regressions include education, experience, and period fixed effects, as well as interactions between education and experience fixed effects, education and period fixed effects, and experience and period fixed effects. ***, **, and * denote statistical significance at the 1, 5, and 10% level, respectively.

The long-run impact of immigration

Next, we re-estimate the model using two alternative immigration measures, namely recent immigrants (with 10 or less years of residence in Greece) and veteran immigrants (with more than 10 years of residence in Greece)[46]. The rationale behind implementing such a strategy is to obtain a better understanding of whether the substitutability between natives and immigrants varies with the assimilation process of immigrants. As put forward by Cohen-Goldner and Paserman (2011) and Carrasco, Jimenez and Ortega (2008), if immigrants lack country-specific human capital (i.e. migrants are not perfect substitutes with natives upon arrival), their short-run impact is expected to be negligible. However, as migrants accumulate human capital, they could compete more heavily with natives in the long-run. On the contrary, if immigrants happen to be perfect substitutes with natives upon their arrival in the host country, then one would expect large adverse effects in the short-run. Yet, as discussed in Section 3, there are many reasons to expect that in the long-run, the

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[46] A similar approach has been previously used by Cohen-Goldner and Paserman (2006 and 2011), who report evidence that native wages are negatively correlated only with the fraction of immigrants with little experience in the Israeli labour market. On the other hand, Carrasco, Jimenez and Ortega (2008) find that the impact of immigration becomes more adverse as time of residence in Spain goes by.

economy has the capacity to mitigate the initial negative influence of immigration on the employment opportunities of natives.

Table 7 The Impact of the Immigrant Share by Years of residence in Greece on the Labour Market Opportunities of Native Education-Experience Groups

	Recent Immigrants	Veteran Immigrants
Panel A: Men		
Log Monthly wages	-0.148	0.143*
	(0.130)	(0.072)
Unemployment to labour force	0.195***	0.142***
	(0.061)	(0.037)
Employment to population	-0.484**	-0.014
	(0.225)	(0.174)
Average hours worked	-0.351*	0.037
	(0.178)	(0.075)
Panel B: Women		
Log Monthly wages	-0.225	-0.066
	(0.291)	(0.096)
Unemployment to labour force	-0.031	-0.013
	(0.096)	(0.081)
Employment to population	-0.067	-0.101
	(0.178)	(0.111)
Average hours worked	-0.146	-0.089
	(0.104)	(0.081)
Panel C: Pooled Men and Women		
Log Monthly wages	-0.049	0.127*
	(0.124)	(0.072)
Unemployment to labour force	0.236*	0.054
	(0.132)	(0.049)
Employment to population	-0.513***	-0.078
	(0.175)	(0.117)
Average hours worked	-0.310**	0.015
	(0.129)	(0.091)

Notes. Sample I: GRLFS data. The table reports the coefficient of the immigrant share variable from regressions where the dependent variable is the mean labor market outcome for a native education-experience group for the 1998-2015 period. Each cell contains estimates from a separate regression. Standard errors are reported in the parentheses below the estimated coefficients, and are adjusted for clustering within education-experience cells. All regressions are weighted by the sample size of the education-experience-period cell. All regressions include education, experience, and period fixed effects, as well as interactions between education and experience fixed effects, education and period fixed effects, and experience and period fixed effects. ***, **, and * denote statistical significance at the 1, 5, and 10% level, respectively.

The results reported in Table 7 indicate that recent immigrants compete more heavily with natives than veteran immigrants do. More precisely, when the impact of immigration on the employment outcomes of natives is considered, the coefficient of veteran immigrants becomes lower in magnitude and usually insignificant. Interestingly, there is evidence that in the long-run, migration exerts a positive (significant) influence on male earnings. As for females, the results again point in favour of imperfect substitutability, either in the short-run or in the long-run. When pooling men and women, the results are again consistent with the idea that the host economy can absorb immigration by creating new job opportunities.

