Immigration and labour market outcomes: immigrant self-employment, native task reallocation and the role of policies

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Abstract

In order to meet skill shortages, manage incoming migration flows and ensure immigration is a win-win for both immigrants and the host economy, policy-makers need more information about the dynamic between immigration and labour market outcomes: (1) how do immigrants adjust and fare in the local labour market?, and (2) how does immigration affect the host economy? The dissertation explores a number of aspects of precisely these questions, and discusses their implications for policy debates and scholarship. It engages with theoretical arguments concerning the importance of host country policies and the way they impact immigrants' employment, and in the end their productivity and contribution to economic development.

The dissertation is composed of four self-contained chapters that analyse complementary aspects of the interaction between immigration and labour market outcomes. The first substantive chapter investigates the effect of immigration policies, with results highlighting the importance of considering the effect they have in shaping the volume and skill composition of immigrants, as well as their labour market trajectories and subsequent economic activities. The second substantive chapter investigates the effect of employment protection legislation for regular and temporary contracts, with results pointing to the interdependency between the two types of regulations and the fact that changes in one sphere should be interacting with changes in the other one. The third substantive chapter examines how self-employment interacts with overeducation and shows that self-employed individuals have a lower likelihood of being overeducated, likelihood that decreases with age. In accordance with the existing literature, overeducation is also likelier for women. Lastly, the fourth substantive chapter examines the effect of an increase in the relative supply of immigrants on the natives' task reallocation. The chapter finds that an increase in the share of

immigrant population has a negative effect on the native populations' relative supply of manual and communication skills, with significant gender differences.

One major contribution of the dissertation is the bringing back into research the concept of immigrant agency. Immigrants are not passively reacting to external factors, but rather proactively trying to overcome labour market barriers that might come their way, for instance, by becoming self-employed. From a policy perspective, this perception shift might add another layer of complexity to the already intricate matter that is the relationship between immigration and the labour market, yet it may constitute a step further towards ensuring that the right mix of policy measures is put in place to ensure that immigration is a win-win strategy.

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Chapter 1 Introduction

Migration and the labour market: framing the debate

In order to meet skill shortages, manage incoming migration flows and ensure immigration is a win-win for both immigrants and the host economy, policy-makers need more information about the dynamic between immigration and labour market outcomes: (1) how do immigrants adjust and fare in the local labour market?, and (2) how does immigration affect the host economy? We do not yet have a clear insight into the factors that can speed up or slow down the rate of economic assimilation of immigrants (Borjas 2014), but many of the gaps in our current knowledge could be solved if we have a better understanding of how labour markets adjust to immigration and how immigrants themselves adjust to the local labour market conditions. This dissertation intends to contribute a piece to the puzzle that is the dynamic between immigration and labour market outcomes, by asking new questions and looking for alternative explanations for old phenomena.

Migration has become one of the defining processes of our times. The European Union (henceforth EU), in particular, has been undergoing an unprecedented intake of immigrants over the past four decades. There are strong push and pull factors that make migration to the EU and its member states inevitable. On the one hand, demographic decline, the need to innovate and become globally competitive, and economic growth all generate a strong demand for human capital that can be met, at least partially, through immigration. On the other hand, conflict and instability, poverty, aspirations, together with new and affordable means of communication and transportation generate a steady supply of potential immigrants, who will choose Europe for various reasons (historical ties, network effects, geographical proximity, etc.). Yet, despite receiving increased immigration flows, and even exhibiting higher shares of immigrants in the

