

Migration and the growth of low-wage work in the EU

Lars Fredrik Andersson [Corresponding author]

Umeå University, Department of Geography and Economic History, Sweden

Rikard Eriksson

Umeå University, Department of Geography and Economic History, Sweden

Sandro Scocco

Arenagruppen, Arenaide, Sweden

ABSTRACT

Our paper is focusing on the current trends of migration and job polarization. In doing so, we have looked at the role of both the EU-enlargement and the refugee migration in an effort to trace the factors behind the growth of low-paying occupations in Europe. Our empirical findings however indicate that the growing share of migrant workers only has a limited general impact on the growth of the low-wage sector in the EU during the last two decades. The main drivers behind the increasing labour market polarization and growth of the low-wage sector in particular seem more related to technological changes and globalization. When considering the structure of immigrant workers and institutional settings, the impact of immigration workers on the expanding low-wage sector however differs. Most apparent is the positive impact of refugee migrants on the expanding low-wage sector in the Anglo-Saxon economies, and the negative, if any, impact in the other EU15 macro regions.

Keywords: Migration; job polarization; EU; globalization; Digitalization; Refugees

JEL: classification: F22, J31; R23

Introduction

In recent years, the labour market consequences of migration have been widely discussed in the EU. First in relation to the inclusion of new member-states in 2004 and 2007, and then the refugee crises of 2015/16 led to an even more polarized debate over immigration and potential solutions (Hatton, 2015). Although the peak of the high inflow of refugees is behind us, many of those that arrived to Europe are likely to stay – with expected long-run economic effects on hosting countries (OECD, 2017). Prior research on labour market participation shows great heterogeneity across nations and immigrant cohorts, resulting in largely different effects of immigration (Seukwa, 2013). Research on public finance also shows that not only employment rate but also tax revenues are influenced due to lower income levels of refugee workers (Ekberg, 2011).

As shown by Dustmann and Frattini (2011) the occupation gaps between native and foreign labour is substantial. Non-EU refugee immigrants tend to end up in less well-paid occupations, and such segregation is more apparent in the south than in the north of Europe. Over time, segregation between natives and foreign workers seem however to decline due to occupational upgrading. Immigrants originating from EU enlargement countries and other middle-income countries tend to upgrade, while women and immigrants from poor countries are less likely to climb the income-ladder (Rodriguez-Planas, 2010). Hence, it is basically non-EU refugee immigrants that drive the substantial differences between native and foreign workers in the EU (Dustmann and Frattini, 2011). A reason behind these diverging trends could be that the driving forces behind these two types of flows are different in character. EU integration and enlargement has on the one hand created a largely demand-driven flow of migrant workers from the new EU countries, as the potential supply of workers increase within the common market. Differences in wage-levels between regions then pull workers from low- to high-income regions (Harris and Todaro, 1970). Refugee migration, on the other hand, shape an exogenous inflow of workers with low-skills that hardly could be argued to be demand-driven.

Given the different driving forces behind the abovementioned type of flows, it is also reasonable to expect differences on the impact on the receiving countries economic structures. In a paper on immigrant impact on output mix, González and Ortega (2011) show that unskilled immigrants that increased the supply of labour did not change the output mix, but rather the skill intensities within industries. Immigrant labour supply thus tend to have a moderate impact on natives' wages, but absorbed by changes in relative factor intensity. As shown by Dustman (2016), this is especially the case for new firms. If refugee migrants are imperfect substitutes of native workers, it helps explaining why wages and employment rates of natives tend to be less affected by immigrants. However, it also raises the question on how the overall employment structure is affected. Are native workers reallocated from low-skilled and less paid occupations into more qualified occupations as suggested in the more recent literature (c.f., Ottaviano and Peri 2012), or should we as Lewis (2011) expect that the low-wage sector will grow in size by adopting less skilled-biased technology?

To address this issue, this paper will analyze how immigrant workers impact the growth of low-wage occupations in the EU15 during the years 1995 to 2015 – a period when both the low-wage sector and immigrants' employment share expanded due to both EU-enlargement and increasing refugee migration. The EU integration and enlargement process open for a large-scale and demand-driven migration of labour mainly from the new member countries to the old EU countries. As such, the drivers and structures of migration was largely different from the exogenous driven refugee migration. In this paper, we address these potential different effects, as the impact on the expanding low-wage sector is expected to differ.

The growth of low wage work has received a large interest in the job polarization literature. While the main argument is related to technological changes, globalization and inequality, much less interest have been put on the potential immigrant-induced change in skill composition in the EU context (Goos et al, 2009; Fernandez-Macias and Hurley, 2017). For the US, a study by Autor and Bron (2013) shows that growing low-skilled migration had much less impact than technological factors on the expansion of low-skilled occupations. But for the EU15 countries, with largely different institutional settings and immigrant structure than the US, the impact of low-skilled immigration may be different, although the common market should be regarded as one macro-region without internal barriers on mobility. A study on immigrant effects on the low-wage sector in EU15 – as ours – may help to narrow this gap. We believe that the omission on addressing this issue may furthermore overlook the potential impact that immigrant work segregation has on the fiscal impact of immigration. An extensive literature on fiscal impact assumes refugee immigrants, given their low-wage occupational bias, give rise to an expansion of the low-wage occupation sector as a whole. Such an expansion of low wage work mechanically translates into lower taxable incomes on average for the national economy (Ekberg, 2011). By addressing the validity of such an assumption, this study may help to improve the assumptions underlying the public financial impact of immigrants.

The remainder of the paper is structured as follows. In the next section, our analytical framework is outlined. In the third section, we outline the trends in low-wage occupations and structure of immigration in EU15 between 1995 and 2015. In the fourth section the research design is presented, and in the fifth section our empirical findings are reported. Section six concludes.

Analytical framework

Based on the seminal work of Harris and Todaro (1970) one can expect that workers will move between regions due to expected differences in the standard of living. In relation to international migration this include disparities in levels and distribution of incomes, net migration costs, chances to pursue a rewarding career, costs of living and the quality of public goods and amenities (Borjas, 1999; Massey, 1990). Aspects of which the perceived benefits need to exceed the perceived costs in order for mobility to take place (Sjaastad, 1962). Since the workers due to these factors tend to be positively or negatively self-selected into either migrating or staying, it is also difficult to disentangle the exact effect of migration on the receiving economies. In relation to how the labour markets of "Old EU" were affected by the inclusion of EU8 in 2004, Kahanec (2013) argue that this mainly has to do to the degree of substitutability or complementarity between migrants and native workers (see also Chiswick

et al 1992), and finds that the long-term effect of EU-enlargement on the economies facing increased labour supply is negligible, but mainly positive.