A Comparison with the Spatial Correlations

In Table 8[47], we collapse our data into region-education-experience-year cells and re-estimate the impact of immigration on the usual labour market outcomes of natives. As discussed in Section 3, spatial correlations tend to yield biased towards zero results if migrants settle in regions with booming economic conditions. Hence, it seems interesting to compare the results from the spatial correlations with those previously obtained from the national approach (in particular, those reported in Table 3 and 5[48]).

Following Borjas (2003), each Column reports results based on different sets of fixed effects. Specifically, the first Column includes region, education, experience, and year fixed effects, as well as region by year, education by year, experience by year and education by experience fixed effects. The second Column adds a three-way interaction between region, education and experience fixed effects, while the third Column adds education by experience by year fixed effects. Finally, Column (4) includes region by education by year and region by experience by year fixed effects. We also

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[47] The results reported in Table 7 are obtained using the command reghdfe in STATA.

[48] However, the results should be interpreted with caution given that the number of observations per each regional skill cell is small.

report two set of heteroscedasticity robust standard errors. The first set is adjusted for clustering within region-education-experience cells, and the second within region-year cells.

Table 8. The Impact of the Immigrant Share on the Labour Market Opportunities of Native Region-Education-Experience Groups

Dependent Variable	(1)	(2)	(3)	(4)
1. Monthly wage	-0.003	-0.023	-0.039	0.037
	[0.027]	[0.036]	[0.038]	[0.048]
	[0.025]	[0.032]	[0.036]	[0.043]
2. Unemployment to labour force	0.154	0.035	0.006	-0.009
	[0.025]***	[0.022]	[0.023]	[0.035]
	[0.016]***	[0.020]*	[0.022]	[0.029]
3. Employment to population	-0.302	-0.075	-0.022	-0.012
	[0.186]	[0.027]***	[0.026]	[0.040]
	[0.043]***	[0.030]**	[0.029]	[0.036]
4. Average hours	0.010	0.031	0.010	0.020
	[0.064]	[0.025]	[0.027]	[0.037]
	[0.037]	[0.033]	[0.028]	[0.039]
Controls:				
(Region by year), (education by year), (experience by year), (region by education) fixed effects	Yes	Yes	Yes	Yes
(Region by education by experience) fixed effects	No	Yes	Yes	Yes
(Education by experience by year) fixed effects	No	No	Yes	Yes
(Region by education by year), (region by experience by year) fixed effects	No	No	No	Yes

Notes. Sample I: GRLFS data. The table reports the coefficient of the immigrant share variable from regressions where the dependent variable is the mean labor market outcome for a native region-education-experience group for the 1998-2015 period. Two sets of heteroscedasticity robust standard errors are reported in brackets below the estimated coefficients. The first is adjusted for clustering within region-education-experience cells and the second within region-year cells. The regression on monthly wage has 5234 observations; the regression on unemployment to labour force have 5580 observations; the regression on employment to population has 5595 observations; the regressions on average hours have 5555 observations.

As can be verified, when spatial units enter into the analysis, the effect of immigration on the employment opportunities of natives, usually appears to be insignificant. Of course, this finding is probably driven by simultaneity bias, that is, immigrants settle in areas where the labour markets

are strong, thereby resulting in downward bias in the estimates. There is, nevertheless, some evidence in Column (1), that immigration exerts an adverse influence on the employment outcomes of natives.

The impact of immigration on the task performance of natives

Up to this point, we have analyzed the relationship between immigration and the labour market opportunities of natives. In this section, we follow the literature[49] that examines the nexus between immigration and task specialization of natives (see e.g. Peri and Sparber, 2009; Amuedo-Dorantes and de la Rica, 2011; D'Amuri and Peri, 2014; Ortega and Verdugo, 2014)[50], seeking to provide new insight on whether and how immigration affects the task performance of native workers. As discussed in Section 3, these studies document that natives protect themselves from foreign-born competitors by reallocating towards complex tasks, complementary to manual and routine tasks, usually performed by immigrants.

