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people to jobs, jobs to people

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global mobility and labor migration

study by

IZA - Institute of Labor Economics

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Preface

Significant talent challenges are looming in the Northern and Southern hemispheres by 2020 and beyond. In the Northern hemisphere, the expected talent gaps will be caused mainly by demographic shifts – notably, the retirement of baby boomers. For example in the United States, Germany, Canada and the United Kingdom, immigration and expected birth rates will not balance the workforce losses caused by aging populations. Over the next decade, Western Europe's talent supply will continuously decrease, leading to almost empty talent pipelines beyond 2020. Economic growth expectations coinciding with projected waves of retirements will force employers to find, attract and retain scarce talent.

Around the globe, some 247 million people – are living (and in large part working) in a country other than that of their birth. Sometimes described as the unfinished business of globalization, labor migration issues raise complex and sensitive political, human rights, economic and social concerns, as well as an array of legal and regulatory challenges. Migration accordingly occupies a prominent place on both national and multilateral policy agendas, and in public discourse and debate.

Investment in STEM disciplines (science, technology, engineering and mathematics) is increasingly seen in the US and Europe as a means to boost innovation and economic growth. The tech intensive sectors create high-tech STEM jobs which are typically more productive and therefore generate additional demand. These companies tend to concentrate in high-tech hubs where high-paid workers employed in STEM occupations are likely to spend their income on local non-routine services. Research shows that with the creation of one high-tech job, between 2.5 and 4.4 additional jobs are created outside tech intensive sectors in these high-tech regions. This is an important fact because, and contrary to what is sometimes considered, the boosting of high-tech employment helps rather than hurts growth of employment at the lower end of the labor market.

The importance of science education is recognized on both sides of the Atlantic but the debate gets particularly heated when it intersects with immigration. Europe is in a similar position to the United States, but has much more rigid immigration policies making that Europe attracts fewer high-skilled workers than not only the United States, but also Canada and Australia. Only 3 percent of scientists in the European Union come from non-EU countries, whereas in the United States 16 percent of scientists come from abroad.

A global labor market is already here, but we lack the institutions to make it work effectively. A global shortage of STEM skills is not the real problem for the world economy, but the location mismatch between employers and employees is. Talented people cannot move to where the jobs are. Several US and European firms have moved their R&D operations offshore over the last two decades, which diminishes the number of STEM jobs in both of these locations. Demand has not dwindled, but instead has relocated to countries such as China and India.

The changes in the digital era raise profound issues how to adapt labor market policy and institutions, as well as global mobility, decent flexible work arrangements and social security, in order to provide adequate security for workers while exploiting the potential of the new ways of working to enhance opportunities.

Randstad is pleased to attribute to the public discourse with this 'People to Jobs, Jobs to People' research. Commissioned by Randstad, the IZA Institute for the Study of Labor in Bonn has studied the determinants of worker migration, highlight expected changes in labor supply of targeted migration flows and offer a comprehensive discussion of firms' (re)location choices to investigate the potential of job flows in response to skill shortages.

Jacques van den Broek
CEO Randstad

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INTRODUCTION: MIGRATION IS A CRUCIAL ISSUE

- Population aging, technology-induced changes in labor demand as well as the recent refugee crisis have once again stirred continuous debates about the economic and social consequences of international labor migration in Europe and other developed countries. Proponents of international labor mobility highlight that migrants substantially contribute to the fiscal budget, provide well-needed skills and frequently take jobs that natives eschew. Critics, in turn, accuse immigrants of draining the welfare and healthcare systems, taking natives' jobs, or eroding social trust in the destination countries. To date, and detached from this recent turmoil, many developed countries, however, actively attract and retain a wide range of foreign talent in order to strengthen their economies and to offset the (severe) consequences of aging populations, decreasing labor force potentials and unsustainable fiscal deficits.

- Against this backdrop, our project aimed at assessing potential determinants of worker and job mobility in an international context. Chapter 1 studies determinants of worker migration – both from an individual and an aggregate, country-level perspective. Chapter 2 highlights expected changes in labor supply net of targeted migration flows up until 2030. Chapter 3 offers a short but comprehensive discussion of firms' (re)location choices to investigate the potential of job flows in response to skill shortages. In Chapter 4, the main findings from this project are summarized and policy-relevant conclusions are drawn and discussed.

1.1: WHAT MOVES TALENT? THE ROLE OF INSTITUTIONS IN ATTRACTING HIGH-SKILLED IMMIGRANTS

- The first chapter of the project provides an empirical assessment of workers' international mobility with respect to legislative features of the labor market in both the receiving countries. To these ends, the study investigates the relationship between a set of labor market institutions (minimum wages, employment protection regulation, unions, and mandated benefits), overall economic prosperity, and the skill composition of immigrants in the OECD countries. The analysis is based on detailed data on the educational attainment of the immigrant population in all OECD countries by place of birth paired with detailed information from the OECD's database on tax-benefit policies and employment. Regression results offer suggestive evidence on the relationship between labor market regulations and skilled migration patterns, as well as to assess the importance of each factor in attracting and retaining foreign-born skilled workers.

- In the analysis, immigrants are classified into three categories according to their educational attainment. High-skilled immigrants hold a tertiary education degree (ISCED 5-6), medium-skilled have received upper secondary school qualifications (ISCED 3-4), while low-skilled have completed at most primary or lower secondary education (ISCED 1-2). Since the analysis is based on stock data, i.e., net cumulative flows, the analysis thus focuses on the role of institutional factors in attracting and retaining differently skilled immigrant workers.

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- Simple descriptive statistics show that the immigrants' average skill level has increased in almost every OECD country over the period from 2001 to 2011. Canada, Australia, and the United Kingdom exhibit the largest share of tertiary-educated immigrants in 2011, while Southern and Central European countries, such as Italy and Germany, rank last. Top sending countries of high-skilled immigrants to OECD countries are India, the Philippines, and China. However, a large number of high-skilled immigrants come from other OECD countries, too; for example, the UK or Germany. There are no significant gender differences in the composition of the stocks: males and females are equally represented among the high-skilled immigrants, and the increase in the number of tertiary educated immigrants is similar for both groups, too.

- The study's regression analysis reveals additional empirical regularities. About 58 percent of the variation in the stock of high-skilled immigrants can be attributed to push factors in the country of origin; correspondingly, only 42 percent of this variation is due to pull factors in the receiving country. Among the pull factors, economic variables - such as tax rates, average wages, unemployment rates, and GDP growth - largely account for differences in the magnitude and the composition of migration stocks across countries. The relative contribution of these factors to the overall variation is about 30 percent for both high and low skilled foreign workers. In particular, the average wage paid in the host country is positively correlated with the number of high-skilled immigrants, contributing to roughly 13 percent of the total variation; a slightly larger effect is found for the low-skilled migrants.

- When looking at labor market institutions, the results demonstrate that employment protection legislation has the largest positive impact on the stock of high-skilled immigrants. Unemployment benefits are, in turn, negatively associated with the presence of high-skilled immigrants. As high-skilled individuals are typically net contributors to unemployment insurance systems, an increase in the generosity of these benefits may reduce the attractiveness of a particular destination for this immigrant group. Conversely, the presence of low-skilled immigrants is found to be larger in those countries with more generous welfare systems and a higher union density. Intuitively, more powerful unions may increase workers' conditions, in particular for low-skilled workers. For example, this may explain why liberal market economies like Canada, the UK, Australia and to a lesser extent the USA have larger shares of high-skilled migrants compared to Social Dialogue countries like Germany and the Netherlands.

- The study also aims at investigating whether immigrants move to destinations where they are needed. When particular skills are short in supply, the entry of immigrants may alleviate shortages in critical occupations and sectors. The analysis suggests that the number of immigrants increases with the number of vacancies. However, due to data limitations, the findings need to be interpreted with caution. The effect is positive and statistically significant for both low and high-skilled workers. Part of this effect may be driven by specific policies aimed at facilitating the entry of immigrants in periods of high demand for skills.

- Overall, the analysis puts forth two main conclusions. First, immigrants, both high- and low-skilled, are more responsive to economic factors than to changes in labor market institutions. Second, labor market institutions may better explain differences in the number of high-skilled immigrants across countries than in the number of low-skilled. Limited access to information may be a possible explanation for this result: low-skilled immigrants may not be aware of labor regulations at the destination countries and they may thus be more responsive to factors directly affecting their wages.

1.2: WHAT WILL MOVE TALENT?

- The second chapter of this project shifts the focus to individual-level determinants of migration intentions of individuals having different skill levels and socio-economic backgrounds and living in different world regions. While emigration intentions are tentative, studying factors and circumstances linked with potential emigration decisions may help policymakers to address global mobility issues proactively rather than retroactively, both in migrant-receiving and migrant-sending societies.

- To better understand individual-level migration decisions, the chapter utilizes the main publicly available cross-country data sources on emigration intentions for the 2010-2013 period, covering a wide range of developing and developed regions (Europe, Central Asia, Latin America, the Middle East and North Africa). Based on these data, the chapter then assesses the relative importance of different factors for the emigration intentions of high-skilled individuals: socio-demographic and family characteristics, skills, foreign contacts and experiences, and the perception of socio-economic and institutional conditions at home. Moreover, and related to chapter 1.1., the study further investigates how emigration intentions are shaped by institutional mobility restrictions.

- Overall, the extent of emigration intentions and their determinants vary considerably across regions and skill groups. However, several unifying themes emerge. First, highly-educated individuals are most likely to express emigration intentions, desires, and aspirations. For example, in 2010, respondents in transition economies with Master's or Ph.D. degrees were around 9 percentage points more likely to express intentions to move abroad than comparable individuals with primary education. Second, previous stays abroad or networks of family and friends in foreign countries are robust determinants of emigration intentions. For example, interviewees from Europe, who have either lived or worked abroad before, were 4-4.5 percentage points more likely to express intentions to live abroad in the future compared with comparable individuals with no previous foreign experience. Third, perceptions of politico-economic and institutional conditions serve as determinants of emigration decisions. Specifically, poor economic conditions, crime, and lack of trust in institutions motivate talented individuals

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from developing and transition countries to seek better opportunities abroad. Potential emigrants also tend to have lower than average life satisfaction, despite being more educated and having a higher income than their fellow citizens. Fourth, it appears that emigration intentions are higher among respondents facing more mobility restrictions. This result likely reflects the fact that countries with considerable travel restrictions are also subject to relatively poor macro-economic and institutional conditions, which potential emigrants are trying to escape.

- Fifth, evidence from the EU Neighborhood barometer and Eurobarometer (polling respondents aged 15-35) suggests that emigration is mostly intended to be of temporary nature. This result implies that temporary migrants may help alleviate (temporary) skill shortages in receiving countries, but may also disseminate knowledge and technology in their home countries. The study also shows that potential emigrants from the Eastern Partnership countries may respond to skill shortages when choosing a potential destination country. Last, it is documented that emigration intentions declined during the recent economic crisis in both developed and developing countries. Interestingly, emigration intentions in Europe were lower in those countries that were most affected by the crisis, i.e., Portugal, Ireland, Greece, and Spain.

1.3: LABOR MARKET IMBALANCES, SKILLS AND IMMIGRATION: DO IMMIGRANTS MOVE TO WHERE THEIR LABOR IS NEEDED?

- The final study of Chapter 1 shifts attention to the analysis of worker mobility in response to labor market imbalances. Simple economic reasoning suggests that immigrants should be more responsive to changes in skill or labor imbalances than natives, given that immigrants have already borne the costs of leaving their home and social network and should thus be more willing to respond to economic incentives. This reasoning should be particularly true for those immigrants who have not yet amalgamated with their new milieu. In contrast, natives' decision to move still entail the pecuniary and non-pecuniary costs of parting with their home and social network.

- In order to empirically evaluate this theoretical reasoning, the study analyzes the responsiveness of high- and low-skilled immigrants to labor market imbalances in the EU-15. For this purpose, labor market imbalances and (high- and low-skilled) immigrant labor shares are calculated at the occupation-industry-country level for each year over the 2004-2012 period.

- By linking the immigrants' allocation to the study's measure of labor market imbalances, it is shown that non-EU-15 immigrants are generally more responsive to labor market shortages than natives. The effect is significant in the statistical sense for the low-skilled segment of the labor market, i.e., low-skilled immigrants are significantly more responsive to labor shortages than low-skilled natives. On the other hand, EU-15 immigrants are similarly responsive to labor shortages as native workers, but more responsive than their low-skilled counterparts.

- The study further shows that the responsiveness to labor shortages across occupations, industries and countries of low-skilled, non-EU-15 immigrants is salient across countries with different levels of GDP, unemployment rates, employment protection legislation, social expenditures relative to GDP, union density or collective bargaining coverage. Similarly, low-skilled, non-EU-15 immigrants' responsiveness to shortages does not depend on countries' migration history, migration policy, or integration policy. Low-skilled, non-EU15 immigrants are thus more responsive than their native counterparts under a broad range of institutional, economic and policy contexts. On the other hand, it is shown that the potential of low-skilled, EU-15 immigrants, to fill in labor and skill shortages is significantly higher in countries with above-the-median levels of employment protection, social expenditures relative to GDP, bargaining coverage and open migration policies.

2: PROJECTING DEVELOPMENTS IN LABOR SUPPLY AND DEMAND

- While the first part of this project has analyzed the role of immigration and immigration policies in solving skill shortages in Western economies, the remainder of this work offers a brief but comprehensive analysis of the potential conditions and motivations for firm (re)location choices, i.e., job mobility, in general and in response to shortages in the general labor force and/or specific skills (Chapter 3) in particular. To guide the analysis of relocation choices, Chapter 2 of the project complements this work by assessing potential future shortages by predicting changes in labor supply and demand up to 2030.

- Demographic change due to the aging of Western societies as well as increasing migration flows are expected to significantly change individual and aggregate labor supply. Against this backdrop, Chapter 2 investigates potential changes in the size and composition of the labor force over a time horizon of fifteen years (2015 to 2030) for ten selected European countries, as well as the United States. The analysis expands mere accounting exercises by explicitly addressing behavioral responses in household labor supply. Moreover, by considering labor supply and labor demand in one unified framework, firm-level reactions to excess or lacking supply of a particular type of labor can be directly accounted for. In a nutshell, the underlying methodology exploits state-of-the-art reweighting techniques, and bases upon detailed, country-specific population projections paired with detailed individual-level survey data, which provide rich information on individuals' labor market participation and other individual characteristics.

- The underlying population projections are aligned with official population scenarios from Eurostat and the US Census Bureau, respectively, and supplemented with auxiliary projections on educational attainment for each country, which allows differentiating the population by sex, age and skills. Two different scenarios are considered: (i) a baseline scenario that accounts for the

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official migration projections by Eurostat and the US Census Bureau, and (ii) a constant migration scenario that assumes that net migration is equal to the average migration flows observed over the period of 2004 to 2013.

- The projections indicate that total population is likely to increase in seven out of ten countries under investigation. Decreases in population are only found for Germany, Poland and Spain (baseline scenario) only. Considering the changes in the labor force, defined by the number of individuals aged 15 to 64, yields a gloomier picture. The size of the labor force is predicted to increase less (decrease more) strongly than the overall population. While this implies a general aging of the societies under consideration, it also points to increasing dependency ratios, as a smaller share of individuals in the overall population is in the labor force. However, the general trend in aging is accompanied by steadily increasing educational attainment. Over time, an increasing share of the workforce is predicted to receive tertiary education (henceforth, the high-skilled). Relatedly, the share of low-skilled workers is predicted to unanimously decrease in every country studied.

- Based on these aggregate population projections, the application of reweighting techniques paired with current individual-level survey data further allows forecasting of individual labor supply behavior over the period of 2015 to 2030. This procedure eventually allows to investigate the evolution of the number of supplied jobs and hours worked, disaggregated by different types of occupations and/or industries; characteristics that are not covered by the population projections but rather reflect workers' preferences and opportunities.

- According to our projections, changes in hours worked exceed expected changes in the labor force size. For countries that are subject to a decreasing labor force, losses are thus partially mitigated by behavioral responses in labor supply. The main driver of this development is the increasing share of high-skilled workers, who supply considerably more hours than medium- and low-skilled workers. Both the baseline and constant-migration scenario lead to similar results, although negative developments are mitigated by more intensive migration. Targeted migration policies may hence play a key role for economies that are expected to face major demographic transitions. The projections also point to an increasing importance of white-collar compared to blue-collar jobs. This trend is observable across all countries, although quantitative differences can be substantial. The projections further point to significant increases in labor supply in the non-market service sector, while labor supply generally decreases in the manufacturing sector. Both effects can be attributed to the observed trend in upskilling.

- In a last step, changes in labor demand behavior are taken into account to obtain partial equilibrium effects at the labor market. The basic underlying mechanism is a scarcity effect: excess supply in certain sectors may lead to lower wages, which lowers individual labor supply in turn. The opposite effect may be observed in sectors with more pronounced labor shortages. This channel hence counteracts the demography-induced transitions, lowering scarcities or excessing supply. Quantitatively, this offsetting effect is, however, small. Therefore, it seems unlikely that potential shortages in skills may fade due to higher wages for (potential) workers.

3: JOBS TO PEOPLE? - ASSESSING FIRM LOCATION CHOICE BEHAVIOR IN THE LIGHT OF (POTENTIAL) SKILL SHORTAGES

- Given the empirical findings presented in the previous chapter and the observed temporal lags in immigration policy effects, the literature survey outlined in Chapter 3 of the project investigates whether skill shortages in production may eventually induce firms to relocate (parts of) their production sites to skill-abundant regions.

- To these ends, the study first investigates the current extent and scope of skill shortages in Western economies. It is concluded that public opinion and academic evidence about the extent of skill shortages is widely apart: despite substantial claims by many employer-led organizations, academic research has failed to provide evidence in favor of skill shortages. Rather, over-qualification in the labor market remains a persistent feature, as many workers exhibit tasks well below their actual skill set. However, demographic change (see, for example, Chapter 2) as well as continuing job polarization at the expense of medium-skilled employment may well trigger notable skill shortages in the near future. From an economic perspective, these potential shortages in required skills may in turn urge firms to adjust their production technology mix or their employment strategies to overcome these deficiencies, which may impede firms' output and productivity.

- Against this backdrop, the study continues by evaluating one potential adaption strategy for firms: the relocation of (parts of) the firms' production sites. To better understand relocation decisions in response to potentially arising skill shortages, the study first provides a general analysis of location choice factors, and then examines determinants of relocation.

- The study characterizes the complexity of firms' location choices documented by the vast empirical research. Among others, and as detailed in Chapter 3, it has been documented that market potential serves as one key determinant of location choice. The region's GDP/purchasing power, the presence of competitors/suppliers, and the quality of the infrastructure, crucially affect firms' assessments of markets and their location choice. Firms have been further shown to appreciate locations that are inhabited by similar firms, creating industrial clusters. This agglomeration may, however, be also due to natural local advantages, which lead firms to naturally select into specific regions. Non-surprisingly, the presence of suitable employees has been further shown to guide firms' location choices, and to foster the extent

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of entrepreneurial activities. For example, the foundation of new, high-tech firms in the US can be related to the close presence of scientists and universities that provided valuable scientific knowledge to these new firms. As expected by economic reasoning, differences in the level and scope of taxation, the degre e of governmental regulations (e.g., regarding employment or the environment) and the presence of local amenities, such as social structures, norms or milieus, further guide firms' preferences in favor of or against certain locations.

- Given the sketched complexity and variety of determinants affecting firms' location choice, the chapter concludes by reasoning that it appears unlikely that firms relocate their entire production process to different regions in response to moderate changes in the disposability of one factor in production. Empirical evidence suggests that relocation is mostly due to external growth (merger or take-overs) and rather infrequent.

- Chapter 3 suggests that increased offshoring rather than relocation may serve as firms' more common behavioral response to skill shortages. Although other reasons for offshoring have been identified by empirical research, too, access to qualified personnel already serves as a key determinant of firms' decision to offshore activities. Given the expected demographic developments in Western societies paired with the technological progress in many non-Western countries (in particular Asia), this trend can be expected to increase over the upcoming years.

4: OUTLOOK AND POLICY CONCLUSIONS

- The observed aging of populations paired with ongoing technological change in favor of high-skilled and/or non-automatable labor in developed countries have led to continuous discussions about suitable policies to counteract potential shortages of skills. Although increasing educational attainment or changes in working arrangements may help to alleviate skill shortages, we argue that migration should be seen as one of the key policy instruments to align (skill-specific) labor demand and supply in developed countries or regions and thus to ensure economic progress and avoid firm relocation into skill-abundant countries.

- We extract three key messages from this project. First, facilitating labor migration helps to substantially ease potential labor shortages and contributes to growth and employment. Hence, the opening of borders should lead to substantial benefits. In turn, the restriction of legal migration in either the sending or receiving countries may well cause a loss of opportunities both at the individual and the aggregate level. Coherent migration policies hence appear to be useful, in particular policies that systematically account for skill-specific demands by the national economy. Second, apart from economic dynamism, national institutions in both the receiving and sending countries have important effects on the size and the composition of the migrant population. Specifically, certain institutional features such as unemployment benefits or employment protection seem to influence different groups of the potential migration pool in different ways. Hence, apart from explicit (skill-oriented) migration policies, national policymakers face strong incentives to create 'good' institutions in order to attract or retain a skilled and productive (migrant) workforce in an increasingly global labor and product market.

- Third, transnational networks seem to furnish relevant information to potential migrants regarding prospective working conditions and job opportunities in the receiving countries, and also provide employers in these countries with a reliable pool of foreign workers. Therefore, better understanding and engaging immigrants´ networks can be beneficial for sending countries (e.g., to encourage return migration, brain circulation, and engage diasporas abroad) and destination societies (e.g., to reduce illegal migration). From the destination countries' point of view, the possible influx of highly-educated foreigners may be key in addressing problems related to population aging, labor shortages, and skill mismatches. Importantly, informing policymakers about the emigration decisions of those still pursuing their education may help arrange migration policies that encourage brain circulation.

1.1 What Moves Talent?
The Role of Institutions in Attracting High-skilled Immigrants

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What Moves Talent?

The Role of Institutions in Attracting High-skilled Immigrants

I. Introduction

This chapter studies the determinants of high-skilled international migration stocks by specifically focusing on host countries' labor market institutions. Much of the economics of immigration literature has highlighted the importance of economic and demographic factors in explaining international migration; income differentials, physical distance and migration costs largely account for differences in the magnitude and the composition of migration flows across countries and over time (Borjas, 1987 and 1999; Grogger and Hanson, 2008).

The role played by destination countries' institutions in attracting and retaining immigrants has received relative little attention. In one exception, Bertocchi and Strozzi (2009) find that the level of democracy and the quality of political institutions are powerful magnets for international migration. They provide robust empirical evidence that a wide array of institutions, such as education policies, citizenship laws and land redistribution, played a major role in determining 19th century mass migration from the Old to the New World. A different set of papers has instead analyzed the impact of migration institutions, such as migration policies, in attracting foreign-born workers to the OECD countries. Ortega and Peri (2009) use data on annual bilateral migration flows for 15 OECD receiving countries,

The first chapter of the project provides an empirical assessment of workers' international mobility with respect to legislative features of the labor market in both the receiving countries. To these ends, the study investigates the relationship between a set of labor market institutions (minimum wages, employment protection regulation, unions, and mandated benefits), overall economic prosperity, and the skill composition of immigrants in the OECD countries.

58%

of the variation in the stock of high-skilled immigrants can be attributed to push factors in the country of origin

differences in the skill composition of immigrants across OECD countries.

Labor market institutions are generally defined as the set of laws and policies that regulates employment contracts, wages and working conditions, thus characterizing labor markets (Betcherman, 2013). The impact of these institutions on economic outcomes has been widely analyzed in many OECD countries. Existing studies have found that labor institutions, such as employment protection laws, minimum wages and collective bargaining coverage, reduce the dispersion of earnings and income inequality; however, they show ambiguous effects on other outcomes, such as employment and unemployment (Freeman, 2007). The interplay between these institutions and immigration is still largely unexplored.[1]

In this chapter I focus on four types of labor market institutions: minimum wages, employment protection regulation, unions, and mandated benefits (Betcherman, 2013). The minimum wage can have ambiguous effects on immigrants' composition and presence (Giulietti, 2014); on the one hand, the minimum wage increases the average wage (Cortes, 2004), thus attracting and retaining more immigrants; on the other hand, the minimum wage could also worsen immigrants' employment prospects if it has adverse effect on employment levels (Neumark and Wascher, 2006). The empirical literature provides evidence that the minimum wage represents an important determinant of immigrants' location decisions, but the sign of its effect remains ambiguous (Cadena, 2014; Boffy-Ramirez, 2013).

Geis et al. (2013) show that labor market institutions, such as employment protection, union coverage and unemployment benefits, largely affect the composition and magnitude of migration flows. Job security is probably an important factor for immigrants who aim at building up a new life abroad. Migrants may also respond to changes in the level of labor protection through their expected wages and the probability to get employed, as long as these changes affect labor market prospects

and information on immigration policy's changes at the destination over the period 1980-2006, to show that restricting laws regulating immigrants' entry causes inflows to fall by about 6% after one year. Along similar lines, Mayda (2010) finds that the effect of both pull (e.g., income at a given destination) and push (e.g., per capita GDP at the origin) factors on migration flows significantly increases when lenient immigration policies are implemented by host countries.

From existing studies, we can draw two conclusions: first, falling barriers to migration are generally associated with larger volumes of migration flows; second, countries with better institutions also have higher immigration rates. Whether institutional factors at destination have an effect on the composition of immigrants' decision to move and stay in a particular country still remains an open question. This chapter aims at filling this gap by empirically investigating the extent to which labor market institutions can explain

1 Angrist and Kugler (2002) provide empirical evidence that restrictive institutions in European countries, such as stricter employment protection legislation, are likely to increase the negative impact of immigration on natives' employment.

The immigrants' average skill level has increased in almost every OECD country

(Bazillier and Moullan, 2012). Unions may also affect migration rates as a higher union density implies higher bargaining power for workers, especially for low-skilled ones (Geis et al., 2008; Baudassé and Bazillier, 2010). Finally, De Giorgi and Pellizzari (2009) find that the generosity of mandated benefits constitutes a factor explaining differences in immigrants' stocks and composition across European countries, being a pull factor particularly relevant for low skilled. Giulietti et al. (2013) also show a moderate correlation between unemployment benefit spending and immigration flows from non-EU origins.[2]

Using data on the educational attainment of the immigrant population in all OECD countries by place of birth (DIOC 2001-2011) and data from OECD's database on tax-benefit policies, I perform a regression analysis in order to estimate the effect of each institution and of other economic determinants on migrant stocks, ultimately assessing which factor contributes the most to attract and retain foreign-born skilled workers.

The chapter concludes by providing empirical evidence on the positive correlation between labor shortages as the stock of immigrants, both high and low skilled. These results highlight the role of immigration as a response to employers' need for skills in OECD countries.

2 The positive effect almost disappears when more sophisticated econometric techniques are used to address endogeneity issues.

Canada, Australia, and the United Kingdom exhibit the largest share of tertiary-educated immigrants in 2011, while Southern and Central European countries, such as Italy and Germany, rank last.

II. Data and descriptive statistics

2.1 DATA ON IMMIGRANT STOCKS IN THE OECD

The Database on Immigrants in OECD Countries (DIOC) provides information on the educational attainment of the population of all OECD countries by place of birth. Demographic characteristics, such as age and gender, and employment outcomes are also included. The data cover 34 OECD destination countries and more than 200 countries of origin for three waves, i.e. 2001, 2005, and 2011.[3] This is the first internationally comparable dataset providing information on stocks of immigrants by skill level for all OECD countries in recent years. The international migration dataset by Artuc et al. (2015) contains data on bilateral migration stocks by age of entry, educational level and gender for both OECD and non-OECD destination countries but the last available year is 2000.

In line with the existing literature, I define a working-age individual as high-skilled if he/she has a tertiary education degree (ISCED 5-6), medium-skilled if he/she has upper secondary school qualifications (ISCED 3-4), and low-skilled if he/she has only completed primary and lower secondary education (ISCED 1-2).

Figure 1 provides a first picture of the evolution of the high-skilled immigrants living in OECD countries. Immigrants' skill composition has improved almost everywhere over the period 2001 and 2011. Canada, Australia and the United Kingdom show the largest share of tertiary educated individuals in 2011. The increase in the share of high-skilled registered in the UK is possibly due to the adoption of a point based system designed to select individuals on the basis of skills beneficial to the national economy (de la Rica et al. 2013). Southern and Central European countries, such as Italy and Germany, rank last. Germany's foreign-born population is largely composed of workers arriving under the guest worker programmes; these individuals generally show low educational attainments. Italy did not have any specific permit for high-skilled immigrant workers before 2011.[4]

Figure 2 decomposes the share of high skilled immigrants by gender. Males and females are equally represented among the high-skilled immigrants. Moreover, the increase in the number of tertiary educated immigrants is similar for both groups.

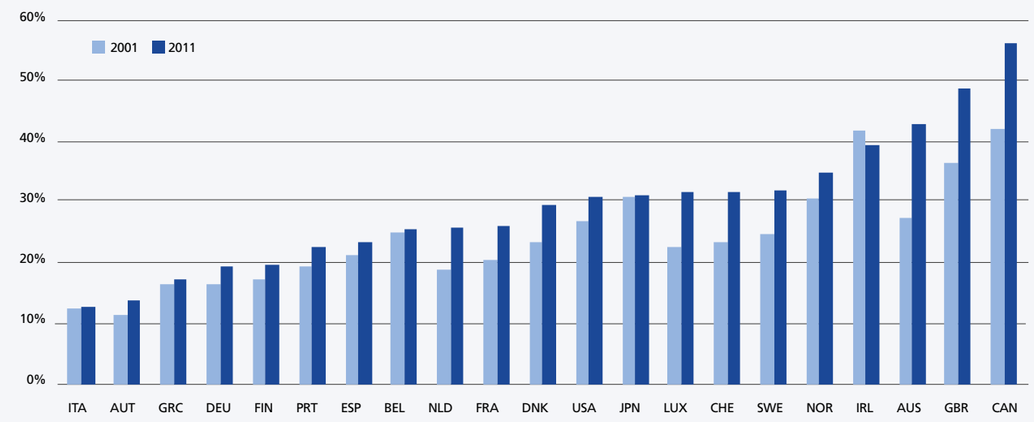
Table A1 in the appendix provides the list of OECD countries in the sample, reporting exact figures on the number of immigrants by educational attainment in 2011, i.e., the last available year.[5]

Figure 3 looks at source countries, by plotting the number of high-skilled immigrants by country of origin in 2011. Top sending countries of high-skilled immigrants to OECD countries are India, the Philippines, and China. A large number of high skilled immigrants also come from European countries, like the UK, Germany, and Poland.

2.2 DATA ON LABOR MARKET INSTITUTIONS AND LABOR MARKET CHARACTERISTICS

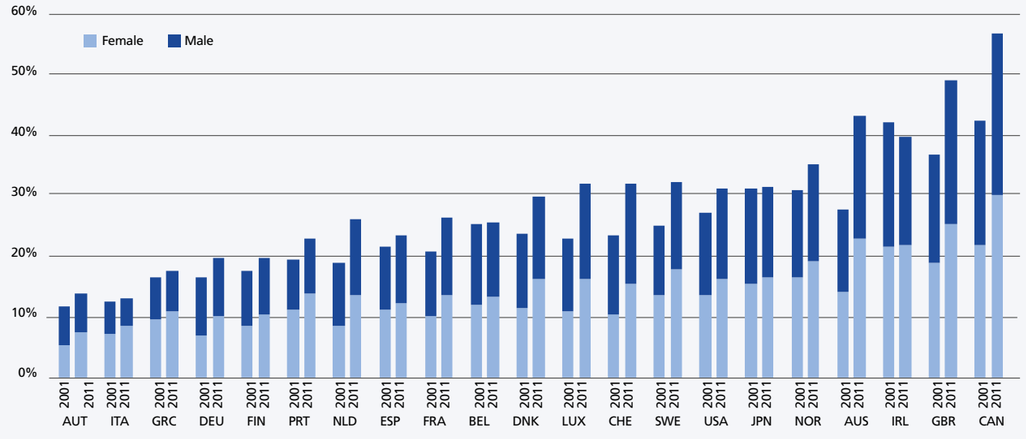
The second dataset that I use in this chapter provides information on labor market institutions in OECD countries. As noted in the introduction and following the existing literature (Betcherman, 2013), I focus on

Figure 1: Share of high-skilled immigrants, by country



Note: author's calculation on DIOC, 2001 and 2011.

Figure 2: Share of high-skilled immigrants, by gender and country

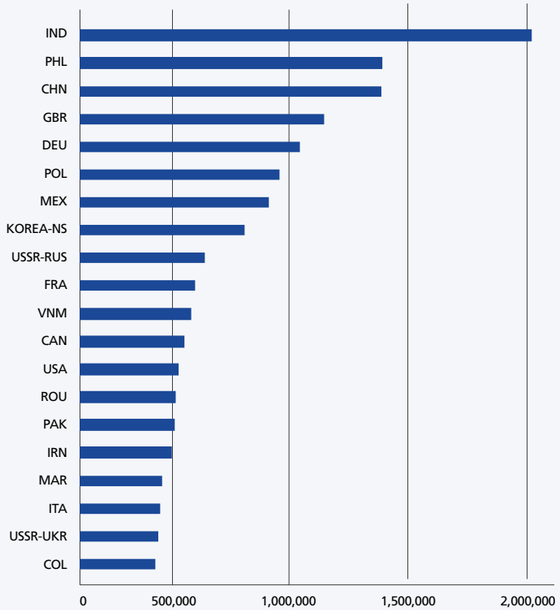


Note: author's calculation on DIOC, 2001 and 2011.

3 This information has been compiled in collaboration with OECD national statistical offices, population censuses and population registers, sometimes supplemented by Labor Force Surveys (http://www.oecd.org/els/mig/dioc.htm).

4 As many European countries did not have fast-track entry schemes for high-skilled non-EU nationals, the European Commission decided to adopt the Blue Card Directive, which aimed at easing the access of highly skilled non-EU workers to Europe. The Directive was officially transposed by EU Member States only in late 2011. 5 Some countries in the DIOC data only provide figures for the last year of observation; these are Bulgaria, Chile, Cyprus, Estonia, Island, Israel, Latvia, Lithuania, Malta, Romania, Russia, and Slovenia.

Figure 3: Top source countries of high-skilled immigrants



Note: author's calculation on DIOC, 2011 Destination countries are the ones represented in Figures 1 and 2.

four types of labor market institutions: minimum wages, employment protection regulation, unions, and mandated benefits.

The OECD Employment Database has information on:

- **Employment Protection Legislation (EPL)** measures the procedures and costs involved in dismissing individuals or groups of workers holding a regular work contract. It ranges from 0 to 6, with higher scores representing stricter regulations.
- **Union Density (UD)** is computed as the ratio of wage and salary earners that are trade union members, divided by the total number of wage and salary earners.[6]
- **Minimum Wage (HRMW),** the real hourly minimum wage, which is the statutory minimum wage, converted into a common currency unit (USD) using Purchasing Power Parities (PPPs).[7] As of 2011, minimum wage was present in 21 OECD countries.

Figure 4 provides an overview of the level of employment regulations across OECD countries in 2011. Germany and Italy have the highest figures for the EPL Index; at the same time, they also have low shares of high-skilled immigrants. The opposite holds for countries like Canada and the UK; stricter employment protection policies are likely to lower the ratio of high-skilled wages to the low-skilled ones, ultimately protecting low-skilled workers (Boeri and Jimeno, 2005).

Stricter employment protection policies are likely to lower the ratio of high-skilled wages to the low-skilled ones, ultimately protecting low-skilled workers

The information on mandated benefits are instead recovered from the OECD Statistical Office that publishes datasets on taxes and benefits on the incomes of working age individuals in the same OECD destination countries for the period 2000-2012. Mandated benefits are then measured by Net Replacement Rates (NRR); these correspond to the average of the net unemployment benefits, including social assistance and cash housing assistance.

Other variables included in the OECD dataset on taxes and benefit that proxy for labor market

6 Density is calculated using survey data, wherever possible, and administrative data adjusted for non-active and self-employed members otherwise. 7 Real hourly minimum wages are calculated first by deflating the series using the consumer price index taking 2013 as the base year. The series are then converted into a common currency unit (USD) using Purchasing Power Parities (PPPs) for private consumption expenditures in 2013.

Figure 4: Employment Protection Legislation, 2011

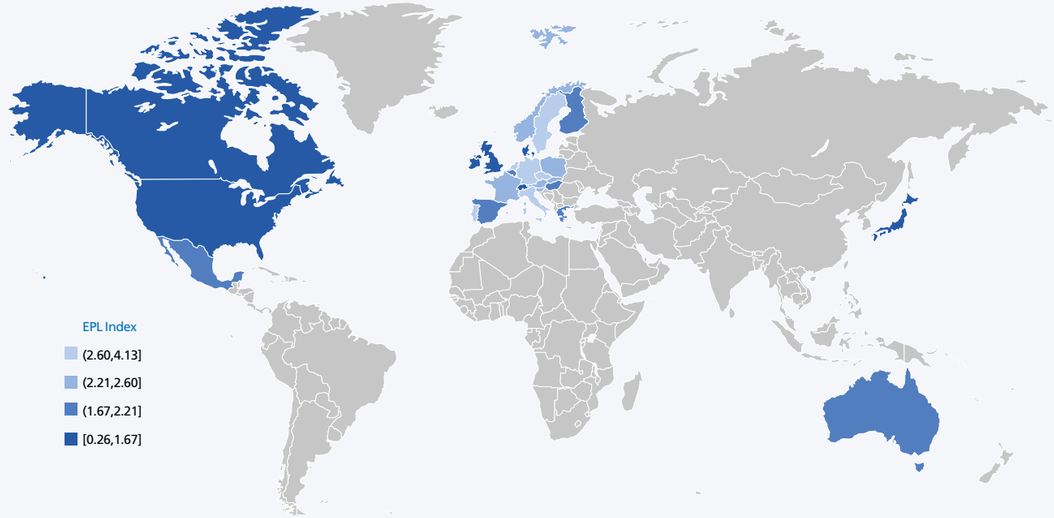
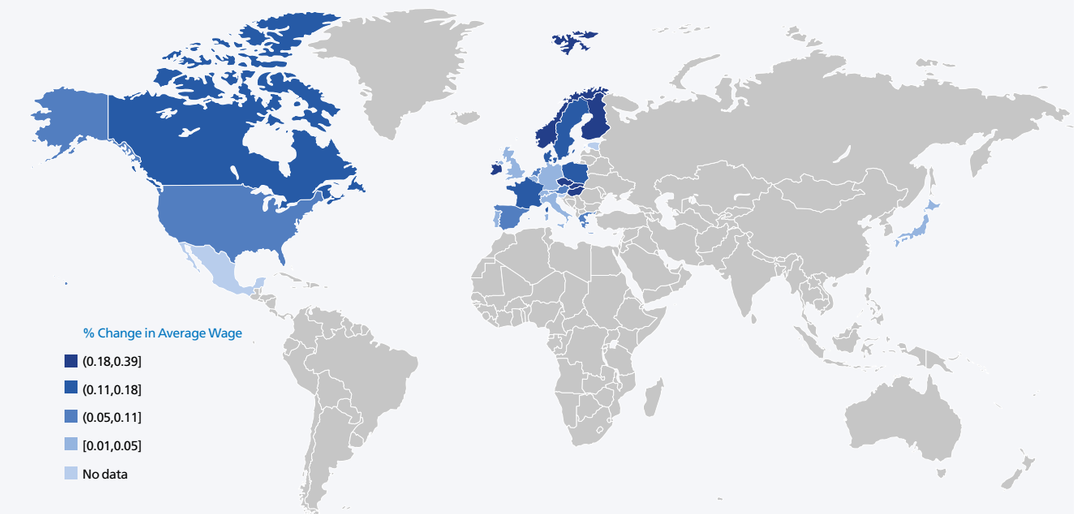


Figure 5: Change in average wages (%), 2001-2011



The higher the average wage, the higher the economic incentive of a migrant to move and stay in a particular destination

characteristics are:

- **Marginal Effective Tax Rates (METR),** which refer to the percentage of an extra unit of income that the worker loses because of income tax.
- **Average Wage (AW),** which is obtained by dividing the national-accounts-based total wage bill by the average number of employees in the total economy, which is then multiplied by the ratio of average usual weekly hours per full-time employee to average usually weekly hours for all employees.

Figure 5 plots the change in the average wages across OECD countries over 2001-2011. The average wage, measured in 2013 constant prices at 2013 USD PPPs, increased almost everywhere in the OECD countries. Australia, Norway and Canada, three of the largest countries in terms of share of high-skilled immigrants also registered the highest increases in the average wages, thus suggesting a positive correlation between the level of wages and the share of high-skilled immigrants.

stock driven by push factors. I thus estimate a linear probability model in which the dependent variable is in turn, the stock of high- and low-skilled foreign born working-age individuals residing in each OECD country. **The empirical model I estimate is the following:**

$$Y_{ijt} = \alpha + X'_{it}\beta + \lambda_{jt} + \delta_t + \varepsilon_{ijt}\ , \quad (1)$$

where the dependent variable is the number of immigrants from origin *j*, living in country *i* at time *t*. λ_{jt} are origin*year fixed affects, absorbing any change (economic, demographic or institutional) at the origin that may affect migration from a particular country, i.e., push factors; δ_t are year dummies, controlling for time-trends. Finally, X is a vector of time-varying host country's characteristics, i.e., pull factors. These characteristics are:

- **Marginal effective tax rates (METR)** when the worker is single, childless and earning at 150 and 50 per cent of the annual average wage in the destination country.[8] The expected coefficient of these tax rates is negative for the type of immigrants they target; for instance, an increase in the tax for high-skilled workers, e.g. METR 150, would lower their net salary, ultimately decreasing their incentive to choose country *i* as a host country.
- **Host country's average wage (AW)** captures wage differentials across countries and over time. The higher the average wage, the higher the economic incentive of a migrant to move and stay in a particular destination country.
- **Minimum wage (HRMW);** this is considered a pull factor for immigrants, as an increase in its level increases average wages; on the other hand, workers' employment perspectives might be adversely affected as there is more competition for low-skilled jobs. This labor market institution is unlikely to affect high-wage earners (Giulietti, 2014), but it is likely to affect migrants at the bottom of the skill distribution.
- **Employment protection legislation (EPL);** employment protection policies generally compress the wage structure, thus protecting unskilled workers and lowering the ratio of high-skilled wages to the low-skilled ones; the sign of

Several studies have shown that minimum wage only affects low-skilled workers; high-skilled workers are not directly affected since their wages should be above the minimum wage

III. Empirical strategy

The aim of this chapter is to shed light on institutional factors that influence immigrant presence in OECD countries. In particular, the specific focus of the analysis is on high-skilled immigrants. According to different international migration theoretical models, determinants of migration can be divided into push and pull factors, which are supposed to have opposite signs and similar-sized effects on migrants' decision to move to a certain destination. I am particularly interested in analyzing the effect of pull factors, as these are ones that can be targeted by host countries' policies. By exploiting the time-series variation and given the multitude of origin-countries, I am able to net out any effect on immigrants'

8 According to the EU Blue Card Directive (2009/50/EC), a high-skilled immigrant is a non-EU national worker with a valid work contract or a binding offer for a skilled job, and a minimum salary threshold equal to at least 150 percent of the annual average wage in the destination country.

ECONOMIC VARIABLES
such as tax rates, average wages, unemployment rates, and GDP growth -- largely account for differences in the magnitude and the composition of migration stocks across countries

this coefficient should be negative for high-skilled while it has an ambiguous sign for low-skilled immigrants (Bazillier and Moullan, 2012). Cicagna and Sulis (2013) provide further evidence of strong and negative effects of employment protection on immigrant flows in 15 OECD countries.

- **Unemployment benefits (UB),** which are measured by net replacement rates. These are powerful migration decisions' determinants especially for low-skilled workers, who have worse employment prospects with respect to the high-skilled.
- **Union density (UD);** it should affect only low-skilled workers, as these are concentrated in traditionally unionized occupations and sectors of the economy, such as manufacturing and construction. Previous studies found a positive effect of union membership on immigrant workers' wages (Schmitt, 2010); however, only a small proportion of immigrants is either member of unions or worker covered by a union or employee association contract (Grieco, 2014).[9]

Further controls for the host country's economic conditions include the unemployment rate and the annual real GDP growth. Finally, I add indicator variables for the population size of each country. All standard errors are clustered at the level of the interaction between the country of origin and the country of destination to allow for correlation over time of country-pair observations (Mayda, 2010). An advantage of using stocks instead of flows is that stocks allow us to estimate the role of institutional factors in attracting and retaining immigrant workers.[10]

In order to identify the effect of these institutions on migrant stocks in OECD countries, I exploit variation across host countries and over time. Given that I only have three years of observation, including host country fixed effects would reduce variation in the explanatory variables, making thus hard to estimate equation parameters. This approach comes at a cost, as changes in the explanatory variables may not be orthogonal to unobservable factors that change simultaneously, potentially affecting the composition of immigrants. Therefore, readers are advised to exercise some caution when interpreting the estimated coefficients as they may be biased.

Following Shorrocks (2013) and Nikolova and Graham (2015), I decompose the share of explained variance, the R2, of my empirical model into relative contributions of each regressor. This strategy allows me to tell which variables are the most important predictors of immigrant composition in OECD countries. To this end, I use the Shapely-based decomposition procedure, which provides the percentage contribution of each explanatory variable to the goodness of fit statistics.