The finding that immigration has a weak, if any, impact on native population's wages and employment rate has led researchers to consider alternative adjustment mechanisms to immigration (Eva and Tritah, 2016). By recognizing how open economies are highly interconnected with trade, recent work has focused on the adjustment mechanism described by the so-called Rybczynski-theorem (Rybczynski, 1955). In principle, it demonstrates how changes in a given endowment affects the outputs of the goods when full employment is maintained in an open economy. The mechanism is that immigration of less skilled workers will expand the sector that uses that particular factor (low skilled labour) intensively. Due to the adjustment mechanism, the factor prices in the open economy will be unaffected while the inflow of low-skilled immigrants will be absorbed by changing the structure of production (González and Ortega, 2011). A more abundant supply of less-skilled immigrant workers may further invoke adjustment on labour demand. By adapting to an increasing supply of low-skilled immigrants, such as an exogenous inflow of refugees, firms have less incentives to adopt skilled-biased technology (Lewis, 2011). The given implication of this, is that the low-wage sector need to grow (or to adapt lower minimum wages) in order to absorb the increasing labour supply and avoid unemployment. Hence, we hypothesize:

H1: Refugee-induced growth in employment will have a positive and significant impact on the growth of the low-wage sector.

An exogenous refugee driven immigration-induced labour supply shock, may however also open for a reallocation of native workers to more skill demanding occupations, as immigrant workers take over more manual intensive work. This is because when the economy expands, natives are offered new career possibilities and migrants will take over low-wage manual work. The result is that the economy's job and wage structure tend to be largely unaffected, or at least that the low-wage sector will not expand as a result of exogenous refugee immigration. However, this type of process also entails that the occupational segregation might be more pronounced with reinforced labour market segmentation as fewer natives will have employment in the low-wage sector and migrants will be overrepresented. Still, it is argued that the negative effect on native workers from immigration is negligible (Dustmann et al 2005; Foged and Peri, 2012; Foged and Peri, 2016).

In a seminal work on migration and economic growth, Brinley (1954) observed how migration to the US in the late 19th and early 20th century coincided with investment upswings and to the introduction of new capital structures. The adjustment of capital towards new (electricity, chemistry) innovative and labour-saving machinery and equipment coincided with the inflow of cheap, low-skilled labour leaving south-east Europe at the time. It was a process leading to the 'widening' of capital structures with the benefit to the productive powers of the US economy. These ideas are taken up by Tabellini (2017) who further argues that immigrants are imperfect substitutes as natives can work in both the skilled and the unskilled sector, while immigrants are barred from skilled occupations. Capital on the other hand is endogenously supplied and can produce an endogenous response from the production side which can accommodate the inflow of immigrants, i.e. via new plants (workplaces). Under these

conditions, the result from the micro studies can be accommodated within a macroeconomic model. As Tabellini (2017: 70) concludes *“In this case, immigration is absorbed by two distinct channels: first, through an increase in firms’ investment, as before; second, via occupational mobility of natives who tend to take up jobs where they have a comparative advantage relative to immigrants.”* Hence, relative unemployment among migrant is then mainly attributed to weak growth or barriers for social mobility. Given that line of reasoning, we hypothesize:

H2: Refugee-induced growth in employment will have an insignificant impact on the growth of the low-wage sector.

These somewhat diverging effects of immigration, and refugee migration in particular, could be related to institutional differences. As a matter of fact, both H1 and H2 are reasonable but likely to be channelled through different institutions. First, for the low-wage sector to expand according to H1, this is more likely to happen in economies with high income elasticity and low social mobility. In cases when the lower minimum wage is not possible, this is less likely to occur. Second, the possibility of social mobility is likely to influence the extent to which an upgrading can occur in accordance to H2. This varies between the EU member states as it has increased only in Belgium, Denmark, Finland, Greece, the Netherlands and Slovakia while stagnated in most of the developed member states (Eurofound 2017). A lack of social mobility due to for example, residential segregation and early educational selection and tracking is likely to impede the social mobility and long-term integration of foreign workers. Third, the origin of migrants also matters. In this paper we make a division between labour migration within the common EU labour market, which in a labour market context should be regarded as one single country with free mobility similar to the US, and external EU-immigration that is regulated. We expect that EU mobility primarily is demand driven and workers will move where there is a demand for their skills and where capital can absorb an increasing supply. This will especially be the case if the workers expect higher living standards as a result from mobility (Harris and Todaro, 1970). This will predict, since the problem is labour shortage, that sectors that otherwise would experience expansion problems can expand. In turn, an exogenous driven refugee immigration induced growth in labour supply will rather than responding to demand, force an adjustment in capital if any (Tabellini 2017).

To understand the labour market effects of refugee migration in a theoretical context of capital adjustment it is therefore necessary to separate demand driven free labour mobility from exogenous driven refugee immigration. By separating endogenous demand driven labour migration within the EU from exogenous refugee migration from outside the EU, this paper will examine if the adjustment mechanisms is related to different institutional settings. To highlight institutional differences, we make use of institutional division proposed by Farkas (2016) that distinguish between the Nordic/Scandinavian, North-western/Anglo-Saxon, Mediterranean/Southern Europe, and Continental/Central European models of capitalism.

Growing foreign employment and low-wage work

Unlike countries like the US or Canada, most large-scale immigration in European countries is a recent phenomenon (Frattini, 2012). For most EU15 countries the share of foreign born has grown from only a few percent in the early 1990s to over ten per cent today (Eurostat, 2017).

Foreign born has played a vital role for expanding the labour supply in EU15. Foreign employment as share of total employment has risen by close to 5 percentage points during the last two decades in the EU15 countries on average. As shown in figure 1, in Southern Europe, the share of foreign-born labour has grown from 2% in the mid-1990s to almost 10% today. In Ireland and the UK (Anglo-Saxon countries), the foreign employment share has expanded from 3% to 11%, while Continental Europe has seen somewhat less of an expansion. In turn, we can see that foreign employment has been rising in the Scandinavian countries; from 5% in the mid-1990s to 11% today. The general trend of growing shares of foreign labour is observed for all EU15 countries, although the size and growth differs. Most pertaining is the high foreign labour share in Switzerland, which is roughly twice the region (Continental Europe) average, and Sweden that is almost twice the average for the other Scandinavian countries. Among the countries with the smallest share of foreign employment we find the Netherlands and Finland. These two countries both show a slow growth rate and less than 5% of foreign employment in 2015.