total population than traditional immigration countries[1] (Table 1-1), some member states are still reluctant to consider themselves countries of immigration. This self-perception has had important consequences in terms of how immigrants are perceived, treated and integrated: most integration policies have been implemented on an ad-hoc basis, in reaction to what is perceived as a crisis (such as the "European refugee crisis" in 2015), but have often yielded minimal results (Penninx 2005). As a consequence, most of the member states do not have adequate institutional settings that promote the socio-economic, cultural and political integration of immigrants, and enable them to contribute to the economic growth of their host country. Nevertheless, the increasing share of immigrants in their population has raised concerns among many of these member states, about the capacity of the labour market to absorb the new entrants (Longhi, Nijkamp, and Poot 2008). Moreover, many have realized that integrating immigrants into the labour market and society as a whole is vital for promoting social cohesion and a frequent prerequisite for the native population's acceptance of further immigration. *Labour market integration* specifically, is critical for both receiving and sending countries: well used immigrant skills lead to increased productivity in the former and contribution to development in the latter. It is important to also keep in mind, that, as Borjas (2014) remarks, the extent to which immigrants integrate in the host country's labour market also depends on the economic benefits from doing so. If the returns to their investment in education in either the origin or destination country are high, then immigrants will have incentives to integrate.

In order to implement effective labour market integration policies, policy-makers need first to understand the fundamental question of the dynamic between the two processes: how are immigrant labour market outcomes shaped by policies of the host state and the broader institutional setting, and how are these in turn adjusting to immigration? This dynamic will vary

[1] For instance, Austria, Ireland, Germany and Sweden, all have a higher share of immigrants than the US

from country to country, and so will the policy mix needed to address it. Some member states have had a long history of immigration from former colonies (e.g. United Kingdom, France, Portugal), others a more recent history involving guest worker programs (e.g. Germany, Netherlands, Sweden), and yet others have only started to experience immigration fairly recently (e.g. Italy, Spain, Ireland). Such historical differences will be, of course, reflected in the size of the immigrant population and the effects of immigration itself (Penninx 2005). Nevertheless, understanding the effect that immigration has on host societies becomes critical if we are to design policies that maximise the benefits of migration, especially by improving immigrants' employment situation (OECD 2014).

Table 1-1 Share of immigrants in total population, by country, 2016

Country	**%**	**Country**	**%**	**Country**	**%**
Austria	17.5	Greece	11.3	Romania	1.2
Belgium	12.3	Hungary	4.6	Slovak Republic	3.3
Bulgaria	1.4	Italy	9.7	Slovenia	11.4
Canada	21.8	Latvia	13.4	Spain	12.7
Czech Republic	3.8	Lithuania	4.7	Sweden	16.8
Denmark	10.1	Luxembourg	44.0	United Kingdom	13.2
Estonia	15.4	Netherlands	11.7	United States	14.5
Finland	5.7	Norway	14.2	Ireland	15.9
France	12.1	Poland	1.6	Australia	28.2
Germany	14.9	Portugal	8.1		

Source: Eurostat 2016, migr_pop3ctb

Aim and approach of the dissertation

This dissertation investigates the dynamic between immigration and labour market outcomes, and discusses the implications for policy debates about immigrant integration and the effects of immigration on the host economy. It engages with theoretical arguments concerning the importance of host country policies and the way they impact immigrants' employment, and

ultimately their productivity and contribution to economic development. The empirical sections of each chapter have an exclusively European focus, and include both a macro perspective on the effects of policies and a micro perspective on the adjustment mechanisms of immigrants and natives. The European focus is motivated by the dual nature of immigration to and between these countries, the intra-EU mobility on the one hand, that affords equal rights to all EU citizens, and extra-EU immigration, which affords different rights to different categories of immigrants. Various aspects of both types of immigration are considered throughout the research project.

Based on the distinctive theoretical aspects discussed in each chapter and the corresponding empirical analyses, the dissertation aims to contribute to normative and policy debates about immigrant labour market integration and the effects of immigration. There is an extensive empirical research literature on the dynamic between labour markets and immigration, arguably one of the economic areas where immigration has most consequences. Two main questions have dominated this strand of (mostly economic) literature: (1) do immigrants assimilate in the labour market? and (2) what are the effects of immigration on the host economy? The first question has been commonly answered by looking at whether the gap between immigrants and natives decreases over time in terms of employment and unemployment rates (Chiswick et al 2006; Borjas 1985), skills mismatch (Aleksynska and Tritah 2013), earnings (Chiswick 1978); and the immigrant experience with self-employment (Aldrich and Waldinger 1990). All of these aspects of employment represent important indicators of economic integration, and a measure of both the initial human capital of the immigrants and the skills they have acquired in the host country labour market (Venturini 2017). To answer the second question, researchers have generally focused on the effect of immigration on native wages (Ottaviano and Peri 2012), on native employment rates (Card 2001), participation and