However, there are good reasons to expect that the mechanism of positive reallocation is weaker Greece[51]. In particular, the Greek labour market exhibits pronounced segmentation between a formal and an informal sector[52]. The former offers complex, non-manual jobs, but at the same time, there is limited access for the outsiders, because of entry barriers imposed by the insiders. By contrast, the informal sector is unregulated and offers low-paid, non-complex jobs. As a result, mobility across sectors is rather limited and the validity of the model questionable.

In order to capture the complex picture of how immigration affects the task specialization of natives, we combine GRLFS data with data on task measures across occupations, namely routine

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[49] Immigration literature builds on the work of Autor, Levy and Murnane (2003) and Goos, Manning and Salomons (2009.

[50] More closely related to this study is the paper by Ortega and Verdugo (2014), that estimate the effect of immigration on the task performance of natives in France, employing data on task measures from Goos, Manning and Salomons (2010).

[51] See also the discussion in Peri (2014).

[52] See the discussion in Iversen and Soskice (2013). The widely cited study by Schneider and Enste (2000) estimates that the informal economy in Greece is about 29.6 percent of GDP.

task intensity, abstract, routine and service task importances, calculated by Goos, Manning and Salomons (2010)[53]. In Table 9 we regress the aforementioned task measures on the immigrant share and the usual set of education, experience and year fixed effects. Following Peri and Sparber (2009) and Amuedo-Dorantes and de la Rica (2011) we focus on recent immigrants (i.e. those with less than 10 years of residence in Greece). Nevertheless, we also report results considering the impact of the entire pool of immigrants. In addition, we examine whether the effect, if any, differs with the phase of business cycle.

Unlike previous studies, the evidence reported in Table 9, albeit not very much precise, indicates that immigration is positively associated with routine task intensity when the group of males is considered (Panel A). Given that routine task intensity is defined as the ratio of routine task importance to the sum of abstract and service task importances, the positive effect is mainly driven by the positive significant impact of immigration on the nominator variable and the negative significant impact on the second denominator variable. Remarkably, the correlation between immigration and the task measures appears to be stronger during the 2008-2015 period.

For females (Panel B), the inflated standard errors do not facilitate the inference, since the results appear to be insignificant at standard significant levels. The estimated coefficients appear to be much smaller than those reported for males, but the pattern remains unchanged. In Panel C, we pool Men and Women. The findings again confirm that higher immigrant concentrations are associated with stronger routine task intensity and routine task importance.

Summarizing, the evidence shown in Table 9 suggests that immigration causes a negative reallocation of natives towards routine tasks. Hence, our findings do not support the idea that immigration triggers a positive occupational mobility of natives. We believe, that we can reasonably assume that labour market rigidities, and in particular the entry barriers imposed by the

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[53] The task measures are calculated at the O*NET occupational level, and then are converted into ISCO level. The relative values are reported in Goos, Manning and Salomons (2010), Table 4, p.49.

insiders of the formal sector, do not facilitate mobility of native workers from routine more complex tasks.

Table 9. The Impact of the Immigrant Share on the Supply of Tasks of Native Workers

	All immigrants	Recent immigrants	1998-2007 subsample	2008-2015 subsample
Panel A. Men				
Abstract task importance	0.473 (0.307)	0.621 (0.421)	-0.309 (0.402)	1.109** (0.448)
Routine task importance	0.956* (0.550)	1.622* (0.899)	0.751* (0.427)	2.484*** (0.761)
Service task importance	-0.407 (0.279)	-0.838* (0.487)	-0.591 (0.382)	-1.056** (0.439)
Routine task intensity	0.648 (0.409)	1.189* (0.693)	0.669 (0.399)	1.770*** (0.619)
Panel B. Women				
Abstract task importance	0.217 (0.368)	0.165 (0.338)	-0.112 (0.452)	-0.399* (0.198)
Routine task importance	0.578 (0.396)	0.542 (0.533)	0.387 (0.328)	-0.139 (0.828)
Service task importance	-0.166 (0.276)	-0.223 (0.349)	-0.095 (0.448)	-0.281 (0.930)
Routine task intensity	0.412 (0.257)	0.406 (0.379)	0.297 (0.341)	0.029 (0.761)
Panel C. Pooled Men and Women				
Abstract task importance	0.368 (0.250)	0.386 (0.320)	-0.279 (0.376)	0.611 (0.448)
Routine task importance	0.838* (0.412)	1.270* (0.706)	1.061* (0.535)	1.553* (0.834)
Service task importance	-0.419 (0.327)	-0.707 (0.454)	-0.745 (0.462)	-0.726 (0.515)
Routine task intensity	0.597* (0.346)	0.992* (0.566)	0.885* (0.475)	1.162* (0.665)