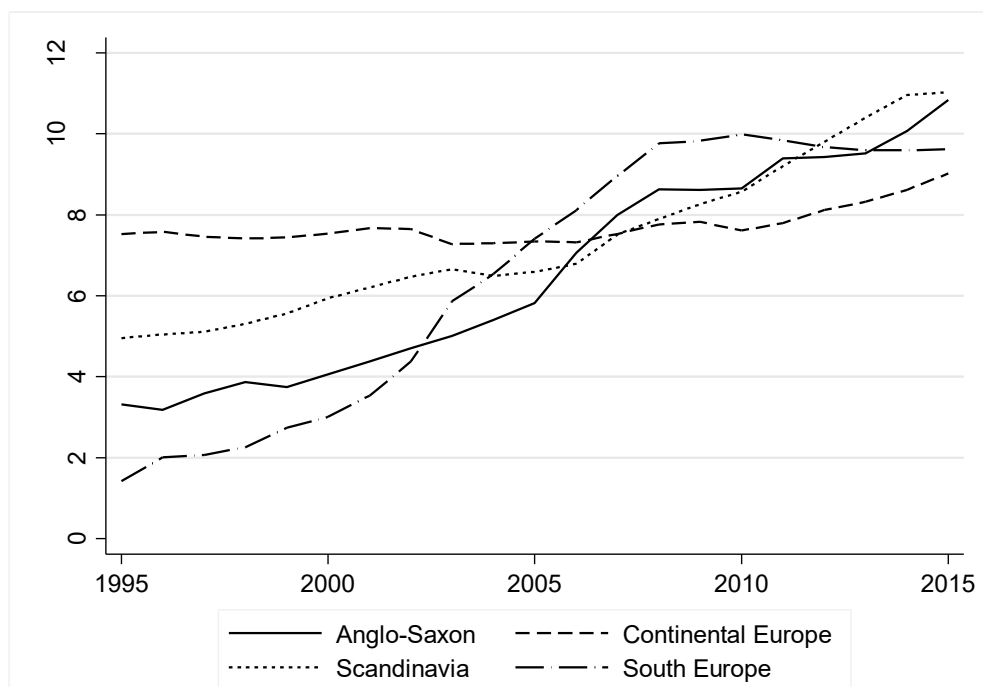


Figure 1. Foreign employment share (%) in EU15* by regions between 1995 and 2015.

Source; Eurostat, LFS. OECD, Demography and Population.

Notice; *EU 15 with Luxemburg excluded and Norway included. Continental Europe (Austria, Belgium, France, Germany, Netherlands) Anglo-Saxon (United Kingdom, Ireland). South Europe (Greece, Italy, Portugal, Spain); Scandinavia (Denmark, Finland, Norway, Sweden). Country size (employment) is used as weight for region average.

The origin of immigrant workers however differs largely across the EU15. To account for the heterogeneous structure of immigrant workers, we have divided between three main categories: (i) labour migrants originating within EU15 or other high-income countries, (ii)

labour migrants from the EU enlargement countries, and, (iii) refugee immigrant workers from low-income countries outside EU28. In figure 2 the results are reported by EU15 regions for the year 2015. The Anglo-Saxon countries have a relative larger share of labour migrants from EU15 or other high-income countries as well as a higher share of EU migrants. In turn, the share of non EU/low-income countries is lower. Continental Europe has on average a lower share of immigrant workers from EU or other high-income countries, while the share of refugee non EU/low-income countries is larger.

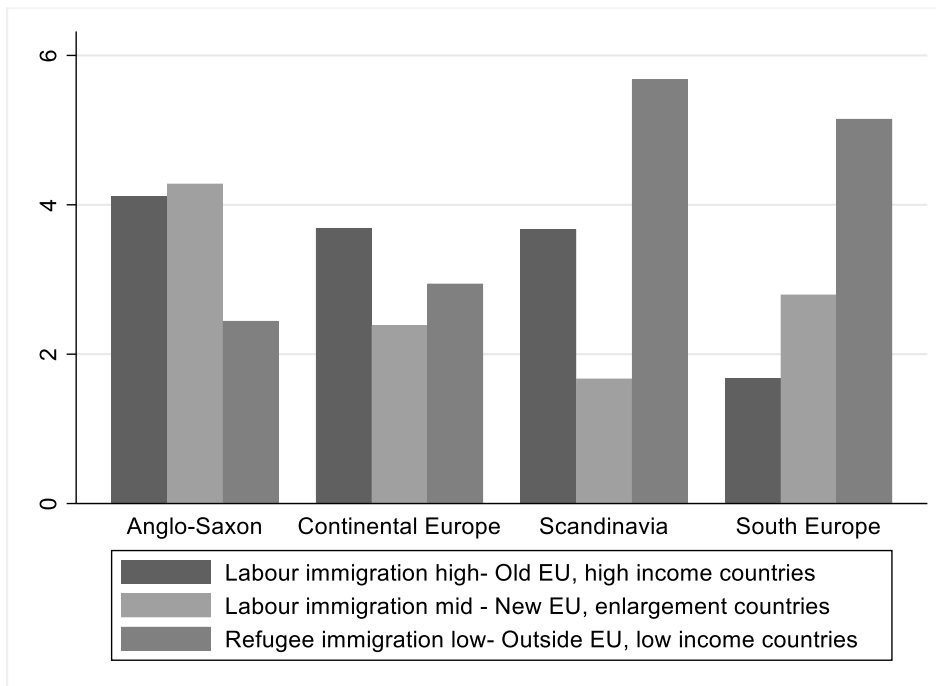


Figure 2. Immigrant workers employed by origin in EU15, 2015.

Source; EUROSTAT, LFS. OECD, Demography and Population.

Note; High income countries includes; Chinese Taipei, Hong Kong, Israel, Japan, Singapore, South Korea, Iceland, Norway, Switzerland, North America, Australia, New Zealand. The immigrant worker share is weighted by country size (employment).

The share of refugee immigrant workers origin from non EU/low-income countries is the highest in Scandinavia, while the share labour migrants from new EU countries is the lowest. Labour migrants from the old EU or other high-income countries is similar to Continental Europe. In South European member countries, labour migrants from the old EU or other high-income countries is fairly low, while the share refugee immigrants originating from outside the EU28 is high.