9 Another suitable variable to measure unions' power is the proportion of workers covered by collective agreements; such across-country information is only provided by the ILO Statistical Office for years 2005-2014, thus not matching the years covered by the migrants' sample. As a check, the correlation between union density and collective agreements coverage in the countries analysed is positive and significant for the year 2010, suggesting that both measures are likely to produce the same sign of the estimated coefficient. 10 Stocks are net cumulative flows over time, i.e., the cumulative difference between inflows and outflows, thus capturing a country's ability to attract and keep foreign born individuals.

Average wage contributes to

13%

of the variation in high-skilled immigrants

IV. Results

4.1 IMMIGRANTS AND LABOR MARKET INSTITUTIONS

This section presents regression results of equation (1). The sample is composed of 24 OECD migrant-receiving countries and more than 200 source countries for 2001 and 2011.[11] I had to exclude from the analysis year 2005 as this wave does not report origin countries, making thus hard to control for push factors. The total number of observations is 7,962.

Table 1 provides estimates of equation (1) where the dependent variable is the stock of high-skilled immigrants living in country *i* from origin *j* at time *t*. All variables in the regressions have been log transformed so that the interpretation of coefficients becomes straightforward. Controls for population size, unemployment rate, and real GDP growth are finally included in each regression.

Table 1: OLS-Dependent variable: log high-skilled immigrants

	ALL	Female	Male
	(1)	(2)	(3)
METR 50% AW	-0.8125***	-0.8383***	-0.8475***
	(0.1398)	(0.1443)	(0.1387)
AW	2.5977***	2.7909***	2.1264***
	(0.0956)	(0.0992)	(0.0956)
HRMW	-0.0753**	0.0089	-0.0825**
	(0.0355)	(0.0371)	(0.0354)
EPL	-0.7043***	-0.6473***	-0.8170***
	(0.0627)	(0.0646)	(0.0630)
UB	-0.1105***	-0.0970***	-0.1068***
	(0.0129)	(0.0138)	(0.0125)
UD	0.0127	0.1224*	0.0656
	(0.0683)	(0.0705)	(0.0671)
Controls			
U Rate	Yes	Yes	Yes
GDP growth	Yes	Yes	Yes
Population Dummies	Yes	Yes	Yes
Year*Origin	Yes	Yes	Yes
Adjusted R^2	0.6803	0.657	0.6621
Observations	7,692	7,692	7,692

*Note: * p<0.10, ** p<0.05, *** p<0.01. Standard errors in brackets are clustered at the level of the interaction between origin j and destination i. The dependent variable is the log of high-skilled immigrants in country i from country j at time t. In columns (2) and (3) the dependent variable is the log of high skilled male and female immigrants respectively. All explanatory variables have been log transformed.*

11 Chile, South Korea, Slovenia, Estonia, Israel, Iceland, Luxembourg, Mexico, New Zealand, and Turkey are excluded because of missing data.

As high-skilled individuals are typically net contributors to unemployment insurance systems, an increase in the generosity of these benefits may reduce the attractiveness of a particular destination for this immigrant group

Estimated coefficients have the expected signs. The marginal tax rate coefficient shows that higher taxes for high-earners at a particular destination are associated with a smaller presence of high skilled immigrants. The average wage coefficient is positive and statistically significant. Wage differentials across countries, holding constant all other variables, account for large differences in the number of highly-skilled immigrant workers. It is important to mention that differences in the average salary across countries may also reflect different labor market conditions that affect the stock of high-skilled immigrants, ultimately increasing the magnitude of the estimated coefficient.

Negative coefficients are found for three types of labor market institutions: minimum wage, employment protection legislation, and unemployment benefits. Several studies have shown that minimum wage only affects low-skilled workers; high-skilled workers are not directly affected by this institution since their wages should be above the minimum wage (Giulietti, 2014; Zavodny, 2014). The estimated effect in Table 1 is negative and statistically significant. A possible reason has to do with complementarity between high and low skilled immigrants; if an increase in the minimum wage leads to a reduction of the total employment of low-skilled, high-skilled workers may also experience a decrease in their employment rate. The effect would have been positive if high-skilled workers were substitutes for low-skilled workers and the minimum wage had a negative employment effect on the latter.

Furthermore, a negative coefficient is found for unemployment benefits. High-skilled immigrants generally have a positive fiscal impact (Orrenius and Zavodny, 2013), contributing more in tax payments than they use in welfare and public services; this group of immigrants also has better employment prospects, facing a low risk of unemployment. If high and middle-wage earners shoulder the fiscal burden of unemployment benefits, an increase in the generosity of these benefits may reduce the attractiveness of a particular destination for this immigrant group.

Stricter employment protection legislations are associated with a low presence of high-skilled immigrants; this result is consistent with the idea that employment protection compresses the wage distribution, ultimately favouring low-skilled at the expense of high-skilled workers. The coefficient for the EPL is indeed negative and highly significant. As expected, union density is not significantly correlated with the stock of high skilled immigrants, as these are unlikely to be covered by collective agreements.

In column (2) and (3), I run separate regressions for high-skilled foreign-born males and females, respectively. The results suggest that high-skilled female immigrants are mainly concentrated among middle-wage earners: the magnitude of the coefficients of marginal tax rates and of the EPL are smaller for females than those for males; moreover, the minimum wage coefficient for women turns positive but it is not statistically significant. High-skilled male immigrants are more responsive than their female counterparts to changes in the marginal tax rate, the minimum wage, and the EPL index, suggesting that high-skilled male immigrants are more likely to be employed in high-paid occupations than women.

Canada, the UK, Australia and the USA have larger shares of high-skilled migrants

Table 2: Relative contribution (%) of regressors: high-skilled

	ALL	Female	Male
	(1)	(2)	(3)
METR 150% AW	0.80	0.85	0.80
AW	13.10	14.95	11.21
LM Institutions	11.90	11.89	12.93
Year*Origin FE	58.27	56.46	58.86
Other Controls	15.93	15.85	16.20
Adjusted R^2	0.6803	0.657	0.6621
Observations	7,692	7,692	7,692

Note: the table reports values from Shapely-based decomposition for high-skilled immigrants.

The second stage of the analysis aims at indicating the relative contribution of each regressor to the overall variance in the number of high-skilled immigrants in OECD countries. To this end, I use the Shapely-based decomposition. **Table 2** provides results separated for male and female immigrants.[12]

Push factors, which are proxied by the Year*Origin fixed effects, explain about 58% of the overall variation. Tax rates and wages account for less than 1% and 13% of the overall variation in the number of high skilled migrants respectively. There are no substantial differences between males and females; however, average wage seems to be a better predictor for female than for male

12 Table A2 in the appendix re-run the Shapely-based decomposition by isolating the contribution of each labor market institution analysed. Results are fairly similar to the ones in tables 2 and 4; the EPL variable seems to be the most relevant predictor among LM institutions.

Economic factors explain about

30%

of the overall variation in the number of high-skilled immigrants

immigrants, as shown by the coefficient in Table 1, column 2. The four labor market institutions analyzed explain about 12% of the overall variation and their weight is slightly higher for male than female immigrants.

Table 3 reports regression results of equation (1) where the dependent variable is the stock of low-skilled immigrants (in logs). Both the marginal tax rate for low-earners and the average wage have the expected signs; high tax rates are associated with a low number of low-skilled immigrants in a particular destination. Similarly, the average wage is positively correlated with the number of low-skilled immigrants in a host country.

The minimum wage coefficient is again negative but not statistically significant. The negative effect may be due to the fact that a minimum wage increases competition for low-skilled jobs, possibly disadvantaging immigrants if employers consider them as less skilled than native workers. Higher firing costs also seem to lower the number of low-skilled immigrants: reduced flexibility may have adverse

Table 3: OLS - Dependent variable: log low-skilled migrants

	ALL	Female	Male
	(1)	(2)	(3)
METR 50% AW	-0.3376***	-0.3426***	-0.3233***
	(0.0801)	(0.0778)	(0.0801)
AW	2.1204***	2.0674***	1.6519***
	(0.2145)	(0.2105)	(0.2121)
HRMW	-0.1109	-0.1474**	-0.0306
	(0.0701)	(0.0693)	(0.0716)
EPL	-0.2280***	-0.2139***	-0.3179***
	(0.0789)	(0.0782)	(0.0803)
UB	0.0905***	0.0782***	0.0989***
	(0.0203)	(0.0199)	(0.0203)
UD	0.7744***	0.7586***	0.7782***
	(0.1219)	(0.1202)	(0.1214)
Controls			
U Rate	Yes	Yes	Yes
GDP growth	Yes	Yes	Yes
Population Dummies	Yes	Yes	Yes
Year*Origin	Yes	Yes	Yes
Adjusted R^2	0.6264	0.6149	0.5962
Observations	7,692	7,692	7,692

*Note: * p<0.10, ** p<0.05, *** p<0.01. Standard errors in brackets are clustered at the level of the interaction between origin j and destination i. The dependent variable is the log of low-skilled immigrants in country i from country j at time t. In columns (2) and (3) the dependent variable is the log of low skilled male and female immigrants respectively. All explanatory variables have been log transformed.*

effect on both low- and high-skilled immigrants. Migrants may respond to changes in employment protection through their expected wages and the probability of finding a job; employment protection differentials may have a negative impact on immigrants' mobility decisions, as immigrants, both low- and high-skilled, typically do not look for more protective labor legislation (Bazillier and Moullan, 2012).

As expected, the presence of low skilled immigrants is positively correlated with the amount of unemployment benefits; these immigrants generally have worse employment prospects than high-skilled, they are thus the ones interested the most in the generosity of mandated benefits. Finally, the union density coefficient is positive and highly significant; this result is consistent with the story predicting that increased union density also improves bargaining power for workers, in particular low-skilled workers, thus rising low-skilled immigrants' presence (Baudassé and Bazillier, 2010).

Columns (2) and (3) show that there are no substantial differences between male and female workers but for the minimum wage coefficient; female immigrants may be negatively affected by an increase in the minimum wage because of a higher competition for low-skilled jobs.

Table 4 reports the relative contribution of each regressor to the overall variance in the number of low-skilled immigrants in OECD countries. It is interesting to notice that labor market institutions have a higher contribution for high-skilled than for the low-skilled. This is probably due to the fact that high-skilled immigrants' wages and employment outcomes suffer more than the low-skilled from rigid labor markets workers, ultimately affecting their decision to move or stay in a particular country.

Table 4: Relative contribution (%) of regressors: low-skilled

	ALL	Female	Male
	(1)	(2)	(3)
METR 50% AW	0.86	0.94	0.82
AW	17.06	17.11	15.28
LM Institutions	7.70	8.08	7.93
Year*Origin FE	57.94	56.40	59.63
Other Controls	16.45	17.47	16.34
Adjusted R^2	0.6264	0.6149	0.5962
Observations	7,692	7,692	7,692

Note: the table reports values from Shapely-based decomposition for low-skilled immigrants.

Table 5: Immigrant stocks and English as Lingua Franca

	High-Skilled	Low-Skilled
	(1)	(2)
English Speaking	1.8044***	0.2595
	(0.1172)	(0.1889)
METR 150/50% AW	-0.1317	-0.2640***
	(0.1379)	(0.0852)
AW	2.1675***	2.2137***
	(0.0936)	(0.2185)
HRMW	-0.3639***	-0.1640**
	(0.0397)	(0.0824)
EPL	-0.0692	-0.1348
	(0.0771)	(0.1047)
UB	-0.0002	0.1018***
	(0.0129)	(0.0213)
UD	-0.3366***	0.6563***
	(0.0697)	(0.1233)
Controls	**High-skilled**	**Low-skilled**
U Rate	Yes	Yes
GDP growth	Yes	Yes
Population Dummies	Yes	Yes
Year*Origin	Yes	Yes
Adjusted R2	0.6959	0.6264
Observations	7,692	7,692

*Note: * p<0.10, ** p<0.05, *** p<0.01. Standard errors in brackets are clustered at the level of the interaction between origin j and destination i.*

4.2 DOES ENGLISH AS THE LINGUA FRANCA MATTER?

In the last decades English has increasingly become the international language of communication, or the lingua franca. Language skills are believed to be crucial for migrants' economic success and integration; further, language barriers may also be the cause of segregation between natives and foreigners. Because of the widespread use of English and the consequent low level of language barriers, English-speaking countries may have then become popular destination for immigrants.

In order to test this hypothesis I estimate equation (1) by introducing a dummy variable that takes value one when the country *i* is an English speaking country.[13] Estimate should be interpreted with caution as there might be potential collinearity issues. Results are reported in **Table 5**, where the dependent variables are in turn the log of high-skilled and low-skilled immigrants. As we can see, the English speaking country dummy is positive and statistically significant for the group of immigrant with tertiary education. English is often the second language for high-skilled individuals, for this reason English speaking countries may represent a desirable destination for this group of workers and thus attract more high-skilled workers. The dummy variable is not significant for low skilled immigrants, as English may not be their second language (or they may not speak any language other than their native one). [14]

When particular skills are short in supply and certain vacancies are hard to fill in, labor migrants may help filling these gaps

13 These countries are: Australia, Austria, Belgium, Switzerland, Czech Republic, Germany, Spain, Finland, the UK, Hungary, Norway, Poland, Portugal, Sweden, and the USA. 14 As you can see, some of the coefficients in table 5 loose statistical significance with respect to tables 1 and 3 (even if the signs are the same), possibly because of multicollinearity; for instance, the English dummy is likely to be highly correlated with the EPL variable, thus reducing the statistical significance of the EPL coefficient.

4.3 IMMIGRANTS AND LABOR SHORTAGES

In the last part of this chapter I analyse whether immigrants move where they are needed. When particular skills are short in supply and certain vacancies are hard to fill in, labor immigrants may help filling these gaps. Over the years, different immigration policies have been implemented by wealthy states to facilitate the entry of particular types of immigrants in order to alleviate shortages in critical occupations and sectors. Among different policies, an example is the United States' Bracero Program, a bilateral agreement between Mexico and the US in response to tight labor supply in agriculture during and following World War II; many other OECD countries have issued lists of occupations in high demand and introduced a shortage list in recent years (Sumption, 2011).

Measuring labor shortages is not an easy task; the ratio between unfilled positions and unemployed does not represent a reliable measure as it assumes that unemployed workers have the skills requested by the employers. On the other hand, shortages are only apparent if the conditions of employment are such that workers are unwilling to accept job offers, either because of poor working conditions or low wages. There might also be an excess in labor demand even when unemployment is high if employers look for skills not available in the labor market.

The OECD provides estimates of the number of unfilled job vacancies across national economies. I use the number of unfilled vacancies, which have been seasonally adjusted, as a potential measure for labor shortages. A limitation of these data is that they do not specify the category of skills requested by those jobs.

I then estimate equation (1) where the dependent variable is in turn the log of high and low skilled immigrants. The main explanatory variable is now the log of the average number of unfilled positions over the five preceding years. Controls include unemployment rate, GDP growth, host country's population dummies, and the interaction between year and the origin country, thus absorbing any effect coming from push factors. Results are shown in **Table 6**. Data on shortages are available only for 15 countries, so that the total number of observations is reduced to 4,444.[15]

Results show that as the number of vacancies increases, the number of high-skilled immigrants increase as well. The effect is positive and statistically significant for low-skilled workers; however, this coefficient is smaller than the one estimated for high-skilled immigrants.

Most countries always try to limit immigration of low-skilled workers, while, at the same time, encouraging and facilitating migration of high-skilled workers. Therefore, when demand for high skilled labor is high, governments may soften immigration legislation to facilitate the access and stay of high-skilled immigrants. Low-skilled immigrants usually face stricter entry regulations even wif they are needed in the labor market.

15 These countries are: Australia, Austria, Belgium, Switzerland, Czech Republic, Germany, Spain, Finland, the UK, Hungary, Norway, Poland, Portugal, Sweden and the USA.

The difference between the estimated coefficients can be explained by different responses of national governments depending on the type of workers needed. Most countries always try to limit immigration of low-skilled workers, while, at the same time, encouraging and facilitating migration of high-skilled workers. Therefore, when demand for high-skilled labor is high, governments may soften immigration legislation to facilitate the access and stay of high-skilled immigrants. On the other hand, low-skilled immigrants usually face stricter entry regulations even if they are needed in the labor market. The points-system schemes in countries like New Zealand and Denmark facilitate the entry of high-skilled immigrants only, as they reward immigrants based on their educational attainment and their willingness to work in designated occupations (Sumption, 2011).

Since the data do not provide information on the type of skills required by these vacancies, I cannot rule out that the estimated effect for highly skilled can be mechanically amplified if these vacancies mainly refer to this category of immigrants.

V. Concluding remarks

This chapter provides empirical evidence of the role played by labor market institutions in attracting and retaining high-skilled immigrants. Following the existing literature (Betcherman, 2013), I focus on four types of labor market institutions: minimum wages, employment protection legislation, unions, and unemployment benefits.

Immigrants move and stay where there are labor shortages

By employing data on educational attainment of immigrants and on taxes and benefits in OECD countries, I perform a regression analysis for the years 2001 and 2011 in 24 OECD countries. The chapter offers three key findings.

First, immigrants, both high and low skilled, are more responsive to economic factors than to changes in labor market institutions, as already shown by existing studies (Ortega and Peri, 2009; Mayda, 2010). Economic factors (tax rates, average wages, unemployment rates, and GDP growth) explain about 30% of the overall variation in the number of high-skilled immigrants across OECD countries, while the relative contribution of labor market institutions is less than 12%.

Second, labor market institutions better explain differences in the number of high-skilled immigrants across countries than for low-skilled. This difference seems to be driven by the effect of the employment protection index: stricter employment legislations compress the wage structure, thus lowering the ratio of high-skilled wages to the low-skilled ones. Access to information may also play a role, as low-skilled immigrants may not be aware of labor regulations in the destination country and they may be thus more responsive to factors directly affecting their wages.

Finally, this chapter shows that immigrants may move and stay where there are labor shortages. The effect is particularly large for high-skilled immigrants; part of the effect may be driven by specific policies aimed at attracting this category of immigrants. Whenever there is high demand for highly skilled workers, governments intervene by making immigration easier for in designated occupations and preventing inflows of low-skilled immigrants.

Table 6: Immigrant stocks and labor shortages

	High-skilled	Low-skilled
	(1)	**(2)**
Vacancies	0.5706***	0.2406***
	(0.0485)	(0.0637)
Controls		
AW	Yes	Yes
U Rate	Yes	Yes
GDP growth	Yes	Yes
Population Dummies	Yes	Yes
Year*Origin	Yes	Yes
Adjusted R^2	0.7399	0.6095
Observations	4,444	4,444

*Note: * p<0.10, ** p<0.05, *** p<0.01. Standard errors in brackets are clustered at the level of the interaction between origin j and destination i.*

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Table A1: Immigrants in the OECD, by educational attainment in 2011

GEO	HIGH	MEDIUM	LOW	GEO	HIGH	MEDIUM	LOW
AUS	1,515,142	1,515,142	658,915	ISR	361,887	361,887	147,619
AUT	442,820	442,820	292,463	ITA	1,681,671	1,681,671	1,944,361
BEL	205,777	205,777	355,864	JPN	471,855	471,855	199,762
BGR	11,178	11,178	952	LTU	1,262,608	1,262,608	365,809
CAN	1,598,100	1,598,100	717,435	LUX	39,488	39,488	49,659
CHE	566,993	566,993	444,376	LVA	886,045	886,045	303,347
CHL	106,506	106,506	18,693	MEX	117,588	117,588	158,501
CYP	55,337	55,337	38,697	MLT	4,052	4,052	8,096
CZE	4,681,264	4,681,264	1,108,937	NLD	483,227	483,227	541,128
DEU	3,471,220	3,471,220	2,975,910	NOR	119,950	119,950	141,085
DNK	108,611	108,611	93,916	NZL	219,759	219,759	203,877
ESP	1,420,155	1,420,155	2,151,450	POL	63,670	63,670	19,304
EST	422,971	422,971	146,721	PRT	230,289	230,289	347,137
FIN	41,589	41,589	87,993	ROU	5,740	5,740	2,276
FRA	1,704,821	1,704,821	2,275,970	RUS	63,500,000	63,500,000	11,600,000
GBR	1,628,102	1,628,102	1,641,256	SVK	1,440,583	1,440,583	1,621,950
GRC	478,187	478,187	445,287	SVN	799,969	799,969	347,437
HUN	152,978	152,978	41,375	SWE	380,250	380,250	203,615
IRL	251,028	251,028	111,457	TUR	360,009	360,009	880,474
ISL	10,909	10,909	8,860	USA	13,500,000	13,500,000	10,900,000

Note: author's calculation on DIOC 2011.

Table A2:Relative contribution (%) of each labour market institution: high and low skilled

	High-Skilled	Low-Skilled
	(1)	(2)
METR 150/50% AW	0.7	0.9663
AW	12.8	15.6608

LM Institutions:	High-Skilled	Low-Skilled
HRMW	1.4	1.0032
EPL	8.5	5.0322
UB	1.5	0.9668
UD	2.0	0.7565
Year*Origin FE	58.6	58.1442
Other Controls	14.6	17.47
Adjusted R2	0.6803	0.6264
Observations	7,692	7,692

Note: the table reports values from Shapely-based decomposition for high and low-skilled immigrants.

1.2 Migration
What Will Move Talent?

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Migration:

What will move talent?

I. Introduction

People move across international borders for various reasons – to reunite with relatives and friends, seek better employment opportunities and earn higher incomes, avoid political or religious persecution, or as a response to climate change. While scholars have studied international migration stocks and flows, they have paid less attention to potential emigration and its determinants.[1] This chapter contributes to the literature by examining the factors associated with individual emigration intentions across different regions, skill levels, and among people with varying socio-economic backgrounds. While emigration aspirations, desires, and intentions are tentative – and many of those who express willingness to move may never do so – studying what factors and circumstances are linked with potential emigration helps political leaders address issues related to global mobility proactively rather than reactively (Esipova, Ray, & Srinivasan, 2011).

The Gallup World Poll – an annual survey in about 160 countries representing 98 Percent of the world's adult population – indicates that about one in ten people (about 13 Percent) would like to emigrate permanently if they had the opportunity (Clifton, 2013). This statistic and the push and pull factors behind it are of interest to policymakers in both potential destination and origin countries. In particular, immigration may be

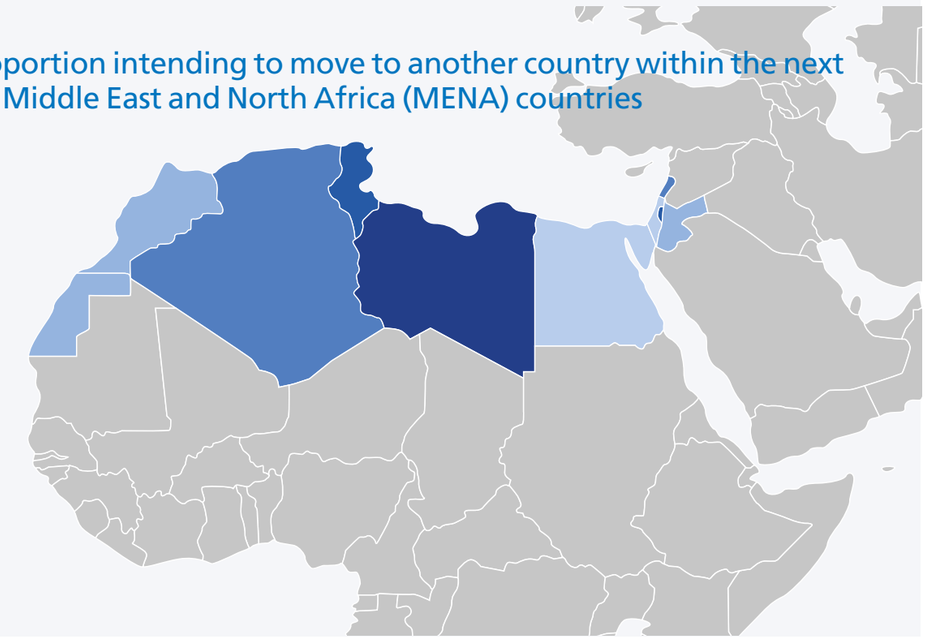
1 See Docquier, Peri, and Ruyssen (2014) for a recent exception.

The second chapter of this project shifts the focus to individual-level determinants of migration intentions. While emigration intentions are tentative, studying factors and circumstances linked with potential emigration decisions may help policymakers to address global mobility issues proactively rather than retroactively, both in migrant-receiving and migrant-sending societies.

Map 1. Proportion willing to move for employment reasons, former socialist countries and selected Western European countries

Source: Live in Transition Survey (LITS) 2010

Map 2. Proportion intending to move to another country within the next two years, Middle East and North Africa (MENA) countries



Source: EU Neighborhood Barometer Wave 4, Autumn 2013

According to the Gallup World Poll

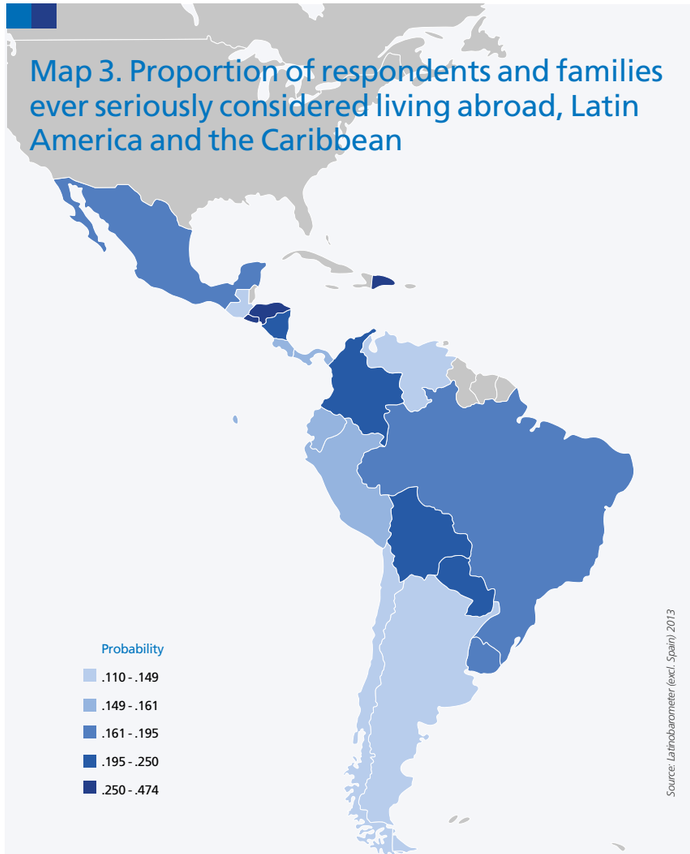
13%

would like to emigrate permanently if they had the opportunity

a partial solution to problems such as unsustainable fiscal deficits and pension systems, aging populations, as well as labor and skill shortages in many migrant-receiving economies.[2] Understanding the drivers of potential emigration flows may also help design better assimilation and integration policies and programs in migrant-receiving countries. In addition, by learning why people want to leave, decision-makers in the origin countries can help prevent or mitigate loss of talent or better engage diasporas abroad. Therefore, understanding what's behind the emigration intentions statistics is of pivotal importance for proactively managing migration flows and creating development opportunities for both sending and destination societies.

While our results vary depending on the region and survey year (see also **Maps 1-4**), several common themes emerge. First, our results show that generally, the most educated respondents, and frequently, those currently pursuing their education are the most internationally mobile groups. Second, having connections of friends and family abroad increases the likelihood of expressing emigration intent. Third, we also discover that perceptions

Map 3. Proportion of respondents and families ever seriously considered living abroad, Latin America and the Caribbean



Source: Latinobarometer (excl. Spain) 2013

"Understanding emigration intentions is important for proactively managing migration flows and creating development opportunities for both sending and destination societies."

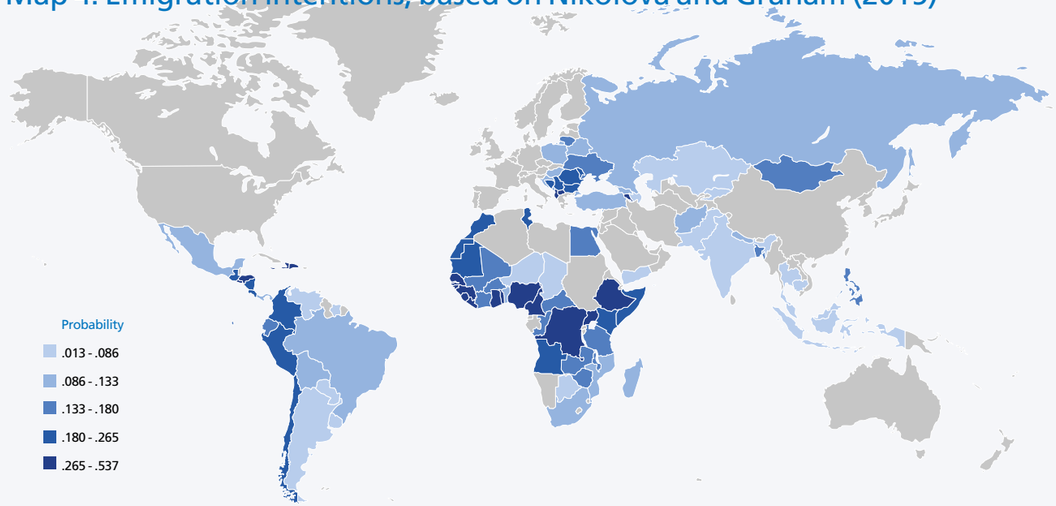
2 Despite popular misconceptions, immigrants make positive fiscal and broader well-being contributions to OECD countries (Akay, Constant, & Giulietti, 2014; Betz & Simpson, 2013; OECD, 2013).

of politico-economic and institutional conditions matter for migration decisions. In particular, poor economic conditions, crime, and lack of trust in institutions motivate talented individuals from developing and transition countries to seek a better life abroad. Fourth, respondents living in countries with relatively restricted freedom of movement, as measured by the Henley and Partners Visa Restrictions Index, express relatively higher intentions to move, compared with respondents who can travel more freely. This result likely reflects the fact that countries facing mobility restrictions also have relatively poor macro-economic and institutional conditions.

High-educated individuals are relatively more likely to express emigration intentions, desires, and aspirations

Fifth, among young Europeans, with a few exceptions, most potential emigrants were likely to be temporary or equally likely to be temporary and permanent. In the EU's neighboring countries, among those with emigration intent, only about a fifth intend to emigrate permanently, while about half plan to stay for a few years, suggesting the temporary nature of the emigration intention. We also document some changes in migration patterns which could have been associated with the recent economic crisis. Finally, our study shows correlational evidence that potential emigrants from the Eastern Partnership countries may consider skill shortages when selecting a potential destination. This is important from destination countries' point of view, as immigration may be a partial solution to structural labor market gaps.

Map 4. Emigration intentions, based on Nikolova and Graham (2015)



II. Theory, empirical evidence and research questions

Migration theories generally assume that potential migrants weigh the costs and benefits of migration prior to the move (Massey et al., 1993; Sjaastad, 1962). We first present a simple theoretical model of the emigration decision and then examine the empirical evidence related to individual emigration intentions.

Following Grogger and Hanson (2011) and Gibson and McKenzie (2011), we assume a linear utility model, whereby the utility *U* of individual *i* from migrating from a source *c* to a destination country *d* is a linear function of the well-being experienced at destination *d* and migration costs from *c* to *d*:

$$U^{j}_{icd} = \alpha(W^{j}_{id} - C^{j}_{icd}) + \varepsilon^{j}_{icd},$$

where *j* corresponds to skill level (low, medium, or high levels of education), *C* are the costs of migration (which could be both fixed and decreasing in skill level and are incurred before and after migration), *W* is the well-being (both objective and perceived) that can be achieved abroad, and ε is the error term ($\alpha > 0$). Migration costs could be monetary, such as visa fees, plane tickets, language courses fees; or psychological – related to separating from family and friends and adjusting to a new environment.
The log odds of emigration, given the assumption that emigrants maximize their utility by choosing their ideal location, are:

$$\alpha(W^{j}_{id} - W^{j}_{ic}) - \alpha C^{j}_{icd}.$$

One strand of the literature has examined

Respondents living in countries with relatively restricted freedom of movement express higher intentions to move, compared with respondents who can travel more freely

Migration costs could be monetary, such as visa fees, plane tickets, language courses fees; or psychological – related to separating from family and friends and adjusting to a new environment

the determinants of aggregate migration flows in relation to country-level conditions at the origin and the destination. For example, Mayda (2010) uses data on international bilateral migration flows and finds that income opportunities abroad, migrant networks, inequality, and distance (which is related to emigration costs) explain emigration rates. These effects are mitigated by migration quotas and immigration policies, meanwhile. In addition to absolute income and poverty, migration decisions depend on relative poverty and positional concerns in the community (as measured by the Gini coefficient) (Stark, Micevska, & Mycielski, 2009; Stark & Taylor, 1989). Polgreen and Simpson (2011) discover that average country happiness has a U-shaped relationship with emigration rates – while emigration falls with happiness, beyond some point, people from very happy countries are more likely to emigrate. Other determinants such as migration networks, climate variation, and conflict have also been documented (Bang & Mitra, 2013; Beine & Parsons, 2012; Dustmann & Okatenko, 2014; Feng, Krueger, & Oppenheimer, 2010; Hatton & Williamson, 2002; Stark & Jakubek, 2013; Stark, et al., 2009).

A second strand of the literature has relied on data on emigration intentions to explain the factors and mechanisms driving the movement of people across international borders. Liebig and Sousa-Poza (2004) combine individual emigration intentions data with country-of–origin characteristics and demonstrate that there is positive self-selection even in high income inequality countries. In addition, Dustmann and Okatenko (2014) show that insufficient wealth can restrict the emigration intention, even if individuals may find it optimal to migrate. The authors find that migration intentions (without distinguishing between international and internal migration) increase with wealth in Africa and Asia, but are not affected by wealth in Latin America, which is relatively richer compared to the more developing contexts. Importantly, discontentment with local public goods is a big determinant of moving intent, particularly in Africa. In a recent paper, Docquier et al. (2014) find that network size and the employment probability in the destination country matter the most for potential emigration. For turning potential into actual migrants, having a college experience and the growth perspectives in the destination country matter the most.

Third, an emerging literature has further shown that life (dis)satisfaction also influences the migration decision (Cai, Esipova, Oppenheimer, & Feng, 2014; Chindarkar, 2014; Graham & Markowitz, 2011; Ivlevs, 2015; Nikolova & Graham, 2015; Otrachshenko & Popova, 2014). Future emigrants can thus be seen as "frustrated achievers" (Graham & Markowitz, 2011) as they are more educated and have higher material well-being but have lower perceived well-being than non-migrants (Lovo, 2014). As such, they aspire to move to countries with higher life satisfaction and lower perceived corruption (Lovo, 2014).[3]

Previous stays abroad or networks of family and friends in foreign countries are robust determinants of emigration intentions

Building on the extant literature, we use individual-level data from several sources to explore the determinants of individual emigration intentions across different regions and socio-demographic groups. While our analysis is an extended exploration of previous studies, we make several contributions. First, we use the main publicly available cross-country data sources on emigration intentions for the 2010-2013 period. Second, we specifically examine the relative importance of each socio-economic or demographic factor for the emigration intention of the highest educated respondents, which has not done before.[4] Third, we link emigration intentions with actual mobility restrictions that respondents from different countries have. Specifically, we address the following six questions: (i) Do migration intentions vary across regions and countries and across socio-demographic groups? (ii) What role do migration policies or restrictions play in the decision of potential emigrants? (iii) How do perceptions of socio-political and institutional conditions influence the emigration intentions, especially among the high- skilled? (iv) Do potential emigrants seek to move permanently or temporarily? (v) Are the migration intentions stable over time or did the economic crisis change the dynamics? And (vi) Do migration intentions respond to skill shortages in the destination countries?

3 In one exception, Ivlevs (2015) finds that the happiest respondents in Europe and Central Asia are the most likely to express emigration intentions. 4 Note that Nikolova and Graham (2015) examine the relative importance of different socio-demographic variables across different regions but not specifically for high-skilled potential emigrants.

Table 1: Datasets with intentions to move

Survey Name	Year	Countries Included	Methodology	Wording of Emigration Intent Question
Latinobarometer	2006-2013	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Spain, Uruguay, Venezuela	An annual nationally representative (of the population aged 16 and older) survey in 18 Latin American countries since 1995, with about 1,000-1,200 interviews per country. The interviews are conducted face-to-face. The sampling procedure is a multi-stage random one, combined with quota selection in the last stage. A reference survey is conducted in Spain. For more information, see: **http://www.gesis.org/en/institute/competence-centers/rdc-international-survey-programmes/latinobarometer/**	Have you and your family ever seriously considered going to live abroad?
EU Neighborhood Barometer Wave4	2013	Algeria, Armenia, Azerbaijan, Belarus, Egypt, Georgia, Israel, Jordan, Lebanon, Libya, Moldova, Morocco, Palestinian Territories, Russia, Tunisia, Ukraine	A nationally representative survey of the population aged 15 and older. The sampling is a stratified multistage one. Broad national demographic quotas based on gender*age, urbanization and region have been applied. A national weighting procedure using marginal and intercellular weighting was carried out to ensure that the samples match the target universes. Interviews are conducted face-to-face with about 1,000 respondents in each country. For more information, see: **http://euneighbourhood.eu/approach-results/**	
Eurobarometer 79.2	2013	Austria, Belgium, Bulgaria Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Northern Ireland, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden	A nationally representative survey of the population aged 15 and older, with about 1,000 respondents per country (in Luxembourg, Malta, and Cyprus, about 500 interviews were collected). The sample design is a multi-stage, random (probability) one. In each country the drawing of the sampling points is with probability proportional to population size (for a total coverage of the country) and to population density. Interviews are conducted face-to-face. For more information, see: **https://dbk.gesis.org/dbksearch/sdesc2.asp?no=5688&db=e&doi=10.4232/1.11849**	Would you consider working (again) in an EU Member State other than your "home country" (i.e. where you lived most of your life) in the next 2 to 5 years?
Eurobarometer 75.1	2011	Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, Great Britain, Greece, Hungary, Ireland, Italy, Luxembourg, Lithuania Latvia, Malta, Netherlands, Northern Ireland, Poland, Portugal, Romania Sweden, Slovenia, Slovakia	A nationally representative survey of the population aged 15 and older, with about 1,000 respondents per country (in Luxembourg, Malta, and Cyprus, about 500 interviews were collected, and in Northern Ireland - about 300). The sample design is a multi-stage, random (probability) one. In each country the drawing of the sampling points is with probability proportional to population size (for a total coverage of the country) and to population density. Interviews are conducted face-to-face. For more information, see: **https://dbk.gesis.org/dbksearch/sdesc2.asp?no=5526&db=e&doi=10.4232/1.11645**	Would you consider working in another EU Member State than (OUR COUNTRY)?
Eurobarometer 73.3	2010	Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Northern Ireland, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden	A nationally representative survey of the population aged 15 and older, with about 1,000 respondents per country (in Luxembourg, Malta, and Cyprus, about 500 interviews were collected). The sample design is a multi-stage, random (probability) one. In each country the drawing of the sampling points is with probability proportional to population size (for a total coverage of the country) and to population density. Interviews are conducted face-to-face. For more information, see: **https://dbk.gesis.org/dbksearch/sdesc2.asp?no=5233**	How likely do you think it is that you will move to another country within the next ten years, to live there?
Flash Eurobarometer 319B (Youth on the Move - Respondents Aged 15-35 - Mobility in Education and Work)	2011	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey, United Kingdom	Nationally representative coverage of the population aged 18 and older. Two-stage clustered stratified sampling procedure. In Russia, Ukraine, Uzbekistan, Serbia, Poland, and the United Kingdom, 1,500 face-to-face household interviews were conducted. In all other countries, 1,000 face-to-face household interviews were conducted. In the first stage, the sampling frame was established using electoral districts, polling station territories, census enumeration districts, or geo-administrative divisions. In the second stage, the households were selected within the primary sampling units. Within the household, the primary respondent was selected using a selection grid. For more information, see: **http://www.ebrd.com/news/publications/special-reports/life-in-transition-survey-ii.html**	Would you be willing / would you like to work in another European country in the future?
Life in Transition Survey (LiTS) 2	2010	Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, France, FYR Macedonia, Georgia, Germany, Hungary, Italy, Kazakhstan, Kosovo, Kyrgyz Republic, Latvia, Lithuania, Moldova, Mongolia, Montenegro, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, Sweden, Tajikistan, Turkey, Ukraine, United Kingdom, Uzbekistan	Nationally representative coverage of the population aged 18 and older. Two-stage clustered stratified sampling procedure. In Russia, Ukraine, Uzbekistan, Serbia, Poland, and the United Kingdom, 1,500 face-to-face household interviews were conducted. In all other countries, 1,000 face-to-face household interviews were conducted. In the first stage, the sampling frame was established using electoral districts, polling station territories, census enumeration districts, or geo-administrative divisions. In the second stage, the households were selected within the primary sampling units. Within the household, the primary respondent was selected using a selection grid. For more information, see: **http://www.ebrd.com/news/publications/special-reports/life-in-transition-survey-ii.html**	

Poor economic conditions, crime, and lack of trust in institutions motivate talented individuals to seek better opportunities abroad

Skilled migration refers to the transfer (from a sending to a destination country) of human capital resources, i.e., skilled professionals such as engineers, physicians, scientists, and other individuals with university training

III. Data and variables

1. DATA SOURCES

To answer the research questions outlined above, we rely on several data sources described in **Table 1**. We screened all major publicly available micro-level datasets for the availability of questions related to the willingness, intention, aspiration, desire, plan, and preparation to move abroad in the future. Datasets with larger geographical coverage were preferred over single-country studies and only data collected during or after 2010 were considered to furnish the most time-relevant and up-to-date answers of our research questions. Our datasets cover Europe (including Turkey), Central Asia, Latin America, and the Middle East and North Africa (MENA). The sampling methodologies and question wording differ across the different data sources, thus precluding the combination of the information in a single dataset. To maintain consistency and comparability, we coded the variables as similarly as possible across different datasets.

In addition, we used data on Visa Restrictions from Henley & Partners, which is produced in collaboration with the International Air Transport Association (IATA).[5] Henley & Partners analyze the visa regulations of all world countries and rank countries based on the degree of the visa-free access their citizens enjoy to other countries.

Our unemployment rate data are from Eurostat. Finally, for skill shortages, we relied on OECD data on the annual stock of vacancies (seasonally adjusted). While this is an imperfect measure, we are constrained by the lack of a formal definition and inconsistent cross-country data.

2. DEFINITIONS AND KEY VARIABLES

Migration intentions. Tracing individuals before and after moving across international borders is costly and rarely undertaken. Therefore, researchers often capture the emigration decision using survey questions administered in the country of origin and eliciting responses about willingness (aspirations), plans, and preparations to emigrate. Potential (or aspiring) emigrants are therefore individuals in the country of origin who express intentions to migrate to another country in the future. Of course, not everyone who expresses willingness to migrate will eventually undertake this action. The literature suggests, however, that migration intentions are good predictors of subsequent moving behavior (Creighton, 2013; Simmons, 1985; van Dalen & Henkens, 2008, 2013).

Respondents who have made concrete preparations (such as obtaining a work permit, buying a plane ticket, or finding housing) have a higher probability of completing this move later on. In all analyses, the migration intentions variable is a binary variable, where 1 corresponds to having emigration intentions and 0 to not having such intentions.

The wording of migration intention questions differs across surveys, thus limiting the comparability across studies (Table 1). For example, while most surveys ask about the individual migration in the future, Latinobarometer's question is about family migration considerations in the past. Surveys may also inquire about different types of migration (temporary vs. permanent) and offer varying time horizons (e.g., in the next 10 years or in the next 12 months).

To avoid biased results, we exclude from the analysis individuals who are foreign-born as their intentions to move to another country are likely return intentions. No information about country of birth was available in the Life in Transition Survey and the EU Neighborhood Barometer.

Skills. The notion of skills relates to a labor force's productive capabilities, which are acquired through learning (Toner, 2011). While economists have failed to provide a consistent analytical definition of skills, variables such as education, training, and experience capture this concept. In the context of migration, skilled migration refers to the transfer (from a sending to a destination country) of human capital resources, i.e., skilled professionals such as engineers, physicians, scientists, and other individuals with university training (Docquier & Rapoport, 2008).[6]

In this chapter, we approximate skills with individual levels of education. For consistency purposes, we rely on a variable about the age at which the respondent finished his or her education. Specifically, we distinguish among those who are still studying, those who have no formal education, those with low education levels (i.e., stopped their formal education by age 15), respondents with medium levels of education (i.e., completed education between ages 16-19), and those with high education levels (i.e., those who stopped their education at age 20 or older). While we acknowledge that it is an imperfect measure of skills, we are limited by the survey content.[7]

Income and Wealth. As none of the datasets contain information on individual or household income, we construct a wealth index, i.e., a count variable which sums all household amenities and goods such as a TV, mobile phones, a computer, an internet connection, and others. This procedure is standard

5 For more information about the Visa Restrictions Index, please visit: http://www.iata.org/Pages/default.aspx.

6 By 2000, 20 million highly skilled immigrants lived in the OECD area, which comprised a 70 percent increase in a decade (Docquier & Rapoport, 2008). 7 In the Life in Transition Survey, the education variable is about the highest completed degree (e.g., primary, secondary, or tertiary education). We exclude respondents with no educational attainment from the Eurobarometer studies as they comprise less than 0.5 percent of the sample thus precluding meaningful multivariate analyses.

in the literature. In addition, we also use a notional income ladder question which asks respondents to position their income between the poorest and the richest in their country. When available (i.e., Latinobarometer, LiTS, and EU neighborhood barometer), we include variables about personal financial or economic satisfaction.