Notes. The table reports the correlation of the immigrant share with four measures of natives' task performance for the 1998-2015 period. Each cell contains estimates from a separate regression. Standard errors are reported in the parentheses below the estimated coefficients, and are adjusted for clustering within education-experience cells. All regressions include education, experience, and period fixed effects, as well as interactions between education and experience fixed effects, education and period fixed effects, and experience and period fixed effects.
***, **, and * denote statistical significance at the 1, 5, and 10% level, respectively.

7. Summary and Conclusions

Recent developments in the empirical literature of immigration have challenged the notion from the earlier spatial correlations studies that the effects of immigration are clustered around zero. Succesive national, skill-cell studies (e.g. Borjas, 2003 and 2009, Ottaviano and Peri, 2012, and Manacorda, Manning and Wadsworth, 2012), have reported conflicting results. Along those lines, this study explores, for the first time, the labour market consequences of immigration in Greece. We show that the presence of immigrants, especially in the short-run, negatively affects the employment outcomes of Greek workers. On average, the estimated elasticities imply that a 10% increase in the share of immigrants, decreases employment by 3% and increases unemployment by 1.8%. The group that appears to bear the cost of immigration is that of the less-skilled natives.

On the other hand, native earnings appear less sensitive to immigration. However, given the rigid institutional setting in Greece, it is not surprising that immigration is negatively associated with the employment opportunities of natives in the short-run, but does not depress the earnings of natives. Remarkably, we find that the impact of immigration differs with the stage of the business cycle. In particular, there is some evidence of complementarity before the Great recession. Yet, adverse effects are ascertained during the Great Recession.

Of course this study has some limitations which have to be pointed out. First, the estimated impact of immigration could be attenuated by potential sampling error of the key explanatory variable (e.g. Aydemir and Borjas, 2011. Second, when we aggregate wages, the average size across cells is 912 observations. By contrast, the average size across skill-cells is 1580 observations in the employment equations. Hence we are more confident about the robustness of the employment effects of immigration. The wage equations also reflect stark discrepancies between weighted and unweighted specifications. Consequently, we prefer specifications where the sample size of the education-experience-period cell is used as weight.

What is more, the focus is on the short-run, where the capacity of the economy to absorb the supply shock without detrimental effects on the competing natives is very limited as emphasized in Ottaviano and Peri (2012). For instance, allowing full capital adjustment to restore the capital/labour ratio to its steady-state level or taking in account other job creation mechanisms, that is, analyze the impact of immigration using a general equilibrium framework, should possibly contribute to a better understanding of the big picture. Indeed, our attempt to approximate the long-run effects of immigration, supports the idea that the impact of immigration becomes weaker after a considerable length of time (i.e. after 10 years). All in all, the substantial partial effects on natives labour market outcomes reported in this paper, mainly driven by the adverse effects of immigration ascertained during the Great Recession, highlight the need for considering changes in the structure of the labour and product markets, rather than following the Malthusian rationale in immigration policy. Implementing structural reforms that will enable the country to break the vicious cycle of recession, and enter a virtuous cycle of growth, would make again possible for the economy to accommodate immigration without significant effects (as our results for the pre-crisis period imply).