As shown in previous studies on occupational segregation, if exogenous-driven refugee immigration from low-income countries outside EU increase, this generally translates into a larger immigrant share in low-skilled occupations (Rodriguez-Planas, 2010). Studies on wage-gaps also show how primarily non-European migrants ends up in low-wage work. In France, for instance, first-generation immigrant men from Europe do not experience any earning gap, while workers from sub-Saharan Africa earn much less than natives. In the UK the earning gap

is greater compared to Germany and France (Algan et al., 2010). And for Italy, Venturini and Villosio (2006), shows substantial wage gap over time between natives and foreign workers. African workers are the less payed, while East Europeans tend to converge to natives' wages. The inflow of low-skilled refugee immigrants may also translate into an expanding low-wage sector in general terms if firms adopt to less skilled-biased technology (Lewis 2011). If native workers respond by reallocating from low-skilled and low-wage occupations into more qualified and well-paid occupations, the expansion of the low-wage sector due to immigrants will be largely negligible (Ottaviano and Peri, 2012 Autor and Bron, 2013).

In line with previous studies on European data (e.g., Goos et al, 2014), figure 3 shows that the low-wage sector has grown more than average employment during the last two decades. In the Anglo-Saxon countries, the employment growth in low-wage occupations (ISCO 5 & 9) normalized by total employment growth, is on average 1.2% between 1995 and 2015. Continental European economies have encompassed a somewhat stronger expansion of low-wage occupations (1.3%), while the low-wage sectors Scandinavian countries have seen less of an expansion. The average growth rate is down to 0.5% annually. In Southern European countries, the sector has expanded more. Thus, while the type of immigrants differ between these macro-regions in the EU, so does also the expansion of the low-wage sector. While this, on the one hand, could be associated with different models of capitalism that have different institutions influencing both the presence of low-wage occupations, and the openness towards immigrants (Farkas , 2016; Goos et al, 2014), it is likely to also be associated with varying degrees of social mobility within countries.

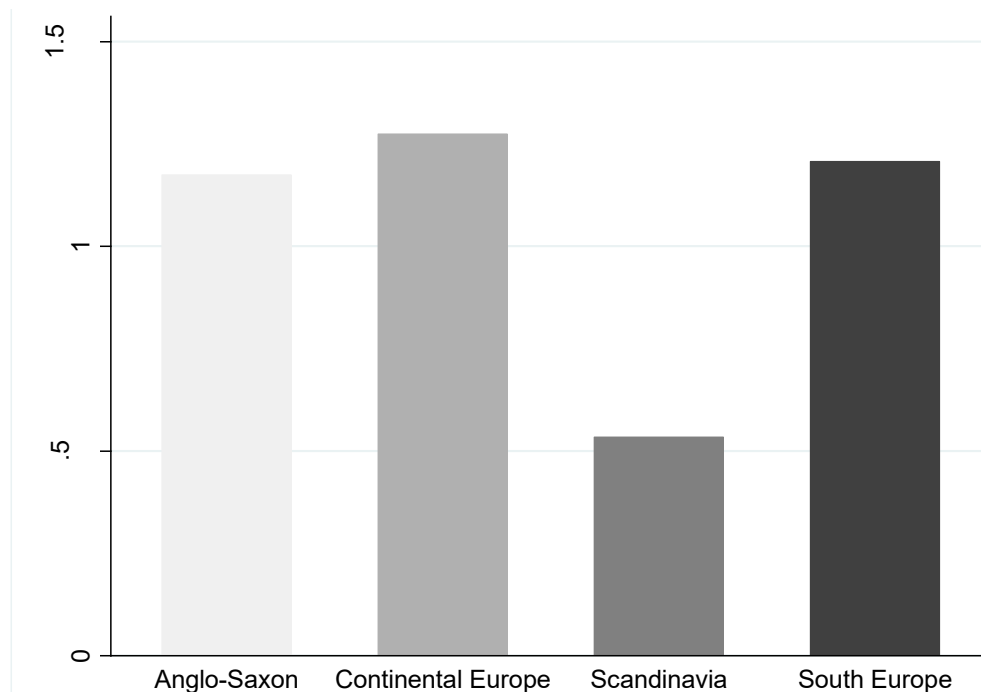


Figure 3. Employment growth in low-wage occupations normalized by total employment growth in EU15 regions during the period 1995 to 2015.

Source; EUROSTAT, LFS. OECD, Demography and Population.

Note; Low wage occupations is defined as ISCO 5 (Service workers) and ISCO 9 (Elementary occupations)

Research design

Data

To assess the impact of migration on the low-wage occupations in the EU, we have used data from the European labour force survey 1995-2015. The rationale for analysing the period of 1995-2015 is that there are plenty of missing data prior to 1995 and because countries like Sweden, Finland and Austria did not become members until that year. The database includes a wide array of information at individual level (e.g., occupation, country of birth etc.) that can be linked to each of the member states. As the discussion on occupational changes mainly refer to countries that could be referred to as the "Old EU", we include 16 countries (i.e., EU15 plus Norway and Switzerland, but excluding Luxemburg) meaning we in total had 336 country-year observations. Still, information on occupations were missing for Sweden, Finland and Switzerland for some years (1995-1996, 1995-1996 and 1995, respectively), meaning that we ended up with 331 observations.

Dependent variable

Our dependent variable is the annual share of low-wage occupations compared to total employment in each country. In accordance to previous studies on the EU (e.g., Goos et al, 2009; 2014) we have defined low-wage occupations based on the share of workers belonging to the 1-digit occupation-codes (ISCO) 5 and 9. That is, *service workers and shop and market sales workers* (ISCO-5) and *elementary occupations* (ISCO-9). Although the income levels within these groups across countries vary due to different levels of purchasing power in each economy¹, it is still argued that this generic definition of low-wage occupations is better than making specific definitions for each country as it will ease the comparison across countries and continents (c.f., Goos et al, 2014).