Foreign experience and networks. Return migrants (i.e., respondents who have lived abroad in the past) and those who have networks of friends and family abroad have a higher probability of emigrating again. Whenever available, we include information about foreign contacts and past work or other experience abroad.

Perceptions of socio-economic and institutional conditions. When available, we introduce controls for perceptions of social trust and trust in government, perceptions about the country's current and future economic situations, life satisfaction, financial satisfaction, and satisfaction with democracy.

Socio-demographic variables. Depending on data availability, we control for standard socio-demographic factors such as age, marital status, employment status, household size and the number of children, urban or rural location, and others.

8 We did not cluster the standard errors by country of interview due to the small number of clusters.

IV. Analytical model, methods, and limitations

For each individual *i* living in country *c*, the probability of expressing emigration intentions *M* is:

$$M_{ic} = \beta_0 + X'_{ic}\,\beta_1 + \gamma_c + \varepsilon_{ic},$$

where *X* is a vector of socio-demographic characteristics and perceptions variables such as education, age, gender, marital status, household size, number of children, household wealth, urban/rural location, trust in society and institutions (where available), satisfaction with public goods or standard of living, and others. Because our dependent variable is binary, we estimate the above equation using logistic regressions with robust standard errors.[8] For ease of interpretation, we report the results in terms of average marginal effects.

In addition, following Nikolova and Graham (2015), we compare the relative importance of each included factor for the probability of expressing emigration intentions based on a Shapley-based decomposition procedure (Israeli, 2007; Shorrocks, 2013). This method splits the goodness of fit statistic (i.e., the pseudo R^2 in this case) into the relative percentage contributions of each included independent variable.

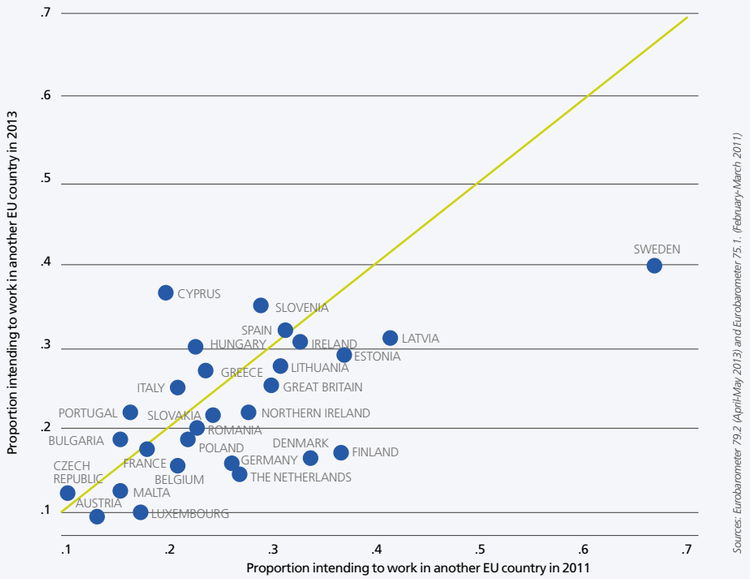
It is important to note that due to several data and methodological limitations, our results cannot be interpreted as causal. First, there is endogeneity related to unmeasurable factors correlated with both the emigration decision and personal circumstances. For example, unobservable traits such as ability, motivation, risk tolerance, and aspirations are relevant for both the emigration decision and variables such as income or institutional trust. Failing to control for these unobservables results in biased estimates. Second, reverse causality is a problem if having made the decision to stay or leave changes actual circumstances. For example, it is possible that the emigration choice influences other behaviors such as the decision to marry, have children, or become (un)employed.

Due to data limitations, we can only mitigate but not fully eliminate the two methodological problems, which implies that the causal interpretation of our results should be treated with caution. Our objective is to examine patterns and associations across world regions and skill levels. We attempt, to the extent possible, to address the internal validity concerns by including a large set of individual-level observable characteristics and socio-economic variables associated with the emigration decision.

Within-EU migration is interesting as distances between countries are relatively small, pecuniary migration costs are relatively low, migrants can move freely across international borders, and social benefits are largely transferable.

Figure 1: Proportion intending to work in another EU country

by country of origin



Notes: No data for Croatia available for 2011, N= 25,142 for 2011; N=25,875 for 2013. See Table 1 for question wording.

V. Results

1. INTENDED LABOR MIGRATION WITHIN THE EU: PATTERNS AND DIFFERENCES ACROSS SKILL GROUPS

Within-EU migration is interesting as distances between countries are relatively small, pecuniary migration costs are relatively low, migrants can move freely across international borders, and social benefits are largely transferable. Compared with those from developing countries, EU migrants have easier access to information about opportunities and living conditions abroad (Lovo, 2014).

Furthermore, labor migration within the EU is "circular," i.e., characterized by temporary back and forth movements between the source and destination counties (Constant, Nottmeyer, & Zimmermann, 2013). Therefore, potential emigrants willing to work within the EU are likely non-permanent movers. For the first time, Eurobarometer 75.1 (February – March 2011) asked about intended labor migration within the EU and Eurobarometer 79.2 (April-May 2013) furnishes the latest follow-up information at the time of writing.[9]

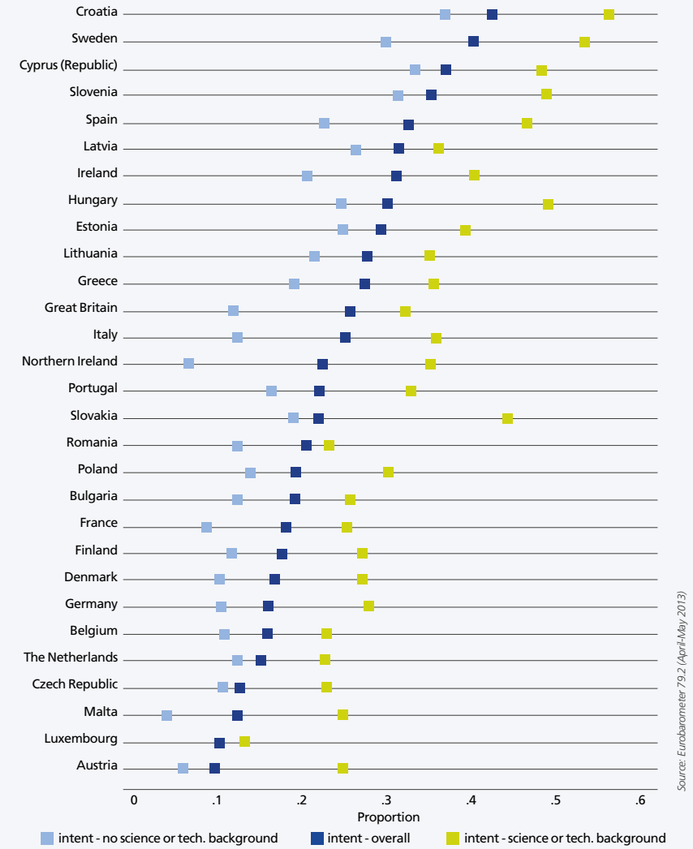
On average, about a quarter of Europeans – 27 percent in 2011 and 24 percent in 2013 – expressed willingness to work in another EU country. The highest proportions of potential future emigrants were in the Nordic and Baltic States, while the smallest was in the Czech Republic (**Figure 1**). In almost all countries, emigration intentions declined in 2013 compared with 2011 (and were thus below the 45-degree line in **Figure 1**).[10] The few exceptions were some of the member states from the most recent enlargements and the crisis countries Portugal, Spain, and Greece, along with Italy.

Across the board, Europeans with technical or scientific backgrounds were more likely to express emigration intentions (**Figure 2**). While on average, across all countries, 33 percent of Europeans with scientific training wanted to work in another EU state, the percentages were overwhelmingly large in Croatia (56 percent), Sweden (52 percent), and some of the countries from the most recent EU enlargements (**Figure 2**).

We next turn to the estimates based on on the equation described in Section IV above . **Figures 3-4** demonstrate the adjusted emigration probabilities by each education level for 2011 and 2013, respectively. These are the conditional marginal effects by education level and taking into account all other included variables in the model. The conditional emigration intentions differ by skill level – being 38 percent for Europeans currently pursuing their studies, 20 percent for the low-educated, and 31 for the high-educated in 2011 (**Figure 3**); and ranging from 29 percent among those still studying, to 24 percent for the high educated, and 19 percent for those with low education in 2013 (**Figure 4**).

Figure 2

Intent to work in another European Union country in the next 2-5 years, by respondents science and technology background and country of interview



Potential emigrants willing to work within the EU are likely non-permanent movers

9 The question wording differs slightly between the two waves (Table 1). In EB 75.1, no time frame was given while in EB 79.2, respondents were asked whether they would consider working (again) in an EU Member State other than their home country in the next 2 to 5 years, with possible answers ranging from definitely not, probably not, probably yes, and definitely yes. For ease of interpretation and comparability with other studies, we combined responses into two categories: yes and no. Croatia was only polled in 2013.

10 In 2013, Croatia had the highest proportion of respondents reporting intent to work in another EU country. This result likely reflects the fact that the survey was conducted just a few months prior to Croatia's joining the EU on July 1, 2013.

Table 2: Emigration intent to another EU country, marginal effects, 2011 and 2013

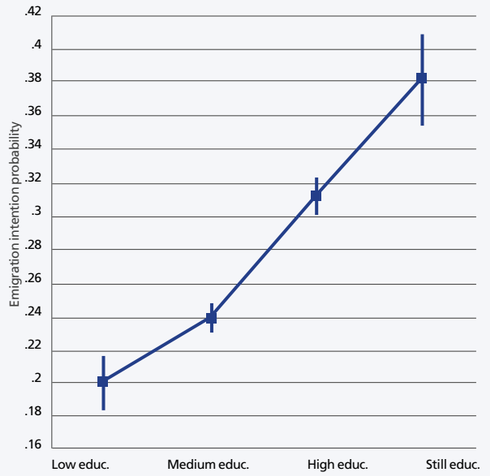
	Emigration Intent 2011	Emigration Intent 2013
Educational attainment: Ref. category: Low education		
Medium education	0.039***	0.031***
	(0.008)	(0.008)
High education	0.112***	0.055***
	(0.009)	(0.009)
Still studying	0.182***	0.100***
	(0.016)	(0.014)
Science/ technology background		0.054***
		(0.005)
Age	-0.007***	-0.009***
	(0.000)	(0.000)
Married or in a civil partnership	-0.031***	-0.032***
	(0.006)	(0.006)
Male	0.053***	0.047***
	(0.005)	(0.005)
Employed	0.005	0.010*
	(0.006)	(0.005)
Income ladder (1= 6 and above)	-0.009	-0.010*
	(0.005)	(0.005)
Wealth index	0.011***	0.002
	(0.002)	(0.002)
Large town	0.025***	0.027***
	(0.006)	(0.005)
Number of children	-0.008**	-0.007**
	(0.004)	(0.004)
Household size	0.003	0.002
	(0.003)	(0.002)
Foreign experience	0.253***	0.193***
	(0.010)	(0.009)
Trust authorities	-	-0.026***
	-	(0.005)
Country dummies	Yes	Yes
Pseudo R^2	0.242	0.277
Observations	23,647	23,929

Source: EB 75.1 (February-March 2011) in (1) and EB 79.2 (April-May 2013) in (2)

*Notes: Robust standard errors in parentheses. Average marginal effects. The dependent variable is a binary indicator for whether the respondent expressed an intention to move to another EU country in the next 2-5 years. The educational attainment variables correspond to still studying, low education (stopped education by age 15, which is the omitted category), medium education (stopped education at ages 16-19), and high education (stopped education at ages 20 and over). The "No education" category is excluded from the analyses due to insufficient number of observations. Wealth index corresponds to the total number of consumption goods and durables in the household. Foreign experience is coded as 1 if the responded worked in another EU country in the past; Trust authorities is coded as 1 if the respondent's trust in national authorities remained the same or increased during the crisis and 0 if it declined. EB 75.1 lacks information on trust in authorities and science or technology background. *** p<0.01, ** p<0.05, * p<0.1*

Figure 3

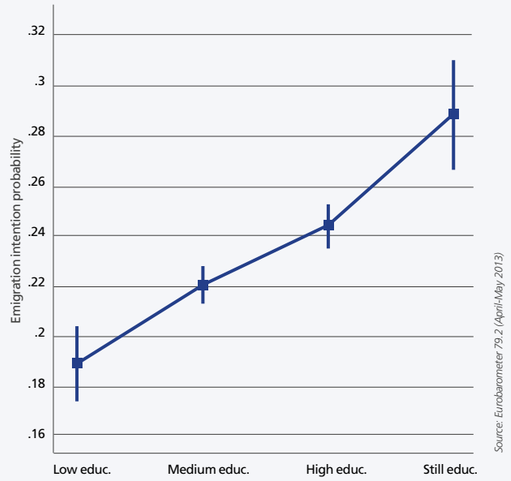
Emigration intentions to another EU country, adjusted predictions with 95% Confidence Intervals, by education level



Source: Eurobarometer 75.1 (February-March 2011)

Figure 4

Emigration intentions to another EU country, adjusted predictions with 95% Confidence Intervals, by education level



Source: Eurobarometer 79.2 (April-May 2013)

It appears that after controlling for other socio-demographic factors, Europeans who were studying at the time of interview and the most educated were the most likely groups to aspire to work in another EU country.

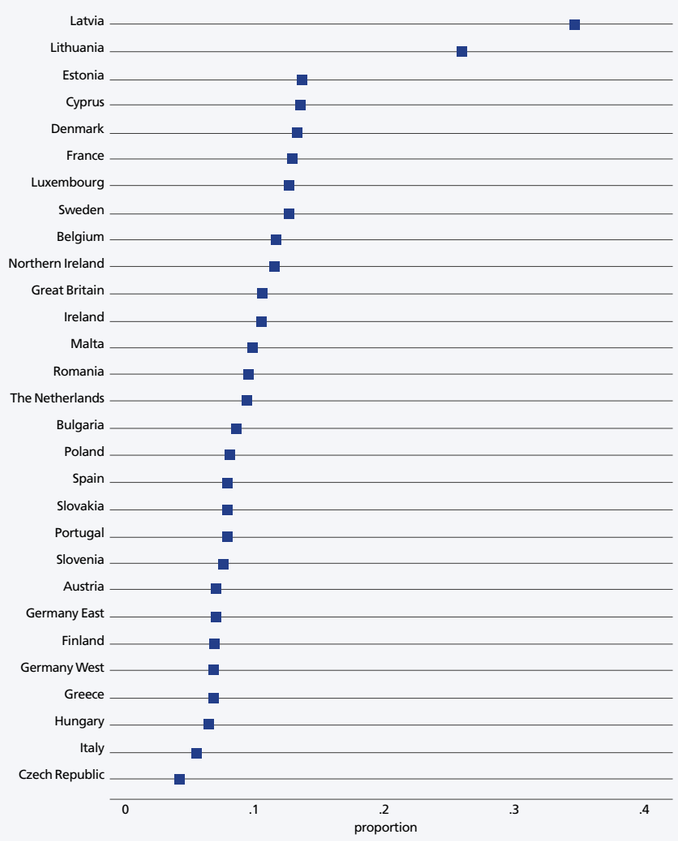
Table 2 provides further detail about the estimations for 2011 and 2013 (in terms of average marginal effects) for the intentions to move within the EU. The first three rows show the probability of reporting emigration intentions by educational attainment relative to having low education, which is the omitted category. For example, compared with those with low levels of education, respondents who were still studying were 18.2 percentage points more likely to state emigration intentions in 2011 and 10 percentage points more likely in 2013 (also evident from Figures 3-4). Similarly, compared with those with low education, Europeans with high educational attainment were between 11.2 and 5.5 percentage points more likely to consider moving within the EU, while those with medium levels were between 3.9 and 3.1 percentage points more likely, respectively. In 2013, Europeans with a scientific training had a 5.4 percentage points higher probability of being potential emigrants compared to those without such a degree.

Europeans with technical or scientific backgrounds were more likely to express emigration intentions

Being a potential EU migrant is positively associated with foreign experience in the past, being male, and living in a large town

Figure 5

Likely to move to live in another country in the next 10 years, by country of interview



Source: Eurobarometer 73.3 (March - April 2010)

Notes: N=24,227. See Table 1 for question wording.

The other included variables in the model have the expected associations with emigration intentions. Being a potential EU migrant is positively associated with foreign experience in the past, being male, and living in a large town.[11] It is also negatively correlated with age, being married (or living with a partner), having more children, and trusting national authorities (in 2013 only). Wealth and the income ranking are not robust determinants of the within-EU emigration intent across the two survey waves, although it appears that potential emigrants may be positively selected on wealth but negatively selected on income perceptions.

2. EMIGRATION INTENTIONS AMONG EU CITIZENS: PATTERNS AND DIFFERENCES ACROSS SKILL GROUPS

We also examined the general emigration intentions among EU citizens (i.e., intentions which were not specifically to another EU country) using Eurobarometer 73.3 (March-April 2010).[12] Across all countries, about one in ten interviewees (11 percent) stated that they are likely to live in another country in the next 10 years. Respondents from the Baltic states Latvia (34 percent) and Lithuania (26 percent) expressed the highest likelihood of moving to another country in the next 10 years to live there (**Figure 5**). Czech

Among Europeans who were willing to emigrate, the most likely destination was another EU country, with the low-educated being slightly more likely than other education groups to select EU destinations.

respondents were again the most reluctant to express emigration intent (only 4 percent did so). Furthermore, among Europeans who were willing to emigrate, the most likely destination was another EU country, with the low-educated being slightly more likely than other education groups to select EU destinations (**Figure 6**). Those still studying were slightly more likely than other groups to favor the big OECD countries – USA, Canada, Japan, Australia, and New Zealand.

The adjusted probabilities of emigration by education levels ranged between 13 percent for those still in school to about 9-10 percent for the rest (**Figure 7**). Unlike potential movers within the EU, the highest educated were no more likely than the low and medium educated to express emigration intent. **Table 3** further shows that except for Europeans still in school, the probability of emigrating does not differ for rest of the educational groups. Having foreign connections and experiences, however, increases the probability of emigration intent, although having a foreign parent is not associated with emigration intentions. For example, interviewees who have lived abroad and those who have worked abroad in the past were 4 percentage points and 4.5 percentage points more likely to want to live abroad compared with those with no foreign experience.

11 The coefficient estimates for personal employment are positive but only marginally statistically significant in 2013 and insignificant in 2011. 12 Respondents were asked to provide the likelihood of moving on a scale of 1 to 4, where 1 corresponded to "very likely," and 4 corresponded to "not at all likely." To maintain consistency, we recoded the variable as a binary indicator, whereby 1 corresponds to "likely" and 0 to "unlikely."

Table 3: Likely to move to another country to live there in the next 10 years European Union residents, marginal effects

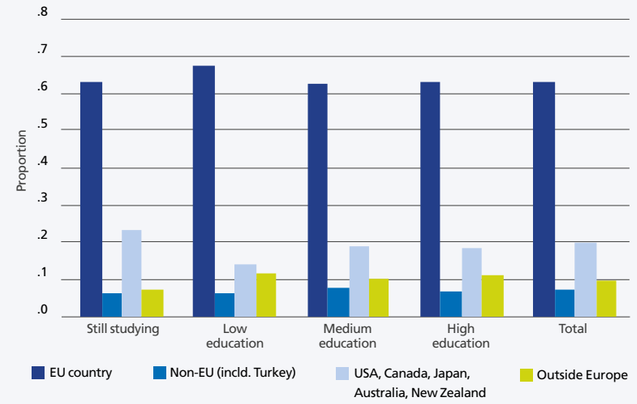
Educational attainment: Ref. category: Low education	
Medium education	-0.008
	(0.007)
High education	-0.006
	(0.008)
Still studying	0.032***
	(0.011)
Age	-0.004***
	(0.000)
Married or in a civil partnership	-0.018***
	(0.004)
Male	0.010***
	(0.004)
Employed	-0.008*
	(0.004)
Income ladder (1= 6 and above)	0.002
	(0.004)
Wealth index	-0.002
	(0.001)
Large town	0.007*
	(0.004)
Number of children	-0.009***
	(0.003)
Household size	-0.001
	(0.002)
At least one foreign parent	-0.001
	(0.006)
Eat foreign food	0.014***
	(0.005)
Foreign friends	0.021***
	(0.004)
Friends in other countries	0.050***
	(0.004)
Spends holidays abroad	0.022***
	(0.005)
Follows foreign news	0.020***
	(0.004)
Foreign language fluency	0.013***
	(0.005)
Lived abroad	0.040***
	(0.007)
Foreign partner	0.034***
	(0.007)
Worked abroad	0.045***
	(0.006)
Owns property abroad	0.049***
	(0.016)
Has relatives abroad	0.020***
	(0.004)
Studied abroad	0.022***
	(0.008)
Country dummies	Yes
Pseudo R^2	0.278
Observations	22,170

Source: Eurobarometer 73.3 (March-April 2010)

*Notes: Robust standard errors in parentheses. Average marginal effects. The dependent variable is a binary indicator for whether the respondent is likely to move to another country in the next 10 years to live there. The educational attainment variables correspond to still studying, low education (stopped education by age 15, which is the omitted category), medium education (stopped education at ages 16-19), and high education (stopped education at ages 20 and over). The "No education" category is excluded from the analyses due to insufficient number of observations. Wealth index corresponds to the total number of consumption goods and durables in the household. The foreign connections/networks are dummy variables. For example, "worked abroad" is coded as 1 if the responded worked in another EU country for at least three months in the past. *** p<0.01, ** p<0.05, * p<0.1*

Figure 6

Desired destination to live in the next 10 years for those likely to move, by education level



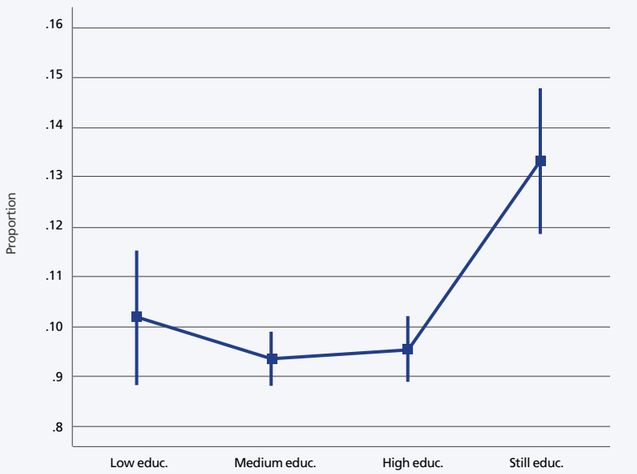
Source: Eurobarometer 73.3 (March-April 2010)

3. EMIGRATION INTENTIONS IN TRANSITION AND NON-TRANSITION ECONOMIES: PATTERNS AND DIFFERENCES ACROSS SKILL GROUPS

We also analyzed the 2010 wave of the Life in Transition Survey (LiTS), which polled 29 transition economies.[13] For comparison purposes, LiTS also surveyed the following non-transition nations: France, Germany, the UK, Sweden, Turkey, and Italy. Respondents were asked both about whether they would be willing to move abroad for employment reasons (25 percent of respondents in transition economies and 29 in non-transition economies gave a positive answer) and whether they intended to move in the next 12 months (1 percent of non-transition and 5 percent of transition respondents had concrete emigration plans, respectively). Swedes had the highest general willingness to work abroad (48 percent) but far

Figure 7

Likely to move to another country to live there in the next 10 years, adjusted predictions with 95% Confidence Intervals, by education level

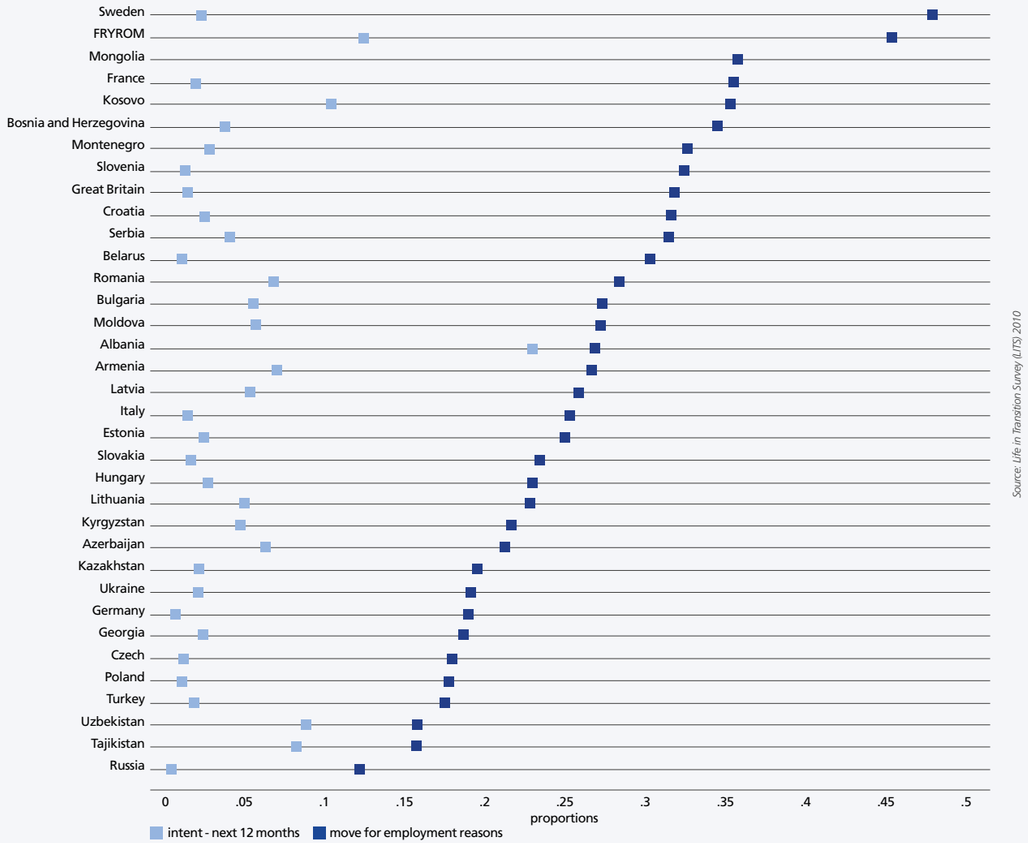


Source: Eurobarometer 73.3 (March-April 2010)

13 The term "transition economies" refers to the countries in Central and Eastern Europe and the former Soviet Union, which recently underwent or are still going through transitions to democracy and market economy.

Figure 8

Precent intending to move abroad in the next 12 months or willing to work abroad, by country of interview



Source: Life in Transition Survey (LITS) 2010

N=37,109 for moving for employment reasons; N=38,859 for overall intent. See Table 1 for question wording. See Table 1 for question wording.

fewer Swedes reported concrete migration intent (2 percent) (**Figure 8**). Albanians were most likely to report concrete emigration intentions in the next year (23 percent). Russians were the least interested in moving abroad, meanwhile.

The adjusted probabilities for willingness to work abroad (Figures 9-10) indicate that in both transition and non-transition countries, the conditional probability of intended labor migration generally increases with education, being the highest for those with MA and Ph.D. degrees.[14] **Table 4** further shows that in transition economies, all education groups except those without any education and those with lower secondary education have a higher probability of reporting willingness to work abroad than interviewees with primary education. In non-transition countries, respondents with post-secondary education and above are more likely to want to work in a foreign country.

Respondents with no education in non-transition countries were 7.3 percentage points less likely than those with primary education to want to move for employment. Concrete moving intentions do not differ among education groups in transition countries. In non-transition states, those with post-secondary education and above were more likely than the least educated to report

In both transition and non-transition countries, the conditional probability of intended labor migration generally increases with education

14 Similar patterns emerge when we use the concrete emigration intentions in the next 12 months. Results are available upon request.

All education groups in transition and non-transition countries except those without any education and those with lower secondary education have a higher probability of reporting willingness to work abroad than interviewees with primary education

Table 4: Willing to work abroad or intending to move to another country in the next year, marginal effects

	Transition		Non-transition	
	move for employment	move - next 12 months	move for employment	move - next 12 months
Educational attainment: Ref. category: Primary education	**(1)**	**(2)**	**(3)**	**(4)**
Lower secondary	0.014	-0.001	0.018	0.006
	(0.011)	(0.006)	(0.025)	(0.005)
Uppwer secondary	0.034***	-0.003	0.001	0.001
	(0.010)	(0.005)	(0.024)	(0.004)
Post-secondary (non-tertiary)	0.039***	-0.002	0.072**	0.011*
	(0.011)	(0.006)	(0.028)	(0.006)
Bachelor's degree	0.065***	-0.004	0.109***	0.013**
	(0.012)	(0.006)	(0.029)	(0.007)
Master's degree or Ph.D.	0.093***	-0.000	0.174***	0.024**
	(0.016)	(0.009)	(0.032)	(0.010)
No education	0.032	0.008	-0.073**	-0.003
	(0.021)	(0.012)	(0.031)	(0.005)
Age	-0.007***	-0.001***	-0.004***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Married	-0.040***	-0.016***	-0.062***	-0.006*
	(0.006)	(0.003)	(0.012)	(0.003)
Male	0.045***	0.019***	0.065***	0.006**
	(0.005)	(0.003)	(0.011)	(0.003)
Worked in the past 12 months	0.025***	0.001	-0.013	-0.002
	(0.006)	(0.003)	(0.013)	(0.004)
Income ladder (1= 6 and above)	-0.043***	-0.005	-0.025**	-0.005
	(0.006)	(0.003)	(0.013)	(0.003)
Wealth index	0.012***	0.002**	0.009**	0.001
	(0.002)	(0.001)	(0.004)	(0.001)
Household size	-0.006**	-0.003***	0.014**	0.000
	(0.002)	(0.001)	(0.007)	(0.002)
Number of children	-0.001	0.004**	-0.022**	-0.002
	(0.004)	(0.002)	(0.009)	(0.002)
Life satisfaction (1=Yes)	-0.026***	-0.006*	-0.007	0.001
	(0.006)	(0.003)	(0.014)	(0.004)
Personal fin. situation satisfaction (1=Yes)	-0.026***	0.001	-0.001	-0.006
	(0.007)	(0.003)	(0.013)	(0.004)
Social trust	-0.012**	-0.002	-0.020*	0.000
	(0.006)	(0.003)	(0.012)	(0.004)
Trust the government	-0.026***	-0.010***	0.009	0.002
	(0.006)	(0.003)	(0.013)	(0.004)
Willingness to take risk (1-10 scale)	0.027***	0.004***	0.040***	0.003***
	(0.001)	(0.001)	(0.002)	(0.001)
Affected by the economic crisis (1=Yes)	0.027***	0.011***	0.025**	-0.001
	(0.006)	(0.003)	(0.012)	(0.004)
Country dummies	Yes	Yes	Yes	Yes
Pseudo R^2	0.166	0.155	0.149	0.109
Observations	24,270	25,305	5,932	6,038

*Notes: Robust standard errors in parentheses. Average marginal effects. The dependent variable in columns (1) and (3) is a binary indicator for whether the respondent would be willing to move abroad for employment reasons and in columns (2) and (4) is whether the respondent intends to move abroad in the next 12 months. Wealth index corresponds to the total number of consumption goods and durables in the household. *** p<0.01, ** p<0.05, * p<0.1*

Source: Life in Transition Survey (LITS) 2010

Potential emigrants from transition and non-transition countries are positively selected on wealth and in terms of risk seeking preferences but negatively selected on income

emigration intent. There is some evidence that potential emigrants are positively selected on wealth and in terms of risk seeking preferences but negatively selected on income (**Table 4**).

4. EMIGRATION INTENTIONS AMONG LATIN AMERICANS: PATTERNS AND DIFFERENCES ACROSS SKILL GROUPS

Based on Latinobarometer 2013, about one in five respondents and their families in Latin America seriously considered going to live abroad, with nearly half (47 percent) of respondents in the Dominican Republic reporting such considerations (**Figure 11**). At the other extreme, only 11 percent of Chileans wanted to move abroad in 2013. Importantly, as some potential emigration from Latin America may be illegal, certain respondents may be unwilling to report their true willingness to go abroad.

The conditional probability of emigration considerations is 24 percent among the most educated, about 22 for those currently in school, compared with 18 percent for the least educated (**Figure 12**). **Table 5** further indicates that Latin Americans with all educational backgrounds, except those with no formal schooling, were more likely to express emigration intentions than the low educated group (the reference group). Household wealth is positively associated with emigration intentions but income perceptions are statistically insignificant. Those who are dissatisfied with their lives as a whole and with their economic situation were 4.8 and 2.2 percentage points more likely to aspire to move abroad, respectively. Unsurprisingly, in a region plagued by violence and crime, having been a victim of a crime raises the predicted probability of expressing emigration intentions by 6.8 percentage points. Interestingly, having high social trust is also positively associated with emigration aspirations among Latin Americans. One explanation for this result is that the social trust variable captures sociability or optimism, which may be positively correlated with emigration intentions.

Figure 9

Willing to move for employment reasons, adjusted predictions with 95% Confidence Intervals, transition countries

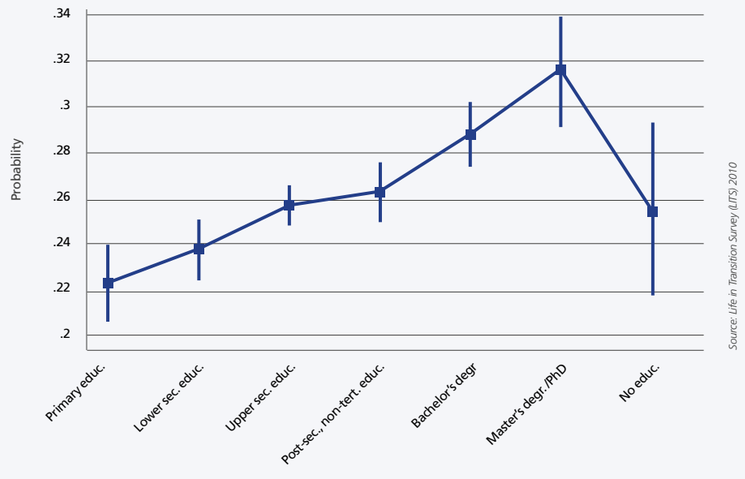


Figure 10

Willing to move for employment reasons, adjusted predictions with 95% Confidence Intervals, non-transition countries

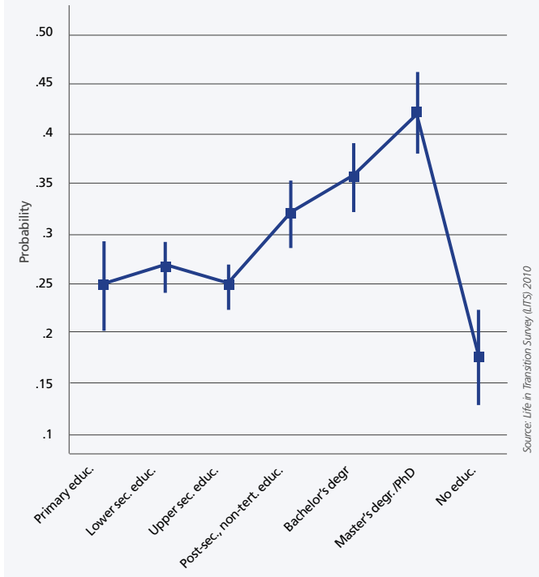
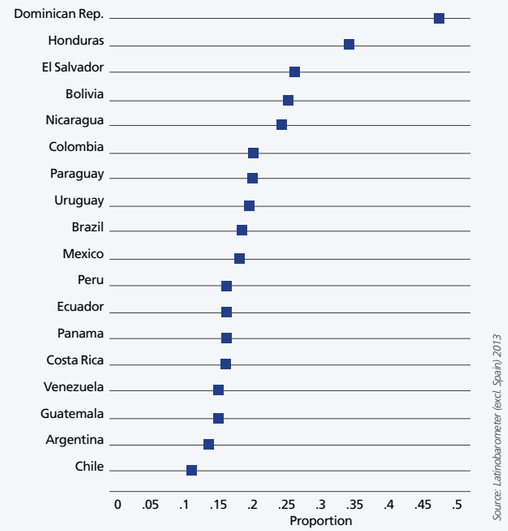


Figure 11

Respondent and family ever seriously considered living abroad, by country of interview



Notes: N=19,764. See Table 1 for question wording.

Those who are dissatisfied with their lives as a whole and with their economic situation in Latin America more likely to aspire to move abroad

Table 5: Respondent and family ever seriously considered living abroad, marginal effects, Latin America, 2013

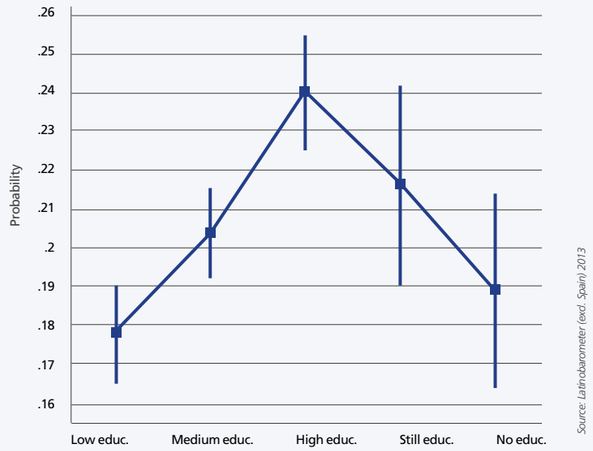
Educational attainment: Ref. category: Low education	
Medium education	0.026***
	(0.009)
High education	0.062***
	(0.010)
Still studying	0.038***
	(0.015)
No education	0.011
	(0.014)
Age	-0.003***
	(0.000)
Married or in a civil partnership	-0.007
	(0.007)
Male	0.024***
	(0.007)
Employed	0.006
	(0.008)
Income ladder (1= 6 and above)	0.005
	(0.008)
Wealth index	0.011***
	(0.002)
Large town	0.032***
	(0.007)
Race: White	0.005
	(0.008)
Life satisfaction (1=Yes)	-0.048***
	(0.009)
Personal econ. situation satisfaction (1=Yes)	-0.022**
	(0.009)
Social trust	0.032***
	(0.009)
Trust the government	-0.030***
	(0.007)
Crime victim	0.068***
	(0.007)
Country's present economic situation	-0.009
	(0.009)
Country's future economic situation	-0.019***
	(0.007)
Satisfaction with democracy	-0.004
	(0.008)
Country dummies	Yes
Pseudo R^2	0.080
Observations	14,551

Source: Latinobarometer (excl. Spain) 2013

*Notes: Robust standard errors in parentheses. Average marginal effects. The dependent variable is a binary indicator for whether the respondent and family ever seriously considered moving to another country to live there. The educational attainment variables correspond to no education, still studying, low education (stopped education by age 15, which is the omitted category), medium education (stopped education at ages 16-19), and high education (stopped education at ages 20 and over). Wealth index corresponds to the total number of consumption goods and durables in the household. *** p<0.01, ** p<0.05, * p<0.1*

Figure 12

Respondent and family ever seriously considered living abroad, adjusted predictions with 95% Confidence Intervals, by education level



Source: Latinobarometer (excl. Spain) 2013

5. EMIGRATION INTENTIONS IN THE EU NEIGHBORHOOD COUNTRIES: PATTERNS AND DIFFERENCES ACROSS SKILL GROUPS [15]

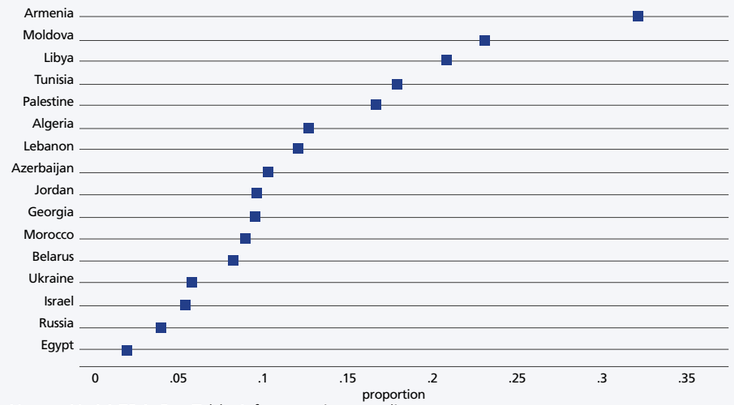
To study the emigration intentions among the EU's closest neighbors, we used data from the EU Neighborhood barometer (Wave 4), conducted in Fall 2013. Roughly one in ten respondents (13 percent) from the region thought they were likely to emigrate in the next two years. Based on **Figure 13**, Armenians were the most likely to move abroad (32 percent), while Egyptians were the least likely (2 percent). In general, emigration aspirations were slightly higher among the Eastern Partnership countries (EaP) than in the Middle East and North Africa (MENA) economies. **Figures 14-15** further show that the adjusted probability of migration in the EaP countries was the highest among the most educated (17 percent), but, unlike in other regions, was the lowest among respondents currently in school (9 percent) (**Figure 14**). A similar pattern by skill groups emerges in the MENA region (**Figure 15**). Finally, Table 6 indicates that EaP respondents pursuing their education at the time of interview were in fact marginally less likely than the least educated to want to move abroad. In both EaP and MENA countries, the high education groups were marginally more likely to be potential emigrants than the least educated. As in other world regions, potential emigrants in EaP and MENA were positively selected on wealth but those in MENA are negatively selected on income. Having relatives and friends abroad increases the probability of reporting emigration intent by 7.5 percent in EaP and 9.1 percent in MENA.

In general, emigration aspirations were slightly higher among the Eastern Partnership countries than in the Middle East and North Africa economies

15 The European Neighborhood countries include the EU's closest bordering countries, namely the Eastern Partnership countries (EaP) (Armenia, Azerbaijan, Belarus, Georgia, Moldova, and the Ukraine) and countries in the Middle East and North Africa Region (MENA) (Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, and Tunisia). Since 2004, Moldova has been a major emigration sending country, though emigration from the rest of the EaP has been more limited (Danzer & Dietz, 2014).

Figure 13

Proportion intending to move to another country within the next two years, by country of interview



Notes: N=14,734. See Table 1 for question wording.

Figure 14

Likely to move abroad in the next two years, EaP countries, adjusted predictions with 95% Confidence Intervals, by education

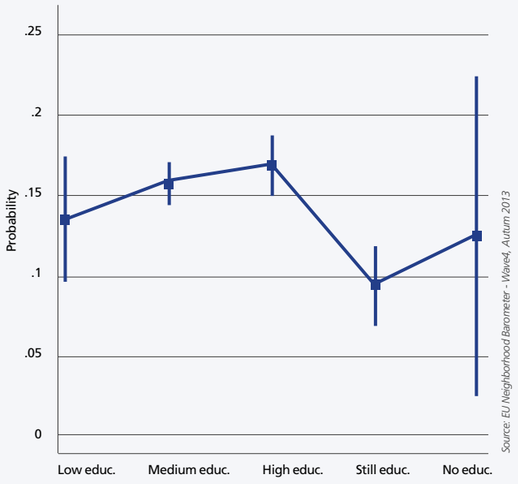


Figure 15

Likely to move abroad in the next 2 years, MENA countries, adjusted predictions with 95% Confidence Intervals, by education

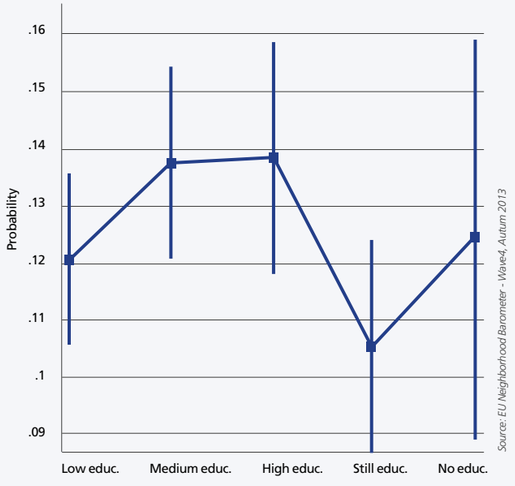


Table 6: Respondent likely to move abroad in the next 2 years,marginal effects

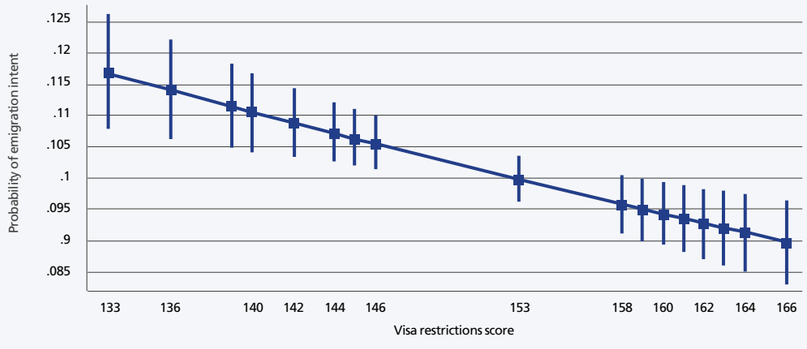
	EaP	MENA
Educational attainment: Ref. category: Low education		
Medium education	0.022	0.017
	(0.021)	(0.011)
High education	0.034	0.018
	(0.022)	(0.013)
Still studying	-0.041*	-0.015
	(0.024)	(0.013)
No education	-0.011	0.004
	(0.054)	(0.019)
	EaP	**MENA**
Age	-0.005***	-0.002***
	(0.000)	(0.000)
Married or in a civil partnership	-0.005	-0.014
	(0.012)	(0.010)
Male	0.033***	0.042***
	(0.010)	(0.008)
Employed	0.004	-0.009
	(0.011)	(0.009)
Income ladder (1= 6 and above)	-0.006	-0.027***
	(0.010)	(0.010)
Wealth index	0.010***	0.012***
	(0.003)	(0.003)
Large town	-0.005	-0.009
	(0.011)	(0.008)
Household size	-0.005	0.002
	(0.004)	(0.002)
Number of children	0.008	0.002
	(0.007)	(0.004)
Life satisfaction (1=Yes)	-0.034***	-0.012
	(0.011)	(0.010)
Personal fin. situation satisfaction (1=Yes)	-0.029**	0.009
	(0.011)	(0.010)
Trust the government	-0.063***	-0.011
	(0.012)	(0.010)
Relatives abroad	0.075***	0.091***
	(0.012)	(0.010)
Visited or lived in the EU past 12 mo.	0.101***	0.093***
	(0.020)	(0.016)
Country's present economic situation	-0.006	-0.043***
	(0.015)	(0.012)
Country's future economic situation	0.004	0.020**
	(0.013)	(0.010)
Satisfaction with democracy	-0.025*	-0.016
	(0.013)	(0.010)
Country dummies	Yes	Yes
Adjusted R^2	0.205	0.142
Observations	4,660	6,229

Source: EU Neighborhood Barometer (Wave 4), Autumn 2013

*Notes: Robust standard errors in parentheses. Average marginal effects. The dependent variable is a binary indicator for whether the respondent is likely to move to another country in the next two years. The educational attainment variables correspond to no education, still studying, low education (stopped education by age 15, which is the omitted category), medium education (stopped education at ages 16-19), and high education (stopped education at ages 20 and over). Wealth index corresponds to the total number of consumption goods and durables in the household. *** p<0.01, ** p<0.05, * p<0.1*

Figure 16

Likely to move to another country to live there in the next 10 years, adjusted predictions with 95% Confidence Intervals, by visa restriction score



Note: The visa restriction scores for 2010 are as follows: Bulgaria = 133, Romania = 136, Latvia = 139, Estonia & Lithuania = 140, Cyprus, Czech Rep. & Hungary = 142, Slovakia & Slovenia = 144, Poland = 145, Malta = 146, Greece = 153, Austria & Portugal = 158, Ireland = 159, Belgium & Spain = 160, France, Germany, Italy & Netherlands = 161, Finland & Luxembourg = 162, Sweden = 163, Denmark = 164, Great Britain = 166.