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Table A 1 Bilateral Correlations between the key variables used in the paper

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Immigrant share	1.00								
2. Unemployment	0.47	1.00							
3. Employment	-0.36	-0.66	1.00						
4. Average hours worked	0.23	0.03	0.23	1.00					
5. Log monthly earnings	-0.59	-0.86	0.54	-0.27	1.00				
6. Abstract task importance	-0.57	-0.57	0.32	-0.68	0.79	1.00			
7. Routine task importance	0.61	0.35	-0.18	0.70	-0.64	-0.90	1.00		
8. Routine task intensity	0.60	0.36	-0.19	0.71	-0.66	-0.92	1.00	1.00	
9. Service task importance	-0.53	-0.25	0.10	-0.70	0.57	0.85	-0.96	-0.97	1.00
10. Experience [6-10]	0.10	0.22	-0.02	-0.04	-0.27	-0.08	0.03	0.04	-0.05
11. Experience [11-15]	0.11	0.02	0.16	0.06	-0.09	-0.04	0.02	0.02	0.00
12. Experience [16-20].	0.12	-0.07	0.21	0.07	0.02	-0.01	0.01	0.01	0.01
13. Experience [21-25]	0.03	-0.13	0.23	0.09	0.10	0.02	0.00	0.00	-0.01
14. Experience [26-30]	-0.07	-0.17	0.21	0.08	0.18	0.05	0.01	0.00	0.00
15. Experience [30-35]	-0.16	-0.17	0.10	-0.02	0.23	0.09	-0.02	-0.03	0.01
16. Experience [36-40]	-0.20	-0.18	-0.20	0.07	0.24	0.12	-0.05	-0.06	0.06
17 Medium Education	-0.23	0.02	0.00	0.33	-0.11	-0.31	0.09	0.13	-0.12
18. High Education	-0.48	-0.31	0.20	-0.78	0.57	0.90	-0.86	-0.88	0.84

Table A2 Distribution of Immigrants in the Labour Force by Level of Education and Experience, 1998-2015

Education	Years of Experience	1998	2002	2006	2010	2015
Lower secondary and below	1-5	0.129	0.203	0.213	0.340	0.091
	6-10	0.132	0.159	0.209	0.391	0.204
	11-15	0.106	0.157	0.209	0.313	0.339
	16-20	0.091	0.132	0.172	0.319	0.310
	21-25	0.050	0.085	0.141	0.268	0.331
	26-30	0.043	0.068	0.082	0.183	0.241
	31-35	0.034	0.048	0.066	0.105	0.145
	36-40	0.012	0.020	0.031	0.071	0.097
High school graduates	1-5	0.058	0.056	0.063	0.115	0.067
	6-10	0.064	0.069	0.073	0.092	0.062
	11-15	0.063	0.083	0.077	0.095	0.064
	16-20	0.070	0.080	0.081	0.130	0.067
	21-25	0.060	0.069	0.090	0.113	0.088
	26-30	0.029	0.059	0.067	0.078	0.099
	31-35	0.055	0.061	0.062	0.094	0.080
	36-40	0.054	0.048	0.053	0.078	0.073
University graduates	1-5	0.048	0.052	0.019	0.034	0.017
	6-10	0.063	0.068	0.049	0.035	0.028
	11-15	0.042	0.052	0.047	0.052	0.021
	16-20	0.059	0.063	0.040	0.052	0.039
	21-25	0.058	0.055	0.034	0.051	0.042
	26-30	0.041	0.073	0.078	0.063	0.055
	31-35	0.061	0.072	0.064	0.073	0.061
	36-40	0.024	0.097	0.059	0.097	0.058