Independent variables

The key explanatory variables we wish to assess are all related to the country of origin of the workforce to proxy the role of migration. First, this includes the annual share of foreign born workers in each country to capture the overall role of migration (TOTAL). Still, our main interest in this analysis is to assess whether the origin of migrants has any influence on the size of the low-wage occupations as we argue that migrants from the new member states (that is Central and Eastern Europe) to a greater extent could be regarded as demand driven, while refugee migration rather are supply driven as their main purpose of entering the EU is not to (at first at least) seek employment. Therefore, in a second step, we created three variables

¹ For example, the mean income of elementary occupations (ISCO-9) in the total sample is 65% of the mean income of all workers in the EU. For service workers (ISCO-5) the average income discrepancy in the EU is 68% of the mean income, while it is lowest in Anglo-Saxon (UK and Ireland) with 61% of the mean income and highest in Scandinavia with 75% of the mean income.

defining the annual share of workers originating from high-income countries (LABMIG HIGH), middle-income countries (LABMIG MID) and low-income countries, where the latter group is defined as refugee migrants (REFMIG). This is done by combining Eurostat data on the country of birth (within EU15, EU16-28 and non-EU) with OECD data on income levels. LABMIG HIGH is then defined as the annual share of foreign workers from other EU15 countries *or* outside the EU with comparable income levels as the EU15. LABMIG MID is defined as the annual share of foreign workers in each country originating from a EU16-28 country. Analogously, REFMIG is defined as the annual share of foreign workers in each country originating from outside the EU not belonging to LABMIG HIGH or MID (i.e., with lower income levels than EU16-28). In this way, acknowledge the fact that each economy has different income levels which may influence the migration flows (Harris and Todaro, 1970) and that different types of migrants (both internally within the EU and from outside the EU) either are regarded to exhibit a demand-driven influence on the occupation structure (LABMIG HIGH or MID) or supply-driven influence (REFMIG) depending on country of origin and new country of work. It should be noted that we only include migrants that are part of the workforce. Hence, an undisclosed number of immigrants not active in the labour market are omitted as well as temporary workers on short-term contracts.

Apart from migration flows, a number of additional factors identified in the literature might influence the growth of the low-wage occupations (c.f., Goos et al, 2009; 2014; Fernandez-Macias and Hurley, 2017; Tabelini, 2017), see table A1 in the Appendix for definitions and sources. We have divided them into four main groups. First, institutional factors are related to the regulations of labour markets. We first add a dummy (*EU25+*) capturing the year when a total of 10 new member states enter the EU as this could influence the mobility of workers within the common market. The indicator *CollBar* captures the adjusted bargaining cover rate as an annual proportion of all workers as this is likely to influence both the level and distribution of incomes in an economy. Also, the regulation of employment conditions may have an effect on the low-wage occupations as stronger regulations limit the growth of temporary and part-time positions which is common among low-wage occupation. Hence, the variables *EmpDis* and *EmpTemp*, respectively captures the degree to which each economy regulates the protection against dismissals and temporary employment. Second, we created a number of indicators related to the pressure that globalization processes might have on the labour market. *ImpShare* is the annual value of imports in relation to GDP in percentages as that captures the degree of foreign competition. Moreover, outgoing foreign direct investments (*FDI*) as a proportion of GDP might co-determine to what extent certain occupations face risk of outsourcing. The third group of indicators relate to technology. The variables used to proxy this are: Annual labour productivity (*LP*) defined as GDP per capita, human capital (*HC*) defined as the share of workers with at least a 3-year university diploma, and technological change (*TechChange*) defined as the annual factor productivity growth. Finally, we control for the annual relative wage (*RelWage*) in each economy as a proportion of each countries wage in relation to the EU-average in percentages and the size of the economy by the annual number of employed in thousands (*LMsize*).

Model

Due to the panel structure of the data (i.e., multiple country-year observations), we resort to a fixed-effects (FE) model with a full set of time-dummies to capture unobserved time-specific heterogeneity (e.g., non-observed shocks in specific years, for example, the recession in 2008-2009 and upsurges in migration inflows due to conflicts). Compared to a pooled-OLS, this model emphasizes the within variation in the data. Hence, it controls for unobserved country-specific unobservables and could be regarded more efficient than a between-estimator (a significant Hausman-test reveals that the FE-model is preferable over a RE-model). This is particularly crucial in our case since we do not have detailed information on the industry-structure of each economy although it is reasonable to expect that occupations in certain industries might be more sensible to migration than other sectors (González and Ortega, 2011). The model is specified as follows:

$$LWO_{it} = \beta_0 + \beta_1[Migration_{it-1}] + \beta_2[Institutions_{it-1}] + \beta_3[Globalization_{it-1}] + \beta_4[Technology_{it}] + \beta_5[Controls_{it-1}] v_i + \epsilon_{it}$$

where LWO_{it} is the share of low wage occupations in country i in time t . $Migration_{it-1}$ represent a vector of indicators on migration (*TOTAL*, *LABMIG HIGH* and *MED*, *REFMIG*) measured in $t-1$ to mitigate the impact of reversed causality. $Institutions_{it-1}$, $Globalization_{it-1}$, $Technology_{it-1}$, and $Controls_{it-1}$, each represent a vector of variables capturing the role of institutions, globalization, technology and control variables presented above. v_i is the unobserved country-specific effect and ϵ_{it} is the unobserved random error-term. Based on the correlation matrix and additional VIF-tests, no serious cases of multicollinearity was detected. It should be noted that we also used up to five lags (rather than just the first) for each of the variables. The results were fairly unaffected by this exercise apart from the fact that only the latest lag was significant up until $t-3$. After that no further lags were significant. Also, since the within-estimator stresses the dynamics within cases over time, rather than the inter-country variation, it cannot include time-invariant variables and produce imprecise estimates on variables with only moderate changes over time. This latter feature is somewhat present for some of our control variables (e.g., the size of each economy changes only slowly over time) but does not affect our migration variables for which the within variation is as large as the between variation. The benefit with this dynamic approach is, however, that the model stresses whether a change in a given right-hand side variable is related to a change in the dependent variable. Hence, we can assess whether an increase in foreign born labour (i.e., migrants) will influence subsequent growth of the low-wage occupations.

Empirical findings

Table 1 presents the regression results. It is estimated in a stepwise manner in a total of seven different models. First, model 1 estimates the impact of migration regardless of origin without any other variables while Model 2 separates the inflows based on origin, still only controlling for time-specific unobserved heterogeneity. In Model 3 we add all vectors of independent variables. While models 1-2 based on this approach on the one hand could be argued to suffer from omitted variable bias since we do not include conceptually motivated indicators, it is on the other hand motivated by the fact that it allows us to first disentangle the relative role of

migration as such and then in combination with control variables. Models 4-7 then introduce region-specific interactions to assess whether the different groups of regions discussed in section 3 are influenced differently by migration based on their relative location and differences in welfare models and economic structure.