Source: Eurobarometer 73.3 (March-April 2010) Henley and Partners Visa Restrictions Index 2010

6. DO MIGRATION POLICIES AND REGIONAL AGREEMENTS PLAY A ROLE IN THE MIGRATION DECISION OF POTENTIAL (HIGH SKILLED) MIGRANTS?

The evidence indicates that the probability of reporting emigration intentions within the EU is relatively high, likely because of the fact that EU citizens face no emigration restrictions and relatively low migration costs. Furthermore, it also seems that respondents from the EU Neighborhood countries also favor EU countries, with Germany, Italy, and France being among the top desired destinations (**Table 7**).[16] To formally examine whether emigration intentions differ depending on the mobility restrictions respondents faced, we merged data from the Henley & Partners' Visa Restrictions Index (HVRI) with data from Eurobarometer 73.3, EU Neighborhood barometer, the Life in Transition Survey, and Eurobarometer (**Figures 16-22**).[17]

It appears that emigration intentions are higher among respondents facing more mobility restrictions (i.e., lower Visa Restrictions scores). This result likely reflects the fact that countries that face mobility restrictions also have relatively poor macro-economic and institutional conditions. In other words, factors

Table 7: Top 3 most likely destinations, by country of origin

Origin Country	Most Likely Destinations
Algeria	France, Italy, Spain
Armenia	Russian Federation, France, United States
Azerbaijan	Turkey, Russian Federation, Georgia
Egypt	United Arab Emirates, Saudi Arabia, Kuwait
Georgia	United States, Russian Federation, Denmark, Germany
Israel	Afghanistan, Armenia, Algeria
Jordan*	United Arab Emirates, Saudi Arabia, United States
Lebanon	Australia, Canada, United States
Moldova	Russian Federation, Italy, Republic of Moldova
Morocco	France, Spain, Italy, Germany
Palestine	Saudi Arabia, Sweden, United Arab Emirates
Russia	Germany, Afghanistan, United States
Belarus	Russian Federation, Poland, Germany
Tunisia	France, Algeria, Canada
Ukraine	Germany, Russian Federation, Italy
Libya	Tunisia, Morocco, France

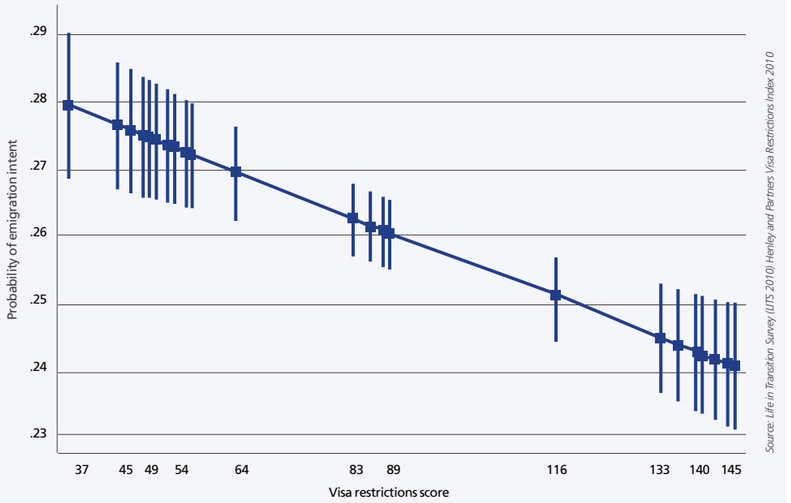
*Notes: Based on the number of respondents with emigration intentions, N=1,850. "Most Likely Destinations" refers to the top three most frequently stated destination in response to the question about to which country or countries potential emigrants would like to move. *The most frequent response for potential emigrants in Jordan was "Don't know" and the UAE was the second most frequent.*

Source: EU Neighborhood Barometer - Wave 4, Autumn 2013

16 Respondents with emigration intentions were asked about the country or countries where they intend to move (with up to 5 possible answers). In Table 7, we list the top three most frequently listed "ideal destinations" by country of origin. Respondents from the former Soviet Union tend to prefer Russia, while North Africans – France. 17 We excluded EB 79.2 and EB 75.1 from these sets of analyses because these surveys only inquire about intentions to move within the EU.

Figure 17

Willing to move for employment reasons - transition countries, adjusted predictions with 95% Confidence Intervals, by visa restrictions score



Note: The visa restriction scores for 2010 are as follows: Kosovo = 37, Mongolia = 45, Uzbekistan = 47, Albania = 49, Tajikistan = 50, Armenia & Azerbaijan=51, Bosnia and Herzegovina & Kyrgyzstan = 53, Kazakhstan = 54, Belarus & Georgia = 56, Moldova = 57, Ukraine = 64, Russia = 83, Montenegro = 86, Serbia = 88, FYROM = 89, Croatia = 116, Bulgaria = 133, Romania =136, Latvia = 139, Estonia & Lithuania = 140 ,Czech Republic & Hungary = 142, Slovakia & Slovenia = 144, Poland = 145.

Countries that face mobility restrictions also have relatively poor macro-economic and institutional conditions

related to mobility restrictions and the intentions to move likely drive the negative relationships presented in **Figures 16-22**. The results differ slightly based on region of origin.

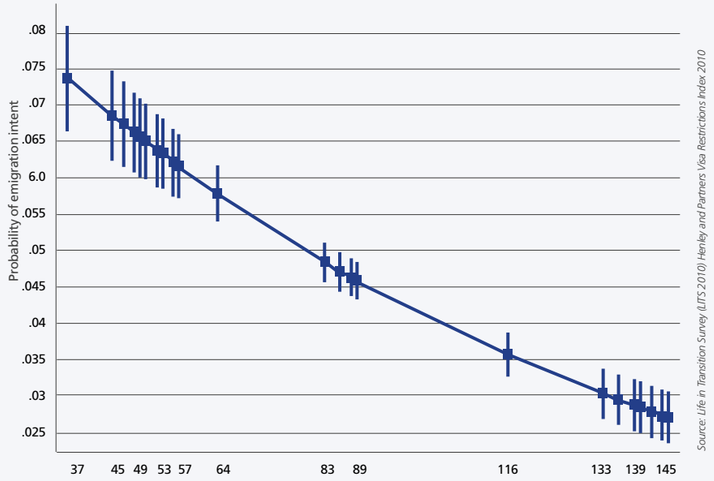
For example, in 2010, the difference in the conditional probability of reporting emigration intentions between the European country with the lowest score (Bulgaria=133) and the country with the highest score (Great Britain=166) was about 2 percentage points, which is relatively small (**Figure 16**).

Based on the LiTS sample, among transition economies in 2010 (**Figure 17**), the conditional probability of reporting intent to work abroad for respondents in the country with the lowest HVRI score (Kosovo) was about 28 percent, while for Poland, the country with the highest HVRI score – was about 24 percent. A similar pattern emerges when we consider concrete emigration intentions in the next 12 months, albeit with much lower predicted probabilities (**Figure 18**). Among the non-transition countries, Turkish respondents had the lowest (adjusted) probability of emigration intentions (about 19 percent), while those in the UK, Sweden, France, Italy, and Germany had probabilities of about 30 percent (**Figure 19**). The reverse trend holds when we look at concrete plans to move within the next year (**Figure 20**).

Furthermore, there is a large differential in the emigration probabilities among MENA country respondents – those coming from the most restricted societies (Palestine, Libya, and Lebanon) face conditional emigration intention probabilities of about 14-15 percent, while Israelis, who enjoy relatively high access to foreign countries, have a conditional probability of emigrating of about 5 percent, on average. Among the EaP countries, for the least restricted, the emigration intention probability is about 5 percent (Russia), while for those in Azerbaijan and Armenia (the most restricted), it is about 18 percent, which constitutes a 13 percentage point differential.

Figure 18

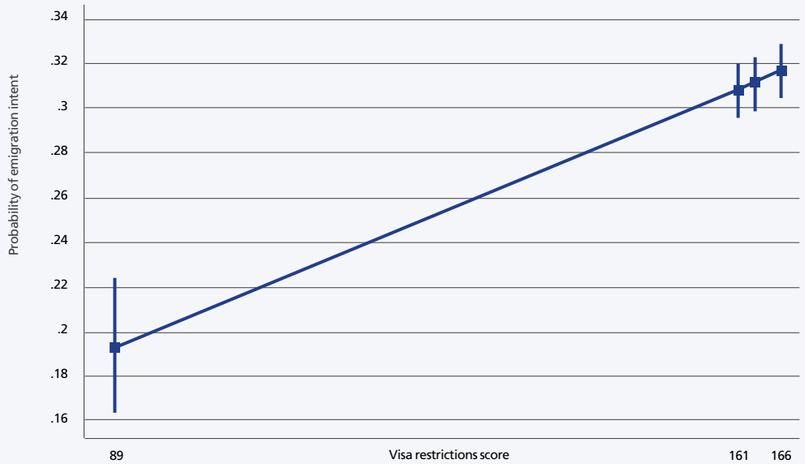
Intention to move abroad within the next 12 months, adjusted predictions with 95% Confidence Intervals, transition countries by visa restrictions score



Note: The visa restriction scores for 2010 are as follows: Kosovo = 37, Mongolia = 45, Uzbekistan = 47, Albania = 49, Tajikistan = 50, Armenia & Azerbaijan=51, Bosnia and Herzegovina & Kyrgyzstan = 53, Kazakhstan = 54, Belarus & Georgia = 56, Moldova = 57, Ukraine = 64, Russia = 83, Montenegro = 86, Serbia = 88, FYROM = 89, Croatia = 116, Bulgaria = 133, Romania =136, Latvia = 139, Estonia & Lithuania = 140, Czech Republic & Hungary = 142, Slovakia & Slovenia = 144, Poland = 145.

Figure 19

Willing to move for employment reasons - non-transition countries, adjusted predictions with 95% Confidence Intervals, by visa restrictions score



Source: Life in Transition Survey (LITS 2010) Henley and Partners Visa Restrictions Index 2010

Note: The visa restriction scores for 2010 are as follows: Turkey = 89, France, Germany & Italy = 161, Sweden = 163, UK = 166.

Figure 20

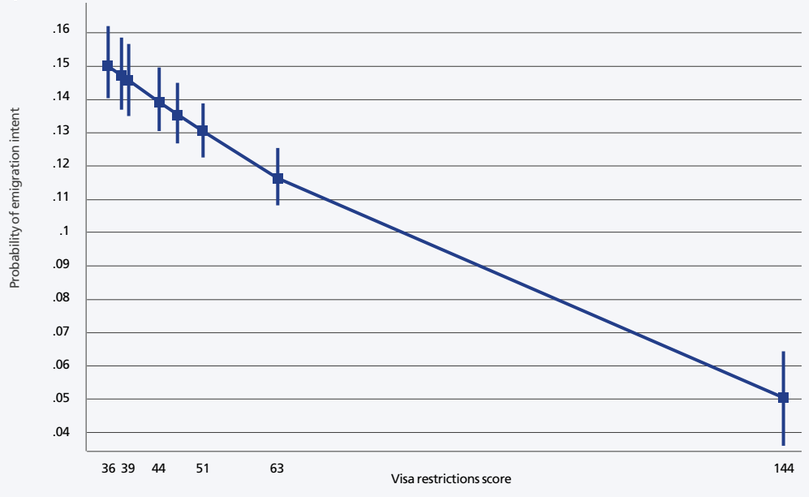
Intentions to move abroad within the next 12 months by education level, adjusted predictions with 95% Confidence Intervals, non-transition countries, by visa restrictions score

Source: Life in Transition Survey (LITS 2010) Henley and Partners Visa Restrictions Index 2010

Note: The visa restriction scores for 2010 are as follows: Turkey = 89, France, Germany & Italy = 161, Sweden = 163, UK = 166.

Figure 21

Likely to move abroad in the next two years, MENA countries, adjusted predictions with 95% Confidence Intervals, by visa restrictions score

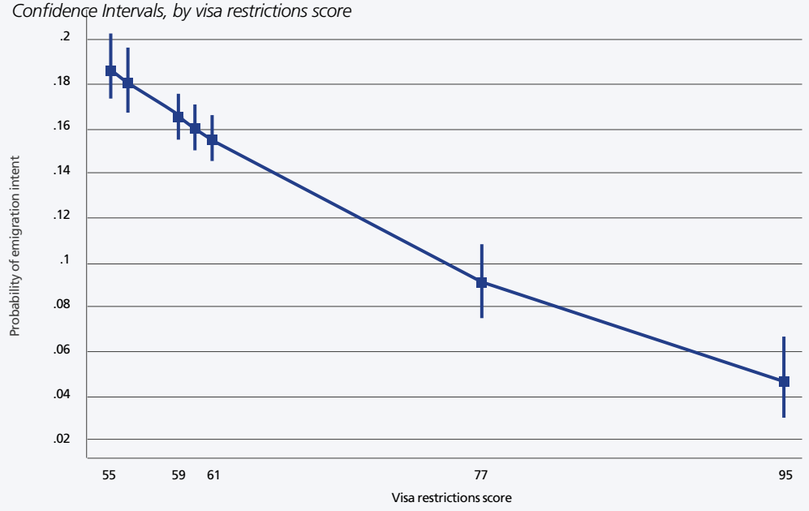


Source: EU Neighborhood Barometer Wave4, Autumn 2013/Henley and Partners Visa Restriction Index 2013

Note: The visa restriction scores for 2013 are as follows: Palestinian Territories = 36, Lebanon = 38, Libya = 39, Jordan =44, Algeria & Egypt = 47, Morocco = 51, Tunisia = 63, Israel = 144.

Figure 22

Likely to move abroad in the next two years, Eastern Partnership countries, adjusted predictions with 95% Confidence Intervals, by visa restrictions score

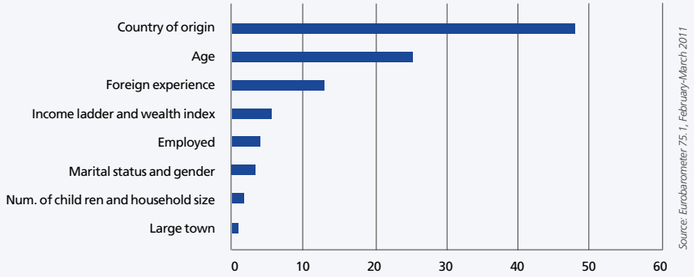


Source: EU Neighborhood Barometer Wave4, Autumn 2013/Henley and Partners Visa Restriction Index 2013

Note: The visa restriction scores for 2013 are as follows: Armenia = 55, Azerbaijan = 56, Moldova = 59, Georgia = 60, Belarus = 61, Ukraine = 77, Russia = 95.

Figure 23

Relative importance of factors for emigrantion intentions to work within the EU in the next 2-5 years, respondents with high education (% contribution to Pseudo R^2)



Notes: Shapley-based decomposition results; Pseudo R^2*= 0.180*

7. (HOW) DO PERCEPTIONS OF ECONOMIC, POLITICAL, AND INSTITUTIONAL CONDITIONS RELATE TO THE MIGRATION INTENTIONS OF TALENT?

Our results demonstrate that in general, being subjectively satisfied with personal and macro-economic circumstances lower the probability of wanting to move across international borders. Specifically, the EU evidence for 2013 indicates that having trust in the authorities lowers the predicted probability of planning to work within the EU by about 3 percent. Yet, perceptions of institutional and economic conditions did not affect the emigration aspirations among the six European non-transition countries polled in LiTS but respondents affected by the economic crisis were marginally more likely to want to go abroad. In transition countries, however, life dissatisfaction, lack of social trust, lack of trust in the government, and the economic crisis were correlated with employment migration considerations, and in some instances, with concrete emigration plans in the next year.

Potential Latin American emigrants were also less satisfied with their lives, had lower trust in government, and had little faith in the country's future economic situation, but had higher social trust, than non-migrants (Table 5). Finally, in both EaP and MENA states, unhappier respondents were more likely to want to move abroad in the next two years. Among EAP respondents, financial dissatisfaction, and dissatisfaction with democracy were also push factors, while for future emigrants in MENA, the country's present economic situation and optimism about the future economic situation seemed to matter (**Table 6**).

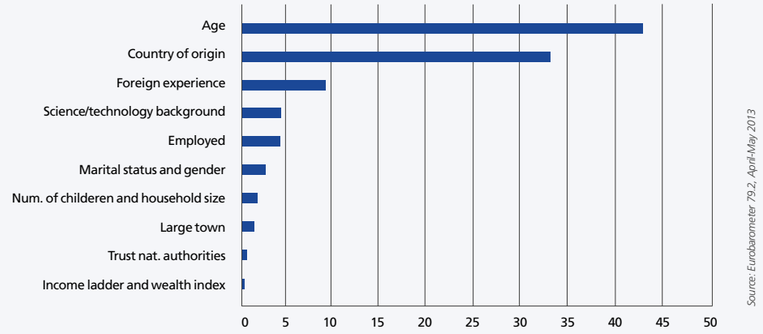
Next, we focus on the high skilled respondents and assess the relative importance of perceptions of socio-economic, political, and institutional conditions for moving aspirations. Due to data availability, we relied primarily on Latinobarometer, LiTS, and EU Neighborhood barometer surveys.[18,19] **Figures 23-32** demonstrate that across different regions, socio-demographic characteristics and country of origin are often among the biggest predictors of emigration intent. Migrant networks and past experience abroad are also powerful determinants. We find that household wealth and perceived income are generally unimportant for the emigration decision. Based on Eurobarometer data, for European respondents (**Figures 23-25**), country of origin, age, and foreign experience are the top most important factors.

Based on LiTS data (**Figures 26-29**), socio-economic characteristics, country of origin, and risk preferences dwarf

[18] Note that the results in Figures 23-32 cannot be compared across regions as the estimated models in different regions include a different number of variables and country indicators. [19] The only insight regarding within-EU migration comes from EB 79.2 (Figure 1), which shows that trust in national authorities explains about 0.5 percent of the emigration decision.

Figure 24

Relative importance of factors for emigration intentions to work within the next 2-5 years, respondents with high education (% contribution to Pseudo R^2)



Notes: Shapley-based decomposition results; Pseudo R^2*=0.209*

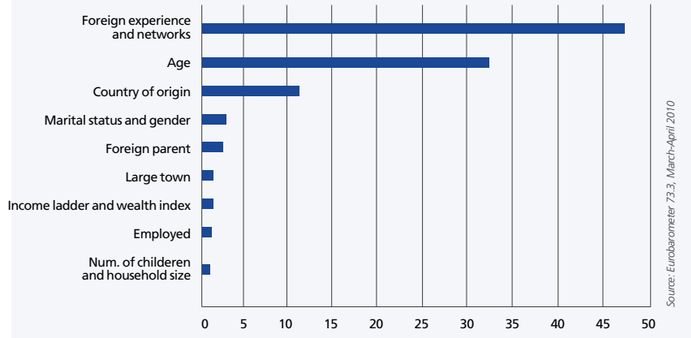
Socio-demographic characteristics and country of origin are often among the biggest predictors of emigration intent. Migrant networks and past experience abroad are also powerful determinants. We find that household wealth and perceived income are generally unimportant for the emigration decision.

the importance of other factors for both concrete emigration plans in the next year and intended labor migration in both transition and non-transition countries. Social and institutional trust seem to be generally more important for the emigration likelihood than the influence of the recent economic crisis. In transition countries, however, the economic crisis and trust were equally important for expressing concrete emigration desires in the next year (**Figure 28**).

In Latin America, being a victim of a crime is the third most important determinant of the decision to leave among the high-skilled, explaining 9 percent of the variation in potential emigration (**Figure 30**). Given the region's worrisome violence statistics (UNDP, 2013), crime appears to be a big push factor for potential Latin American emigrants. Perceptions about the country's

Figure 25

Relative importance of factors for emigrantion intentions to work within the next ten years, respondents with high education (% contribution to Pseudo R^2)



Notes: Shapley-based decomposition results; Pseudo R^2*=0.21907*

current and future economic situation are just as powerful push factors for the most educated Latin Americans– explaining 8 percent of emigration intentions. Perceptions of formal and informal institutions (trust in government and society) contribute about 5 percent and satisfaction with – another 1.6 percent – to emigration intentions.

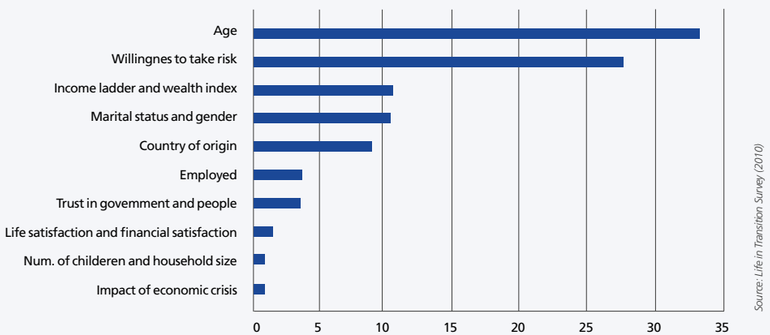
In the EaP and MENA countries, migration networks and having lived or worked in another EU country in the past year explain more than a quarter of the variation in emigration intentions. In the EaP countries, trust in government and satisfaction with democracy jointly account for a fifth of the variation in emigration intentions, with assessments of the current and future economic situations contributing another 5 percent. In the MENA region, perceptions about the political, economic, and institutional environment play a smaller role, jointly explaining about 3 percent in the overall emigration intentions.

Being subjectively satisfied with personal and macroeconomic circumstances lowers the probability of wanting to move across international borders

In transition countries life dissatisfaction, lack of social trust, lack of trust in the government, and the economic crisis were correlated with employment migration considerations, and in some instances, with concrete emigration plans in the next year

Figure 26

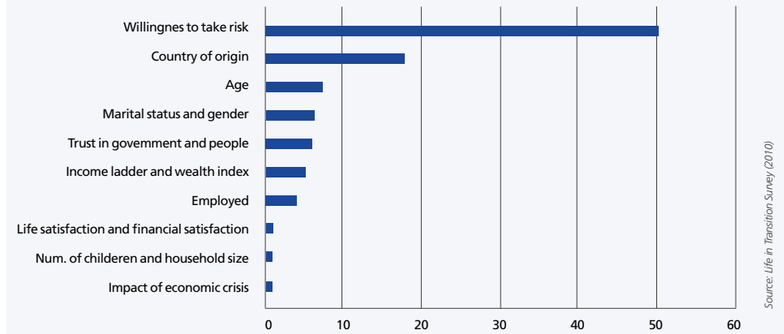
Relative importance for willingness to move for employment reasons, transition countries, respondents with high education (% contribution to Pseudo R^2)



Notes: Shapley-based decomposition results; Pseudo R^2*= 0.139*

Figure 27

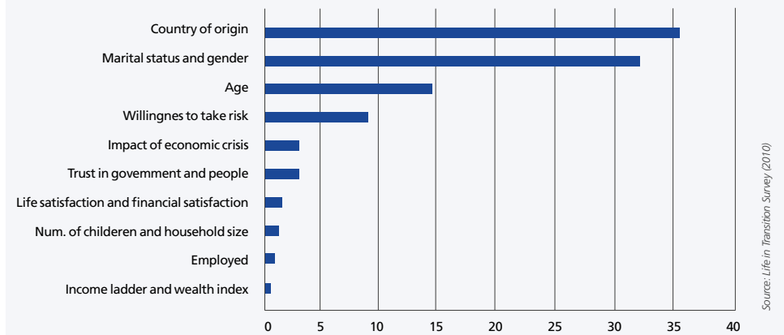
Relative importance for willingness to move for employment reasons, non-transition countries, respondents with high education (% contribution to Pseudo R^2)



Notes: Shapley-based decomposition results; Pseudo R^2*= 0.069*

Figure 28

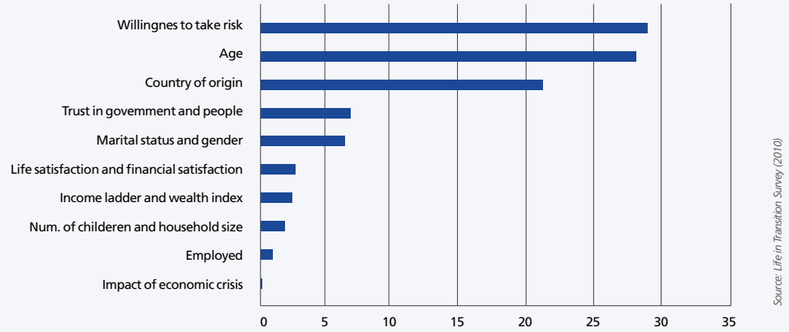
Relative importance of factors for intention to move abroad within the next 12 months, transition countries, respondents with high education (% contribution to Pseudo R^2)



Notes: Shapley-based decomposition results; Pseudo R^2*= 0.15491*

Figure 29

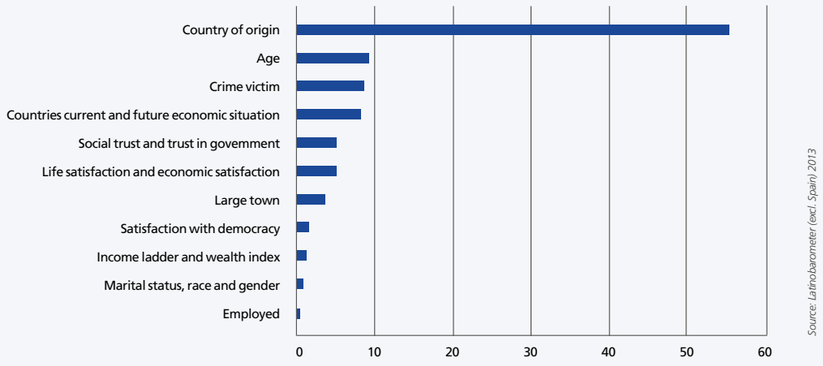
Relative importance of factors for intention to move abroad within the next 12 months, Non-transition countries, respondents with high education (% contribution to Pseudo R^2)



Notes: Shapley-based decomposition results; Pseudo R^2*= 0.090*

Figure 30

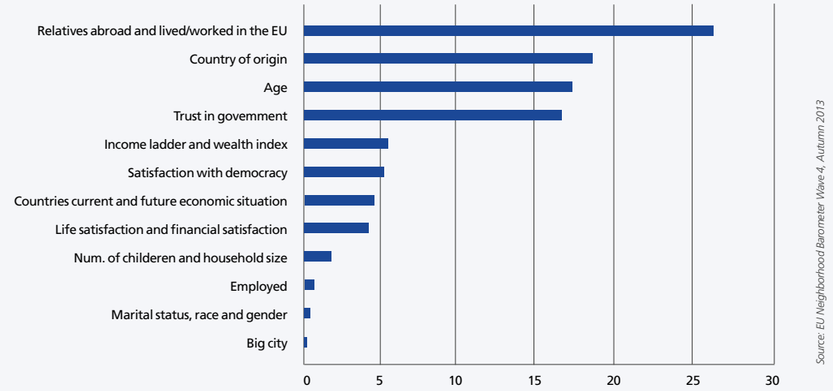
Relative importance of factors for emigration intentions, Latin America and the Caribbean, respondents with high education (% contribution to Pseudo R^2)



Notes: Shapley-based decomposition results; Pseudo R^2*= 0.079*

Figure 31

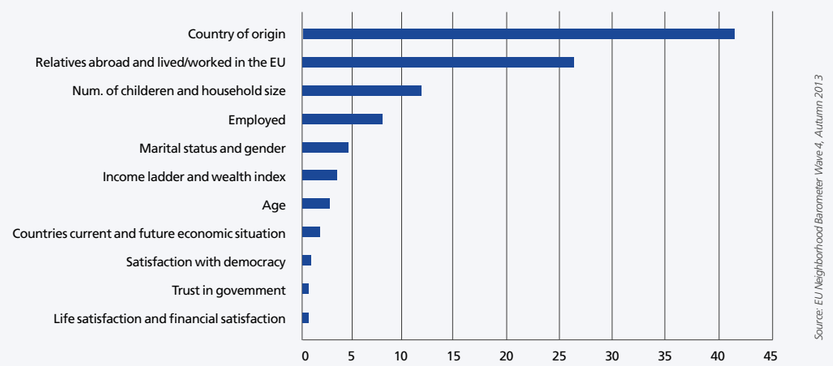
Relative importance of factors for intention to move to another country in the next 2 years, Eastern Partnership, respondents with high education (% contribution to Pseudo R^2)



Notes: Shapley-based decomposition results; Pseudo R^2*= 0.238*

Figure 32

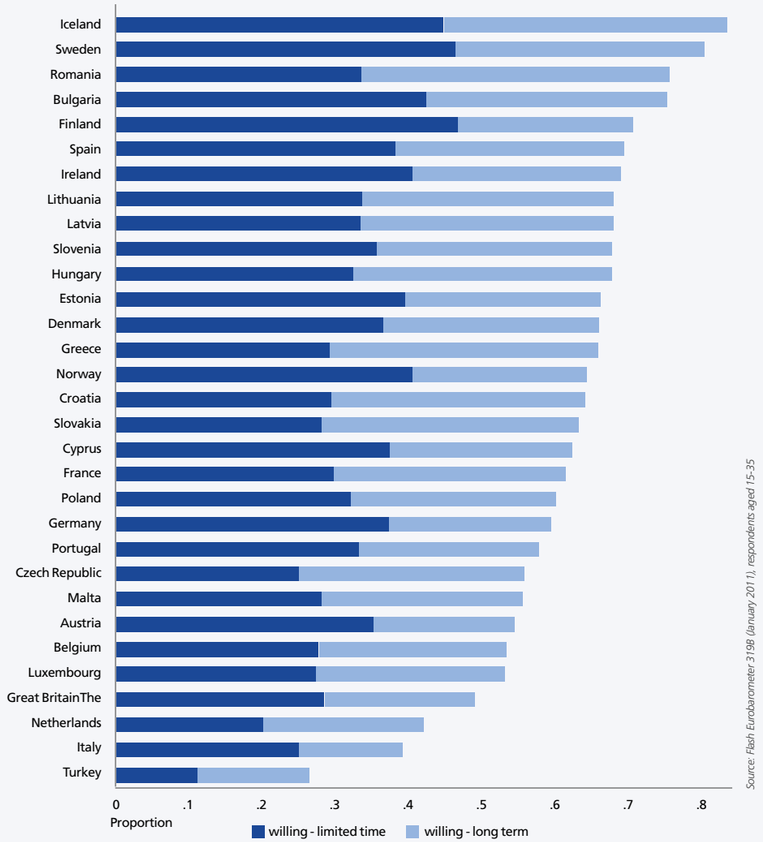
Relative importance of factors for intention to move to another country in the next 2 years, Middle East & North Afrika,, respondents with high education (% contribution to Pseudo R^2)



Notes: Shapley-based decomposition results; Pseudo R^2*= 0.190*

Figure 33

Proportion willing to work in another European country in the future all respondents aged 15-35, by country of interview and intended duration of stay abroad



Notes: N=28,728. See Table 1 for question wording.

Circular migration may be beneficial for both sending and receiving countries by filling labor and skill shortages in destinations and through remittances and the spread of ideas and technology in source countries

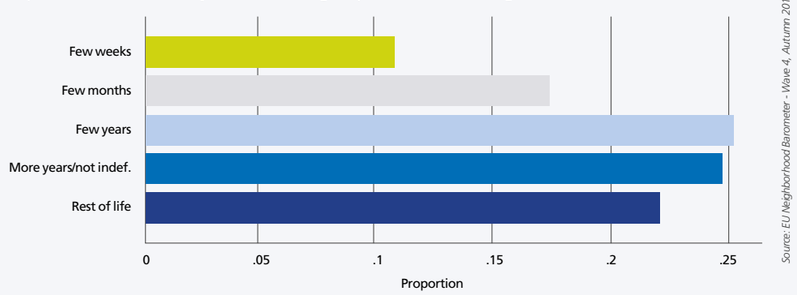
8. PERMANENT VS. TEMPORARY MIGRATION

As noted above, despite popular misconceptions, labor migration tends to comprise non-permanent moves from and back to the origin countries (Zimmermann, 2014). As such, circular migration may be beneficial for both sending and receiving countries by filling labor and skill shortages in destinations and through remittances and the spread of ideas and technology in source countries (Zimmermann, 2014).

Two of our data sources – Flash Eurobarometer 319B and the EU Neighborhood Barometer – furnish information on the intended duration of stay in the destination country. Flash EB 319B polled young respondents aged 15-35 to better understand youth mobility, education and training, employment and entrepreneurship. About three out of five young Europeans (62 percent) expressed willingness to work in another EU country in the future. Among all respondents, a third wanted to work in the EU for a limited time, and 29 percent planned to work within in the EU within the long term. **Figure 33** shows that in 2011, the top sending countries of potential young emigrants were Iceland (86 percent) and Sweden (80 percent), but followed by Bulgaria and Romania (75 percent each), which were then most recent EU members.[20] With a few exceptions, most potential emigrants were likely to be temporary or equally likely to be temporary and permanent.

Figure 34

Expected duration of stay abroad among respondents with emigration intentions



In addition, the EU Neighborhood barometer asked those with emigration plans about their intended duration of stay (**Figure 34**). Being the EU's closest neighbors, the emigration potential from the EaP and MENA countries is important for the EU, especially in terms of alleviating problems related to skill shortages and population aging. Among those with emigration intent, only about a fifth intend to emigrate permanently, while about half plan to stay for a few years, suggesting the temporary nature of the emigration intention. According to Danzer and Dietz (2014), temporary EaP migrants are negatively selected on education, with the least educated preferring Russia as a destination. EaP migrants heading to the EU are generally more educated and have prepared for the move with language skills and qualifications.

9. TRENDS IN POTENTIAL EMIGRATION AND THE ECONOMIC CRISIS

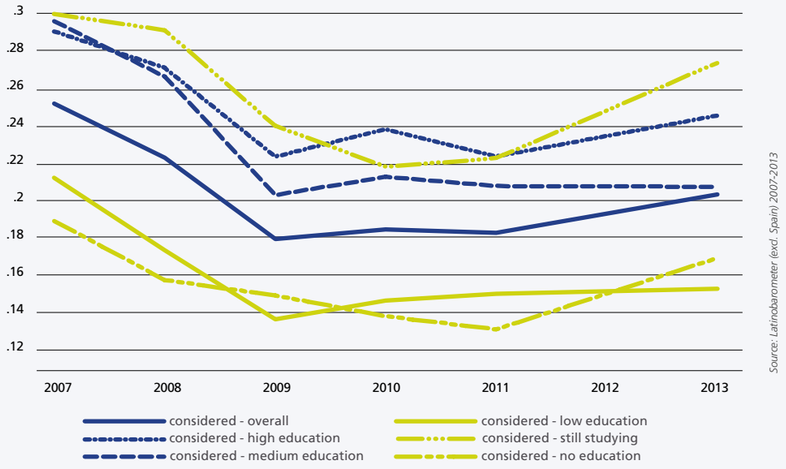
Since our analysis period encompasses the aftermath of the recent financial crisis, we consider the possible effects that the global economic downturn might have had on potential and actual emigration. The evidence suggests that the crisis resulted in more migration restrictions coupled with a declines in the actual emigration (Tilly, 2011). That said, the economic crisis and the bleak employment prospects abroad did not discourage all potential migrants, as the evidence from Ireland (Cairns, 2014) and Serbia (Santric-Milicevic et al., 2015) suggests, among others. In fact, emigration may have been a response to the bleak employment prospects in Romania, for example (Andren & Roman, 2014).

The emigration potential from the EaP and MENA countries is important for the EU, especially in terms of alleviating problems related to skill shortages and population aging

20 Croatia joined the EU on July 1, 2013.

Figure 35

Respondent and family ever seriously considered living abroad, by education and year of interview



Source: Latinobarometer (excl. Spain) 2007-2013

Notes: N=118,583 for the overall sample for all years. N=19,509 for 2007; N=19,459 for 2008; N=19,878 for 2009; N=19,825 for 2011; N=19,904 for 2013. See Table 1 for question wording.

Historically, unemployment in the source country pushes emigration, while unemployment at the destination has constrained it, with the receiving country's conditions dominating the effect

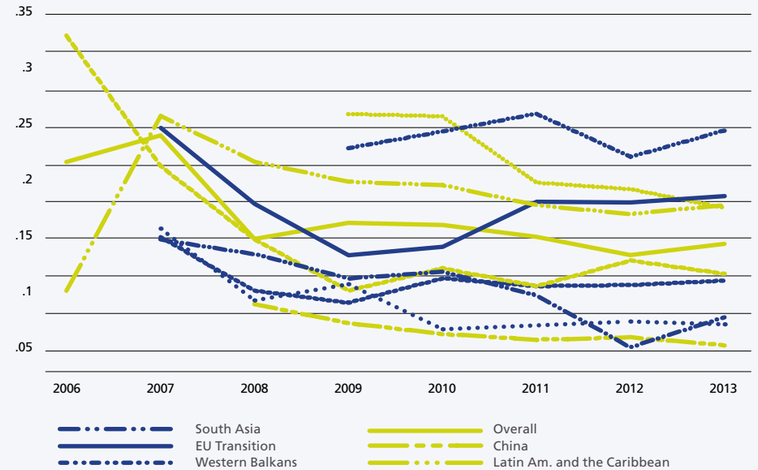
In this section, we furnish descriptive evidence about whether emigration intentions are stable over time and whether the recent economic crisis and its uneven recovery influenced the inclination to move. Historically, unemployment in the source country pushes emigration, while unemployment at the destination has constrained it, with the receiving country's conditions dominating the effect (Hatton & Williamson, 2009). Tilly (2011) shows evidence of reduced migration flows due to the recent recession. Given this observation, we also expect that the probability of reporting emigration intentions decreased during the crisis.

First, to glean insight into whether migration intentions vary over time and specifically before and after the global economic crisis, which began in 2008, we relied on data from Latinobarometer, Waves 2007-2013.[21] Between 2007 and 2013, about a fifth of the interviewees stated that they and their families seriously considered going to live abroad. It is evident from the solid line in **Figure 35** that intentions declined from about 25 percentin 2007 to about 18 percent in 2009 and have risen only slightly after that to about 20 percent in 2013. It is possible that the economic crisis and its consequences in traditional migrant-receiving countries such as Spain, Portugal, and the United States worsened the employment prospects and decreased the willingness to move abroad. Whether the crisis had a lasting impact on the emigration intentions of respondents in the region remains an open question. **Figure 35** also reveals that intentions to emigrate declined between 2007-2013 and failed to recover to their 2007 levels among all education groups. Emigration consideration among high-skilled respondents declined by 7 percent points between 2007 and 2009, and

21 We excluded earlier waves as they lack information on whether the respondent is a citizen of the country of interview or not.

Figure 36

Willingness to move to an advanced country, by world region



Source: N=871, 625. Authors' calculations based on Gallup World Poll Data reported in Nikolova and Graham (2011), Table A.1

Notes: The figure shows the proportion of respondents reporting migration intentions based on all available observations but excluding immigrants. Note that China is also included in this figure. CIS=Commonwealth of independent states. Intention question: Ideally, if you had the opportunity, would you move permanently to another country or would you continue living in this country?

then kept increasing and decreasing slightly until 2013. Note also that respondents who are still studying saw the steepest increase in their emigration intentions between 2011 and 2013 likely because by being in school and investing in their human capital, they were likely better able to weather the negative employment consequences of the economic crisis.

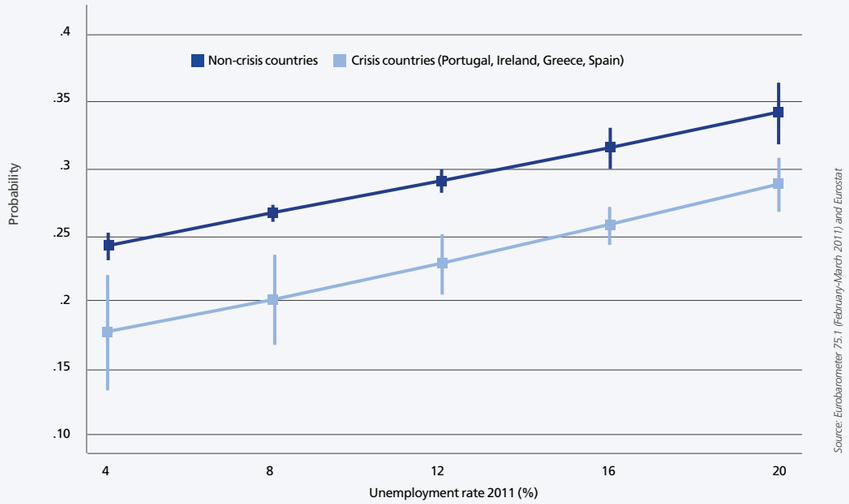
Second, the LiTS survey also allowed us to empirically test whether respondents affected by the economic crisis were more or less likely to express emigration intentions. As **Table 4** suggests, respondents hit by the economic slump were 2.7 percent points more willing to work abroad and 1.1 percent points more likely to emigrate in the next year. In non-transition countries, respondents affected by the crisis were 2.5 percent points more likely to want to work abroad and equally likely to have concrete emigration plans for the upcoming year.

Third, Nikolova and Graham (2015) provide emigration intentions averages from the Gallup World Poll for potential emigrants from developing and transition regions with intentions to move permanently to advanced countries.[22] Specifically for Latin America, similar percentages of respondents report emigration aspirations as in Latinobarometer, and Figure 36 demonstrates that the proportion of those expressing permanent emigration desires declined from about 0.25 in 2007 to about 0.19 in 2012, recovering only

22 Note that the conclusions based on the Nikolova and Graham's data are only generalizable to their analysis sample but are nevertheless suggestive.