Table A3 Unemployment Rate of Natives by Skill Cell, 1998-2015

Education	Years of Experience	1998	2002	2006	2010	2015
Lower secondary and below	1-5	0.20	0.16	0.22	0.33	0.50
	6-10	0.17	0.15	0.15	0.28	0.49
	11-15	0.09	0.11	0.10	0.17	0.39
	16-20	0.06	0.07	0.06	0.13	0.31
	21-25	0.05	0.05	0.06	0.11	0.32
	26-30	0.05	0.03	0.04	0.08	0.22
	31-35	0.04	0.04	0.03	0.08	0.21
	36-40	0.05	0.04	0.04	0.08	0.19
High school graduates	1-5	0.23	0.23	0.18	0.25	0.51
	6-10	0.11	0.11	0.09	0.14	0.32
	11-15	0.06	0.06	0.05	0.10	0.21
	16-20	0.05	0.06	0.04	0.07	0.16
	21-25	0.04	0.03	0.03	0.05	0.18
	26-30	0.03	0.02	0.02	0.06	0.12
	31-35	0.05	0.04	0.03	0.07	0.17
	36-40	0.03	0.03	0.02	0.05	0.18
University graduates	1-5	0.14	0.15	0.13	0.21	0.34
	6-10	0.05	0.06	0.07	0.09	0.19
	11-15	0.02	0.03	0.03	0.05	0.13
	16-20	0.01	0.01	0.02	0.02	0.11
	21-25	0.01	0.01	0.02	0.02	0.07
	26-30	0.01	0.01	0.01	0.01	0.08
	31-35	0.01	0.02	0.01	0.01	0.07
	36-40	0.00	0.00	0.00	0.03	0.06

Table A4 Employment Rate of Natives by Skill Cell, 1998-2015

Education	Years of Experience	1998	2002	2006	2010	2015
Lower secondary and below	1-5	0.13	0.10	0.08	0.04	0.02
	6-10	0.75	0.74	0.74	0.64	0.43
	11-15	0.87	0.84	0.86	0.79	0.55
	16-20	0.89	0.89	0.90	0.79	0.63
	21-25	0.90	0.90	0.90	0.84	0.62
	26-30	0.91	0.90	0.90	0.86	0.71
	31-35	0.89	0.89	0.90	0.86	0.73
	36-40	0.84	0.84	0.85	0.81	0.70
High school graduates	1-5	0.49	0.43	0.36	0.35	0.18
	6-10	0.83	0.82	0.83	0.75	0.53
	11-15	0.93	0.91	0.93	0.88	0.76
	16-20	0.94	0.92	0.94	0.91	0.82
	21-25	0.94	0.94	0.95	0.91	0.80
	26-30	0.92	0.92	0.94	0.90	0.83
	31-35	0.78	0.84	0.87	0.81	0.73
	36-40	0.57	0.60	0.65	0.65	0.58
University graduates	1-5	0.77	0.77	0.77	0.72	0.56
	6-10	0.92	0.91	0.91	0.89	0.78
	11-15	0.97	0.97	0.97	0.93	0.86
	16-20	0.97	0.97	0.97	0.96	0.87
	21-25	0.95	0.95	0.97	0.95	0.88
	26-30	0.87	0.91	0.91	0.90	0.82
	31-35	0.64	0.74	0.79	0.79	0.72
	36-40	0.42	0.47	0.55	0.47	0.42

Table A5 Log monthly wage of Natives by Skill Cell, 2002-2015

Education	Years of Experience	1999	2002	2006	2010	2015
Lower secondary and below	1-5	6.386	6.699	6.946	6.569	6.596
	6-10	6.584	6.803	6.959	6.674	6.541
	11-15	6.675	6.783	6.959	6.779	6.512
	16-20	6.762	6.795	6.925	6.849	6.693
	21-25	6.848	6.807	6.993	6.901	6.633
	26-30	6.895	6.847	6.938	6.948	6.663
	31-35	6.896	6.810	6.950	6.987	6.730
	36-40	6.908	6.790	6.935	6.998	6.754
High school graduates	1-5	6.609	6.797	6.970	6.691	6.452
	6-10	6.698	6.825	7.002	6.804	6.565
	11-15	6.830	6.843	6.973	6.908	6.690
	16-20	6.932	6.849	6.967	6.970	6.757
	21-25	7.008	6.809	6.989	7.042	6.808
	26-30	7.060	6.808	6.988	7.119	6.822
	31-35	7.110	6.842	6.986	7.149	6.902
	36-40	7.120	6.790	6.974	7.173	6.916
University graduates	1-5	6.906	6.870	7.210	6.908	6.692
	6-10	6.970	6.842	7.205	7.049	6.833
	11-15	7.144	6.855	7.226	7.158	6.964
	16-20	7.212	6.843	7.203	7.206	7.056
	21-25	7.274	6.827	7.188	7.297	7.118
	26-30	7.278	6.853	7.206	7.321	7.109
	31-35	7.386	6.853	7.208	7.350	7.235
	36-40	7.354	6.992	7.198	7.381	7.153