As shown in Table 1 the share of non-native workers per se does not have a significant correlation with the growth of low-wage occupations (model 1). Actually, this is rather dependent on the origin of migrants as neither high shares of refugee migrants (REFMIG) nor labour migrants from middle-income countries (LABMIG MID) show a significant correlation with the increase in low-wage occupations (model 2). On the contrary, we find a negative relationship between increasing share of workers from high-income countries and the growth of low-wage occupations. Since both the left-hand side variable and the right-hand side variables are in percentages, we can interpret the coefficients as elasticities. This means that a one per cent increase in workers from high-income countries is, on average, associated with half a per cent increase in low-wage occupations. Although with a slightly smaller coefficient, this result holds when also adding the vectors controlling for differences in institutions, technology, pressure from globalization, and size and income of the respective economy (model 3). Hence, an increasing share of foreign workers per se, is not positively correlated with the increase of low-wage occupations. Rather, our results point to the fact that an increasing share of workers born in high-income countries impede the growth of low-wage occupation in EU16. This corresponds to the ideas of labour market upgrading as higher shares of foreign-born workers from high-income countries corresponds to a higher demand in either high- or medium-income occupations. Not a growth in low-wage sectors.

Table 1: Fixed effect models on the growth of low-wage occupations. Coefficients and standard errors (within brackets) are reported.

	M1: All	M2: All	M3: All	M4: AS	M5: CE	M6: SC	M7: SE
TOT	-0.034 (0.054)						
LABMIG HIGH		-0.502*** (0.169)	-0.446** (0.186)	-0.252 (0.218)	-0.689*** (0.250)	-0.413** (0.180)	-0.732*** (0.177)
LABMIG MID		0.037 (0.085)	-0.023 (0.086)	-0.315 (0.305)	-0.006 (0.089)	-0.169** (0.085)	-0.012 (0.080)
REFMIG		0.104 (0.113)	0.131 (0.131)	0.114 (0.155)	0.151 (0.132)	0.412*** (0.142)	-0.557*** (0.192)
GROUP # LABMIG HIGH				-0.856* (0.440)	0.501 (0.332)	-0.019 (0.356)	4.015*** (0.816)
GROUP # LABMIG MID				-1.318* (0.722)	0.144 (0.598)	-2.350*** (0.496)	0.645 (0.555)
GROUP # REFMIG				15.793** (6.328)	-0.093 (0.588)	-0.756*** (0.223)	-0.447 (0.384)
Institution	No	No	Yes	Yes	Yes	Yes	Yes
Globalization	No	No	Yes	Yes	Yes	Yes	Yes
Technology	No	No	Yes	Yes	Yes	Yes	Yes
Controllers	No	No	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	23.087*** (0.502)	24.194*** (0.648)	131.608 (448.128)	123.993 (445.118)	188.795 (452.763)	-8.033 (408.030)	11.265 (412.904)
N	318	318	318	318	318	318	318

Note: Institutional (EU25, collective bargain, protection against dismissals and temporary work), globalization (import share, FDI share of GDP), technology (labour productivity, human capital and technological change) and controllers (wage and size of the economy) all explains a considerable part of the variation. In fact, the degree of collective bargain and the protection against temporary contracts all limit the growth of the low wage sectors. Other significant factors that moderate the growth of the low-wage sector are increasing labour productivity, high mean wages and the size of the economy. High concentrations of human capital is however positively associated with a growing low-wage sector. Neither the EU25 dummy, import share, FDI nor technological change are significant when all variables are estimated jointly together with year-specific fixed effects. They are however significant if estimate theme by theme.

However, as shown in figure 2, different economies have experienced different inflows of migrants due to their relative location, welfare regimes and the openness towards refugees. To assess whether these varying trajectories have had an impact on the low-wage occupations in respective country-group, we estimate 4 additional models where a dummy representing each regional group (GROUP) is interacted with LABMIG HIGH, LABMIG MID and REFMIG respectively. We can therefore compare the general effect on the labour market with the specific effect in each of the four macro-regions.

Based on these models, a number of interesting findings appear. First, we do find that an increasing share of the workforce from low-income countries have a strong significant effect on the growth of low-wage occupations. This is however only present in Anglo-Saxon countries (AS) but not in any other macro-region. Every percentage increase of refugee migrants to Ireland and the UK is associated with almost a 15-percentage point increase in low-wage occupations. On the contrary, there is a significant negative relationship between REFMIG in

Scandinavia (SC) although they have experienced the greatest increase in such type of migrant workers over the last couple of years. No significant correlation is found in either Continental Europe (CE) or in Southern Europe (SE). Secondly, apart from the positive impact of refugee migrants in AS, the only other positive correlation between an increasing share of foreign born workers and the growth of the low-wage sector is found in Southern Europe (SE), but that mainly concerns migrants from high-income countries where a one per cent increase in migrants from high-income countries is associated with four percentage points increase in low-wage occupations. Hence, while the increase in AS could be argued to be supply-driven, the increase in SE is more demand-driven as an increasing share of workers from high-income countries increase the demand for products and services related to low-wage occupations. This finding can again, be contrasted to AS where both an increasing share of workers from MID and HIGH has a negative association with the increase in low-wage occupations. Thus, EU models of capitalism (Farkas, 2016) do influence the potential mechanisms leading to growing low-wage occupations, and it is only in UK and Ireland where there is some support for the Rybczynski-theorem. This could be attributed to the higher levels of social mobility in, for example, Scandinavia compared to the Anglo-Saxon countries (Eurofound, 2017). At the other extreme, an increasing share of foreign-born workers originating from high-income countries are correlated with low-wage occupation growth in Southern Europe. This corresponds to previous studies arguing the growth of low-wage occupations in especially large agglomerations, to a large degree is driven by demand factors as a population with higher purchasing power also will increase demand for personal services (Sassen, 2001; Cortes and Tessada, 2011).