Figure 37

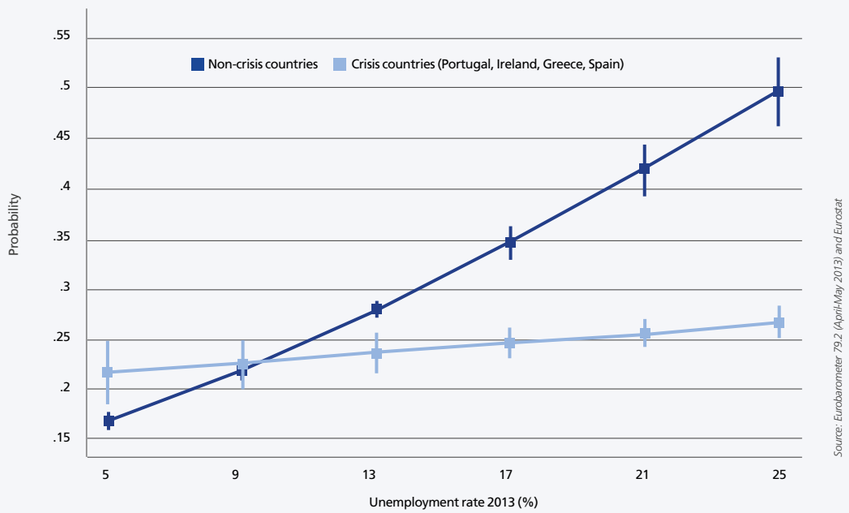
Emigration intentions to another EU country, adjusted predictions with 95% Confidence Intervals, by crisis vs. non-crisis countries and unemployment rate



Source: Eurobarometer 75.1 (February-March 2011) and Eurostat

Figure 38

Emigration intentions to another EU country, adjusted predictions with 95% Confidence Intervals by crisis vs. non-crisis countries and unemployment rate



Source: Eurobarometer 79.2 (April-May 2013) and Eurostat

slightly to 0.20 in 2013. In most developing and transition regions, the proportion wanting to emigrate dipped during the crisis years and has continued to decline in Africa, Middle East and North Africa, China, and South Asia. Interestingly, despite having acquired the opportunity to travel and work abroad within the EU, the EU-transition respondents also decreased their moving aspirations and even in 2013, only 20 percent expressed intentions to emigrate compared to 25 percent in 2007 (**Figure 36**). While the eastern EU enlargements increased the mobility of the EU-10 countries, the economic crisis may have resulted in a slowdown of migration flows from these regions (Zaiceva & Zimmermann, 2012).

Fourth, we examined whether home-country employment conditions as influenced the intention to move, especially for the countries that the recent economic crisis hit the hardest, namely, Portugal, Ireland, Greece, and Spain (PIGS).[23] In 2011, the unemployment rate for the PIGS countries was about 8.9, and about 16.7 for the non-PIGS states, with Austria at 4.6 percent and Spain at 21.4 percent. Meanwhile, the proportions of respondents reporting emigration intent was roughly similar for the crisis (26.6 percent) and non-crisis nations (27 percent). **Figure 37** shows that the predicted probabilities of emigration to another EU country in 2011 increased with the unemployment rate for both PIGS and non-PIGS states, yet non-PIGS countries have higher emigration probabilities at all unemployment levels.

In 2013, the actual unemployment rate was about 9.5 percent in the non-PIGS countries to 20.8 percent in the PIGS, ranging from 5.4 percent in Austria to 27.5 percent in Greece. The unconditional probability of reporting emigration intent was higher in the crisis countries – at 28 percent, and was 23 percent in the non-crisis countries. Regarding the adjusted emigration probabilities, at low unemployment levels, respondents in the crisis countries were more eager to report emigration intentions though the reverse was true at high levels of unemployment (**Figure 38**).

23 These analyses exclude Northern Ireland due to unemployment data unavailability.

In summary, the presented evidence suggests that emigration intentions decreased during the economic crisis in Latin America and other developing and transition regions worldwide. The Latin American data suggest that since 2011, respondents who were still pursuing their education were in fact more likely to consider moving abroad in the future. Yet, high unemployment rates in the home country were positively associated with emigration desires, and to a larger extent among respondents in the non-crisis countries. The causal impact of the economic crisis is difficult to establish, as mobility intentions are influenced by both personal and economic factors.

Regarding the adjusted emigration probabilities, at low unemployment levels, respondents in the crisis countries were more eager to report emigration intentions though the reverse was true at high levels of unemployment

As vacancies abroad increase, the number of potential emigrants willing to move to that particular destination increases

10. DO EMIGRATION INTENTIONS RESPOND TO SKILL SHORTAGES?

Labor or skill shortages pose serious challenges for firms and economies in all of the EU member states and beyond. Labor shortages increase the hiring costs for the firms and may thus have negative consequences for overall growth (OECD, 2015).

While labor shortages are difficult to measure, they could be approximated using the number of vacancies or the number of unemployed persons per job vacancy. Yet, the first measure may be far from ideal as unfilled job vacancies may simply be reflective of poor working conditions or inadequate labor market institutions. The second measure, the number of vacancies per unemployed person, may be imperfect as it assumes that the unemployed have the skills required to do the vacant jobs while in fact vacancies might be caused by technological change requiring skills not yet available. In this chapter, we assume that skill shortages are "genuine," i.e., job vacancies persist despite good working conditions. Immigration, both temporary and permanent, might help mitigate skill shortage problems in destination countries.

We furnish suggestive evidence related to whether migrants move to countries where their skills and experiences are needed. Only one of our data sources, namely the European Neighborhood Barometer, provided information about the desired destinations (up to five responses were possible) to which respondents would like to move. As in Colussi (2015) we merged these data with OECD-provided data on vacancies in the five years preceding the survey year (i.e., 2008-2012).[24]

Our dependent variable is the number of respondents who would like to move to a particular destination, among the destinations with job vacancy data. Our focal independent variable is the average vacancies in the desired destination over the past five years divided by the average population in the desired destinations in the past five years. We log-transformed both of these variables for ease of interpretation. **Table 8** provides information about the destination countries and the vacancy rates.

Table 9 shows the regression results for emigration intentions as a function of skill shortages, whereby in Model (1), we have a bi-variate regression, in Model (2), we add country of origin controls, and in Model (3), we add key variables from the EU Neighborhood Survey for the sub-sample of respondents who would like to move to the desired OECD destinations. All variables are now at the country level and are defined in terms of shares. We add controls for the share of respondents with the highest educational attainment, the share of life and financially satisfied, the share who trust the government, and others. Our results seem to suggest that as vacancies increase, the number of potential emigrants willing to move to that particular destination increases. Specifically, a 1 percent increase in the destination-country vacancies (as a share of the total population) corresponds to about a 0.4 percent increase in the number potential emigrants. While these results are mostly descriptive and should be interpreted with caution, they are suggestive of an overall pattern that potential emigrants from the Eastern Partnership countries may consider skill shortages when selecting a potential destination.

While skilled migration is often seen as unjust as it may benefit receiving countries at the expense of sending countries, note that it is also possible to design policies which are beneficial for both sets of countries without necessarily restricting labor mobility (Clemens, 2015). For example, in the Global Skill Partnership proposed by Clemens (2015), migrant- sending and destination countries decide in advance on the costs and benefits of skilled migration; for instance, origin countries train skilled professionals with the assistance of destination-countries governments thus gaining increases in human capital and the transfer of technology and know-how. At the same time, the destinations benefit from cost savings in training and filling skill shortages. Given that potential emigrants seem to consider destination-countries skill shortages in their decision, streamlining and facilitating the process of whether these skilled migrants go and linking skill creation with skill mobility and skill utilization might be a win-win-win situation for immigrants, and sending and destination countries.

Table 8: Skill shortages, by destination country

Destination country	Average number of job vacancies (2008-2012) in 1,000s	Average population (2008-2012) in 1,000s	Ratio between the job vacancies and population
Australia	170.94	22,052.35	0.0077517
Austria	30.62	8,372.30	0.0036574
Czech Republic	57.51	10,469.53	0.0054935
Finland	32.69	5,350.95	0.0061094
Germany	398.57	81,923.56	0.0048652
Hungary	48.83	10,001.67	0.0048823
Norway	22.94	4,860.16	0.0047192
Poland	49.13	38,297.43	0.0012828
Portugal	16.25	10,599.42	0.0015333
Sweden	41.22	9,335.68	0.0044152
Switzerland	16.23	7,781.19	0.0020862
United Kingdom	499.83	62,117.24	0.0080466
United States	3,166.82	308,104.40	0.0102784

Notes: based on the merged sub-sample of the EU neighborhood barometer data and the destination countries information available in the OECD data. The data exclude Luxembourg as no respondents in the EU neighborhood noted that they would like to move there.

Source: OECD Data on Vacancies, Seasonally Adjusted (2008-2012)

Table 9: OLS Regression, Emigration Intent and Skill Shortages

VARIABLES	(1)	(2)	(3)
Log (Vacancy/ Population)	0.410**	0.414*	0.397*
	(0.201)	(0.223)	(0.214)
Controls	No	No	Yes
Country Dummies	No	Yes	No
Observations	94	94	94
R^2	0.050	0.124	0.103

Notes: OLS regressions, robust standard errors in parentheses. The dependent variable in all regressions is the number of respondents in each source country that expressed emigration intention to one of the countries for which data on job vacancies was available in the OECD dataset. The log (Vacancy/Population) variable refers to the log of the share of job vacancies divided by the population in the destination countries in the past 5 years preceding the survey (i.e., 2008-2013). The destinations include: Australia, Austria, Czech Republic, Finland, Germany, Hungary, Norway, Poland, Portugal, Sweden, Switzerland, UK, and the US. Luxembourg is excluded as no respondents in the EU Neighborhood barometer stated that they would like to emigrate there. The source countries exclude Egypt as no respondents expressed intent to move to any of the above-mentioned destinations. Model (1) is a bi-variate regression, model (2) includes source-country dummy variables; and model (3) includes the share of high skilled, average wealth index, life satisfaction, financial satisfaction, trust in government, relatives abroad, past experiences abroad, assessment of the country's current and future situation, and satisfaction with democracy. All variables are at the country of interview level for the matched sub-sample.

Source: Sub-sample of Potential Emigrants from EU Neighborhood Barometer (Wave 4) matched with OECD Data on Vacancies, Seasonally Adjusted (2008-2012)

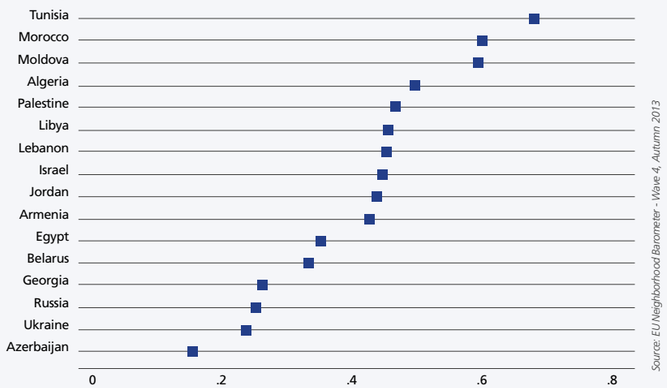
24 Data were available for only several destination countries, namely Australia, Austria, Czech Republic, Finland, Germany, Hungary, Norway, Poland, Portugal, Sweden, Switzerland, United Kingdom, and the United States. Luxembourg is excluded from this analysis as no respondent expressed intention to move there. Moreover, Egypt is excluded from the list of source countries as no respondents wanted to move to a destination country with available data in the OECD job vacancy database.

VI. Illegal migration

Illegal migration has recently been a highly-debated issue in OECD countries and beyond. The plight of many asylum seekers and other migrants who venture off to cross the Mediterranean on a dangerous, and often, deadly journey, has shaken the international community in recent months. With predicted record-high death tolls in the Mediterranean in 2015, policymakers in Europe and beyond are at imminent pressure for designing and implementing policies to address this global challenge.

Figure 39

Percent heard or read recently about illegal migrants crossing Mediterranean, by country of interview



Notes: N=14,543.

While we lack data on potential illegal emigrants, we shed some information based on EaP and MENA respondents' awareness about the issue. **Figure 39** illustrates the proportion of respondents who recently heard or read about illegal migrants trying to reach European countries. About 60 -70 of those interviewed in Tunisia, Morocco, and Moldova answered that they were recently exposed to the topic of illegal immigration. Unsurprisingly, illegal immigration seems to be a highly visible issue in all Mediterranean countries, including Algeria, Palestinian Territories, Libya, Lebanon, Israel, Jordan, while there is relatively less knowledge about unlawful border crossing of the Mediterranean among respondents in some of the former Soviet states (i.e., Georgia, Russia, Ukraine and Azerbaijan).

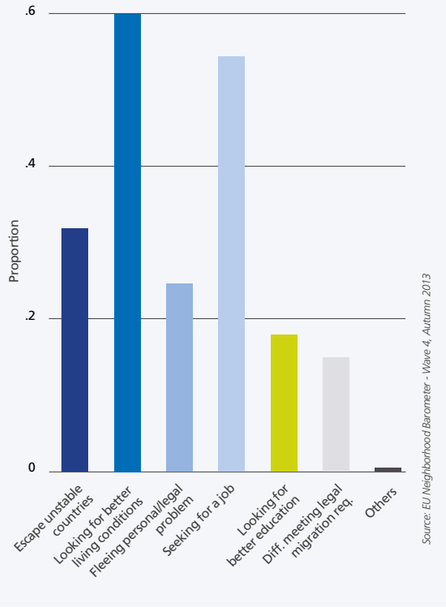
Respondents who knew about illegal migration in the Mediterranean thought that the main reason for that was the attempt to find better living conditions abroad (60 percent), followed by employment reasons (approx. 55 percent). About a third pointed out trying to escape from unstable countries was the main motivation, which is plausible in light of recent civil wars and political instabilities in MENA countries and beyond. Considerably less important are educational reasons and difficulties in meeting legal migration requirements (less than 20 percent).

VII. Conclusions and policy implications

The economic consequences of international migration have received much attention from labor economists, policymakers, and the media. Immigrants are often blamed for disproportionately drawing on host countries' social welfare and healthcare systems, depressing the wages and taking the jobs of natives, eroding social trust, and others (Hanson, 2009). At the same time, Western countries are often competing with one another to attract and retain high-skilled immigrants, who are generally perceived as engines of growth and innovation. A relevant question in this debate then becomes: what will move talent across international borders?

Figure 40

Main reasons why migrants are trying to illegally reach European countries



This chapter investigates the emigration intentions among individuals in several world regions which represent different levels of economic development (see **Maps 1- 4**). While the proportion of people who want to leave their home country varies across regions and different skill groups, several unifying themes emerge. First, respondents with the highest education levels and those who are currently pursuing their education appear to be the most mobile groups. From receiving countries' point of view, the influx of young talented foreigners may be beneficial for addressing problems related to population aging and labor shortages. From the point of view of the sending nations, ethical issues aside, obstructing the emigration of talent may be neither feasible nor effective. Realistically, learning about the emigration decisions, especially for those currently in school, may help arrange migration policies that encourage brain circulation or, at a minimum, engage diasporas abroad.

Second, we find that having lived abroad in the past and having networks of family and friends abroad are robust determinants of emigration intentions. Transnational networks provide information about job opportunities to future emigrants and information about human resources and a reliable pool of workers to employers in the receiving countries (Zimmermann, 2014). Learning more about these networks and better engaging them can be beneficial to sending countries (e.g., to encourage return migration and brain circulation) and receiving nations (e.g., to reduce illegal migration or prevent visa overstays).
Third, we also find that perceptions of politico-economic and institutional conditions matter for migration decisions. In particular, poor economic conditions, crime, and lack of trust in institutions motivate talented individuals from developing and transition countries to seek seek better lives abroad. As in other studies, we find that potential emigrants tend to have lower than average life satisfaction despite being educated and having higher than average material well-being. Given that life satisfaction and perceived well-being are linked with positive externalities such as increased productivity, creativity, and health (De Neve, Diener, Tay, & Xuereb, 2013), policymakers in destination countries may want to put a particular focus on well-being when designing or implementing policies and programs for newly arrived immigrants.

Fourth, citizens of countries with less freedom of movement express relatively higher emigration aspirations, compared with respondents living in countries with fewer travel restrictions. While not causal, this finding is reflective of the fact that countries which have the greatest travel restrictions are also the ones with the poorest macro-economic and institutional performances, and which respondents are trying to leave. Yet our result highlights the importance of migration policies and restrictions.

Fifth, we show evidence from the EU Neighborhood barometer and Eurobarometer (conducted for young respondents aged 15-35) that most potential emigrants were likely to be temporary. Therefore, those who go abroad to work can help alleviate skill shortages in the destination countries and help disseminate novel ideas and technology in their home countries upon return.

Sixth, we also document some changes in migration patterns which could have been associated with the recent economic crisis. We show that emigration intentions declined during the crisis, were lower among the European countries hit hardest by the economic crisis (Portugal, Ireland, Greece, and Spain). Finally, this chapter shows some preliminary results suggestive of an overall pattern that potential emigrants from the Eastern Partnership countries may consider skill shortages when selecting a potential destination. Given that migration presents substantial development opportunities for both sending and receiving countries, our results can inform proactive migration policies for global decision makers.

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1.3 Labor Market Imbalances, Skills and Immigration: Do Immigrants Move to Where Their Labor is Needed?

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The final study of Chapter 1 shifts attention to the analysis of worker mobility in response to labor market imbalances. Simple economic reasoning suggests that immigrants should be more responsive to changes in skill or labor imbalances than natives, given that immigrants have already borne the costs of leaving their home and social network and should thus be more willing to respond to economic incentives. This reasoning should be particularly true for those immigrants who have not yet amalgamated with their new milieu.

Labor Market Imbalances, Skills and Immigration:

Do Immigrants Move to Where Their Labor is Needed?

I. Introduction

In the economic literature immigration is seen as a way to improve the flexibility of the labor market, facilitating its adjustment to shifts in employment demand between sectors of the economy, demographic shocks on the supply side or other external influences (see e.g. Kahanec and Zimmermann 2016, or Ritzen and Zimmermann 2014). Labor mobility can be low in segmented labor markets with barriers to mobility between submarkets, which results in slower adjustment to structural shocks, leading to the contemporaneous presence of skill shortages and unemployment. When immigrants fill jobs that have been vacant due to skill shortages or when immigrants move out of sectors suffering negative economic shocks to take up jobs in booming sectors, they facilitate the adjustment of the economy to structural shocks.

Migration costs faced by workers born in the EU may be substantial and prevent people to move across regions. Slow labor market adjustment can lead to significant economic costs. These include the costs of foregone production due to vacant positions, unemployment and loss of earnings, the social costs of unemployment benefits and other indirect costs. According to Lucifora and Origo (2002), these costs, including short- and long-term as well as direct ▸

Immigrants are more responsive to wage differentials in the labor market than natives

and indirect components, were in the range of 6.9 – 7.1% of GDP across selected EU countries in 1999. Bennet and McGuinness (2009) find that hard-to-fill and unfilled vacancies are related to substantially lower firm productivity. Moreover, skill gaps contribute to skill mismatch in filling vacancies, with both under- and over-skilling lowering labor productivity (Tang and Wang 2005, Quintini 2011). With many unfilled high-skilled positions, an economy performs below its potential in terms of innovation. Furthermore, skill shortages can lead to a broadening of wage differentials across sectors and skills, with wages for sought-after skills rising and wages for skills in excess supply dropping (Neugart and Schömann 2002). This can contribute to rising inequalities between the wages of skilled and unskilled workers (Lucifora and Origo 2002).

Wage differentials

Empirical findings suggest that immigrants are more responsive to wage differentials in the labor market than natives. This is found by Borjas (2011) for the US and by Dustmann, Frattini and Preston (2012) for the UK. Guzi et al (2014, 2015) find this result for the EU15. From the theoretical point of view, Borjas (2001) proposes that this could be explained by the fact that new immigrants, after having decided to part with their home country and actually leaving it, have already incurred a significant part of costs of mobility. This part of migration costs does not influence their future location decisions within the destination labor market. At the same time, the costs of mobility within the domestic labor market influence the decisions of the native employees or of earlier immigrants.

Labor shortages

The responsiveness of immigrants and natives to labor shortages may vary across a number of dimensions. Anderson and Ruhs (2011) argue that the elasticity of labor supply to wages can vary across different workers, sectors and occupations, depending on contextual labor market characteristics such as the actual size and skill composition of labor supply and demand, the time needed for the retraining of the local labor supply, or the social status of the jobs advertised. These contextual factors are shaped by local economic, institutional and policy contexts. Guzi et al. (2014, 2015) show that such institutional, economic and policy factors indeed play role for immigrants' relative responsiveness to labor market imbalances in the EU15.

In addition, immigrants' characteristics may play a role.Migration policies of several countries treat high- and low-skilled immigrants differently, based on the argument that high-skilled immigrants are more beneficial for receiving countries' labor markets (Kahanec and Zimmermann, 2010). High- and low-skilled immigrants may also differ in their responsiveness to labor market imbalances. Whereas skill-specificity may disproportionally tie up high-skilled immigrants in their countries, sectors, or occupations, mobility of their low-skilled counterparts may be more strongly hampered by lack of resources to cover the pecuniary costs of migration.

On this basis, two questions, important for both our understanding of the role of skills for immigrants' labor market fluidity and for implications for migration and integration policies, emerge. Firstly, are low- and high-skilled immigrants similarly responsive to labor shortages, vis-à-vis the natives, in EU labor markets? Secondly, how do low- and high-skilled immigrants differ across the local economic, institutional and policy contexts in terms of their responsiveness to labor market imbalances?

Methodology

We address these questions by investigating the labor markets of the EU15, using data mainly from the EU Labor Force Survey (EU-LFS) and the EU Statistics on Income and Living Conditions (EU-SILC). The Member States that have joined the EU in 2004, 2007 and 2013 are not included in the analysis, due to the relatively more limited inflow of immigrants into these countries (Kahanec and Zaiceva, 2009). In this chapter we build on the approach of Guzi et al. (2014, 2015) who are the first to measure the responsiveness to labor shortages of immigrants relative to natives in the EU-15. The new element in the study is that we distinguish between the low- and high-skilled immigrants' and their responsiveness to labor market imbalances. We further contribute to the policy debate by investigating the labor market fluidity of low- and high-skilled immigrants across economic, institutional and policy contexts.
In particular we investigate if the mobility of immigrants differs between countries at different level of GDP, the unemployment rate, the generosity of welfare spending, immigrant integration programs, openness to admitting immigrant workers and the scale of recent immigration on high- and low-skilled immigrants'.

The study is structured as follows. Firstly, we introduce a theoretical framework to foster the understanding of location decisions by natives and immigrants. Secondly, we develop a measure of labor and skill shortages, and describe the estimation strategy to identify the average responsiveness of low- and high-skilled immigrants to labor shortages as compared to natives. Thirdly, we show how immigrants' responsiveness to labor shortages varies by economic, institutional and policy contexts. Finally, we discuss and interpret the results and the ensuing policy implications.

Skill shortages can lead to a broadening of wage differentials across sectors and skills, with wages for sought-after skills rising and wages for skills in excess supply dropping. This can contribute to rising inequalities between the wages of skilled and unskilled workers.

Country-specific migration costs due to institutional, legal or employment policyrelated barriers to labor market entry and mobility of non-EU15 immigrant workers may differ for low- and high skilled workers

II. Theoretical framework

The theoretical framework of this chapter is based on the model first presented by Borjas (2001). As detailed in Textbox A1 in the Appendix, the basic intuition of the model is that whereas native workers face costs of parting with their initial location, networks, and economic and social relationships, which increases their costs of mobility, immigrants do not face such costs, having arrived to the destination only recently. For them, such costs are sunk[1] and it costs them little more to choose one place as the destination over another.

Following this argument, new immigrants are the most sensitive to wage differentials. The more time passes from initial immigration, the more similar the decisions of migrants become compared to those of natives, due to the gradually increasing attachment to the location and skill-industry group of employment.

In addition, mobility costs of migrants may differ across economic, policy and institutional contexts. These country-specific migration costs due to institutional, legal or employment policy-related barriers to labor market entry and mobility of non-EU15 immigrant workers may differ for low- and high-skilled workers. They encompass mobility costs due to restrictions stipulated in work or residence permits, and more generally relate to barriers to geographic or job mobility due to foreign (non-EU15) citizenship, education, training, work experience or other similar factors. These costs depend on the economic, institutional and policy variables specific to the given EU15 cou ntry's contexts. They are lowered by policies that are also used to facilitate mobility within the EU, such as the transferability of residence and work rights and qualifications, or transferability of rights to social services. The costs are lowered even further if these policies also concern family members.[2] Lower costs of immigrants' mobility should then increase the responsiveness of immigrants to wage differentials and can thus contribute to labor market flexibility. Immigration policy can contribute to labor market flexibility if, upon entry, it imposes a less restrictive regime on immigrants regarding their geographical or job mobility and improve the transferability of their rights.

Clearly, new immigrants are the most sensitive to wage differentials. The more time passes from initial immigration, the more similar the decisions of migrants becomes to compared to those of natives, due to the gradually increasing attachment to the location and skill-industry group of employment.

This theoretical framework illustrates how immigration can facilitate the adjustment of labor markets after temporary or structural shocks, thereby contributing to economic efficiency. This is how immigration can be seen as grease to labor market wheels. This desirable impact of immigration may fade away with the assimilation of immigrants into local environments (as their costs of parting with their current positions may become more similar to that of the natives) but it may also increase, if this reduces mobility barriers stemming from foreign citizenship, education, training, work experience or similar factors. On the other hand, it can be impeded by policies that restrict geographical or job mobility directly or indirectly linked to immigrant status. This is how the economic, institutional and policy context can have a role in determining how responsive low- and high-skilled immigrants are to labor market imbalances as compared to natives. The empirical analysis can shed light on the extent of a country's influence on how immigration can reduce labor market imbalances and contribute to its flexibility.

1 Clearly, when it comes to intra-EU mobility, natives are also concerned by the transferability of rights to social services or any other policy restrictions that are due to policies affecting for example the transferability of qualifications. Still, such costs are typically higher for immigrants than for natives. and this is why the assumption of this model on mobility-related costs is not restrictive. 2 On the process of integration of immigrants into the destination economies, see Constant, Gataullina and Zimmermann (2009) and de Palo, Faini and Venturini (2006).

III. Empirical strategy

3.1 MEASURING LABOR SHORTAGES AND IMMIGRANT-NATIVE RELATIVE SUPPLY

The empirical strategy is adapted from Borjas (2001) and Guzi et al. (2014, 2015). Following Borjas (2001), there are two key variables in our baseline model: labor shortage and the relative labor supply of immigrants and natives across countries and occupation-industry groups. Similarly to Borjas (2001), we estimate labor shortages at the level of occupation-industry-country cells as the part of wages that remains unexplained after differences in the composition of workers across cells are netted out (See Textbox A2 in the Appendix).

New immigrants are the most sensitive to wage differentials

The second key variable in the analysis is the measure of relative supply of migrants and natives in each occupation-industry-country cell. The index is distinguished by skill and expressed by the ratio of immigrants belonging to a given occupation-industry group in a given country and year, and the total number of immigrants in the EU15 in a given group, relative to similarly defined relative supply of natives in the particular skill, occupation-industry-country cell and year (See Textbox A2 for details). The index equals 1 when immigrants and native workers belonging to the same occupation-industry group have the same geographic distribution. The index would be greater than one if immigrants in a given occupation-industry group were overrepresented in the country, and it equals 0 if no immigrants are present in a particular occupation-industry-country group.

3.2 THE BASELINE SPECIFICATION

To measure the relative responsiveness of immigrants to changes in the labor market we adopt a first-difference regression model as follows:

$$\Delta Z^{s}_{kct} = \beta_1 \Delta \gamma_{kct-1} + \delta_k + \delta_c + \delta_t + \mu_{kct}, \quad (1)$$

where the first-differenced wage index $\Delta \gamma_{kct}$, our measure of shortage, is lagged by one year, as the reaction of workers to changes in the labor market is likely to be delayed. The dependent variable is the relative supply of immigrants Z^{s}_{kct} that is defined separately for low- and high-skilled immigrants. The model also includes skill group, country and year fixed effects $(\delta_k, \delta_c \text{ and } \delta_t)$, which control for any specific factors that might change the relative supply of immigrants. In addition

The more time passes from initial immigration, the more similar the decisions of migrants becomes to those of natives

we augment the model with the lagged values of country-level unemployment rate and GDP growth to account for variation in economic conditions between countries and over time. We estimate this model using the Ordinary Least Squares method and every observation is weighted by the total number of individuals in the cell.

A word of caution is due here: our measure of labor shortage captures any increase in the price of labor that cannot be explained by changing composition of workers in terms of gender, education, and work experience in the given occupation-industry-country cell. Whereas first differences and skill group, country and year fixed effects control for a range of additional factors specific to these categories, there still may be changes in residual wages that need not reflect increased shortage of labor in the given group or country, but are rather due to changing wage bargaining or other factors that change the price of labor beyond the variation captured by the compositional and fixed effects. Whereas this observation introduces measurement error in the link between measured and actual labor shortages, it does not affect our results linking immigrants' and natives' mobility in response to changing residual wages (whether due to shortages or other factors).

3.3. THE ECONOMIC, INSTITUTIONAL AND POLICY DETERMINANTS OF SKILLED IMMIGRANTS' RESPONSIVENESS TO LABOR SHORTAGES

The baseline model (1) can be augmented to account for the influence of economic, institutional and policy contexts on the relative responsiveness of low- and high-skilled immigrants to labor shortages as compared to the natives. This can be implemented in the following way: $\Delta Z^{g}_{kct} = \beta_1 \Delta \gamma_{kct-1} + \beta_2 \Delta \gamma_{kct-1} \theta_{ct-1} + \beta_3 \theta_{ct-1} + \delta_k + \delta_c + \delta_t + \mu_{kct}$, (2) where θ_{ct} is a dummy variable indicating the presence of a certain type of economic, institutional and policy context in country c and year t. When the underlying contextual information used to calculate this dummy variable is continuous, such as in the case of the share of total social expenditure in GDP, the value of θ_{ct} is obtained by setting θ_{ct} =1 for countries above the median value for all countries and zero otherwise. Thus, for the case of social expenditure, θ_{ct} equals 1 for countries that are among the more generous welfare states.

In regression model (2), an interaction term is included, to capture the fact that the responsiveness of immigrants to labor shortages can differ by country contexts. The overall impact of a change in labor shortage leads to a change in the relative supply of immigrants of $\beta_1+\beta_2\ \theta_{ct}$. To illustrate this, if θ_{ct} measures the generosity of social spending, β_1 is the effect of labor shortages on the relative supply of immigrants in countries with welfare spending below the median level across the EU15 countries, and $\beta_1+\beta_2$ equals the effect of labor shortages on the relative supply of immigrants in countries with welfare spending above the median level across EU15 countries.

IV. Data and sample characteristics

The empirical part of this study draws from representative samples

of households in 15 EU member states[5] obtained from the European Union Labour Force Survey (EU-LFS) and EU-Statistics on Income and Living Conditions (EU-SILC). The national statistical offices of each member country organize these surveys in harmonized methodology. Both datasets include information on respondents' personal circumstances (including nationality and country of birth), their labor market status and job characteristics during a reference period. The sampling structure of the surveys focuses strongly on permanent residents and therefore does not capture short-term and seasonal migration. The main advantage of EU-LFS is its large sample size but the downside is the missing information on the income status of households. The information on income is complemented from the EU-SILC database (particularly in the estimation of equation 1). The terms 'immigrant population' or 'immigrant individuals' are used in the broad context of immigration, and the origin of immigrants is based on the country of birth. One exception is Germany, for which immigrant origin can be determined only by nationality. The EU-LFS allows us to distinguish two immigrant groups consistently in all years: immigrants born in EU15 countries and those born outside the EU15. Native population comprises people residing in the country

On average, relative to the native population the immigrants from non-EU15 are younger while EU15 immigrants are older and the difference is more pronounced for the low-skilled group.

5 The sample includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.

The distribution of immigrants across countries is very diverse in terms of their education and origin background

of birth. In the chapter we distinguish individuals by the highest qualification achieved and distinguish low-skilled (with less than tertiary education) from high-skilled individuals (with tertiary education).[6]

The empirical analysis uses the sample of individuals aged 15 to 64 and observed during the period 2004–2012. **Table 1** compares the characteristics of EU15 and non-EU15 immigrants in the EU15 member states with the native population. The group of low-skilled comprises individuals with less than tertiary education; individuals with tertiary education form the high-skilled group. The results show that, on average, relative to the native population the immigrants from non-EU15 are younger while EU15 immigrants are older and the difference is more pronounced for the low-skilled group. The share of women is balanced across groups with the exception of highly educated women from outside EU15. A comparison of education characteristics reveals that the group of EU15 immigrants is the most educated with 28% of tertiary educated (compared to 23% of natives). The group of non-EU15 immigrants has the highest share of people with primary education (42%) and the lowest number of tertiary educated (21%). Finally, the data show that around 14% of immigrants from outside the EU15 arrive from countries that joined the EU in the 2004 and 2007 enlargements (so called "New Member States").

Table 1

	Low-Skilled			High-skilled		
	Native	**EU15**	**non EU15**	**Native**	**EU15**	**non EU15**
Share in the population	68	1.69	7.34	20.32	0.66	1.99
Age	39.65	42.24	37.16	40.83	41.06	39.45
Share of female	0.50	0.50	0.51	0.50	0.51	0.53
Share with primary education	0.34	0.35	0.42	n/a	n/a	n/a
Share with secondary education	0.43	0.37	0.37	n/a	n/a	n/a
Share with tertiary education	n/a	n/a	n/a	0.23	0.28	0.21
Share of migrants from NMS	n/a	n/a	0.14	n/a	n/a	0.13

Note: Figures are based on samples of EU15 countries over 2004-2012 period.

Source: EU-LFS 2004-2012

6 The variable 'highest qualification achieved' is coded in each country according to the International Standard Classification of Education (ISCED). The use of this classification may lead to difficulties in cross-country comparisons if ISCED does not adequately reflect the educational system of all countries.

Table 2: The distribution of population by skill and origin

	Low-Skilled			High-skilled		
	Native	**EU15**	**non EU15**	**Native**	**EU15**	**non EU15**
AT	70.3	1.9	12.3	12.7	0.9	1.9
BE	61.4	3.8	6.6	24.5	1.6	2.1
DE	69.5	2.2	6.4	20.2	0.5	1.2
DK	66.3	0.9	4.7	25.6	0.7	1.8
ES	61.1	1.2	10.8	23.5	0.8	2.6
FI	66.9	0.8	2.0	29.3	0.3	0.6
FR	65.9	2.4	6.8	22.1	0.6	2.2
GR	72.4	0.4	7.3	18.7	0.2	1.0
IE	62.3	3.7	4.3	23.8	2.6	3.2
IT	80.2	0.8	6.9	11.1	0.2	0.8
LU	45.5	22.6	5.2	11.3	12.4	3.2
NL	63.2	1.4	8.3	24.1	0.7	2.4
PT	80.7	1.1	5.2	11.3	0.4	1.2
SE	61.7	2.5	8.4	22.8	1.1	3.5
UK	61.9	1.4	7.3	24.8	0.9	3.7

Note: See notes to Table 1.

Source: EU-LFS 2004-2012

The distribution of immigrants across countries is very diverse in terms of their education and origin background. **Table 2** shows that Luxembourg has the highest share of foreigners (close to 45%) in the population of 15-64 years old and Finland has the lowest share (less than 4%). Other countries accommodate between 8 to 17% immigrants. Countries differ largely by the prevalence of immigrants by their origin. Belgium and Ireland accommodate most immigrants from EU-15 while Finland, Greece and Italy attract the least of them. The immigrants from non EU-15 comprise relative large groups in Austria and Spain. When looking at the skill composition of immigrants, Luxembourg together with Ireland, Sweden and the United Kingdom have the highest share of high skilled immigrants in the population. In contrary, Luxembourg, Austria and Spain accommodate relatively the highest share of low-skilled immigrants

We further demonstrate the differences in working conditions faced by immigrant workers of different origin and qualification. The set of indicators measuring standard labor market outcomes are constructed: labor force participation; unemployment and self-employment. Thereafter, the quality of employment is assessed in terms of over-education (downskilling into occupations

below one's qualification); low-skill employment; type of contract (temporary vs. permanent); part-time employment and the intensity of on-the-job search behavior. Figures in Table 3 document that the working conditions of native and immigrant workers from EU15 countries are on average very similar. One difference, although very small, is the one in labor market participation rates (relative to native workforce, low-skilled EU15 immigrants have higher participation rates, and high-skilled EU15 workers have lower participation). The high-skilled EU15 immigrants also work in jobs better matched to their qualifications and have a higher propensity to engage in self-employment activities.

The participation rate of low-skilled non-EU immigrants is equal to the native workforce but the rate of high skilled individuals is visibly lower.[7] However, the group of non-EU15 exhibits the highest unemployment rate. Particularly vulnerable to unemployment are high-skilled non-EU15 immigrants with an average unemployment rate more than two times higher relative compared to their native-born counterparts. The self-employment rates are very comparable across groups and skills. This result is somewhat unexpected because the literature describes self-employment as a preferred alternative for

Table 3: Labor market outcomes and working conditions

	Low-Skilled			High-skilled		
	Native	**EU15**	**non EU15**	**Native**	**EU15**	**non EU15**
Participation rate	0.68	0.70	0.68	0.88	0.85	0.81
Unemployment rate	0.09	0.09	0.17	0.04	0.05	0.11
Self-employment	0.14	0.14	0.11	0.15	0.17	0.14
Over-education	0.06	0.05	0.15	0.42	0.39	0.55
Low-skill job	0.11	0.16	0.28	0.01	0.01	0.09
Temporary contract	0.14	0.13	0.23	0.12	0.13	0.20
Part time job	0.22	0.23	0.23	0.17	0.19	0.20
On-the-job search	0.04	0.04	0.08	0.05	0.06	0.08

Source: EU-LFS 2004-2012

Note: Statistics are weighted by design weights. The variables characterizing working conditions are calculated from the sample of employed individuals. Low-skilled includes individuals with less than tertiary education; high-skilled are those with tertiary education.

7 The sample includes more than 7million individuals so even minor differences are evaluated to be statistically significant. The participation rate is higher by 0.3 percentage points in favor of low-skilled non-EU15 immigrants relative to natives (t-stat equals to 2.83) and the participation of high-skill natives is by 6.8 points higher relative to high-skilled non-EU-15 immigrants (t-stat equals to 43).

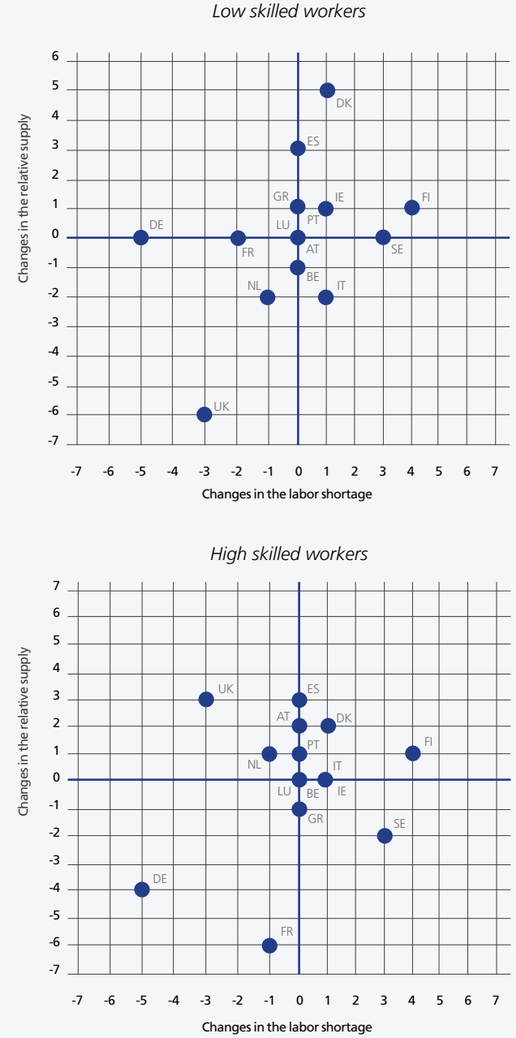
On average every second high-skilled immigrant from non-EU15 origin is employed in job below his qualification

immigrants, particularly during the periods of economic downturn.

Table 3 further compares the quality of jobs and working conditions between natives and immigrant groups. The non-EU15 immigrants have higher incidence of working on a temporary contract, in part-time jobs, and being over-education. Particularly striking is the proportion of high-skilled non-EU15 immigrants employed in elementary low-skilled occupations (9%), when this situation essentially does not occur in other groups. Furthermore, on average every second high-skilled immigrant from non-EU15 origin is employed in a job below his qualification. Finally, we calculate the share of individuals who look for another job when they have a job. The high share of on-the-job searches among non-EU15 immigrants may point to their disappointment with the current employment situation but also to the higher likelihood of job-to-job moves.

This descriptive evidence points to a favorable position of EU15 immigrants in the European labor market. This group is on average older and includes more tertiary educated individuals. The working conditions of this group are highly comparable to the native-born workforce. In contrast, immigrants from

Figure 1: The responsiveness of EU-15 immigrants to labor shortage



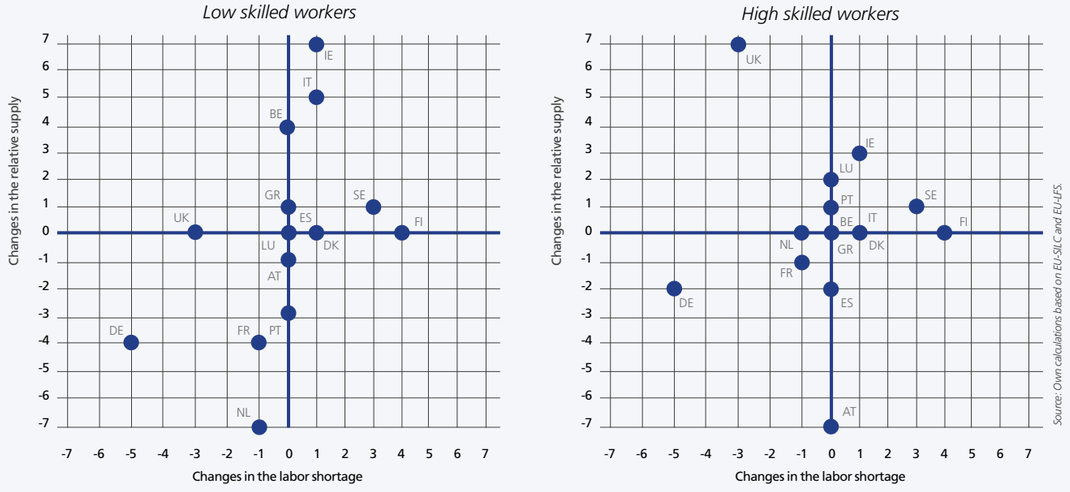
Note: The changes of countries ranking between 2012 and 2004 over the underlying variables

outside the EU15 hold rather unstable and less skilled jobs and are prone to unemployment. Specifically, they work in jobs under their qualification and also exhibit high intense job search behavior. The later finding suggests that immigrants are mobile and responsive to changes in the labor market.

Figures 1 and 2 offer a first glimpse of how immigrants of different origin and skills respond to labor market imbalances. Specifically, the figures address the question whether a change in labor shortages in a country between 2004 and 2012 is correlated with a corresponding change in the share of low- and high-skilled immigrants in the country. For the sake of exposition, we rank EU15 countries by the average values over skill-industry groups of the two underlying variables. The changes of countries' ranking between 2012 and 2004 then provide a tentative support of immigrants' response to labor shortages in the light of model (5).

Figure 1 (for EU-15 immigrants) and in Figure 2 (for non EU-15 immigrants) provide evidence of a higher responsiveness of immigrants, relative to the natives, to labor shortages. Most countries fall in the north-east and south-west quadrants, indicating a positive correlation between (especially low-skilled) immigrants' relative supply and labor shortages as measured by wage residuals. As an example, Ireland moved up (relative to other countries) in both labor shortage and low-skilled immigrant' supply, whereas the rank of the Netherlands decreased in labor shortage and low-skilled immigrant' supply.

Figure 2: The responsiveness of non-EU-15 immigrants to labor shortage



Note: The changes of countries ranking between 2012 and 2004 over the underlying variables

V. Results

5.1 THE BASELINE MODEL

Formal analysis of immigrants' responsiveness to labor shortages as outlined in section 3 confirms the insights from Figures 1 and 2. The positive estimates obtained for labor shortage in the baseline model in Table 4 indicate that the relative supply of immigrants rose in cases where the also premium rose. In particular, non-EU-15 immigrants respond to shortages more fluidly than the natives (Column 2 and 5), whereas we cannot reject the hypothesis that EU-15 immigrants in the statistical sense behave similarly to the natives (Column 1 and 4). In columns 3 and 6, we treat EU-15 as one entity and study the relative responsiveness of nonEU-15 immigrants to labor shortages vis-à-vis the EU-born group (i.e. natives and EU-15 immigrants combined).[8] As one could expect, the results confirm that if we neglect mobility of EU-15 citizens across EU-15 member states, the measured responsiveness of non-EU-15 immigrants vis-à-vis the natives is higher (columns 2 and 5) than in the case where EU-15 migrants' mobility counts towards natives' mobility (columns 3 and 6). However, the differences are very small and statistically insignificant.[9]

In the next step, we replicate the analysis distinguishing low- and high-skilled workers. The measure of labor shortage is the same as above, but the relative supply of immigrants is calculated separately for low- and high-skilled workers (see Textbox A2 in the Appendix for details). Results in Table 5 show that the higher responsiveness of immigrants from non-EU15 countries to labor shortages, relative to natives, emerges in the low-skilled segment of the labor market. The estimated effects of labor shortage for high-skilled non-EU-15 immigrants, as well as both skill groups of intra EU-15 immigrants, are statistically not

Table 4: Baseline model

	EU-15 MS (1)	non EU-15 MS (2)		non EU-15 MS+ EU-15 (3)		EU-15 MS (4)		non EU-15 MS (5)		non EU-15 MS+ EU-15 (6)	
Labor shortage	0.098	0.3	***	0.29	***	0.12		0.302	***	0.291	***
	(0.122)	(0.089)		(0.088)		(0.116)		(0.089)		(0.088)	
GDP growth						0.014	*	0.019	***	0.019	***
						(0.008)		(0.005)		(0.005)	
Unemployment rate						0.003		-0.011	***	-0.011	***
						(0.006)		(0.004)		(0.004)	
R2	0.013	0.034		0.035		0.013		0.045		0.045	
N	2937	2937		2937		2937		2937		2937	

Source: Own calculations based on EU-SILC, EU-LFS, and WDI data.