unemployment (Dustmann, Hatton, and Preston 2005) or worker productivity (Peri 2012). This project, however, aims to depart from customary yes/no type of research questions, and account for the complexity of immigration and its interaction with contextual factors by considering the conditions under which these processes occur as well as the costs and/or benefits they entail. Specifically, the dissertation explores the tensions between attracting highly skilled immigrants and making sure their skills are not wasted; the effects and costs of immigration on natives' employment outcomes; the implementation of flexible enough immigration policies as to allow firms to meet the increasing demand for labour, yet stringent enough to allow the managing of migration flows; and lastly between employment regulations that strike a balance between employers flexibility and worker protection.

The focus on labour market integration is motivated by the belief that employment is one of the best indicators of broader socio-economic integration of immigrants. Furthermore, the zooming in on self-employment is derived naturally from the increased policy interest in immigrant business creation, which is seen as a silver bullet for economic growth, as well as immigrant integration[2]. Moreover, given that immigrants generally exhibit a higher incidence of self-employment, a better understanding of the causes and the nature of immigrant business creation can shed light onto how immigrants respond to the opportunities and constraints they encounter in the local labour market.

The chapters are structured in such a way as to follow the immigrant labour market integration process from entry into the host country until finding employment, and the manners in which various policies affect this process along the way. Upon entry into the destination country, the immigrant labour market journey is shaped by (1) immigration policies; while in the

[2] For instance, the Entrepreneurship 2020 Action Plan of the European Commission. Available here: http://ec.europa.eu/growth/smes/promoting-entrepreneurship/we-work-for/migrants_en

host country, entry into the local labour market is influenced by gatekeepers such as (2) the degree of employment protection legislation; while the incidence of (3) overeducation represents a good indicator for the quality of employment and of labour market integration. Lastly, immigrants' presence in the labour market affects to various degrees (4) natives' employment patterns.

Outline of the chapters and main arguments

The analysis and overall argument of the dissertation are developed in four self-contained chapters. Nevertheless, one can see them as describing the sequences of a journey that many immigrants embark on. This journey begins when immigrants enter the destination country and ends with their integration in the host economy. Even though one can paint a clear picture of every step of the journey, study and understand it in its own right with all their complexities and effects, each step of the journey belongs together. Only if one understands them in the context of each other, do they form a story.

The discussion on how immigrant labour market outcomes are shaped by policies begins at the border, in chapter 2, with an examination of the effect of immigration policies on a particular form of labour market outcome: self-employment. Previous literature investigating the determinants of immigrant self-employment has looked mainly at how immigrant characteristics, their networks and resources shape their entrepreneurial propensities and less so at host country policies and institutions. Yet, I contend, immigration policies play an essential role in setting the conditions under which immigrants enter the country, and the conditions of their stay, which in turn affect how easily they can find jobs, create businesses and integrate into the new society.

In order to investigate the effect of immigration policies on immigrant self-employment, the chapter considers the particular case of the transitional arrangements implemented during the