While the findings thus far have indicated that (i) the share of foreign-born population (LABMIG HIGH) is associated with a growth in the low-income occupations and (ii) that this relationship vary between different groups of countries, two outstanding issues remain. First, if indeed migration is associated with both demand- and supply-driven processes, then this might work differently for different types of low-wage occupations. For example, the growth of service workers and shop and market sales workers (ISCO 5) could be associated with a greater demand originating from a growth of high-income occupations, while elementary occupations (ISCO 9) to a greater extent could be associated with increasing supply of labour. Hence, we need to distinguish between the two. Second, while models 4-7 indicate some differences between groups of countries, the reported results only highlight the difference between each respective group and the remaining countries, not whether there are significant differences between different types of country groups. To acknowledge these shortcomings, table 2 present the marginal effects obtained from three fixed-effect models in which LABMIG HIGH and MED and REFMIG are jointly interacted with all of the country groups in the same model. By splitting the dependent variable into services and shops workers and elementary occupations, the sum of the second and third column corresponds with the score in the first column (combined). Since a significant contrast indicate whether differences in means across groups is significant, we find that when estimating all interactions jointly, the main findings presented in table 1 remain: The growth of low-wage occupations is still only related to an increase of refugee migrants in the Anglo-Saxon countries, and labour migrants from high-income countries in Southern Europe.

Table 2: Pairwise comparisons of marginal linear predictions obtained from fixed effect models on all low-wage occupations (ISCO 5+9) and for service and shop- (ISCO 5) and elementary- (ISCO 9) occupations respectively. Margin and standard errors (within brackets) are reported.

	LowWage	ServiceShop	Elementary
GROUP # LABMIG HIGH			
AS	-1.012** (0.268)	-0.531* (0.187)	-0.481*
CE	-0.618** (0.225)	-0.425* (0.185)	-0.193 (0.129)
SC	-0.402 (0.333)	0.403 (0.274)	-0.805*** (0.190)
SE	3.125*** (0.749)	4.826*** (0.615)	-1.701*** (0.428)
GROUP # LABMIG MED			
AS	-1.848** (0.593)	-1.226* (0.487)	-0.622 (0.339)
CE	-0.852 (0.523)	-0.449 (0.430)	-0.403 (0.299)
SC	-2.612*** (0.473)	-2.750*** (0.389)	0.138 (0.270)
SE	0.173 (0.522)	-1.063* (0.429)	1.236*** (0.298)
GROUP # REFMIG			
AS	16.444** (5.497)	10.860* (4.519)	5.584 (3.140)
CE	-0.439 (0.515)	-0.268 (0.423)	-0.170 (0.294)
SC	-0.508** (0.184)	-0.428** (0.152)	-0.080 (0.105)
SE	-0.809** (0.312)	-0.581* (0.256)	-0.228 (0.178)
Institution	Yes	Yes	Yes
Globalization	Yes	Yes	Yes
Technology	Yes	Yes	Yes
Controllers	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	318	318	318

Note: The following variables are included. Institutional (EU25, collective bargain, protection against dismissals and temporary work), globalization (import share, FDI share of GDP), technology (labour productivity, human capital and technological change) and controllers (wage and size of the economy)

However, when separating between the growth of service workers and shop and market sales workers and elementary workers, some notable differences appear. First, both these positive effects are mainly attributed to the growth of service and shops workers and not elementary workers. Second, there is a significant difference between Southern Europe and the other parts of the EU in terms of the growth of elementary occupation as the only positive correlation from this type of migration is related to labour migrants originating from middle-income countries (LABMIG MID).

Concluding remarks

Our empirical findings indicate that the growing share of migrant workers only has a limited general impact on the growth of the low-wage sector in the EU during the last two decades. The main drivers behind the increasing labour market polarization and growth of the low-wage sector in particular seem more related to technological changes and globalization (Goos et al, 2009; Fernandez-Macias and Hurley, 2017). Our findings are thus largely in line

with Autor and Bron's (2013) study on the US, showing that growing low-skilled migration had much less impact than aforementioned factors on the expansion of low-skilled occupations.

When considering the structure of immigrant workers and institutional settings, the impact of immigration workers on the expanding low-wage sector however differs. Most apparent is the positive impact of refugee migrants on the expanding low-wage sector in the Anglo-Saxon economies, and the negative (or insignificant) impact in the other EU15 macro regions. The only other positive impact is identified for migrant workers in Southern Europe, where the effect is mostly related to labour migrants from high-income countries. The latter suggests a demand driven effect, where higher purchase power create a growth of low wage services (Sassen, 2001; Cortes and Tessada, 2011), while the former is more expected from the arguments derived from the Rybczynski theorem. Another reason could be that Anglo-Saxon firms face less incentives to adopt skilled biased technologies when low-skilled labour is abundant and the wage gap is greater compared to the other macro regions (Algan et al., 2010; Lewis, 2011).

The weak impact of refugee migration on the low-wage sectors in the other macro regions, could also be related to adjustment mechanisms. One reason could be the general possibility of social mobility, and in particular an upward mobility of native workers. When immigrant workers enter more manual and less skilled demanding work, native workers may be reallocated to more skill-demanding occupations. As suggested by Foged and Peri (2016) among others, this is because natives is offered new career possibilities and migrants will take over low-wage manual work when the economy expands. The upward mobility of native workers may further be due to a capital adjustment mechanism as suggested by Tabellini (2017).

The weaker capital adjustment mechanism in the Anglo-Saxon region could be attributed to different institutional factors. One reason could be weaker labour unions pushing down wages on low skilled work may be one reason for expanding such sectors. Another plausible explanation is linked to the educational system. As argued by Eurofound (2017), greater inequality in schooling may create different possibilities among groups in society. Low human capital endowments among native low-wage workers may turn negative for social mobility and associated wage career, which make upskilling less feasible.

Our findings underline the importance of re-considering the immigration impact on overall occupational structures to correctly assess the effect on public finance. Only translating the presence of immigrant workers in low-wage occupations into lower taxable incomes, while overlooking upward mobility on native workers taxable incomes, will probably bias the fiscal accounting of exogenous driven refugee immigration. Instead, our findings show that the impact of refugee migration on the low-wage sector vary across different institutional regimes. Hence, while the Rybczynski theorem holds some merit in the UK and US due to lower minimum wages and less social mobility, while the notion of potential upgrading of natives seems to be more valid in regimes with more compressed income structures and greater potential of social mobility (c.f., Foged and Peri, 2016). In short, the integration of refugees is greatly dependent on broader integration policies. To further delve into this issue

micro-data that makes it possible to separate the occupations of native workers from immigrants similar to Foged and Peri (2016) is required. In such case the immigration effect depending on the country of origin on the occupation structure of both natives and immigrants, respectively, could be assessed. The main limitation of this study is that we only can analyse the overall occupation structure in each economy.