*Notes: The dependent variable is the supply of immigrants relative to natives in the particular occupation-industry-country group expressed in first difference. MS stands for "member state", referring to the level of definition of natives. The labor shortage for the same group is also expressed in first difference. All variables are lagged and models include cell, year and country fixed effects. All regressions are weighted by the number of observations for the skill-industry-country group in year t. Standard errors are in parentheses, *,**,*** identify significance at 10, 5, 1 per cent levels, respectively.*

8 This scenario is compatible with Borjas (2001) who uses the group of US-born as a reference. 9 We also performed a similar analysis in which we controlled for within-cell (industry-skill) correlation (clustered errors terms). Whereas this increased standard errors, our results for non-EU-15 immigrants retained significance at 5% level. Results are available from authors upon request. 10 We also performed a similar analysis in which we controlled for within-cell (industry-skill) correlation (clustered errors terms). Whereas this increased standard errors, our results for low-skilled non-EU-15 immigrants retained significance at 5% level.

Table 5: The relative responsiveness of low- and high-skilled immigrants to labor shortage

Skill	Low-Skilled						High-skilled					
Immigrants	**EU-15**		**non EU-15**		**non EU-15**		**EU-15**		**non EU-15**		**non EU-15**	
Natives	**MS (1)**		**MS (2)**		**MS+ EU15 (3)**		**MS (4)**		**MS (5)**		**MS+ EU15 (6)**	
Labor shortage	0.055		0.346	***	0.336	***	0.207		0.04		0.016	
	(0.128)		(0.099)		(0.098)		(0.369)		(0.168)		(0.157)	
GDP growth	0.017	**	0.009		0.009		0.019		0.026	***	0.024	***
	(0.008)		(0.006)		(0.006)		(0.022)		(0.009)		(0.008)	
Unemployment rate	0.006		-0.017	***	-0.017	***	0.002		0		-0.001	
	(0.006)		(0.005)		(0.005)		(0.016)		(0.007)		(0.006)	
R2	0.008		0.047		0.048		0.089		0.013		0.012	
N	2882		2882		2882		1864		1864		1864	

Source: Own calculations based on EU-SILC, EU-LFS, and WDI data.

Notes: The dependent variable is the supply of (low-/high-skilled) immigrants relative to (low-/high-skilled) natives in the particular occupation-industry-country group expressed in first difference. See also notes Table 4.

Non-EU15 immigrants respond to labor shortages more fluidly than the natives

different from zero, meaning that these groups responds to labor shortages similarly to the corresponding natives.

The results thus document that low-skilled immigrants (from outside the EU-15) are more mobile than their native counterparts and the mobility of high-skilled workers does not differ between immigrants and natives. It has to be noted at this point that this comparison is within high-skilled and low-skilled groups, and tells little about the relative responsiveness of high- and low-skilled immigrants. An important question that remains to be answered is therefore whether high-skilled immigrants are less or more responsive to labor shortages than low skilled immigrants.

In Table 6 we therefore replicate the analysis by comparing low- and high-skilled workers of the same origin. The dependent variable is the relative supply of high-skilled workers, taking the group of their low-skilled counterparts as the reference. Our estimates imply that there is no statistically significant difference between the responsiveness of high-skilled and low skilled workers in the case of natives and non-EU-15 immigrants. However, among EU-15 immigrants, high-skilled workers are more mobile relative to low-skilled ones.

One important concern about the interpretation of our results is the direction of causality, for example, in a situation when the inflow of immigrants affects wages in the local market. The specification of our model includes lagged variables to partly mitigate this problem. In addition, Dustmann et al. (2012) argue that if immigrants increase the relative supply of labor in a given skill group, this should cause wages to decrease for that group and therefore the estimated coefficients can be interpreted as a lower bound. We interpret our results along these lines.

5.2 IMMIGRANTS' RESPONSIVENESS UNDER DIFFERENT ECONOMIC CONTEXTS

The theoretical considerations discussed above and detailed in the Appendix offer no definite predictions whether immigrants should be expected to be relatively more fluid than natives. In the preceding section, we showed that the estimated effects are statistically significant 23 particularly for non-EU-15 immigrants, which suggests that the lock-in effect outweighs the costs attributable to institutional or policy-related barriers. The theoretical model also implies that institutions and policies lowering the costs of adjustment, requalification, or occupational mobility should, in general, increase workers' responsiveness to skill shortages, although lock in effects may set in with the time spent in one destination. In this section, we evaluate the impact of countries' economic conditions, institutions and policies on immigrants' responsiveness to labor shortages.

Institutions and policies lowering the costs of adjustment, requalification, or occupational mobility should, in general, increase workers' responsiveness to skill shortages

We first explore how immigrants' responsiveness to labor shortages varies across various economic and institutional conditions. We estimate four separate models based on equation (2) with dummy variables indicating whether a country has an above- median level of (i) GDP level, (ii) unemployment rate, (iii) share of total social expenditures (SOCX) in GDP, (iv) employment protection index (EPL), (v) union density and (vi) collective agreements coverage in the studied period (θ_{ct}=1; zero otherwise). This way we rather pick up long-term differentials between the countries rather than short-term variation in these variables. Table A1 in the Appendix illustrates the partition of countries according to these variables and shows that economic and institutional conditions in the EU15 are diverse and that each of these variables picks unique dimensions of their development.

Our results, reported in Table 7, confirm those from the previous section, as the effect of labor shortage

is positive and significant for low-skilled non-EU15 immigrants in all cases. It turns out that in some models the coefficient becomes significantly positive also for EU15 immigrants. Estimates obtained for high-skill immigrants indicate that this group is equally responsive to labor imbalances than high-skilled natives. In the rest of the section we therefore focus on the group of the low-skilled.

Although our point estimates indicate that, relative to the natives, low-skilled non-EU-15 immigrants are more responsive in countries with lower GDP, higher unemployment rates, lower employment protection, or less generous social expenditures [11], we note that the measured differences are not statistically significant.

Table 6: The relative responsiveness of high-skilled versus low-skilled workers by origin

	Natives (1)	EU-15 (2)		non-EU-15 (3)
Labor shortage	0.079	4.418	***	-0.295
	(0.177)	(1.603)		(0.443)
GPD growth	-0.014	-0.16	*	-0.015
	(0.011)	(0.084)		(0.019)
Unemployment rate	0.007	-0.04		-0.001
	(0.005)	(0.045)		(0.013)
R2	0.059	0.111		0.058
N	2848	736		1444

Source: Own calculations based on EU-SILC, EU-LFS, and WB data.

Notes: The dependent variable is the supply of (low-/high-skilled) immigrants relative to (low-/high-skilled) natives in the particular occupation-industry-country group expressed in first difference. See also notes Table 4.

The point estimates of the shortage coefficients are positive and statistically significant, and very similar, in low- and high-union density contexts. On the other hand, lower collective bargaining coverage appears to result in a more flexible labor market that channels lowskilled immigrants to sectors, skill groups and countries with labor shortages. Nevertheless, again the difference in coefficients between countries with high and low collective bargaining coverage is not statistically different from zero. We therefore summarize this evidence as showing that low-skilled non-EU-15 immigrants are more responsive to labor shortages than their native counterparts irrespective of the studied institutional, economic and policy contexts.

Interesting results emerge for low-skilled immigrants from other EU15 countries. It turns out, that the concentration of EU15 low-skilled immigrants is statistically significantly positively associated with labor shortages in countries with high EPL index (i.e. more protective labor markets), high spending on social expenditures, and high coverage of collective agreements. In fact, the difference between these three contexts, and their low EPL, low SOCX, and low collective agreement coverage is statistically significant. The difference between our results for EU15 and non-EU15 low-skilled immigrants indicates that the same institutions may work very differently for immigrants with different legal and social status in receiving countries.

11 In this context, Giulietti et al. (2013) show that immigrants are not specifically attracted to European countries with more generous welfare spending.

Table 7: Immigrant responsiveness to labor shortages, by economic conditions

Skill	Low-Skilled					High-skilled		
Immigrants	**EU-15**	**non-EU-15**		**non-EU-15**		**EU-15**	**non-EU-15**	**non-EU-15**
Natives	**MS (1)**	**MS (2)**		**MS+EU-15 (3)**		**MS (4)**	**MS (5)**	**MS+EU-15 (6)**
Low GDP	0.11	0.399	***	0.402	***	0.403	-0.219	-0.251
	(0.140)	(0.151)		(0.151)		(0.251)	(0.211)	(0.201)
High GDP	-0.009	0.284	**	0.258	**	-0.002	0.317	0.301
	(0.262)	(0.117)		(0.114)		(0.841)	(0.259)	(0.235)
Low unempl. rate	0.013	0.255	**	0.242	**	0.133	-0.137	-0.149
	(0.179)	(0.109)		(0.107)		(0.568)	(0.202)	(0.192)
High unempl. rate	0.122	0.491	***	0.485	***	0.334	0.343	0.298
	(0.191)	(0.18)		(0.179)		(0.338)	(0.292)	(0.266)
Low EPL	-0.531	0.491	***	0.464	***	0.588	0.11	0.026
	(0.368)	(0.174)		(0.172)		(1.106)	(0.316)	(0.282)
High EPL	0.328	0.279	**	0.276	**	-0.017	-0.001	0.01
	(0.124)	(0.118)		(0.118)		(0.249)	(0.193)	(0.186)
Low SOCX	-0.3	0.475	***	0.47	***	0.499	0.097	0.017
	(0.235)	(0.163)		(0.163)		(0.786)	(0.225)	(0.206)
High SOCX	0.425	0.213	**	0.195	*	-0.228	-0.043	0.015
	(0.167)	(0.108)		(0.105)		(0.46)	(0.268)	(0.253)
Low union density	0.109	0.364	**	0.363	**	0.358	-0.145	-0.171
	(0.144)	(0.142)		(0.142)		(0.225)	(0.217)	(0.209)
High union density	-0.004	0.327	**	0.306	**	0.032	0.256	0.234
	(0.231)	(0.129)		(0.126)		(0.759)	(0.266)	(0.241)
Low collective agreement	-0.205	0.42	***	0.414	***	0.329	0.01	-0.043
	(0.203)	(0.139)		(0.139)		(0.698)	(0.205)	(0.189)
High collective agreement	0.467	0.23	*	0.211	*	-0.015	0.095	0.124
	(0.156)	(0.124)		(0.121)		(0.48)	(0.291)	(0.275)

Source: Own calculations based on EU-SILC, EU-LFS, and WB data.

Notes: Presented estimates are calculated as interaction from the regression (see Notes to Table 4).

The openness of immigration policy affects the costs of immigration and therefore the type of migrants who enter the country

VI. Immigration policy

European countries differ greatly as to the characteristics of their immigrant population and their immigration policies. In this section we test how the relative responsiveness of immigrants to labor shortages is affected by the scale of immigration, the rate of recent immigration and the openness of the country's immigration policy. We calculate the scale of immigration as the share of foreign-born individuals in the working age population using data from the EU-LFS. The rate of recent immigration is determined from OECD statistics as the ratio of cumulative immigrant inflow during the period 2004-2012 to the total immigrant population in 2012. The index constructed by Ruhs (2011) characterizes the openness to admitting immigrant workers, as of 2009. The Migrant Integration Policy Index (MIPEX) constructed in 2010 is employed to measure the quality of legislation towards immigrants (Huddleston et al. 2011). These variables are described in Table A1 and A2 in the Appendix. We split EU15 countries into two groups, with the median as the threshold, and introduce interaction variables with the labor shortage variable as in the previous sections (See equation 2).

Our findings, presented in **Table 8**, show that, as in **Table 7**, no significant results emerge for high-skilled immigrants, and hence we focus on the low-skilled segment of the labor market. Specifically, low-skilled non-EU15 immigrants are more responsive to labor shortages than the natives in high-immigration countries but the difference with respect to low-immigration countries, where the coefficient is also positive, is statistically insignificant. The responsiveness of non-EU15 immigrants is statistically indistinguishable in countries with different magnitudes of recent (over the preceding decade) immigration.

The openness of immigration policy affects the costs of immigration and therefore the type of migrants who enter the country. A restrictive migration policy effectively reduces the inflow of immigrants in the labor market and increases the selectivity of immigrants. Consequences are difficult to predict with regard to immigrants' potential to react to imbalances in the labor market. In contrast, an open migration policy regime likely intensifies competition in the host labor market, and may therefore help labor market to remove shortages. The results reported in **Table 8** suggest that openness of migration policies[12] plays no role for non-EU15 low-skilled immigrants, who are similarly more responsive than the natives in countries with open as well as restrictive migration policies.

An interesting finding is that EU-15 low-skilled immigrants are statistically significantly more responsive in countries with open migration policies than in those with more restrictive policies. We further measure the impact of integration policies on migrants' responsiveness. The results reported in Table 8 confirm that immigrants are in the statistical sense similarly responsive to labor shortages as natives in countries with more and less favorable integration policies.[13]

Table 8: Immigrant responsiveness to labor shortages in the immigration context

Skill	Low-Skilled				High-skilled		
Immigrants	**EU-15**	**non EU-15**		**non EU-15**	**EU-15**	**non EU-15**	**non EU-15**
Natives	**MS (1)**	**MS (2)**		**MS+ EU15 (3)**	**MS (4)**	**MS (5)**	**MS+ EU15 (6)**
Low migration rate	0.204	0.256	*	0.259 *	0.076	-0.274	-0.294
	(0.147)	(0.148)		(0.148)	(0.262)	(0.194)	(0.192)
High migration rate	-0.099	0.44	***	0.415 ***	0.3	0.265	0.237
	(0.257)	(0.131)		(0.128)	(0.664)	(0.253)	(0.23)
Low recent migration	-0.125	0.374	*	0.369 *	1.005	-0.184	-0.372
	(0.274)	(0.196)		(0.197)	(0.665)	(1.720)	(1.681)
High recent migration	0.154	0.331	***	0.317 ***	-0.435	-2.148	-2.051
	(0.14)	(0.105)		(0.104)	(0.615)	(1.456)	(1.284)
Restricted migration policy	-0.171	0.365	**	0.358 **	0.16	0.098	0.063
	(0.158)	(0.167)		(0.165)	(0.321)	(0.287)	(0.263)
Open migration policy	0.253 *	0.329	***	0.322 ***	0.123	-0.022	-0.022
	(0.134)	(0.123)		(0.124)	(0.234)	(0.208)	(0.196)

Notes: Presented estimates are calculated as interaction from the regression (see Notes to Table 5).

Source: Own calculations based on EU-SILC, EU-LFS, and WDI data.

12 The group with open migration policies includes Belgium, Denmark, France, Germany, Greece, Sweden and the United Kingdom, see Table A2 in Appendix. 13 The group with favorable integration policies includes Belgium, Denmark, Ireland, Luxembourg, the Netherlands, Portugal and Sweden, see Table A1 in Appendix.

VII Conclusions

This chapter extends the methodology of Borjas (2001) and Guzi et al. (2014 and 2015) to study the responsiveness of low- and high-skilled immigrants to labor shortages across various economic, institutional, and policy contexts in the EU-15. We found that immigrants from outside the EU-15 are generally more responsive to labor market shortages than natives. This effect concerning the comparison of immigrants and natives is mainly driven by lowskilled immigrants, but our results also show that low-skilled non-EU-15 immigrants are not more fluid than those who are high-skilled. On the other hand, although EU-15 immigrants are generally not more responsive than natives, high-skilled EU-15 immigrants are more responsive than their low-skilled counterparts.

Based on our estimates, the effect of labor shortages on the distribution of low-skilled non EU-15 immigrants (relative to natives) is not statistically different between countries with high and low GDP, unemployment rate, employment protection, social expenditures relative to GDP, union density, or collective bargaining coverage. Similarly, low-skilled non-EU-15 immigrants' responsiveness to shortages does not depend on countries' migration history, migration policy, or integration policy. Hence, we can conclude that low-skilled non-EU15 immigrants are more fluid than their native counterparts under a broad range of institutional, economic and policy contexts.

On the other hand, for low-skilled EU-15 immigrants, we find that the effect of labor shortages on their distribution (relative to natives) is statistically significantly higher in countries with above-the-median level of employment protection, social expenditures relative to GDP, bargaining coverage, or open migration policies.

Our results are in line with previous studies (Borjas, 2001; Guzi et al. 2014; 2015) but provide additional insights; namely, that it is primarily low-skilled migrants, who drive immigrants' responsiveness to labor shortages, relative to the natives, and that among low-skilled immigrants institutional, economic and policy contexts affect more significantly the responsiveness of EU15, than non-EU15 immigrants. In fact, it seems that institutions work differently for EU15 and non-EU15 immigrants: whereas the responsiveness of the former is higher under more generous social expenditures, higher bargaining coverage, and stricter employment protection, there is some indication that the opposite is true for non-EU15 immigrants.

Colussi in chapter 1 shows that differences in migration flows across OECD countries correlate with their labor market institutions. Importantly, Colussi confirms that immigrant flows are directed to labor markets characterized by higher flexibility and higher labor shortage (measured by the number of vacancies), which is in line with our finding for low-skilled non-EU15 workers. Distinguishing between low- and high-skilled immigrants he finds that the aggregate effect of labor market institutions better explains the variation in the latter group. This contrasts with our finding that it is the low-skilled immigrants who are more responsive to labor shortages. This difference may be due to the facts that Colussi uses two cross-sections (2001 and 2011) whereas we explore more subtle longitudinal variation, and explores the migratory paths to all OECD countries (we only cover the EU15). Both studies, however, confirm that institutional factors influence the mobility patterns of immigrants.

Immigration can be seen as grease to labor market wheels

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APPENDIX

Textbox A1: The responsiveness to labor shortages: immigrants versus natives

Initially, EU natives and immigrants are allocated across EU member states (C) and skill-industry groups (K). Let W_{kc} denote the wage of worker $k \in K$ in country $c \in C$. We assume that W_{kc} is net of any adjustment costs, such as re-qualification costs, which are fixed and equal for workers in a given country and skill-industry group.

The decision criterion for an EU native to move to a new country or to a new skill-industry group from its original country ($^{c}_{0}$) and skill-industry group ($^{k}_{0}$) can be specified as follows:

$$0<I = \max_{c \in C, k \in K} (W_{kc}) - W^{k}_{0}{}^{c}_{0} - D, \qquad (A1)$$

where W_{kc} denotes wage in country c and skill-industry group k, D stands for the cost of relocation, and is assumed to include all pecuniary and non-pecuniary (psychological) costs of the decision to leave behind the country and skill-group of origin. For the sake of exposition D is assumed to be invariant across countries, skill-industry groups, and native individuals.

It is clear that as long as D>0, this cost induces friction into labor market adjustment, as there can be situations where wage differentials persist across countries and skill groups without inducing relocation. This can lead to inefficiencies in the allocation of workers across industries and skill groups. In principle, capital flows could lead to the equalization of wage differentials, but with substantial lags. For the sake of exposition we assume that capital stocks are fixed and do not contribute to adjustment towards market equilibrium.

The decision criterion of an immigrant to move to an EU country from outside the EU can be specified as follows:

$$0<I = \max_{c \in C, k \in K} (W^{s}_{kc}) - W^{s}_{k_F c_F} - (D+B^{s}_{c}), \quad s \in \{l,h\} \qquad (A2)$$

for low- and high-skilled non-EU15 citizens, where $W_{k_F c_F}$ stands for the non-EU15 country and skill-industry group of origin of the immigrant and superscripts l and h denote variables pertaining to low- and high-skilled workers, respectively. B denotes country-specific migration costs due to institutional, legal or employment policy-related barriers to labor market entry and mobility of non-EU15 immigrant workers, which may vary for low- and high-skilled workers.

Immigrants decide to enter the EU for economic reasons only if $I > 0$ in equation (2), hence the benefits of moving into the EU exceed the costs of migration.[9] Once inside the EU, immigrants move to the destination country and skill-industry group that offers the highest wage.[10]

In this model, whenever $D<B_c$ migrants are more sensitive to wage differentials across the EU than natives, because by the time they have entered the EU, they have already incurred the costs D of migration. For natives, on the other hand, costs D are not sunk and hence influence the mobility decision. The opposite holds correspondingly if $D>B_c$; and immigrants and natives behave similarly if $D=B_c$.

9 Immigrants may come to the EU not only for economic reasons, but also as refugees or as relatives or depedent minors of economic immigrants. The model assumes that migrants have perfect information of I. 10 The costs of migration may be assumed to differ by the country of origin and destination, by individual skills or other circumstances. Such cost differences could be for example due to the distance between the home and the new language. Still, for the purposes of this paper it suffices to assume this simplified cost structure. The model could be extended to a more complex cost structure in a straightforward way. Also, the model could be presented in a dynamic version, with wages and costs as stochastic variables. In this case, the key relationships would hold in terms of expected present values.

Equation A2: The empirical model

Specifically, we estimate a log-wage regression separately in every year of this form

$$W_{ikct} = X_{ikct}\,\beta + \gamma_{kct} + \varepsilon_{ikct}, \qquad (A3)$$

where W is the log wage of worker i who belongs to occupation-industry group k in country c and year t, X is a vector of worker i's characteristics including gender, education, work experience and work experience squared, and ε is the error term.[9] We normalize wage and all variables in vector X to have zero means in each year t. The vector γ_{kct} can be then interpreted as the (adjusted) percent wage differential between the average wage of individuals in the particular cell and the mean wage for a given year in the EU. The vector is then used in the analysis to measure migrants' responses to changes in residual wage premia, vis-à-vis the natives' response.

We define the index of relative labor supply separately for low- and high-skilled workers as

$$Z^{s}_{kct} = \frac{M^{s}_{kct} / M^{s}_{t}}{N^{s}_{kct} / N^{s}_{t}}, \qquad (A4)$$

where M^{s}_{kct} is the number of immigrants belonging to a skill group s, occupation-industry group k and country c in year t. The total number of immigrants in the EU15 in year t in a skill group s is denoted as M^{s}_{t}. The denominator similarly indicates the relative supply of natives N^{s}_{kct} / N^{s}_{t} in the particular skill, occupation-industry-country cell and year t.

Textbox A3: Variable definitions (EU LFS)

Employees are defined as those who work for a public or private employer and who receive compensation in the form of wages, salaries, payment by results, or payment in kind; non-conscript members of the armed forces are also included;

Self-employed persons work in their own business, farm or professional practice. A self-employed person is considered to be working during the reference week if she/he meets one of the following criteria: works for the purpose of earning profit; spends time on the operation of a business; or is currently establishing a business;

A full-time/part-time distinction in the main job is declared by the respondent, except in Germany, Ireland and the Netherlands, where thresholds for usual hours worked are used;

An employee is considered as having a temporary job if employer and employee agree that its end is determined by objective conditions, such as a specific date, the completion of an assignment, or the return of an employee who is temporarily replaced. Typical cases include: people in seasonal employment; people engaged by an agency or employment exchange and hired to a third party to perform a specific task (unless there is a written work contract of unlimited duration); people with specific training contracts.

11 By including education as an independent variable we eliminate any wage differentials arising due to educational attainment of workers, but we assume that the residual wage premia are invariant across skill groups.

Table A1: Economic conditions and immigrant population in the EU15

Country	Log GDP	Unemployment rate	EPL	SOCX	Union density	Collective agreements	Migration rate	Rate of recent immigration
PT	10.16	**9.58**	**4.26**	23.89	20.48	**90.17**	0.08	**0.93**
GR	10.28	**12.12**	**2.66**	22.44	23.50	65.00	0.09	0.53
ES	10.39	**14.91**	2.33	23.68	16.45	73.67	**0.15**	**0.98**
IT	10.47	**7.83**	**2.76**	26.22	**34.44**	**85.00**	0.09	0.79
UK	10.48	6.55	1.20	22.09	27.24	33.11	**0.13**	0.82
FR	10.49	**8.87**	**2.43**	**30.94**	7.66	**92.00**	0.12	0.34
FI	10.55	7.76	2.17	**27.37**	**69.84**	**89.60**	0.04	0.80
DE	10.58	**7.95**	**2.87**	**26.40**	19.67	62.89	0.10	**0.83**
BE	**10.59**	7.81	1.85	**27.97**	**54.49**	**96.00**	**0.14**	0.73
SE	**10.61**	7.42	2.61	**28.40**	**71.16**	**91.89**	**0.16**	**0.99**
AT	**10.64**	4.51	2.37	**27.59**	29.98	**99.00**	**0.17**	**0.89**
DK	**10.66**	5.56	2.15	**28.71**	**68.00**	**85.00**	0.09	0.74
NL	**10.66**	4.09	**2.86**	22.18	19.23	84.44	**0.1**3	**1.04**
IE	**10.72**	**8.18**	1.31	20.19	**32.41**	42.00	**0.15**	**0.99**
LU	**11.41**	4.78	2.25	22.40	**37.41**	58.00	**0.43**	0.59

Source: EU-LFS, OECD and WDI

Note: Reported values are average values across the period 2004-2012. GDP per capita in constant PPP prices and the % of unemployed in the labor force are taken from WDI. Employment protection index (EPL) and the share of total social expenditure (SOCX)on GDP are taken from OECD. Union density and collective agreements are taken from ICTWSS database. Migration rate is calculated from EU-LFS as the share of foreign-born individuals in the working age population. The share of recent migrants is calculated as the sum of immigrant inflows over the period, relative to the stock of immigrants in 2012, using OECD statistics. Countries are sorted by GDP. Figures in bold indicate values above the median in the respective category.

Table A2: Index measuring the degree of openness to admitting immigrant workers

Country	Program	Index
AT	Settlement Permit-Key Worker Migrant Programme (AUT)	0.556
IE	Work Permit Scheme (IRE)	0.569
IT	Non-Seasonal (ITA)	0.569
PT	Residency visa (POR)	0.583
ES	General Regime (ESP)	0.625
FI	Ordinary Residence Permit (FIN)	0.639
NL	General labour scheme (NED)	0.639
UK	Tier 2-Skilled workers(General) (Points Based System) (UK)	**0.653**
FR	Temporary permit for tempor. work (3-12month) (FRA)	**0.667**
GR	Residence Permit for Regular Staff (GR)	**0.667**
BE	Work Permit type B (BEL)	**0.694**
DK	The Green Card Scheme (DEN)	**0.708**
DE	Settlement Permit (GER)	**0.722**
SE	General Work Permit Programme (SWE)	**0.722**
LU	N/A	N/A

Source: Ruhs (2011)

Note: Countries are sorted by the index. Figures in bold indicate values above the median.

2.0
Projecting Developments in Labor Supply and Demand

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This study is based on data from Eurostat, The European Labor Force Survey, 2013. The responsibility for all conclusions drawn from the data lies entirely with the author(s)

Projecting Developments in Labor Supply and Demand

I. Introduction

The first and third part of this research project aim at identifying the core drivers of worker and firm, i.e. job, mobility, receptively. The present chapter supplements these two parts of the project by assessing potential future labor market developments up until 2030. By pointing to potential future missing or excess supply of labor in different occupations and countries, the present chapter shows how demand for skilled migration (cf. part 1 of this project) or firm's decisions to relocate (cf. part 3 of this project) may be affected by future changes in labor supply due to demographic change.

Labor supply has been subject to significant structural changes in the past. Among others, increasing female labor force participation as well as raising educational attainment substantially changed the composition of the labor force. To date, demographic change due to the aging of some Western societies as well as increasing migration flows are expected to significantly change individual and aggregate labor supply. Based on detailed country-specific demographic projections on fertility, mortality, educational attainment and migration[1] up to 2030, this chapter aims at assessing the consequences of demographic change for labor supply, as well as the labor market as a whole. In particular, the chapter investigates potential changes in the size of the labor force and the number of hours worked at various levels of aggregation, e.g., differentiating among qualifications, occupations or industries.

Demographic change due to the aging of Western societies as well as increasing migration flows are expected to significantly change individual and aggregate labor supply. Against this backdrop, Chapter 2 investigates potential changes in the size and composition of the labor force over a time horizon of fifteen years (2015 to 2030) for ten selected European countries, as well as the United States by considering labor supply and labor demand in one unified framework type of labor.

1 As shown below, migration scenarios are based on well-balanced assumptions. Arguably, this procedure comes at the cost that exceptionally large migration flows due to large political turmoil, as recently observed, cannot be accounted for. 2 The countries are Belgium, Switzerland, Germany, Spain, France, Italy, Netherlands, Poland, Sweden, United Kingdom.

population size is predicted to increase by

6.5%

The current chapter projects labor supply over a time horizon of fifteen years (2015 to 2030) and focuses on ten selected European countries[2] as well as the United States. In the analysis, we go beyond a mere accounting exercise by explicitly addressing behavioral responses in labor supply and demand. By linking labor supply and demand in a partial equilibrium framework, we further try to capture labor demand reactions by firms in case facing excess or missing supply of a particular type of labor. Relying on micro-data based behavioral parameters, we thereby account for behavioral heterogeneity to the extent possible.

Overall, the results of our analysis point to moderate but notable changes in the size and composition of the labor supply over the next fifteen years. For all countries, a general trend of up-skilling can be observed, which raises the share of high-skilled workers in the labor force accordingly. Assuming peoples' preferences for work to be constant over time, this trend would result in increasing labor supply in white-collar jobs and service industries.[3] This trend is found for every country, but to a varying extent. The results of this exercise further demonstrate that demand side reactions may notably affect the size of the predicted changes.

The remainder of the chapter is structured as follows. Section 2 describes the data underlying this exercise and presents the methodological framework applied. Section 3 discusses the results of the study and highlights the important role of migration in shaping the outcomes of these medium-run projections. Section 4 concludes.

II. Data and methodology

The following section describes the data underlying this study as well as sketches the methodological framework applied. In a nutshell, the analysis bases on detailed country-specific population projections up to 2030 paired with current survey data information on individuals labor market participation and characteristics. By applying reweighting techniques, the current survey data, which matches the characteristics of today's overall workforce due to sample weights, are made representative of the projected population in 2030 such that expected changes in labor supply can be evaluated. In a second step, based on the methodology of Peichl and Siegloch (2012) and Dolls et al. (2015), potential labor demand reactions are accounted for to obtain partial equilibrium effects.

Population projections The population projections for this study are provided by the Netherlands Interdisciplinary Demographic Institute (NIDI). Their projections base on the Eurostat (2015a) population scenarios for Europe and the US Census Bureau (2014) scenarios for the United States. As these administrative projections impose assumptions on central demographic features such as fertility, mortality and migration only, NIDI supplements these figures with forecasts on future educational attainment. These projections are in turn based on the Global Education Trend (GET) scenario, conducted by the International Institute for Applied Systems Analysis (IIASA) and the Vienna Institute of Demography (VID) (Lutz et al., 2014), and assumed to hold for both natives and immigrants. Three different levels of education are considered: (i) low-educated (ISECD0-ISECD2), (ii) medium-educated (ISECD3-ISECD4), and (iii) high-educated (ISCED5 and higher) individuals.

For the purpose of our analysis, two different migration scenarios are distinguished: (i) **a baseline scenario** relying on the projections of Eurostat/US Census Bureau, and (ii) **a constant migration scenario**, which relies on the same assumptions about mortality, fertility and educational attainment as the baseline scenario, but assumes net migration to be equal to the average migration flows observed over the period of 2004 to 2013. **Figure 10** in the Appendix visualizes differences in net migration rates for these two scenarios over the period of 2015 to 2030. From **Table 1** it can be inferred that the constant migration scenario refers to a lower level of migration compared to

Table 1: Assumed annual net migration

	Baseline	Constant Migration
BE	79,839	60,089
CH	72,449	61,186
DE	229,004	144,029
ES	-21,941	305,384
FR	90,508	80,723
IT	354,431	355,764
NL	23,642	10,622
PL	-352	-12,791
SE	55,160	48,775
UK	183,672	247,181
US	965,430	1,293,328

The values refer to mean annual net migration flows by country over the period of 2015 to 2030.

While this implies a general aging of the societies under consideration, it also points to increasing dependency ratios, as a smaller share of individuals in the overall population is in the labor force

2 Among others, Heim (2007) and Blau and Kahn (2007) demonstrated that labor supply elasticities of females substantially decreased over the last decades. 3 Among others, Heim (2007) and Blau and Kahn (2007) demonstrated that labor supply elasticities of females substantially decreased over the last decades.

Over time, an increasing share of the workforce is predicted to receive tertiary education. Relatedly, the share of low-skilled workers is predicted to unanimously decrease in every country studied.

the baseline scenario for Belgium, Germany, the Netherlands, Poland, Sweden and Switzerland. In contrast, the constant migration scenario implies higher inflow for Spain, the UK, and the US. For Italy and France, differences between the two scenarios are minor.

Individual-level data We base our predictions on information from the 2013 European Labor Force Survey (EU-LFS) for the ten European countries and the 2014 Current Population Survey (CPS) for the U.S.[4] Both surveys offer comprehensive information on individual and job characteristics, and serve as the basis for many offcial labor market indicators such as employment or unemployment statistics. In the context of this study, their distinct advantage compared to other surveys is grounded in the rich information on respondents' job characteristics, with both surveys providing detailed individual-level data on the occupation pursued and industry working in. Moreover, both surveys provide information on the number of hours worked, which allows for adding a behavioral dimension to our analysis. The EU-LFS is harmonized across countries to ensure consistency in survey design and definitions.

labor force is predicted to decrease by

-0.4%

in the baseline migration scenario

The general trend in aging is accompanied by steadily increasing educational attainment

The re-weighting procedure The population projections and current survey data are combined by means of a re-weighting procedure.[5] In a nutshell, this technique makes use of the fact that survey data are made representative for an entire population by means of sample weights, which indicate the representativeness of each single person in the total population. To match the projections in 2030, sample weights are thus adjusted according to the predicted changes, such that each observation meets the projected target size. Eventually, the demographic structure of the re-weighted data set corresponds to the population projections.

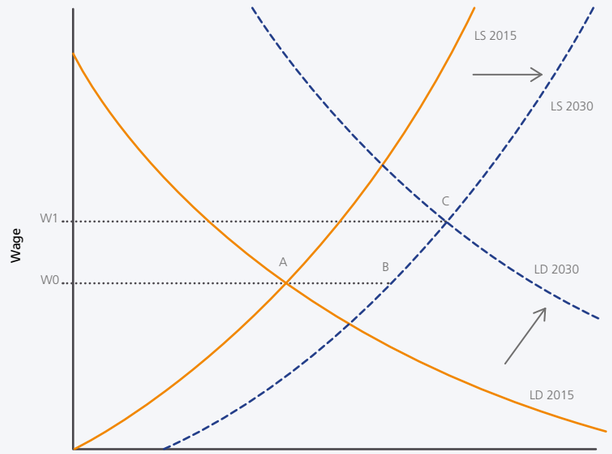
Accounting for labor supply and demand effects While re-weighting techniques allow for the investigation of the effects of demographic change on the labor force and the number of hours supplied, it seems unlikely that changes in the number of hours supplied would keep firms' labor demand behavior unaffected. According to the standard neo-classical model of the labor market, higher (lower) scarcities of the production factor labor are expected to induce an increase (decrease) in wages. This may in turn cause workers to supply more (less) hours of work, given that the potential disposable income rises (decreases).

Based on micro-level estimates of labor supply and labor demand behavior in response to changes in wages, we are able to proxy partial equilibrium effects of the labor market due to demographic change.[6] **Figure 1** illustrates the underlying mechanism in some more detail. LS2015 and LD2015 denote the initial labor supply and labor demand curves for 2015, which are fully characterized by observed workers' (average) wages, the total amount of hours worked, and the respective elasticities.[7] Starting from the initial equilibrium in point A, suppose that the labor supply curve shifts to the right due to demographic change in 2030. Ignoring demand side behavior, and thus keeping wages constant in response to this shock, would thus lead to an increase in overall employment (as indicated by point B). As the negative slope of the labor demand curves indicate, average wages shall yet be expected to decrease absent changes in the total number of employees demanded (not modeled in Figure 1). Given the predicted overall increase in population, we, however, account for a likely positive shift in total labor demand due to overall higher demand for goods and services. Lacking a general equilibrium model, we mimic this likely overall increase in demand for goods by shifting the demand curve to the right proportionally by the population change. This moves the labor market equilibrium from B to C. Compared to point B, the new equilibrium might be characterized by higher employment and wages in case the population-induced effect on labor demand is suffciently large.[8]

The underlying supply side elasticities for this methodology are obtained from Bargain, Orsini, et al. (2014), who provide estimates of labor supply elasticities for a multitude of countries and different types of workers using a uniform methodological framework. The study covers all countries of our sample except for Switzerland. Therefore, we approximate labor supply elasticities for Switzerland by using information on other Continental European countries in the sample, notably Germany, France, the Netherlands, Belgium and Austria. Elasticities are differentiated by gender, marital status and the skill level. The corresponding point estimates are reported in **Table 3** in the Appendix.

To capture reactions on the demand side of the labor market, we generate skill-specific demand elasticities based on the meta-analysis by Lichter et al. (2015). In their study, the authors evaluate potential sources of heterogeneity in the estimates of the elasticity of labor demand, collecting information on a total of 1,334 estimates of the own-wage elasticity of labor demand provided by the

Figure 1: Linking labor supply and demand

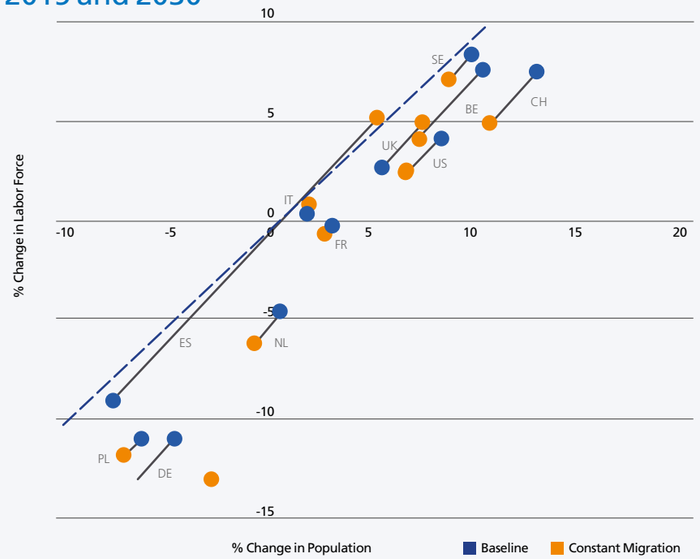


The graph visualizes the consequences of a positive change in labor supply (upper arrow) and population (lower arrow), as this is the most common case in our country sample. The approach is generalizable to any combination of labor supply and population shocks.

4 See Eurostat (2015b) and US Census Bureau (2006) for details. 5 For other applications of the re-weighting procedure, see Deville and Säarndal (1992) and DiNardo et al. (1996).

6 Note that this section builds on the methodological approach of Dolls et al. (2015). However, the present chapter bases on different population projections and data sources. 7 We model twelve separate labor markets for each country in the empirical analysis, differentiating by gender (female/male), marital status (single/married) and skills (low-,medium-,high-skilled). 8 The approach is generalizable to any combination of labor supply and population shocks.

Figure 2: Population andlabor force change between 2015 and 2030



Source: Own calculations based on European Labor Force Survey 2013 and Current Population Survey 2014

For countries that are subject to a decreasing labor force, losses are thus partially mitigated by behavioral responses in labor supply. The main driver of this development is the increasing share of high-skilled workers, who supply considerably more hours than medium- and low-skilled workers.

empirical literature. Based on their sample, we predict labor demand elasticities for 2030, explicitly accounting for general trends in the elasticity of labor demand due to technological change, increasing international competition or labor market deregulation. Predicted elasticities are differentiated by country and skill, and provided in **Table 4** in the Appendix. As expected by theory, all estimates are negative, and largest for Eastern Europe.

III. Results

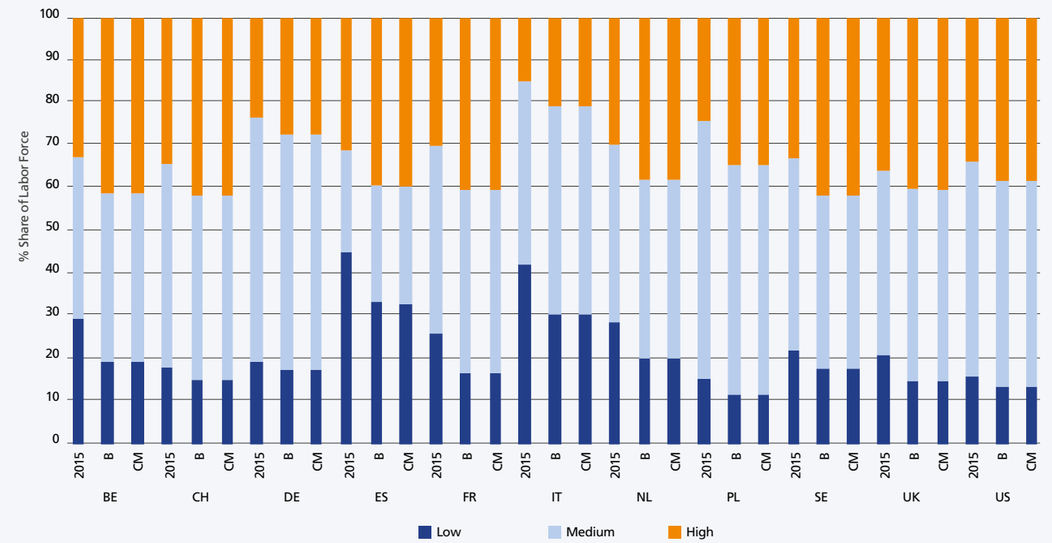
Based on this methodological approach, we first present the predicted key demographic trends for 2030. Based on these projections, we next present the results of our re-weighting exercise, (i) net of labor demand adjustments and (ii) when accounting for firm-level adjustment behavior and, hence, considering partial equilibrium effects.

Demographic trends Aggregate demographic trends for the eleven different countries considered are shown in **Figure 2**. For the period of 2015 to 2030, the projected country-specific changes in the total population are contrasted against the predicted changes in the labor force.[9] On average, population size is predicted to increase by around 6.5%, whereas the labor force is predicted to decrease by -0.4% in the baseline migration scenario and by -0.1% in the constant migration scenario, on average.

Detached from these aggregate findings, **Figure 2** further shows that - with the exception of Poland, Germany and Spain - the countries covered in our analysis are expected to face larger populations by 2030. Germany, Spain (in the baseline migration scenario) and Poland are predicted to face moderate declines in population in turn. Moreover, expect for Spain, aggregate developments do not fundamentally differ across migration scenarios. For Spain in turn, the population is predicted to increase by 8% over the next fifteen years in the constant migration scenario. In contrast, when relying on the baseline migration assumptions, the size of the population is predicted to decline by 4% up to 2030. When assessing potential developments in the labor force, we find that the size of the labor force increases (decreases) less (more) strongly than the overall population. While this implies a general aging of the societies under consideration, it also points to increasing dependency ratios, defined by the relative share of people outside the labor force, i.e., pensioners and children (cf. **Figure 11** in the Appendix).

9 Note that throughout this study, we dene the labor force as the number of people aged between 15 and 64 years.

Figure 3: Skill composition of the Labor Force



Source: Own calculations based on European Labor Force Survey 2013 and Current Population Survey 2014

Changes in hours worked exceed expected changes in the labor force size

Next, we investigate changes in the labor force by skill groups. **Figure 3** plots the corresponding changes for the two scenarios against the current skill shares by country. Despite rather different initial skill distributions, the projections imply a uniform

trend towards higher educational attainment. The share of high-skilled workers is predicted to increase in every country; and most strongly in Belgium, France and Sweden. Relatedly, the share of low-skilled workers is predicted to unanimously decrease in every country.

The projections further point to significant increases in labor supply in the non-market service sector

3.1 TRENDS IN LABOR SUPPLY

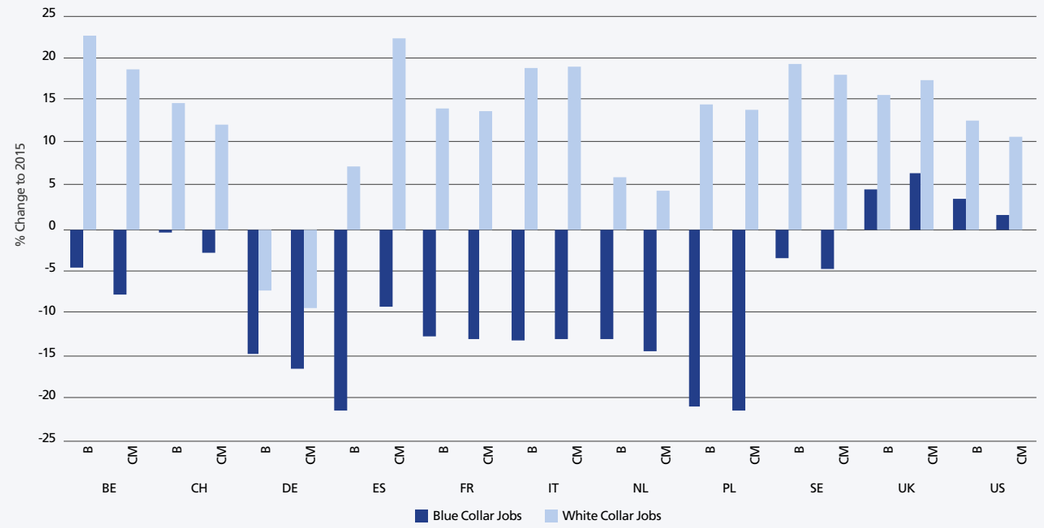
Changes in heads Based on this descriptive summary of the key demographic projections, we use our large survey data and apply re-weighting techniques to study the potential changes in labor supply. In more detail, this includes investigation of the number of supplied jobs and hours worked, disaggregated by occupation and/or industry classification; characteristics that are not covered by the population projections but rather reflect workers' preferences and opportunities.