Table A6 Average hours worked of Natives by Skill Cell, 1998-2015

Education	Years of Experience	1998	2002	2006	2010	2015
Lower secondary and below	1-5	41.112	41.459	38.794	38.339	45.100
	6-10	43.254	44.812	42.649	42.324	42.222
	11-15	45.066	44.789	43.621	42.628	42.310
	16-20	45.656	45.824	45.148	44.174	43.804
	21-25	45.357	45.412	45.084	45.063	44.290
	26-30	45.381	45.746	45.581	45.038	45.163
	31-35	44.674	45.137	45.446	44.657	43.863
	36-40	45.261	45.283	45.077	44.633	46.388
High school graduates	1-5	42.485	42.197	40.698	40.878	39.407
	6-10	44.334	43.547	43.427	42.844	42.161
	11-15	44.181	44.890	44.412	43.982	43.955
	16-20	44.088	44.044	45.435	44.204	43.539
	21-25	43.400	43.760	44.460	44.760	44.459
	26-30	43.399	45.090	44.667	44.156	43.979
	31-35	41.978	43.612	43.807	44.223	44.383
	36-40	42.324	43.677	44.068	43.797	42.716
University graduates	1-5	40.758	39.763	40.233	40.159	40.041
	6-10	40.599	40.940	40.832	40.983	40.369
	11-15	41.109	40.656	41.356	40.696	41.780
	16-20	40.245	39.964	40.116	39.869	41.385
	21-25	39.281	40.122	39.964	39.314	41.261
	26-30	39.538	38.243	38.715	38.897	39.117
	31-35	39.312	38.393	38.193	38.592	39.760
	36-40	38.571	39.741	40.434	39.831	40.530

Table A7. The impact of different types of experience on the long monthly earnings of natives and immigrants

Coefficient of:	Group		
	Natives	Child Immigrants	Adult Immigrants
Source country experience	−	−	-0.002
			(0.002)
Source country experience squared ÷ 10	−	−	0.001
			(0.001)
Greek experience	0.026***	0.029***	0.022***
	(0.000)	(0.004)	(0.006)
Greek experience squared ÷ 10	-0.003***	-0.005***	-0.003
	(0.000)	(0.001)	(0.002)
Mean value of:			
Source country experience	−	−	9.7
Greek experience	21.5	12.9	11.7
Marginal value of an additional year of experience for immigrants:			
Source country experience	−		0.0006
Greek experience	−	0.017	0.015
Marginal value of an additional year of experience for natives, evaluated at mean value of relevant sample of immigrants	−	0.018	0.013
Year dummies	Yes	Yes	Yes
Year of arrival dummies	No	Yes	Yes
Observations	39,177	1,564	4,525

Notes. Robust standard errors are shown in parentheses below the estimated coefficients. The regressions pool data for the 2008-2015 period. The regressions of immigrants include dummy variables indicating the year in which the immigrant arrived (1958-1962, 1963-1967, 1968-1972, 1973-1977, 1978-1982, 1983-1987, 1988-1992, 1993-1997, 1998-2002, 2003-2007, 2008-2012, 2013-2015).***, **,* indicate significant at 1%,5%,10% significant levels