References

- Alcobendas, A., and Rodriguez-Planas N. (2010), "Immigrants' Assimilation Process in A Segmented Labor Market", UFAE and IAE Working Papers 822.10.
- Algan, Yann, C. Dustmann, A. Glitz and A. Manning (2010), "The Economic Situation of First and Second-Generation Immigrants in France, Germany and the United Kingdom", *The Economic Journal*, Vol. 120 (1), pp. F4–F30.
- Amuedo-Dorantes, C. and S. De la Rica (2007), Labour Market Assimilation of Recent Immigrants in Spain, *British Journal of Industrial Relations*, Vol. 45 (2), pp. 257-284.
- Autor, D. and Dorn, D. (2013), The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market, *American Economic Review* 103 (5), 1553–1597.
- Basilio, Leinalie and T. Bauer (2010), "Transferability of Human Capital and Immigrant Assimilation: An Analysis for Germany", *Ruhr Economic Paper* No. 164.
- Borjas, G.J. (1999) Immigration and welfare magnets. *Journal of Labor Economics*, 17:4, 607-37
- Brinley T. (1954) Migration and economic growth: a study of Great Britain and the Atlantic economy. Cambridge: Cambridge Univ.
- Chiswick, C.U., Chiswick, B.R., Karras, G (1992) The impact of immigrants on the macro-economy. Carnegie-Rochester Conference on Public Policy, 37:1, 279-316
- Cortes, P and Tessada, J. (2011) Low-skilled immigration and the labor supply of highly skilled women *American Economic Journal: Applied Economics* 3, 88–123.
- Dustmann and Frattini (2011) Immigration: The European Experience, *CREAM discussion paper*, CDP No 22/11.
- Dustmann C., Hatton T and Preston I (2005) The labour market effects of immigration. *The Economic Journal*, 115, 297-299
- Ekberg, J. (2011) Will Future Immigration to Sweden make it Easier to Finance the Welfare System? *European Journal of Population* 27:103–124
- Eurofound (2017) *Social mobility in the EU*, Publications Office of the European Union, Luxembourg.
- Eva M.-G. and Tritah, A. (2016) The effects of immigration in frictional labor markets: Theory and empirical evidence from EU countries, *European Economic Review* 84, 76–98.
- Foged, M. and Peri, G. (2016) "Immigrants' Effect on Native Workers: New Analysis on Longitudinal Data. *American Economic Journal: Applied Economics*, 8(2): 1-34.
- Farkas B. (2016) Models of Capitalism in the European Union Post-crisis Perspectives, Palgrave, Macmillan.
- González, L. and Ortega, F. (2011) How do very open economies adjust to large immigration flows? Evidence from Spanish regions, *Labour economics* 18 (2011) 57-70.
- Goos, M. Manning, A. and Salomons A. (2009) Job Polarization in Europe, *American Economic Review: Papers & Proceeding*, 99:2, 58–63.

- Goos, M. Manning, A. and Salomons A. (2014) Explaining Job Polarization: Routine-Biased Technological Change and offshoring. *American Economic Review: Papers & Proceeding*, 104:8, 2509-26.
- Harris, J.R and Todaro, M.P. (1970) Migration, unemployment and development. A two-sector analysis. *American Economic Review*, 60:1, 126-42
- Hatton, T. J. (2016) *The migration crisis and refugee policy in Europe*, in Fasani F. Refugees and Economic Migrants: Facts, policies and challenges, Vox CEPR Press.
- Lewis, E. (2011) Immigration, skill mix, and capital-skill complementarity. *Quarterly Journal of Economics* 126 (2), 1029–1069.
- Massey, D.S. (1990) Social structure, household strategies and the cumulative causation of migration. *Population Index* 56:1, 3-26
- OECD (2017) *International Migration Outlook 2017*, OECD publishing, Paris.
- Ottaviano, G. and Peri, G. (2012) Rethinking the effects of immigration on wages, *Journal of the European Economic Association* 10 (1), 152–197.
- Rica S. d. I., Glitz A. and Ortega F., 2013 *Immigration in Europe: Trends, Policies and Empirical Evidence*
- Sassen, S. (2001) *The Global City*. Princeton, NJ: Princeton University Press.
- Seukwa, L H. (2013) *Integration of Refugees into the European Education and Labour Market*, Peter Lang Publishing Group.
- Sjaastad, L.A. (1962) The costs and returns of human migration. *Journal of political economy* 70:5, 80-93
- Tabellini, M (2017) Gifts of the Immigrants, Woes of the Natives: Lessons from the Age of Mass Migration. MIT Job Market Paper Downloadable at: <http://economics.mit.edu/files/13646>

APPENDIX

Table A1: Full variable list

Variable	Description	Source
<i>Dependent variables</i>		
LowWageShare	Low wage occupation (ISCO 5 & 9) share of total employment %	EUROSTAT
ServiceShop	Low wage occupation (ISCO 5) share of total employment %	EUROSTAT
Elementary	Low wage occupation (ISCO 9) share of total employment %	EUROSTAT
<i>Migration</i>		
TOT	Share of foreign born employed, in % of total employed	EUROSTAT, OECD
LABMIG HIGH	Share of foreign born employed from high-income countries as % of total employed	EUROSTAT, OECD
	Share of foreign born employed from new EU, or medium income countries, as % of total employed	
LABMIG MID	Share of foreign born employed from low income countries (refugee migrants) as % of total employed	EUROSTAT, OECD
REFMIG	Share of foreign born employed from low income countries (refugee migrants) as % of total employed	EUROSTAT, OECD
<i>Institutional</i>		
EU25+	EU25_Period (2004-2015 =1, 0 otherwise)	EUROSTAT
CollBar	Adjusted bargaining coverage rate: proportion of all wage	OECD
EmpDis	Protection against dismissals	OECD
EmpTemp	Protection against temporary employment	ICTWSS
<i>Globalization</i>		

ImpShare	Import to GDP share in %	Penn World Tables
FDI	Outward foreign direct investments as proportion of GDP	OECD
<i>Technology</i>		
LP	Labour productivity	OECD
HC	Human capital level (pwt)	Penn World Tables
TechChange	Technological change defined as total factor productivity growth	Penn World Tables
<i>Controllers</i>		
RelWage	Relative wage (country wage to EU average) %	OECD
LMsize	Labour market size (number employed in thousands)	OECD