In our analysis, we keep individual preferences – conditional on age, gender and skills - regarding employment, working hours and occupations constant, i.e., as observed in the survey data. All results need to be interpreted in light of this assumption. Hence, the results point to changes in the labor market given fixed preferences and opportunities of the labor force. Possible changes in preferences, such as higher demand for leisure or changes in labor demand due to technological change and/or increasing international competition, are not accounted for. Overall, our projections point to an increasing importance of white-collar compared to blue-collar jobs.[10] **Figure 4** demonstrates that this trend is uniform across countries, although substantial quantitative differences exist. First, our projections suggest a strong polarization of the labor market in Belgium, France, Spain, and Poland. In contrast, general labor force growth in the United Kingdom and the United States is sufficient to increase the number of both occupational groups. Germany is the only country showing an absolute decrease in both categories, with declines in blue-collar occupations being stronger though. Given the distinct skill structure of white-collar compared to blue-collar jobs (see **Figure 13** in the Appendix), the general trend in up-skilling seems to drive these results: while the share of high-skilled workers in blue-collar occupations is around 10%, high-skilled professionals account for around two-thirds in white-collar occupations, on average.

Next, we turn to exploring potential changes in labor supply by different industries. To ease presentation, we combine data from the European countries and consider six aggregate industries: (1) the primary sector, (2) manufacturing, (3) construction, (4) distribution and transporting, (5) business and other services, and (6) non-market services. **Figure 5** depictscurrent and projected labor supply by sectors. Both for the EU and the US, labor supply in the non-market service sector is predicted to increase by around three million jobs. In addition, labor supply in the transportation and manufacturing sector is projected to remain rather constant in the US, while is predicted to decline in Europe.

Figure 6 further indicates that the positive job trend for the service sectors is rather uniform across countries. Again, the pessimistic demographic outlook for Germany and Spain (in the baseline ▸

Figure 4: Relative change in labor supply by occupations

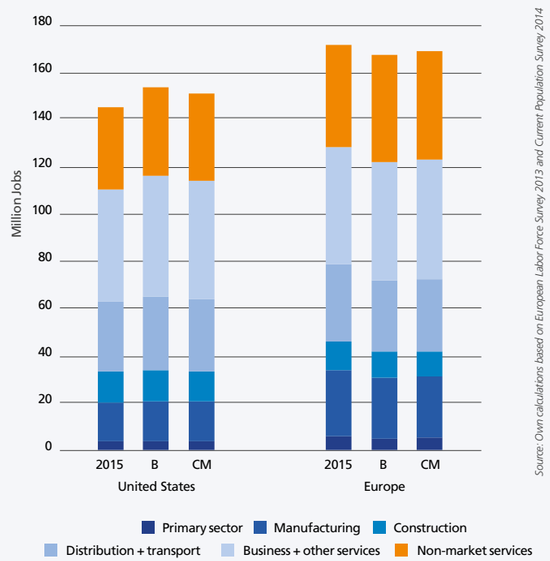


Source: Own calculations based on European Labor Force Survey 2013 and Current Population Survey 2014

10 In the EU-LFS, managers, professionals, technicians and associate professionals, and clerical support workers are considered as white-collar workers. This corresponds to ISCO-08 classications 100 to 400. In the US-CPS, we code workers in management, business, and financial occupations, professional and related occupations, sales and related occupations, and office and administrative support occupations as white-collar workers. All other jobs, with the exception of armed forces, which are excluded from the analysis, are classified as blue-collar.

Targeted migration policies may play a key role for economies that are expected to face major demographic transitions.

Figure 5: Labor supply by industries: US vs. Europe



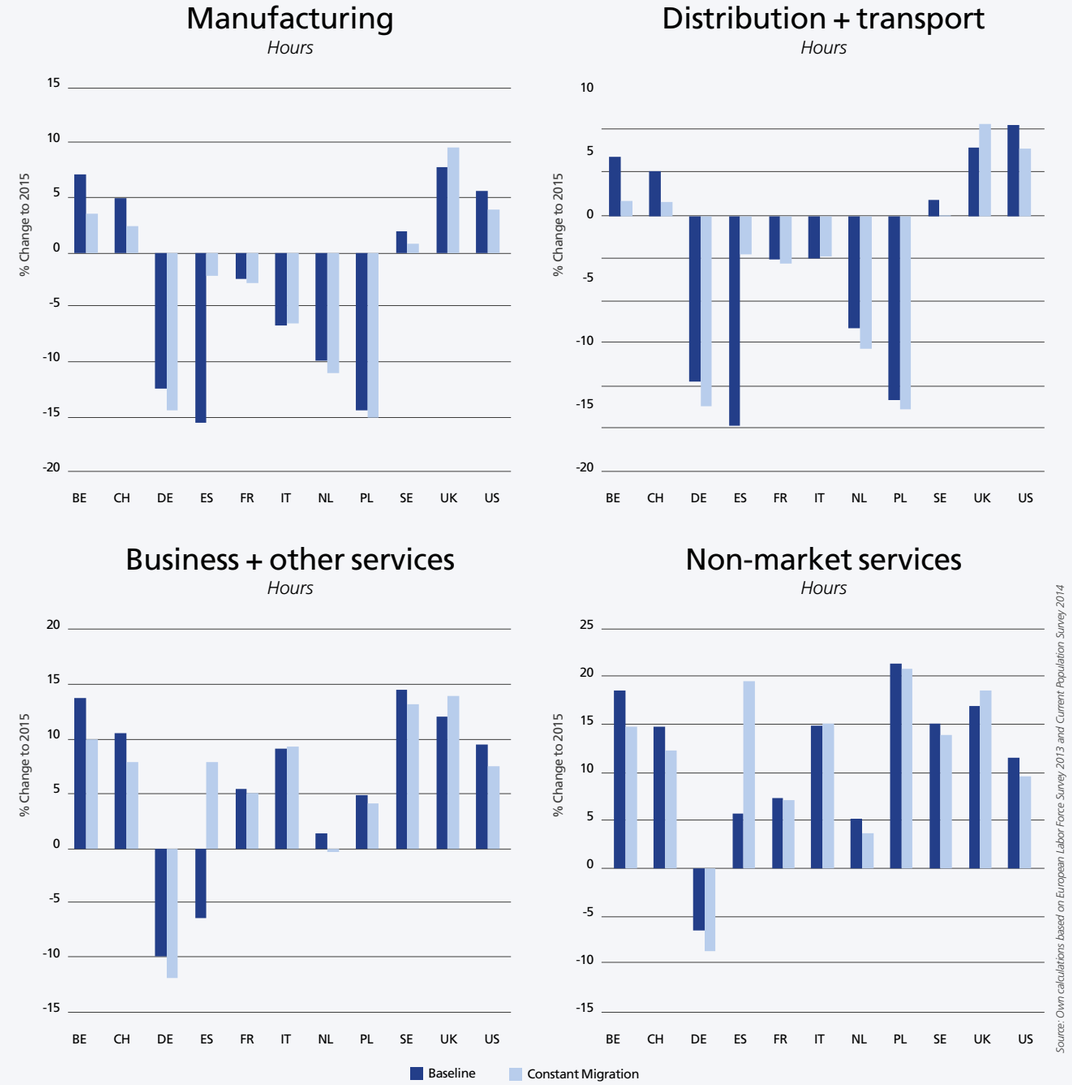
scenario) implies an overall negative impact for these sectors, too. While the majority of countries may in turn face declining labor supply in manufacturing and transportation, increasing labor supply in these two sectors is found for Belgium, Switzerland, the UK and the US. As before, predicted changes in the skill distribution appear to be the key driver for these trends. As indicated in the bottom panel of **Figure 14** in the Appendix, jobs in the business and non-market services are predominantly filled with high-skilled workers. Likewise, the substantial decline of low-skilled workers has major implications on industry-specific labor supply, e.g., for the manufacturing sector in Italy or Spain.

Changes in the total hours worked

The preceding paragraph presented predicted changes in the size of the labor force. Despite being informative per se, this analysis is somewhat restrictive in a sense that preferences for work and the risk of involuntary unemployment are not captured. Our data allows for an extension of this analysis by exploiting individuals' information on their current employment status and weekly hours worked. If predicted changes in the size and composition of the population disproportionately affected those workers with a higher propensity to work, the effect on total hours worked might be less severe.

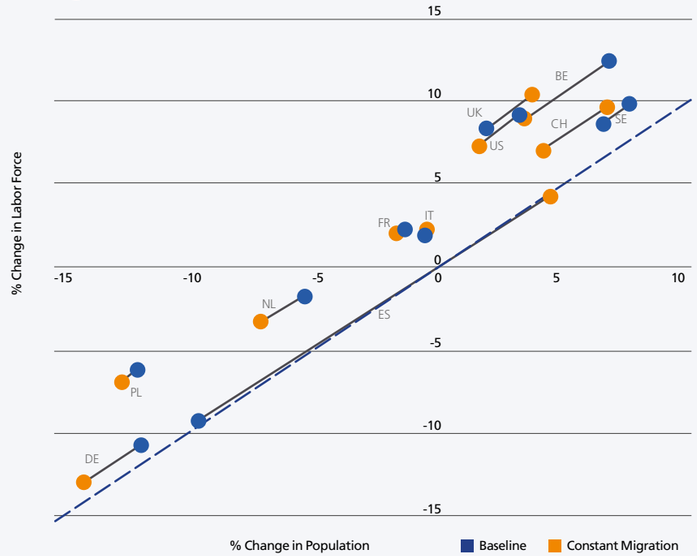
To this end, **Figure 7** compares the projected changes in hours worked to the projected changes in the size of the labor force. We first note that all countries are found on or above the diagonal line. For the upper right quadrant, this means that changes in hours worked exceed the increase in the labor force. For countries in the lower left quadrant, the finding in turn

Figure 6: Relative change in labor supply by sector



Primary Sector and Construction are not shown because of their overall minor importance. B: Baseline Migration Scenario; CM: Constant Migration Scenario.

Figure 7: Comparing hours change with labor force change



Source: Own calculations based on European Labor Force Survey 2013 and Current Population Survey 2014

implies that changes in hours mitigate the loss in heads to some extent. Overall, this finding hence suggests that future structural changes in the labor force are likely to increase the share of workers with a higher tendency to work, both at the extensive and intensive margin.[11] This is intuitive with the notion that better educated workers have a higher probability of being employed. In 2014, the EU-27 average employment rates amounted to 82.1% for individuals with tertiary education, 68.5% for upper secondary education, and 43.4% for lower secondary education and below.[12]

Labor supply generally decreases in the manufacturing sector

3.2 ACCOUNTING FOR CHANGES IN LABOR DEMAND

As shown before, demographic change is likely to alter the size and composition of the labor force as well as the overall hours of work supplied. In this section, we aim to proxy firms' labor demand reactions in response to the predicted changes in labor supply to arrive at general equilibrium effects of demographic change. Table 2 reports the overall results by country. The middle two columns refer to the static effect that ignores labor demand behavior and thus replicate the findings of the previous analysis.[13] The last two columns in turn provide the

11 As noted above, individual preferences are assumed to be constant over time. 12 Source: Eurostat, Employment rates by age and educational attainment level. 13 These columns are visualized in Figure 7.

Table 2: Labor market effects of demographic change

	Labor force change		Hours change, no labor demand		Hours change, with labor demand	
Country	**Baseline**	**Constant Migration**	**Baseline**	**Constant Migration**	**Baseline**	**Constant Migration**
BE	7.55%	4.25%	11.91%	8.20%	15.44%	11.88%
CH	7.43%	4.89%	9.04%	6.45%	10.64%	8.12%
DE	-10.87%	-12.89%	-10.83%	-12.89%	-8.00%	-9.96%
ES	-8.59%	5.38%	-9.16%	4.31%	-4.09%	9.01%
FR	-0.23%	-0.52%	2.39%	2.08%	4.54%	4.23%
IT	0.54%	0.67%	2.11%	2.28%	4.06%	4.22%
NL	-4.46%	-5.98%	-1.64%	-3.21%	2.53%	1.00%
PL	-10.95%	-11.55%	-6.06%	-6.68%	-4.33%	-4.95%
SE	8.44%	7.17%	9.46%	8.21%	11.47%	10.25%
UK	2.82%	4.79%	7.91%	9.83%	8.86%	10.77%
US	4.23%	2.38%	8.72%	6.81%	9.33%	7.45%
Mean	-0.37%	-0.13%	2.17%	2.31%	4.59%	4.73%

Source: Own calculations based on European Labor Force Survey 2013 and Current Population Survey 2014

corresponding results when accounting for labor demand behavior, i.e, in case modeling a new partial market equilibrium.

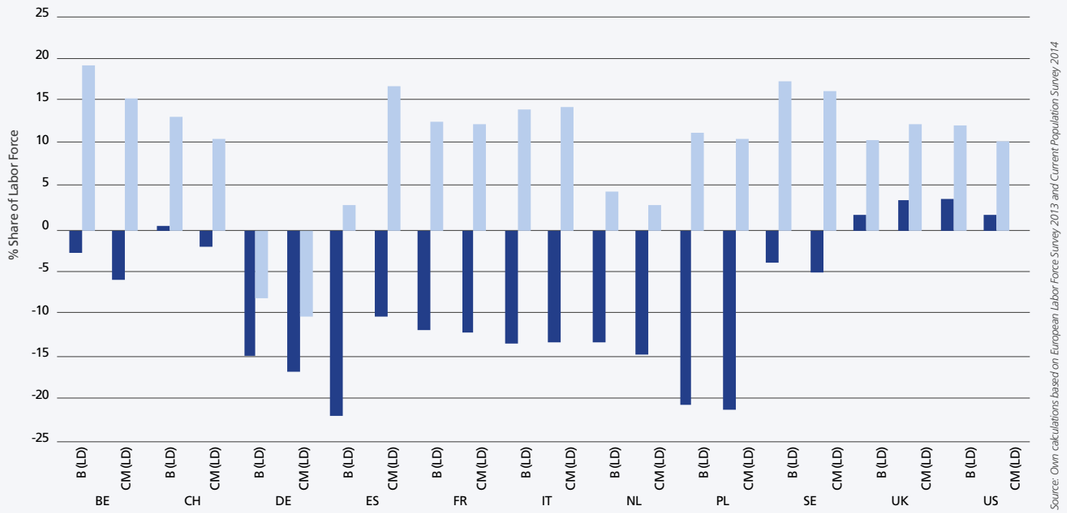
As demonstrated in Section 3.1, increasing educational attainment can be expected to raise labor supply particularly in white-collar jobs and in the service sector. Due to strictly positive labor supply elasticities, this excess supply leads, in tendency, to lower wages for workers in these jobs, which lowers individual labor supply in turn. Simultaneously, wages increase for workers in occupations rather consisting of low-skilled workers due to higher scarcity. These effects are however ambiguous due to the additional demand shift from population change. In any case, wages will increase stronger in those sectors with a shrinking labor supply. As a result, the behavioral channel dampens the structural transitions to some extent. The hours change by occupational type is visualized in Figure 8. The general conclusions with regard to the type of collar are very similar to those from the change in heads (Figure 4). Negative changes become somewhat lower, increases are dampened to some extent. In one single case (Blue collar jobs in Switzerland, Baseline scenario), a decline in heads turns into an actual increase in hours worked.

A similar picture emerges when repeating this exercise on the industry level. The only sector showing noteworthy differences is non-market services. In Poland, as an example, hours increase by over 20% in both scenarios, as opposed to around 15% in terms of headcount. Comparable increases are projected for the

Changes in labor demand

Changes in labor demand behavior are taken into account to obtain partial equilibrium effects at the labor market. The basic underlying mechanism is a scarcity effect: excess supply in certain sectors may lead to lower wages, which lowers individual labor supply in turn. The opposite effect may be observed in sectors with more pronounced labor shortages.

Figure 8: Relative change in total hours by occupations



Source: Ovun calculations based on European Labor Force Survey 2013 and Current Population Survey 2014

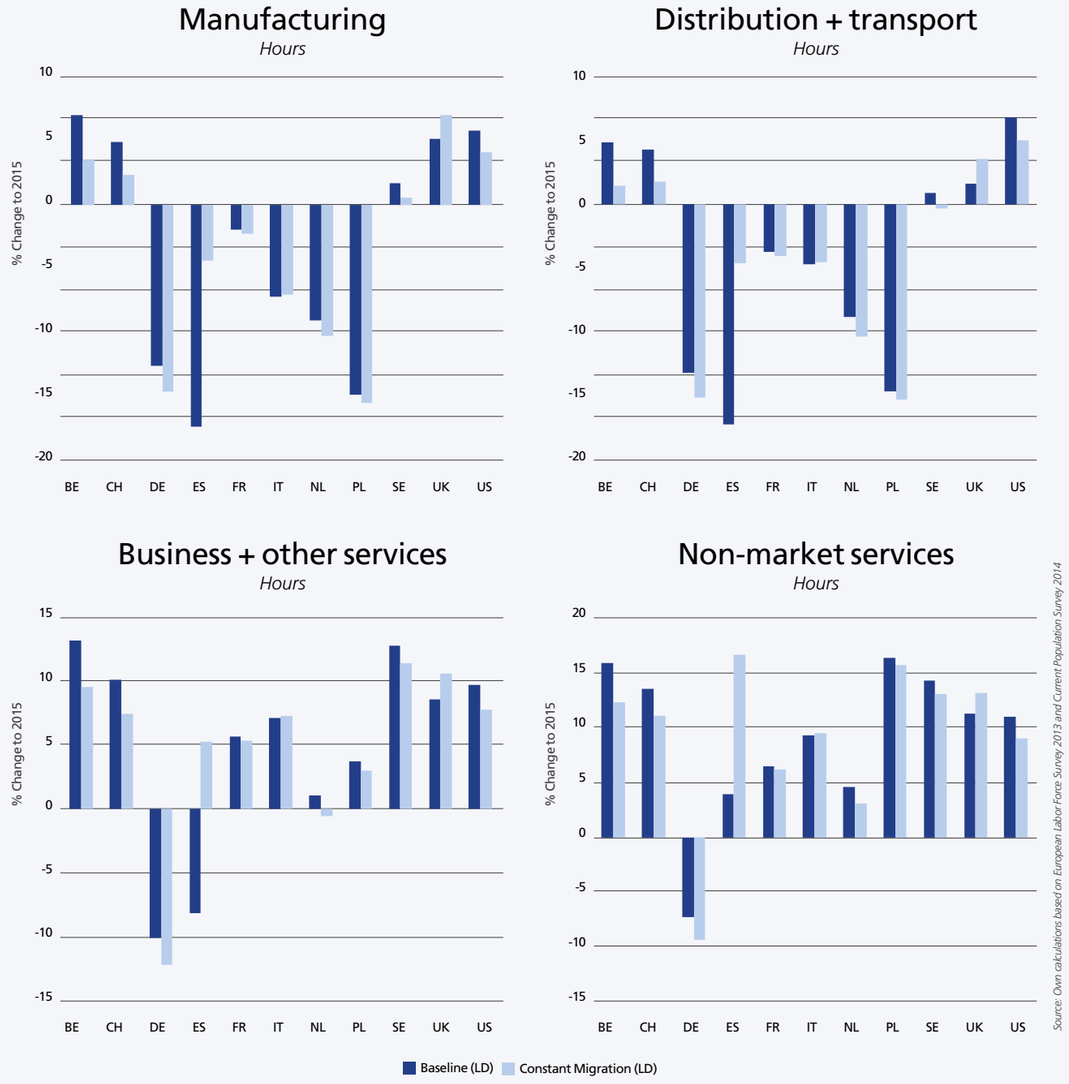
B: Baseline Migration Scenario; CM: Constant Migration Scenario.LD indicates the state after labor demand adjustment.

UK, Belgium and Italy. For Germany, the labor decline in this sector is even slightly worsened.

This section shows that looking at headcount only would lead to erroneous conclusions regarding the labor market impact of demographic change. Adding behavioral reactions alters the aggregate picture, although results do not fundamentally change as the focus of analysis becomes narrower. Behavioral reactions by labor market actors are hence less drastic than demographic transitions. It is therefore unlikely that skill shortages in, e. g., the manufacturing sector will vanish by higher incentives for (potential) workers. This is in line with the empirical literature on workers' responsiveness to tax reforms, which is regularly found to be of limited magnitude (Bargain and Peichl, 2013; Chetty et al., 2011; Keane, 2011).

The mitigating role of migration The results of this analysis have shown that migration flows may significantly shape the size and composition of the workforce. Unlike demographic characteristics such as fertility or mortality, migration flows are subject to short-term changes. For this reason, migration may play a key role for economies that are likely to face major transitions due to demographic change. In our sample of countries, this reasoning particularly applies to Germany and Poland. At the same time, the volatility of migration flows creates problems when assessing future likely trajectories. For example, the substantial inflow of refugees to Europe since 2014 was unanticipated and is not reflected in our population scenarios.

Figure 9: Relative change in total hours by sector



Source: Ovun calculations based on European Labor Force Survey 2013 and Current Population Survey 2014

Primary Sector and Construction are not shown because of their minor importance by the share of total jobs.They can be found in Figure 15 in the Appendix. B: Baseline Migration Scenario; CM: Constant Migration Scenario.

This volatility is reflected in our data to some extent, too. For example, the official population projections for Spain assume substantially lower net migration for future years than what has been observed in the past, which largely effects our labor supply predictions. Preceding the year of 2008, annual net migration to Spain was around 400,000 to 800,000 people, which dropped to zero and even turned negative with the beginning of the Great Recession. The impact of this development is manifested in the difference between the two migration scenarios. As indicated by Figure 9, higher rates of migration would leave the number of hours supplied rather constant in every sector under consideration. This finding in turn demonstrates that potential labor shortages may be filled by means of migration.[14]

IV. Conclusion

Demographic change is going to alter both the size and the composition of the labor force. This chapter aims at approximating likely potential labor market consequences arising from these developments for eleven developed countries. On the basis of detailed population projections paired with comprehensive micro-level data, re-weighting techniques are applied to estimate potential changes in labor supply at the extensive and intensive margin.

Overall, our projections point to a significant aging of the societies under consideration, causing a raising share of dependent people in turn. At the same time, working-age populations are going to undergo substantial structural change, most importantly due to rising educational attainment. This mega-trend serves as intuition for most of our findings. Under the assumption of constant preferences for work (conditional on age, sex and obtained education), a better educated workforce may supply more labor in service sectors and white-collar occupations. In contrast, labor supply in the manufacturing and transportation sector, characterized by more low-skilled and blue-collar jobs, is likely to decrease. By applying two different population scenarios, the potential role of migration policies in addressing changes in labor supply is further analyzed in isolation. Given the caveats attached to our predictions, we conclude this study by highlighting that our findings should not be taken as precise forecasts. This exercise rather points to undergoing changes that will affect Western labor markets in the recent future absent any exogenous shocks.

14 However, note that policies aiming at attracting immigration might have a limited impact. There are push and pull factors specific to origin and destination countries, most of which cannot be influenced by policy-makers. This issue is discussed in Colussi (2015).

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APPENDIX

DETAILED DESCRIPTION OF POPULATION SCENARIOS

POINT OF DEPARTURE

Population data

For EU countries: Population by age and sex based on EUROPOP2013 main population scenario
For USA: Population projections by age and sex of the US Census Bureau, released in 2014
Data on educational level: For EU countries: observations: LFS data as included in the Eurostat database
For USA : observations: data US Census Bureau and back projections compiled by IIASA/VID/Wittgenstein Centre for Demography in Vienna
Projections of educational attainment for EU and USA: The Global Education Trend (GET) scenario compiled by IIASA/VID/Wittgenstein Centre for Demography

BASELINE SCENARIO

The baseline projection for each country is an extension of the Eurostat/US Census Bureau projection with educational attainment. For the base year of the projections the population by age and sex will be distinguished by level of educational attainment using LFS data from Eurostat for the European countries and data on educational attainment for the US Census Bureau for the USA. For the projection years we adopt the Global Education Trend (GET) scenario of the IIASA/VID/Wittgenstein population by education scenario. The GET scenario can be considered as the most likely future trajectory and is based on education-specific progression rates to higher levels of education from the cumulative experience of all countries over the past 40 years. As the population by education estimates of the IIASA/VID/Wittgenstein scenarios are slightly different from the LFS data (they include ISCED4 in the category of high education), we will use the progression rates of these scenarios rather than the exact numbers to estimate the future population by educational attainment.

In real terms the projections by educational attainment mean that for the older age groups we assume the cohort effect to be dominant, i.e. the distribution by educational level in a given age group is the same as five years earlier in the age group five years younger. For example in age group 75-79 the distribution of the population by level of education is similar to the distribution of the age group 70-74 five years earlier. As a consequence we assume that older people do not change their educational status and that education-related differences in mortality do not impact the distribution by level of education in a significant way (or this impact is smaller than the uncertainty of the initial estimations). For younger age groups we assume an increase of the level of educational attainment consistent with the progression rates in the GET scenario. Furthermore, we assume similar levels of education for migrants as for nationals.

ALTERNATIVE MIGRATION SCENARIO

In the second set of projections we keep the fertility, mortality and education assumptions unchanged compared to the baseline scenario, but adopt alternative migration assumptions. Instead of adopting the net migration assumptions of the main scenario of EUROPOP2013, we assume constant net migration for all projection years equal to the average of the net migration figures for the period 2004-2013 (see Figure 1). We only change the level of migration; the age and sex-specific patterns of migration are kept unchanged. For Belgium, Germany, the Netherlands, Sweden and Switzerland, this means a lower level of migration in the second scenario, while for France, Italy and the United Kingdom higher levels of migration are assumed. For Spain and Poland, in the short term the direction of migration will be different in the two scenarios: for Spain from slightly net emigration to substantial net immigration and for Poland from small net immigration to somewhat stronger net emigration.

Figure 10: Annual net migration by country and scenario

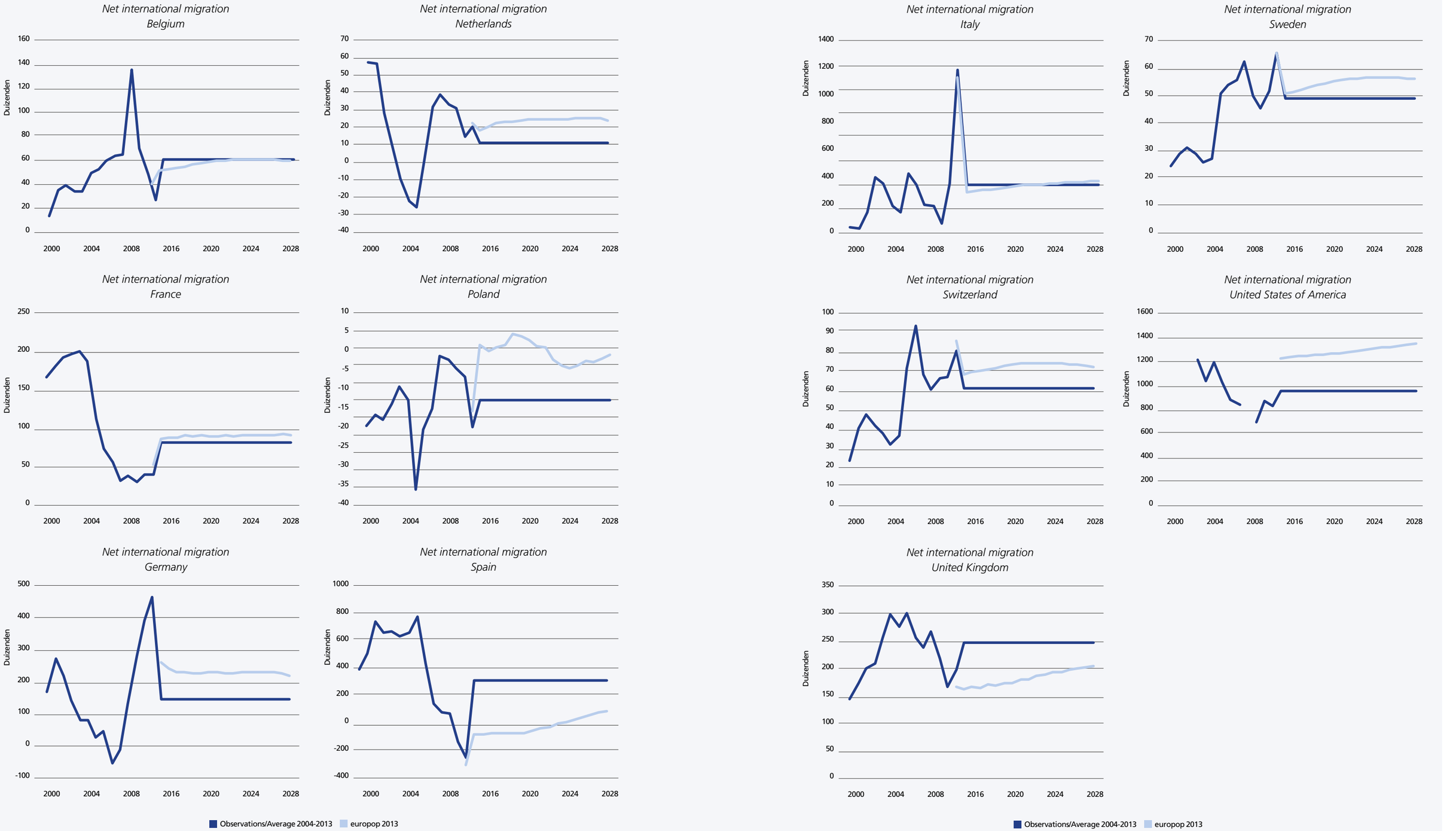


Table 3: Labor Supply Elasticities

Country	Skill level High	Medium	Low	Skill level High	Medium	Low
	Married Men			Single Men		
BE	0.114	0.103	0.138	0.198	0.115	0.485
CH	0.093	0.085	0.109	0.160	0.121	0.228
DE	0.139	0.126	0.156	0.221	0.205	0.132
ES	0.069	0.082	0.075	0.670	0.388	0.650
FR	0.057	0.067	0.060	0.123	0.133	0.189
HU	0.079	0.073	0.084	0.159	0.203	0.129
IT	0.040	0.072	0.031	0.275	0.205	0.192
NL	0.063	0.043	0.083	0.097	0.032	0.109
PL	0.079	0.073	0.084	0.159	0.203	0.129
SE	0.083	0.038	0.104	0.200	0.166	0.304
UK	0.034	0.035	0.037	0.221	0.166	0.378
US	0.077	0.076	0.076	0.208	0.171	0.208

Country	Skill level High	Medium	Low	Skill level High	Medium	Low
	Married Women			Single Women		
BE	0.316	0.307	0.305	0.560	0.244	0.932
CH	0.261	0.286	0.259	0.250	0.143	0.448
DE	0.309	0.311	0.328	0.182	0.130	0.354
ES	0.465	0.598	0.463	0.134	0.090	0.342
FR	0.116	0.159	0.106	0.123	0.082	0.202
HU	0.151	0.152	0.159	0.066	0.077	0.163
IT	0.361	0.485	0.258	0.465	0.618	0.897
NL	0.305	0.366	0.297	0.136	0.117	0.306
PL	0.151	0.152	0.159	0.066	0.077	0.163
SE	0.123	0.094	0.144	0.233	0.140	0.428
UK	0.079	0.120	0.076	0.319	0.281	0.472
US	0.141	0.163	0.123	0.242	0.189	0.260

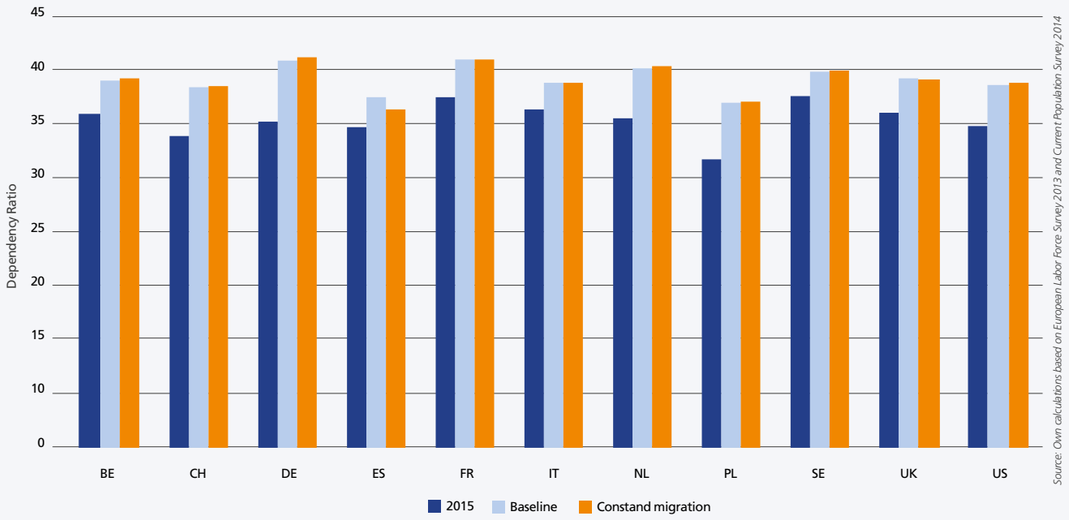
Source: Own calculations based on Bargain, Orsini, et al. (2014).

Table 4: Labor Demand Elasticities

Country	Skill level High	Medium	Low
	Married Men		
BE, DE, NL, CH, FR	-0.805	-0.805	-0.886
SE	-0.795	-0.795	-1.004
UK	-1.026	-1.026	-0.922
IT, ES	-0.868	-0.868	-0.868
PL	-0.754	-0.754	-0.754
US	-1.048	-1.048	-1.438

Source: Own calculations based on Lichter et al. (2015).

Figure 11: Dependency Ratio



Source: Own calculations based on European Labor Force Survey 2013 and Current Population Survey 2014

Figure 12: Labor Force composition

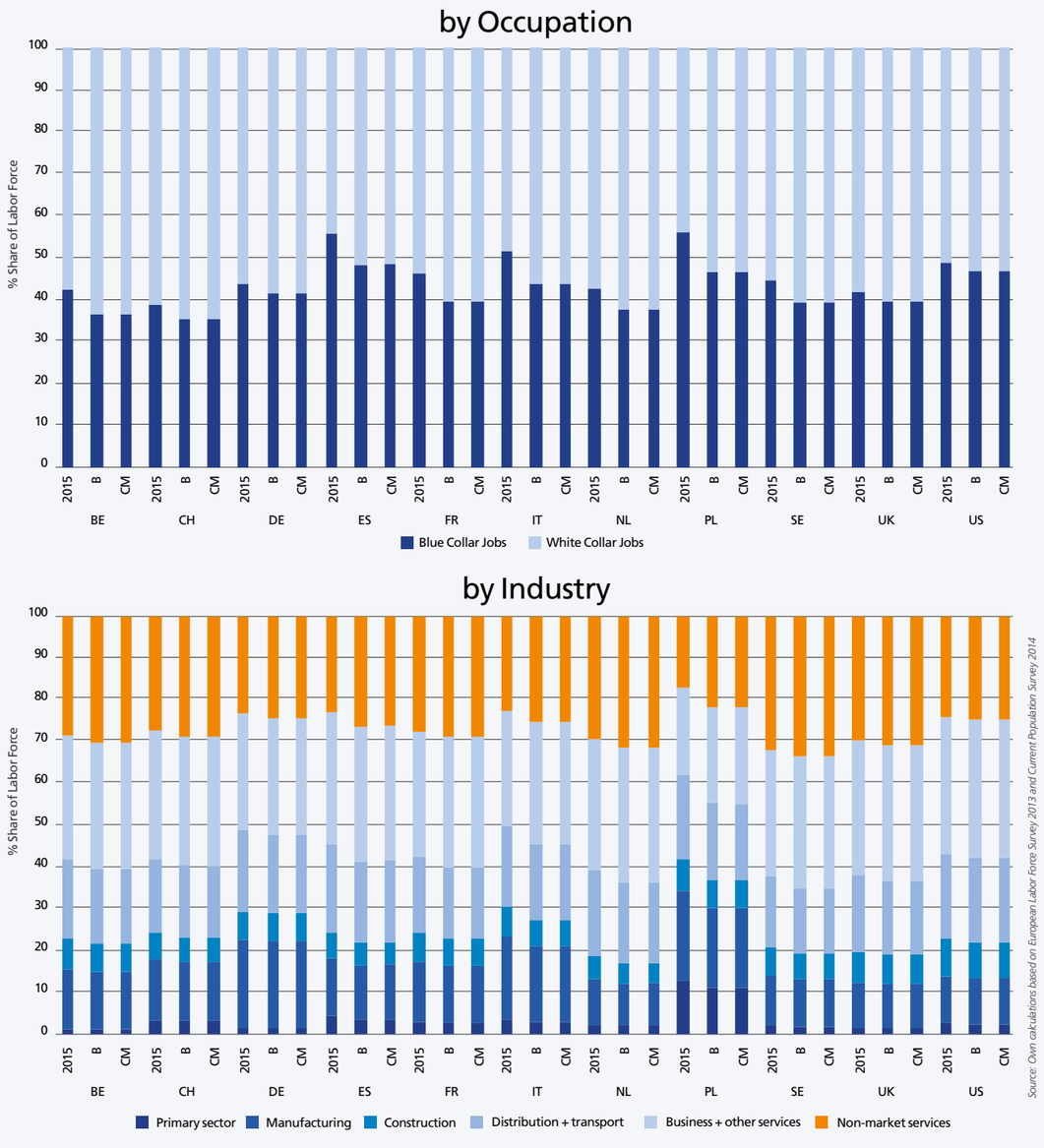
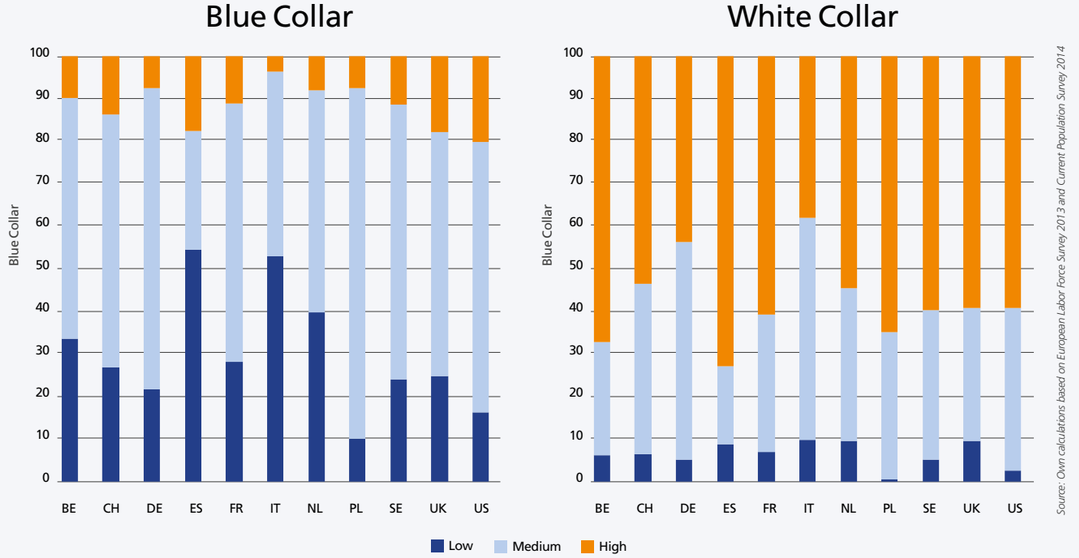
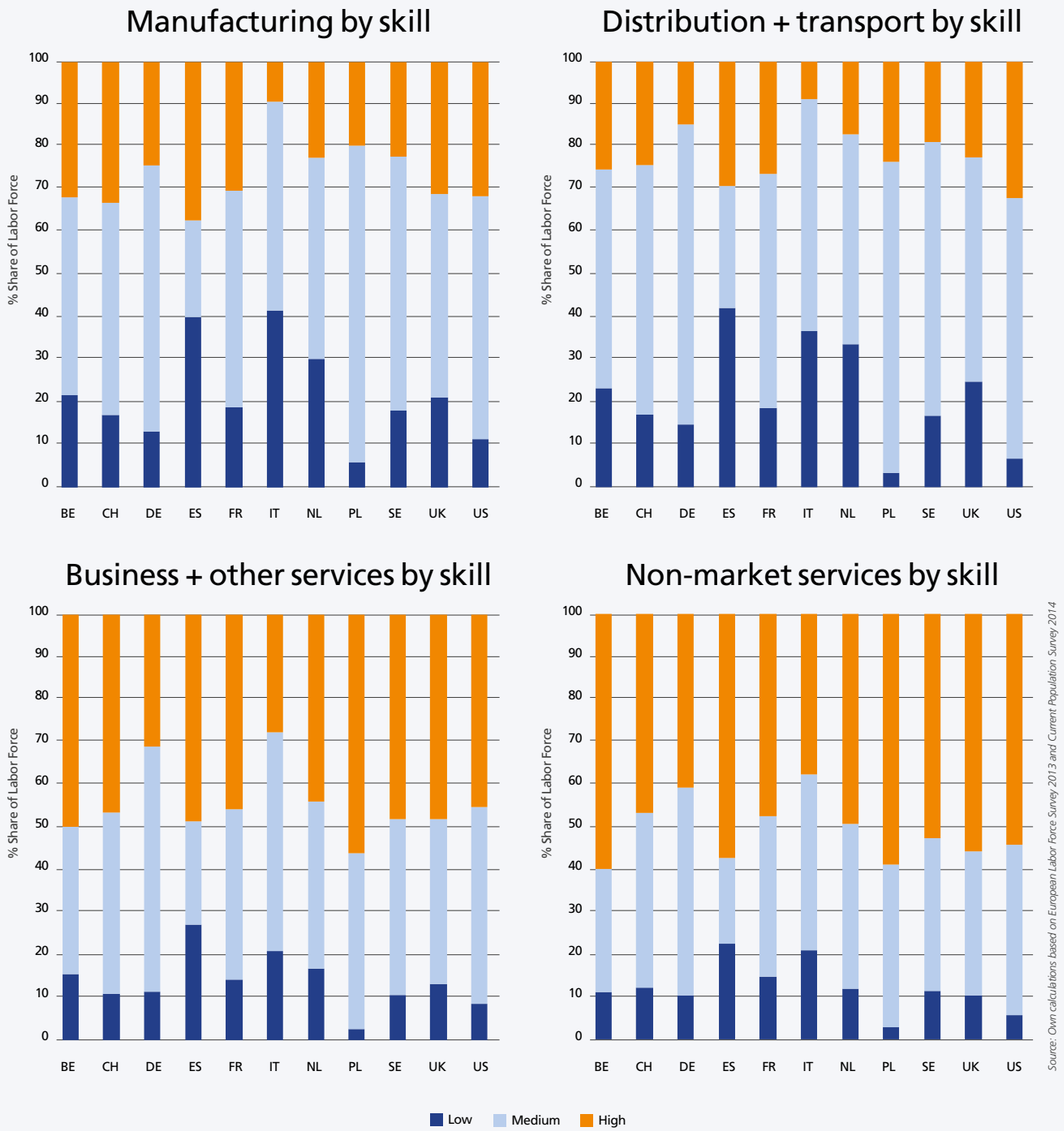


Figure 13: Skill decomposition of occupations



Labor Force decompositions as of 2015.

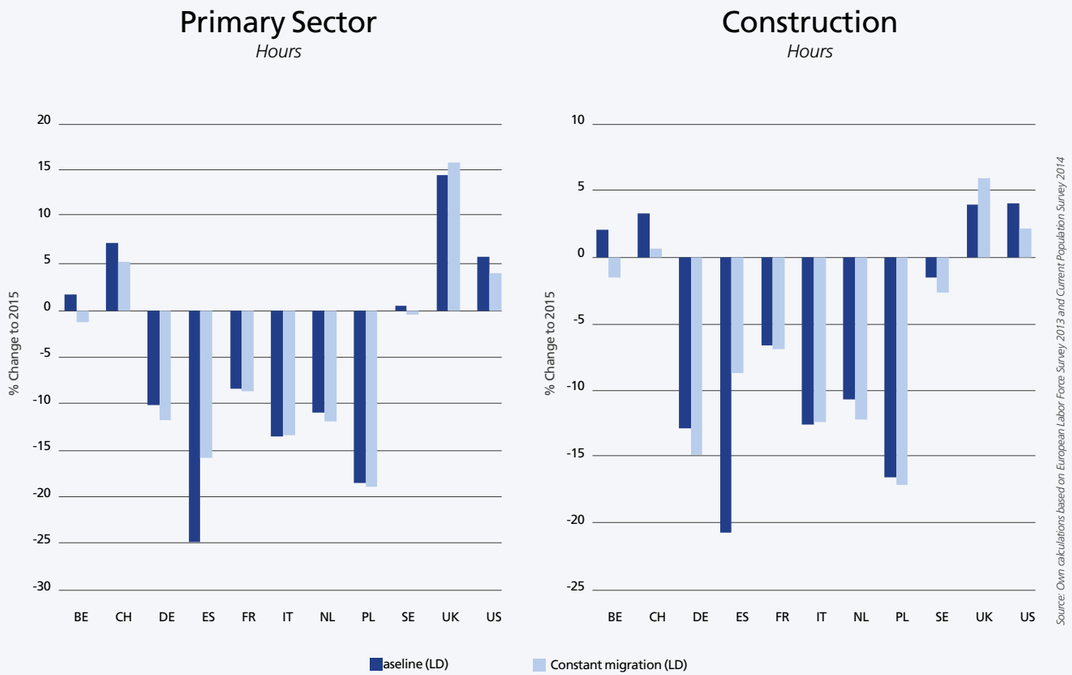
Figure 14: Skill decomposition of sectors



Source: Own calculations based on European Labor Force Survey 2013 and Current Population Survey 2014

Labor Force decompositions as of 2015. Primary Sector and Construction are not shown because of their overall minor importance.