2004 and 2007 European Union enlargement rounds. Transitional arrangements are a series of labour market measures that the incumbent EU member states have implemented in order to prevent a potentially non-manageable inflow of immigrants from the EU8 and EU2 accession countries. Because these measures did not apply to self-employed individuals, some scholars have argued that immigrants have turned to self-employment as a way to circumvent these policies[3]. The hypothesis that both EU2 and EU8 immigrant groups circumvented transitional arrangements by claiming self-employment – since those self-employed were not subjected to the same restrictions - seems highly plausible and available data seems to support it. If this was the case, then self-employment was less the magical solution that would bring about socio-economic gains and enable immigrant integration, and more of a short-term strategy in an attempt to find employment. The results of the analysis suggest that EU2 immigrants have indeed turned to self-employment as a way to circumvent the restrictions, and point to a substitution effect in the case of EU8 immigrants. In this latter case, individuals seem to have migrated instead to countries like the UK or Ireland, which did not implement restrictions, and forego traditional immigration destination like Germany or Austria. In this case, thus, self-employment seems to not have been used as an immigration strategy. This also implies that the observed increase in self-employment for this immigrant group is most likely motivated by existing opportunities and not merely a strategy towards employment.

Immigration policies determine the "rules of the game" – who enters, under what status, what rights are afforded, etc. But they are not the only factors that influence immigrant's labour market outcomes. Immigration and labour market policies interact on a significant level when it comes to the life of immigrants in their new host countries. Once in, immigrants interact with the

[3] See, for instance, Barrell, FitzGerald, and Riley 2007; Elsner and Zimmermann 2013; Blanchflower and Lawton 2010.

labour market institutions and regulations in the host economy, whose role is to mitigate labour market failure and avoid worker exploitation. This takes us to the next step of the journey, in Chapter 3, which explores the immigrant situation right before entering the labour market. Countries decide to regulate the hiring, firing and working conditions of individuals, in such a way as to strike a balance between the flexibility requirements of the market and the need to foster a competitive economic environment. Such regulations, however, can act as gatekeepers, influencing whether and what type of employment immigrants find, and by extension, how well integrated they are in the local economy. Continuing with our focus on self-employment, the chapter investigates the effect of employment protection legislation (EPL), in a comparative perspective, covering 18 European countries over the period 1995-2013. Their effect on employment outcomes, and self-employment in particular, is still a matter of controversy. Lower regulations increase the flexibility of high-risk companies – a pull effect, and decrease the relative advantage of being an employee (a push effect), overall making self-employment a far more attractive option (Van Stel, Storey, and Thurik 2007; Henrekson, Johansson, and Stenkula 2010). Moreover, because generally immigrants have lower expectations concerning employment standards, a lower degree of EPL should generate more demand for immigrants, as the native population is reluctant to take up jobs that might be both financially and in terms of working conditions subpar (Devitt 2011). This could on the one hand decrease self-employment, if it is a last recourse solution due to a lack of available jobs in the market (necessity self-employment); or it could increase self-employment, due to growing demand for ethnic goods and a corresponding increase in business creation (opportunity self-employment). High regulations, on the other hand, represent strong incentives for companies to contract self-employed individuals, leading to an increase in dependent self-employment, as to avoid the high costs of

hiring and dismissal (Stephen, Urbano, and van Hemmen 2009; Henrekson, Johansson, and Stenkula 2010; Roman, Congregado, and Millan 2011). Stringent regulations would also make setting up a business more time consuming and administratively costly, thus driving self-employment rates down. The immigrants becoming self-employed would be those for whom the returns to investments would be high enough to make it worthwhile (Maloney 2004). The nature of the self-employment is of course different for the two extreme levels of regulations, as is the productivity and economic development level associated with it.

I argue that by virtue of being outsiders to the local labour market and unfamiliar with its rules and regulations, immigrants tend to be more affected by EPL than the native population, with consequences for [employment and] business creation. I distinguish between employment protection for temporary and permanent contracts, as the two types are often used in a complementary way and should affect self-employment differently. I compare the effect of EPL on immigrants versus native self-employment, in an attempt to determine whether the outsider(immigrants)/insider(natives) hypothesis holds and immigrants are more affected by regulations. I find that, while regulations governing permanent contracts do not have an effect on immigrants' self-employment rates, they have a positive effect on self-employment rates for natives. In addition, the effect of EPL for temporary contracts has a positive and significant effect for both natives and immigrant self-employment rates.