Figure 15: Hours Change for Primary and Construction Sector



Source: Own calculations based on European Labor Force Survey 2013 and Current Population Survey 2014

B: Baseline Migration Scenario; CM: Constant Migration Scenario.

3.0 Jobs to People?
Assessing firm location choice behavior in the light of (potential) skill shortages

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Demographic change and continuing job polarization at the expense of medium-skilled employment may well trigger notable skill shortages in the near future. From an economic perspective, these potential shortages in skills may in turn urge firms to adjust their production technology mix or their employment strategies to overcome these deficiencies, which may impede firms' output and productivity. Against this backdrop, the study continues by evaluating one potential adaption strategy for firms: the relocation of (parts of) the firms' production sites.

Jobs to People?

Assessing firm location choice behavior in the light of (potential) skill shortages

The preceding chapters of this project have analyzed the role of immigration in solving labor, or more precisely, skill shortages. Although immigration policies certainly serve as one important strategy to deal with skill shortages, for example, arising from the aging of Western societies as observed in Germany[1], effects of immigration policies often exhibit considerable temporal lags and thus may not alleviate shortages in due time. Against this backdrop, the present chapter investigates whether skill shortages might in turn induce firms to relocate (parts of) their production process to skill-abundant regions.

Given considerable conceptual differences in peoples' understanding of the term skill shortages (Cappelli, 2015), the chapter first defines the scope of this analysis and assesses the importance and presence of skill shortages from both the public and academic view. The second part of this chapter characterizes various determinants of firms' location choices, highlighting the role of market access, human capital endowment, agglomeration economies, wage levels and the quality of infrastructure, among others. Based on this general discussion of the economic literature, the third part of this chapter subsequently assesses firms' decisions to relocate production in light of skill shortages.

The short synthesis of the literature provided in this chapter offers three key insights. First, public opinion and academic evidence on the current extent of skill shortages, defined as missing supply for firms' demand for occupation-specific labor (Cappelli, 2003), differs to considerable extent. To date, despite claims from employer organizations or public institutions, academic research provides little

1 In fact, many countries have used migration programs to deal with rather persistent shortages of skilled or low-skilled labor supply.

Easy access to (new) markets, the presence of workers endowed with required skills at acceptable wage rates, adequate infrastructure and non-impeding labor or environmental regulations have been shown to be important determinants of firms' location choice.

evidence of skill shortages, especially in the U.S., but rather highlights the persistent feature of over-qualification in the labor market, with workers exhibiting jobs below their actual skill set. However, future skill shortages may indeed arise due to the aging and shrinking of many Western societies (Directorate General for Internal Policies, 2015) and observed job polarization at the expense of medium-skilled employment (Acemoglu and Autor, 2011; Goos et al., 2014).

Second, economic research has identified firms' location choices to be complex processes subject to a variety of regional determinants as well as firm-level characteristics. Easy access to (new) markets, the presence of workers endowed with required skills at acceptable wage rates, adequate infrastructure and non-impeding labor or environmental regulations have been shown to be important determinants of firms' location choice. Third, we argue that this complexity limits the extent of firm relocation in light of (potential) future skill shortages. However, it seems likely that firms may respond to future skill shortages by increasingly offshore certain parts of the production process. Given substantial investments in infrastructure and human capital by some emerging countries, in particular in Asia, it can be further expected that more skill-demanding production steps will increasingly become subject to offshoring, a development that can be already observed to some extent today (see, for example, Ernst (2006)).

SKILL SHORTAGES: CONCEPTS AND EVIDENCE

Eight years after the official end of the Great Recession, U.S. and European labor markets are still struggling to recover from the substantial effects of this remarkable economic downturn. In the fourth quarter of 2014, the OECD average unemployment rate still exceeded its pre-crisis level by 1.6 percentage points, with young and less-well trained individuals being particularly affected by this long-term labor market crisis (OECD, 2015). Nevertheless, over the past years, numerous organizations have publicly claimed the existence of substantial shortages of skilled talents and drastically illustrated the (potential) consequences of this shortfall. Usually, claimants thereby highlight firms' struggles to meet their demand for occupation-specific labor with correspondingly qualified personnel (see, among others, Shah and Burke (2003) and Cappelli (2015) for more detailed surveys).[2]

Claims are often based on the results of employer surveys. [3] For example, the Talent Shortage Survey shows that a considerable share of the interviewed employers, 38%, argues to be unable to fill open vacancies and expects these shortages to negatively affect firms' performance (ManpowerGroup, 2015). Likewise, the PWC Annual Global CEO Survey reports CEOs' concerns that talent shortages significantly hinder their firms' profitability (PricewaterhouseCoopers, 2012). In similar vein, the European Company Survey 2009 (European Foundation for the Improvement of Living and Working Conditions, 2010) shows that many firms report problems of filling vacancies, with around 20% (in the UK and Ireland) to 50% (in Cyprus and Luxembourg) of the employers in European countries facing open vacancies that are hardly filled. Publications by employer-based organizations, such as Business Europe (2011), or single companies such as the Bayer Corporation (2013), echo these statements at large. Here, most recent attention has focused on skill shortages in science, technology, engineering and mathematics (STEM) occupations, Business Europe (2011), for example, arguing for severe shortages in STEM occupations in many European countries; with likewise statements being observed in the U.S. as well (see, among others, the President's Council, 2012).

Genuine skill shortages may indeed urge firms to adjust their production technology mix or their employment strategies to overcome these deficiencies (Haskel and Martin, 1993; Stevens, 2007), with both adjustment strategies being likely to impede firms' output and productivity (Haskel and Martin, 1993). Academic research has, however, been critical regarding the notion and scope of this feature of the labor market. Cappelli (2015) provides an in-depth discussion of the claims raised and argues that there is little convincing evidence corroborating the existence of skill shortages in the United States. Rather, he highlights that over-education, i.e., levels of education in excess of that which is required for a particular job (McGuinness, 2006), remains the more persistent feature in the U.S. and many European labor markets. Indeed, empirical evidence, recapitulated in McGuinness (2006) and Quintini (2011), suggests that – despite notable empirical challenges – over-education is widely spread, inducing negative effects on the individuals concerned in turn. Against this background, Cappelli (2012, 2015) argues that the high level of reported vacancies might be to some part self-inflicted by the management [4], potentially arising from more selective hiring at times of high unemployment rates (see Cappelli, 2012) or endeavors to hire skills rather than build them inside the firm (see Cappelli, 2015).

Future skill shortages may arise due to the aging and shrinking of many Western societies and observed job polarization at the expense of medium-skilled employment

Market potential serves as one key determinant of location choice

Despites these controversies on the nature and scope of this feature of the labor market, policy makers in Europe and the U.S. consider the occurrence of future skill shortages, particularly arising due to the aging of some Western societies, as one of the big future challenges to sustain

2 In this study, we neglect the analysis of more general skill gaps, i.e., discrepancies arising from firms' general demands on their staffs' skill and the given skill level of the workforce. See Capelli (2015) for a more detailed discussion of these two related terms. 3 Cappelli (2015) provides an in-depth discussion of employer-led claims on skill shortages.

4 In their annual reports, the American Society of Training and Development (ASTD) shows that associated members considered shortfalls in skills to be management-inflicted (see ASTD, 2012).

economic growth (Directorate General for Internal Policies, 2015). Increasing job polarization in many developed countries, with demand for high- and low-skilled work increasing and medium-skilled routine employment being substituted by automatic production technologies or outsourced to low-income countries (see, for example, Acemoglu and Autor (2011) for the United States and Goos et al. (2014) for European countries), is further likely to corroborate (future) changes in firms' demand for labor.

Medium-skilled routine employment may be automatized or offshored to low-income countries

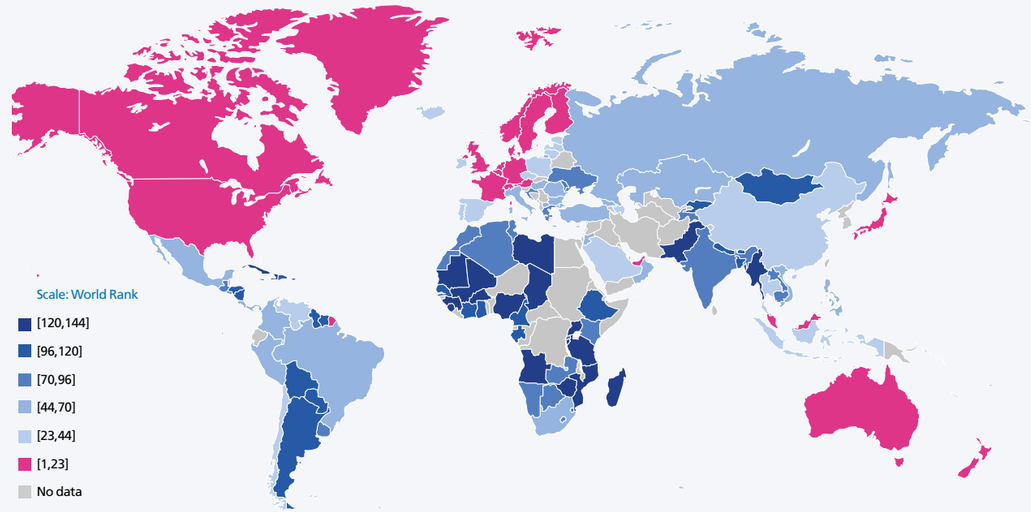
Against this backdrop, the present study evaluates one possible adaption strategy for firms, namely the relocation of (parts of) the firms' production sites and the associated jobs. To better understand relocation decisions in response to arising skill shortages, a general analysis on the determinants of firms' location choices precedes the evaluation of firms' relocation in response to skill shortages.

DETERMINANTS OF FIRMS' LOCATION CHOICE

Given the costly transportation of goods and factors across space and the existence of scale economies arising from the pooling of production processes at one location (Ottaviano, 2008), firms' location choices become a complex decision. Among others, it involves crucial assessments of the potential costs and benefits of entering different countries and deciding on the specific location within a given country. Moreover, decisions regarding the actual amount of investment within the chosen location and -- in a multi-plant setting -- on how to shift profits of operation have to be made (Devereux, 2007).

At first glance, preferable locations for economic activity may, however, be easily identified. The recent World Bank's Doing Business Report ranks countries by several indicators – for example, based on the ease of starting a business, the scope of tax liabilities, legal security with respect to the enforcement of contracts, or the strictness of trade or employment regulations -- and clearly highlights those countries that seem particularly suitable for conducting business (World Bank, 2014). In a similar vein, the Global Competitiveness Report 2014-2015 published by the World Economic Forum judges countries' global competitiveness with respect to the quality of their institutions, educational system, labor market efficiency or innovation activities, among others, and ranks all countries accordingly (World Economic Forum, 2014). On a more disaggregated level, the Cushman & Wakefield European Cities Survey assesses firms' perceptions about European cities' attractiveness for doing business and identifies easy access to markets, availability of qualified staff, quality of telecommunications and suitable transport

Figure 1: Global competitiveness index



Note: This graph is based on data from the Global Competitiveness Index 2014-2015, provided by the World Economic Forum.

links as the four key specified factors for firms' location choice (Cushman and Wakefield, 2010).

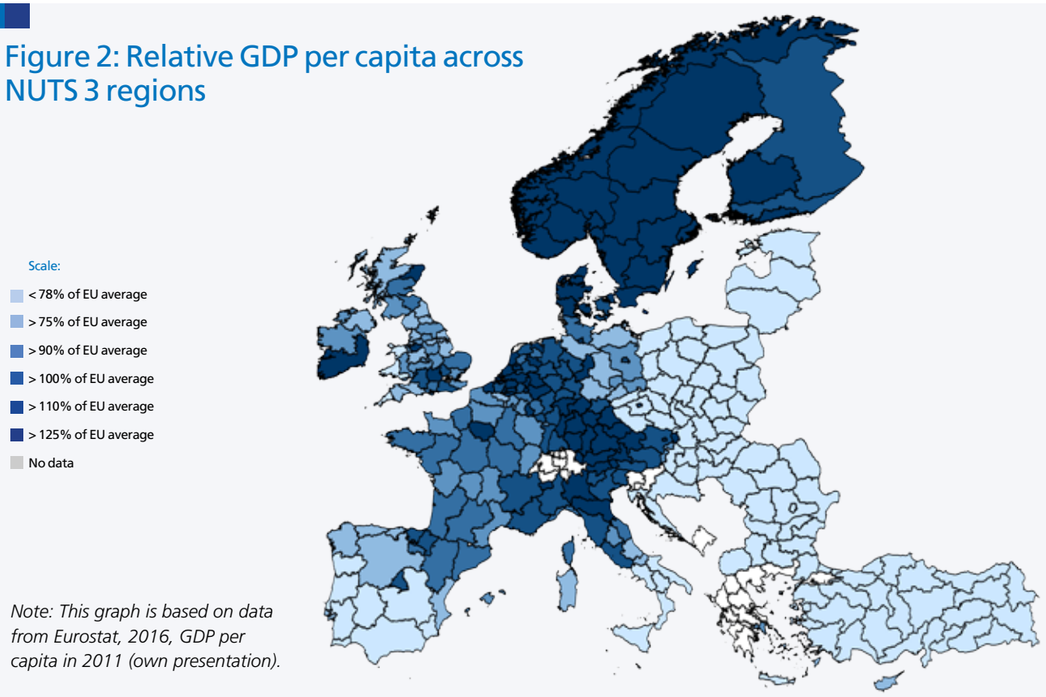
Figure (1) illustrates the results of the Global Competitiveness Report, with brighter colors indicating a higher ranking of the respective country (blank countries have missing data). Australia, the U.S., Canada, Germany, the UK and the Scandinavian countries are ranked highest, while the report identifies countries in Africa to be least competitive.

Although these measures clearly cover particularly important aspects of firms' location choices and signify important differences in countries' prerequisites to successfully run a business, these measures simplify the complex decision on where to run business to some extent by construction. Given its importance, it is hence unsurprising that economic research has devoted enormous attention to the analysis of this decision. The rest of this section therefore highlights the key findings of the economic literature. Throughout this analysis, determinants of firms' location choices at domestic and foreign locations as well as in the context of firms' first entry and the creation of new subsidiaries will be considered.

MARKET POTENTIAL

Potential market size serves as one key determinant of firms' location choice. Early empirical evidence by Coughlin et al. (1991) shows that U.S. states endowed with relatively higher levels of GDP per capital, which is considered as a suitable proxy for local product demand, attract relatively more foreign direct investment (FDI) than

Figure 2: Relative GDP per capita across NUTS 3 regions



Note: This graph is based on data from Eurostat, 2016, GDP per capita in 2011 (own presentation).

other U.S. states. Davis and Weinstein (2003) further argue that the persistence of trade frictions and its power to segment markets crucially affects worldwide patterns of local production, while these geographical patterns of production in turn depend on the extent of local demand.

Hanson (2004) investigates local linkages between regional product demand and spatial agglomeration of economic activity by using data on the universe of U.S. counties. His analysis shows that regional product-demand interactions are central in determining geographic concentration of economic activity, with regions neighboring counties with higher incomes, and thus potentially higher product demand, fostering geographic concentration of economic activity. In this light, Head and Mayer (2004) develop a theoretical model to explain why firms locate "where markets are" and highlight the role of accessibility of markets due to trade costs as well as the presence of potential competitors in shaping this relation. Using data on Japanese firms' location choices in Europe, they further show that a region's market potential indeed significantly increases a firm's chance of locating into this particular region.

Focusing on location choice determinants of foreign firms in China, Amiti and Javorcik (2008) further show that access to markets and suppliers in the province of entry are the two most important factors in determining FDI flows. Market access to other regions in China matters much less when predicting location choices, which is attributed to lacking transport infrastructure and a general fragmentation of the Chinese market. Chen and Moore (2010), however, show that less attractive markets, again measured by means of market size, are targeted by more productive multinational firms, suggesting that firms' location choices rely on potentially unobserved firm-specific factors as well.

Figure (2) exemplarily highlights that economic prosperity, measured by means of GDP per capita, is significantly concentrated to certain European regions. Wealthier regions are predominantly covering Northern Italy, Austria, Southern and Western Germany and the Netherlands. Moreover, several capital regions such as Madrid, Paris, London, Catalonia, certain regions in the Scandinavian countries but also the Eastern European Capitals have higher GDP per capita than the EU average. While differences in regional GDP as displayed in Figure (2) indicate market potential, it may also indicate agglomeration of industries in turn.

The region's GDP/ purchasing power, the presence of competitors/ suppliers, and the quality of the infrastructure crucially affect firms' assessments of markets and their location choice

AGGLOMERATION/CLUSTERS

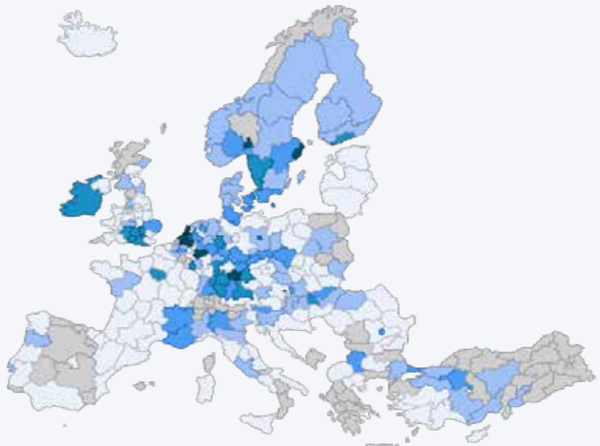
Existing research has further shown companies' general appreciation of locations that are already inhabited by a large quantity of similar firms. In the U.S., most industries show at least some degree of geographic accumulation, although the extent of clustering varies considerably (Ellison and Glaeser, 1997). Reasons for industrial clusters may be natural local advantages, for example, in shipbuilding or wine making, or economical, often labeled as a spillover effects (Glaeser et al., 1992, Ellison and Glaeser, 1999). These spillovers may arise from economies of scale, specialization, or the diffusion of knowledge, i.e., human capital, among others.

In a nutshell, the literature distinguishes urbanization economies, i.e., economies within cities, from localization economies, i.e., economies within single industries (Rosenthal and Strange, 2004). Evidence suggests urbanization economies to be particularly strong (Arauzo-Carod et al., 2010), a doubling of city size being estimated to generate productivity increases by three to eight percent (Rosenthal and Strange, 2004). Hsieh and Moretti (2015) show for the U.S. that spatial reallocation of labor to high productive cities could significantly increase the U.S. GDP and aggregate welfare. However, there seems to exist an inverted U-shaped relationship between the density of economic activity and productivity. Too much concentration may lead to diseconomies of scale (Arauzo-Carod et al, 2010).

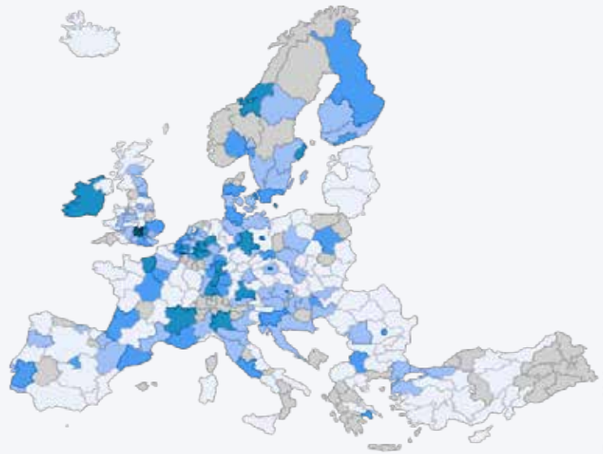
Different economic theories aim at explaining superior productivity of large cities (see, for

Figure 3: Industry Clusters Europe

Digital industries



Biopharmaceuticals



Source: Eurostat, 2016.

Firms appreciate locations that are inhabited by similar firms, creating industrial clusters

example, Melo et al., 2009). Scholars stress actual agglomeration advantages (agglomeration economies) as well as selection of highly competitive firms into urban areas as likely explanations. Combes et al. (2012) test these hypotheses but reject the latter one. Moreover, geographic accumulation of firms or industries has been shown to further originate from targeted location decisions and higher survival rates in a given cluster (Glaeser et al., 1992). For illustrative purposes, **Figure (3)** exemplarily highlights industrial clustering within European regions for the biopharmaceutical and digital industry, both considered to be very important industrial fields with regard to technological progress. With more intensely shaded regions signifying large extents of clustering, it can be inferred that both industries show a substantial degree of clustering, while the regions of economic activity across Europe differ to some extent.

Given the considerable importance of clustering for economic growth, policymakers and academics have constantly tried to implement policies to foster the creation of clusters (see Porter (2000) for the seminal paper on this topic and Duranton (2011) for a critical discussion). For Europe, Ketels and Protsiv (2013) review more than a thousand cluster initiatives to emphasize the wide spread of this policy idea. In his analysis of these initiatives, van der Linde (2003), however, shows that only one out of the 700 clusters studied in his analysis was successfully created from scratch, which signifies the limitations of this policy approach.

HUMAN CAPITAL AND WAGES

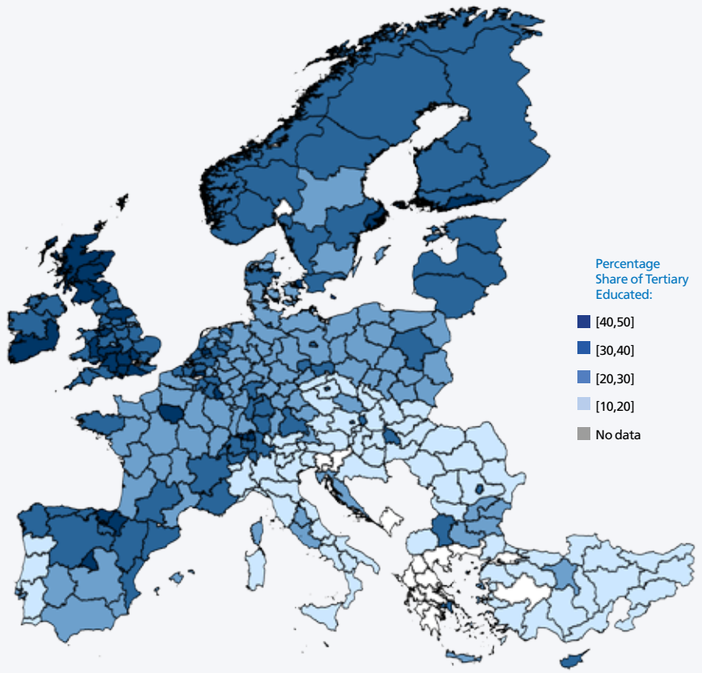
The availability of skilled labor has been further shown to affect firms' location choices, fostering entrepreneurial activity and shaping flows of FDI. As examplified in Glaeser and Kerr (2009), Boston's Route 128 and the Silicon Valley still serve as the canonical examples for situations in which proximity to universities and their research output has fostered entrepreneurial agglomeration and created economic research & development (henceforth, R&D). Zucker et al. (1998) show that both the foundation of new biotech firms as well as the establishment of biotech subsidiaries by previously existing firms at particular locations in the U.S. was crucially determined by the presence of scientists and universities that provided valuable scientific knowledge to these new firms. The authors argue that the growth and the location of intellectual human capital were the principal aspects that fostered growth and location of these industries. Using information on foreign firm's entry and location choice decisions in the United States, Alcacer and Chung (2007) demonstrate that this finding holds true more generally, with firms favoring locations with academic innovative activity. Their results additionally point to important heterogeneity in location decisions by firm types, with less technologically advanced firms favoring locations with high industrial innovative activity, whereas technological leaders try to avoid these locations and hence spatial proximity to their competitors. It is these firms that locate their business in proximity to high-performing academic institutions. In a similar vein, Glaeser and Kerr (2009) further demonstrate that new firms are particularly attracted by abundant workers and their relevant skills, with the authors arguing that these skills serve as one key ingredient for most new entrepreneurs.

The presence of suitable employees has been shown to guide firms' location choices, and to foster the extent of entrepreneurial activities

The agglomeration of talent may further cause significant and beneficial spillover effects for an entire region. Using matched employer-employee data for the U.S., Moretti (2004) shows that – conditional on the innate level of human capital -- firms' productivity significantly increases in case the fraction of college graduates in the firms' spatial environment increases. Almazan et al. (2007), however, argue that some firms may choose not to locate in skill-abundant areas in case firms need to significantly invest in their workers' human capital. According to the authors' theoretical reasoning, location strategies may

The foundation of new, high-tech firms in the US can be related to the close presence of scientists and universities that provided valuable scientific knowledge to these new firms.

Figure 4: Share of population with tertiary education



Note: This graph is based on data from Eurostat, 2016, Percentage share of tertiary educated in 2013 (own presentation).

rather significantly depend on the firm's effort with respect to the development of workers' skills: If a firm has to spend considerable resources for training, it may become a monopsonist for skilled labor when locating into more remote areas and hence avoids competition for skilled labor. Matouscheck and Robert-Nicoud (2005) corroborate this reasoning by demonstrating that firms may be less spatially concentrated in case skills are transferable within an industry (rather than firm-specific) and firms bear the costs of developing these skills. Using British regional-level data, Brunello and Gambarotto (2007) indeed show that employer-provided training decreases with regional labor market competition, providing suggestive evidence that spatial agglomeration of economic activity dampens the level of training. **Figure (4)** shows that the pool of talents, measured by means of the share of the population with tertiary education, indeed differs among European regions. While we do not claim that this distribution of talent is random but rather stress that this pattern may already reflect agglomeration of knowledge-intensive industries/universities across Europe, the Figure highlights that location decisions of entrepreneurs or decisions on FDI may be subject to this uneven distribution of talent.

Absent any regulations or wage bargaining, regional differences in wages should simply reflect regional differences in skills, with individual-specific wages reflecting individual-specific productivity. In reality, wages, however, do not necessarily match productivity, for example, due to institutional regulations such as minimum wages. Hence, firms naturally desire employing particular skills at the lowest costs possible. Unsurprisingly, wage levels have thus long been considered as one key economic driver of location choice.

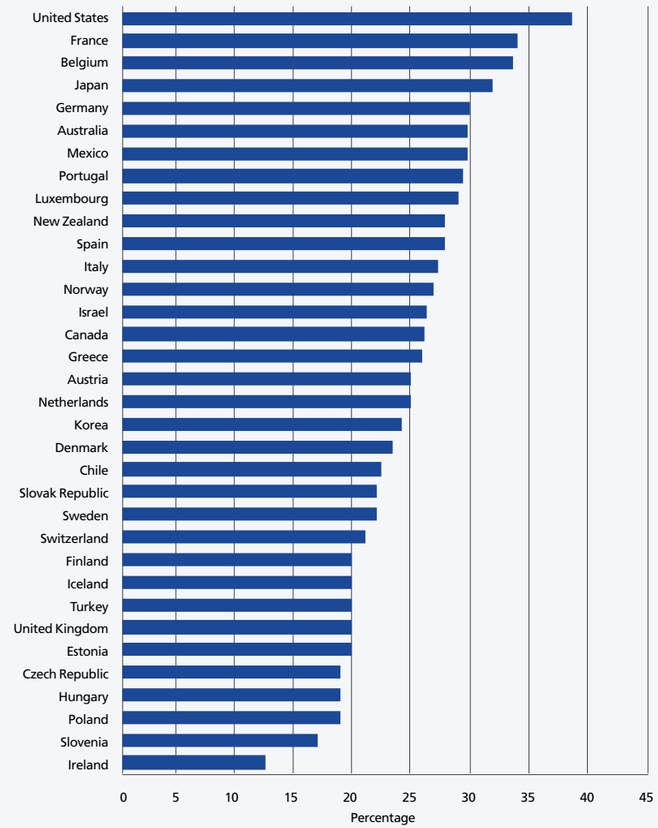
Whereas empirical evidence based on aggregate investment flows offers rather unambiguous evidence that low-wage regions attract capital (see, for example, Wei, 2000), firm-level evidence regarding the effect of wages on firms' location choice is sparse and mixed (see, among others, Keller and Levinson, 2002; Head and Mayer, 2004). Here, reliable empirical evidence on the effect of wages on firms' location choices is presented by Liu et al. (2010), who first demonstrate that the aforementioned mixed evidence may be explained by unobserved location-specific characteristics that are positively correlated with wages and thus cause a downward bias in the estimates, i.e., making firms to appear less sensitive to wages than they are in reality. Based on an alternative econometric procedure, the control function approach developed by Petrin and Train (2005, 2006), the authors then investigate location choices of 2,300 foreign firms' FDI decisions in China from 1993 to 1996 to show that location choices of labor-intensive industries are indeed highly elastic with respect to regional wage differentials. Importantly, the authors yet also show that this sensitivity decreases with the skill intensity of the industry, demonstrating the sensitive interactions arising from firms' need for skilled labor and their corresponding willingness to pay for this production factor.

TAXATION

A country's level and structure of taxation serves as another important determinant of location choice, with firms carefully weighting the extent and quality of public goods provided against the level and extent of corporate taxation (Gabe and Bell, 2004). Despite firms' responsiveness to taxation, corporate tax rates vary considerably across countries, Figure (6) exemplarily visualizing variation in corporate tax rates across OECD countries. Transition countries such as Hungary or Slovenia tend to have lower corporate tax rates than traditionally industrialized nations such as the United States, France or Japan. Likewise, differences in the corporate tax base across countries are apparent, and simultaneous changes in the corporate tax rate and tax base are

Figure 5: Differentials in Corporate Income Tax Rates

OECD: Combined corporate income tax rate, 2015.



Note: This graph is based on data from OECD, 2016, Combined corporate income tax rate in 2015.

As expected by economic reasoning, differences in the level and scope of taxation, the degree of governmental regulations (e.g., regarding employment or the environment) and the presence of local amenities, such as social structures, norms or milieus, further guide firms' preferences in favor of or against certain locations

frequently observed across OECD countries (see, for example, Kawano and Slemrod, forthcoming). Importantly, corporate tax rates may further differ at the intra-national level. For example, additional corporate taxes are imposed at the state level in the U.S., or at the municipal level in Germany. In light of this, variation in tax rates as presented in Figure (6) peculates additional variation.

Over recent decades, empirical research in Public Economics has devoted much attention to identifying the effects of taxation on firms' location choices. Negative effects of taxes on location decisions have been observed by many scholars, although some studies provide evidence for non-negative effects of taxation on location decisions (see de Mooij and Ederveen (2006), Devereux (2007) or Arauzo-Carod et al. (2010) for surveys).

Importantly, details matter: "[E]ffective average tax rates tend to play a significant role in discrete location choices, and hence in the overall allocation of capital; but effective marginal tax rates are much less significant" (Devereux, 2007, p.41).

De Mooij and Ederveen (2006) provide a rigorous synthesis of the corresponding literature by using meta-regression techniques. The results of their analysis suggest that actual location decisions are less elastic to tax rates than the level of investment. On average, a one percentage point increase in tax rates has been found to decrease a country's received foreign direct investments by 2.9%, while important and large heterogeneity in the effect size should be acknowledged. Although the literature hence concludes that taxes reduce incentives for investment, questions regarding the optimal level of corporate taxation and respective welfare effects due to taxation are more nuanced. Absent corporate taxation, other taxes need to be issued in order to finance government activity, which in turn creates negative welfare effects in different ways.

International cooperation in tax setting laws may, however, reduce disincentive effects of corporate taxation and tax competition (Gabe and Bell, 2004, Devereux, 2007). Today, cooperation in tax setting has been observed in the European Union, where differences in tax rates on capital have decreased by almost 10 percentage points since 1995 (Eurostat, 2014). As mentioned above, jurisdictions within countries, such as municipalities, are further subject to tax competition in case issuing local taxes and being able to set tax rates at their own discretion. Theories devised for international settings remain meaningful. In contrast, as mobility tends to be higher, both for capital and private households, firms may respond more elastically with respect to changes in local tax levels. However, given the existence of agglomeration economies, firms' sensitivity to tax rates can be quite low given location-specific advantages that outweigh tax differentials (Brülhart et al., 2015).

Asian countries try to enhance their attractiveness for foreign direct investments by providing the necessary infrastructure, investing heavily into broadband communication and information technology

GOVERNMENTAL REGULATIONS

Unsurprisingly, empirical research further shows that firms' location choices are affected by pro-business policies. Using state-border discontinuities in economic policies in the U.S. and comparing adjacent regions along these state borders, Holmes (1998) shows that manufacturing activity is significantly higher in pro-business states than in those states with policies considered as anti-business. Focusing on economic growth in India over a period of more than three decades, Beasley and Burgess (2004) further show that states that changed labor regulation in favor of employees experienced lower output, employment and investment growth over the period of 1958 to 1992 than those Indian states that kept labor regulations rather stable. Investigating the effects of labor market regulation for 85 different countries, Botero et al. (2005) point out that heavier regulation of labor is associated with higher levels of unemployment and lower labor market participation.

In a similar vein, Cooke (1997) shows that labor practices and regulations may steer firms' destination of FDI. In his study, the author finds that U.S. industry-level investment flows to OECD countries are negatively affected by union power and the degree of government regulations regarding layoffs in the respective country. Bognanno et al. (2005) corroborate these findings by showing that layoff restrictions and other labor market regulations limit U.S. foreign investments, yet state that negative effects are relatively limited when being compared to the host country's market size as a determinant of FDI. Firm-level evidence further confirms the impact of labor market regulations on FDI. Gross and Ryan (2008) investigate determinants of FDI flows and location choices of Japanese firms to Western European countries between the late 1980s and 90s and find that legal protection of workers – in particular protection of non-temporary workers -- in the host country significantly limits FDI flows and location probabilities. For France, Delbecque et al. (2014) demonstrate that employment protection legislation is found to decrease firms' location probability in a given OECD country. Contrasting these findings, Leibrecht and Scharler (2009), however, show that FDI flows to transition economies in Eastern Europe are not affected by country-level differences in employment protection legislation but largely determined by direct production costs, wage costs in particular.

Against the backdrop of these findings, Davis and Vadlamannati (2013) raise the concern whether the negative relationship between location choice/the level of FDI and labor standards may trigger a race to the bottom in labor rights. Using panel data for 135 countries over 17 years,

the authors show that labor standards in a given country are indeed positively spatially correlated with standards elsewhere, and competition in labor standards being particularly pronounced among developing countries with already weak labor regulations.

Different environmental regulations are further often acknowledged to be a driver of firm location decisions. Anecdotal evidence of companies seeking low regulatory locations in so called pollution havens in order to cut costs or of those seeking high-regulation environments to satisfy customer demands for sustainable products are widely known. For many years, China has served as the canonical example for a pollution haven, with provinces competing for investment capital and being open to relaxing or at least not enforcing environmental standards (Esty and Mendelsohn, 1995; Erdogan, 2014). In contrast, Costa Rica enforced its environmental regulations in response to the demands of banana producing companies and their customers, which have shown to favor products that comply with certain ecological standards (Gentry, 1996).

Empirical research, however, has not been able to provide substantial evidence in favor of FDI/ location choice probabilities responding to environmental regulation (see Erdogan (2014) for a review of the literature). As powerful companies may in turn also try to manipulate country's environmental regulation, reverse causality and endogeneity concerns accompany the findings of this literature. Evidence in favor of foreign investment flows indeed trying to affect environmental standards is, however, also scarce and inconsistent (Erdogan, 2014). According to the current state of research, lax environmental standards thus do not appear to be a key driver for firms' location decisions in general.

Employment protection legislation is found to decrease firms' location probability

INFRASTRUCTURE

Although transportation costs have substantially declined over the twentieth century, and technological process has mostly eliminated the importance of fixed infrastructure (such as easy access to water) that had crucially affected the creation of natural urban clusters (Glaeser and Kohlhase, 2004), transportation infrastructure, i.e., the quality and scale of highways, railways, ports or airports, remains another important determinant of firms' location choice.

Publicly provided infrastructure has long been acknowledged to crucially impact regional private sector growth (Lynde and Richmond, 1992), and early evidence by Reynolds et al. (1994) indeed suggests that differences in the size and quality of transportation systems are able to explain differences in firm birth rates across countries. Martin and Rogers (1995) further argue that poor infrastructure in Eastern Europe has been a key obstacle to trade integration of these countries

after the introduction of the Maastricht treaty, as firms' choices to locate in Eastern European countries were deterred by bad infrastructure.

To date, most empirical research has focused on the importance of road infrastructure as a determinant of location choice. Chandra and Thompson (2000) rely on historical U.S. county-level data on highway construction to demonstrate that spatial agglomeration increased in those areas where new highways were created but lowered economic activity in adjacent counties. Holl (2004) uses micro-level data from Spain during times of large expansions of the road network (1980 to 1994) to investigate the effects of infrastructure improvements on new firms' location choices. Her analysis shows that newly installed motorways significantly affected the spatial distribution of new firms, with firms locating in further distance from industrial or residential centers but in proximity to new highways. Michaels (2008) further shows that the U.S. Interstate Highway System fostered economic prosperity of rural areas. Recent studies take particular care of important endogeneity concerns given the non-random course of highways. Duranton and Turner (2012) use instrumental variables techniques to show that an increase

Increased offshoring rather than relocation may serve as firms' more common behavioral response to skill shortages

in a U.S. city's stock of highways significantly increases employment. Using longitudinal plant-level data for Britain and exogenous variation in the construction of new road links, Gibbons et al. (2012) further show that road construction shapes firms' location choices at a small-scale geographical level. Against the backdrop of these findings, Figure (6) highlights that transport infrastructure endowments differ significantly across Europe.

LOCAL AMENITIES

The previously mentioned determinants of location choice may all affect geographic patterns of economic activity and hence trigger spatial agglomeration of industries or firms. A related strand of research has, however, emphasized that location decisions may be also shaped by personal factors of the entrepreneur, which might partly offset agglomeration economies and alike. Figueiredo et al. (2002), for example, show that entrepreneurs weigh objective attributes of non-home and home locations to different extent. While non-home location choices are significantly affected by agglomeration economies or the quality of infrastructure, among others, the authors show that personal factors favoring entrepreneurs' location in his or her home base may even outweigh location advantages of non-home regions to a considerable extent.

Dahl and Sorenson (2012) aim at corroborating this argument by highlighting that this kind of home bias exceeds mere preferences but rather puts a strong constraint on entrepreneurs' ability to found a firm away from home. This constrain is attributed to the importance of personal or professional relationships, in this literature referred to as social capital, present in an entrepreneur's home but absent in foreign regions. Dahl and Sorensen corroborate their claim by showing that entrepreneurs who start their venture at home are indeed more successful than those starting a buisness in non-home regions. Another potential explanation for the existence of a home bias in location choice is provided by Glaeser and Kerr (2009), who show that social structures may reduce stigma associated with entrepreneurial failure and hence increase social readiness of taking risks.

Lastly, and related to the previous two paragraphs suggesting a home bias of entrepreneurs, it has to be noted that workers obviously prefer certain residential locations to others as well. Black et al. (2002) and Arora et al. (2000) both highlight that individuals value the presence and quality of cultural and educational institutions, or amenities in general, as well as the social milieu. To date, little empirical evidence has highlighted this aspect with regard to firms' location decisions.

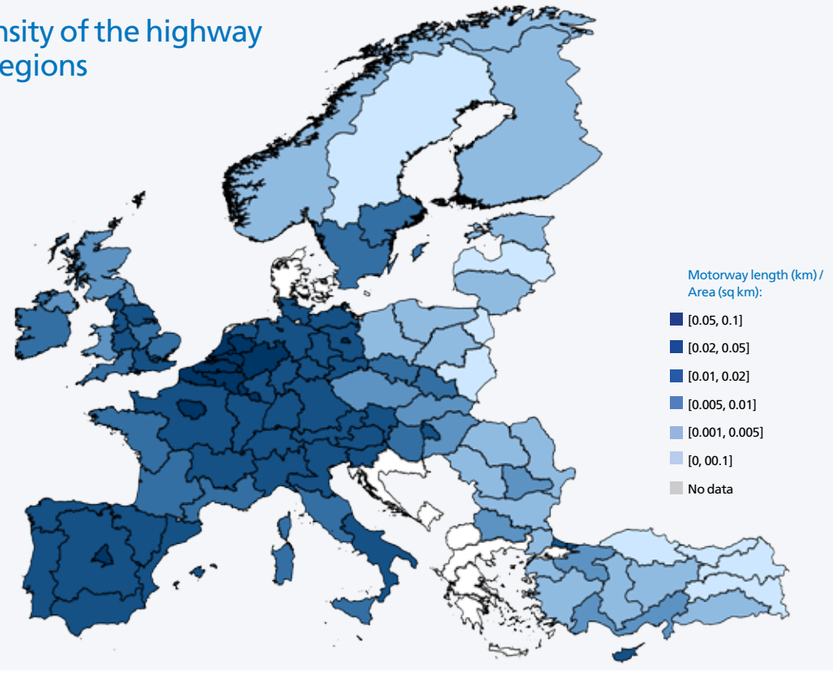
RELOCATION OF FIRMS

Given the complexity and variety of determinants affecting firms' location choice, it seems unlikely that firms relocate their entire production process to different regions in response to moderate changes in one factor of production. Given the importance of skilled labor and potentially more limiting shortages of talent in the future, (partial) relocation may, however, become an option in the longer run, given that it has been shown that genuine skill shortages in a firm's workforce may indeed deter its employment behavior (Stevens, 2007) and productivity (Kampelman and Ryckx, 2012). To date, relocation of firms is observed quite infrequently. Brouwer et al. (2004) report annual relocation rates of around 2.8%. For the U.S., Deller et al. (2015) show that cross-state relocation rates for manufacturing firms range from 0.2 to 2.0%.

Offshoring may serve as a response of firms to skill shortages

Despite scholars' large interest in the determinants of firm location, only a limited number of studies has focused on firms' relocation decisions. In a nutshell, the scarce evidence suggests that relocation probabilities decrease with firm size and age but increase with market size (Brouwer et al., 2004, Strauss-Kahn and Vives, 2009). Moreover, firms' relocation decisions do not seem to respond to state-induced fiscal policy incentives (Deller et al., 2015) but are rather determined by external growth, for example, due to mergers, acquisitions or take-overs (Brouwer et al., 2004). Regarding the choice of where to relocate, agglomerations have been identified to play a central role in firms' considerations (Strauss-Kahn and Vives, 2009) and it has been shown that firms successfully created new clusters in several different countries from scratch: Silicon Valley ventures created subsidiaries in Slovakia or Bangalore,

Figure 6: The density of the highway network across regions



Note: This graph is based on data from Eurostat, 2016, Motorway density in 2013 (own calculation and presentation).

which are now considered as new emerging technological clusters (Alfaro and Chen, 2014).

Offshoring, may, however, serve as an indirect behavioral response of firms to skill shortages. Although labor and non-labor cost savings motives, expected market growth opportunities and competitive pressure have been named as reasons for firms' offshoring decisions, access to qualified personnel also serves as one key determinant of firms' decision to offshore activities to date (Lewin et al., 2008). Rapidly-growing economies, such as China and India, were initially attracting businesses by offering low labor costs, weaker employment protection legislations or environmental standards (see, for example, Hijzen and Swaim (2010) for an evaluation of labor demand consquences due to rising offshoring opportunities). Today, the process of offshoring routine tasks to low-wage countries, however, often triggers the gradual expansion of firms' foreign activities by successively increasing the scope of tasks pursued in foreign locations (Dossani, 2006). Over the course of time, firms may thus be inclined to offshore additional, more skill-demanding processes and jobs (Dossani, 2006; Maskell et al., 2006). Technological process in information technologies and thus increased resource mobility may further enable firms to relocate apparently location-bound jobs, especially white-collar employment, to foreign countries (Agnese and Ricart, 2009; Bunyaratavej et al., 2007).

To date, in particular Asian countries have recognized these trends in offshoring and constantly try to enhance their attractiveness for foreign direct investments by providing the necessary infrastructure, investing heavily into broadband communication and information technology (Ernst, 2006). Moreover, the talent pool of countries like China and India has increased substantially over the past years, which attracts more skill-demanding jobs in turn. As highlighted by Ernst (2006), the number of patents granted to companies located in Asia may serve as a suitable indicator for increasing innovative performance of these countries, and hence as an indication that firms may more easily relocate some parts of their production aboard: over the past ten years there has been a gradual shift in patenting activity from Europe and North America towards Asia. In 2013, 58.4% of all patent applications were filed in Asia, with the number of patents in China rising by around 700% from 2003 and 2013 (World Intellectual Property Organization, 2014, p.13). Correspondingly, new industrial clusters have emerged in countries like China, Taiwan and Singapore, which are in turn attracting additional innovative activities (Ernst, 2006).

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