Finding a job or becoming self-employed does not mean, however, that immigrants are integrated. Labour market integration implies an adequate utilization of their skills, ensuring both that individuals receive returns to their investment in education, and that firms and the economy at large fully tap into the benefits of immigration. One way to assert the quality of immigrant's employment is by looking at whether they are mismatched in their jobs, which is what I proceed

to do in chapter 4, our next part of the journey. I continue with my focus on self-employment and zoom in specifically on overeducation, as numerous times over it has been shown that immigrants exhibit a higher incidence than the native population. It is remarkable how little empirical research[4] exists and how little we know about the dynamic between these two phenomena, given the high policy relevance of matching skills to jobs and of promoting self-employment. Immigration changes economic opportunities differently for different immigrants, which then have an incentive to react and adjust accordingly (Borjas 2014). Thus, one the one hand, immigrants may turn to self-employment in order to avoid overeducation, if the existing paid employment opportunities do not adequately meet their educational level and experience. In this case, self-employment becomes a strategy through which they reduce the incidence of overeducation. On the other hand, immigrants become self-employed because they cannot find *any* opportunities in paid employment, a situation akin to the concept of necessity self-employment[5], in which case the incidence of overeducation may in fact increase. To analyse this dynamic, the chapter employs the European Labour Force Survey for the year 2012, and a number of control variables derived from international databases, in a comparative analysis across 30 European countries, between immigrants and natives. The results indicate that self-employed immigrants have a lower likelihood of being overeducated, and as expected, this decreases with age. Moreover, overeducation seem also to be likelier in the case of women, both immigrant and native. The direction and magnitude of the effect are, of course, contingent on time and the context of the analysis.

This takes us to the end of our journey. The individual is now adequately employed and on track to labour market integration. Yet, by virtue of being in the local labour market, s/he has

[4] There are only two studies to date investigating this relationship: Sanchez, Diaz-Serrano, and Teruel 2015; and Bender and Roche 2013.
[5] See Reynolds et al. 2005.

set in motion a number of processes with profound consequences: immigration has been shown to have an effect on wages (Ottaviano and Peri 2012), native employment and participation rates (Carrasco, Jimeno, and Ortega 2008), and worker productivity (Peri 2012), among others. Chapter 5 explores one such consequence, namely the impact of immigration on native's task specialisation, with a focus on Germany. The potential negative effects of immigration on the labour market outcomes of native workers is one of the major concerns of researchers and policy makers alike, with numerous studies looking into it[6]. The major contribution of this study is a departure from the assumption of perfect substitutability between native and immigrant skills; a focus on the "task biased technological change" framework which argues that the way in which occupations are affected by the arrival of immigrants depends to a large extent on the comparative advantage of the tasks they perform, rather than solely on their educational level[7]; a focus on low-skilled immigrants whose impact on the local labour market is most often contested; and the focus on Germany as a case study, a country with a significantly different set of labour market institutions and market structures than the traditional case study countries, US or Spain. The main argument of the chapter is that immigrants and natives are not perfect substitutes in terms of skills; natives have a comparative advantage when it comes to language proficiency, while immigrants are more able-bodied as a results of self-selection. Thus, gradually, a substitution process is expected to take place, in which the native workers upgrade to communication(language)-intensive occupations, in response to immigration, while immigrants take their places in lower-skilled jobs that require more physical strength. The results of the analysis seem to confirm this hypothesis: increased immigration is positively related to an increase in the natives' relative task supply. Moreover, there seems to be an assimilation effect

[6] With estimates in the hundreds as per Longhi et al 2008
[7] Framework first introduced by (Peri and Sparber 2009)

over time, as this effect is stronger for recent immigrants, but decreases with the duration of stay in the country.

Research and policy relevance

For a number of reasons[8], immigration to the EU is unlikely to stop in the near future. However, even if beginning from today we would prevent all new immigrants from entering the Union, the large-scale immigration flows that member states have received over the past decades have set in motion a series of economic and labour market adjustments (and other social processes) that are bound to affect them well throughout the next century (see Borjas 2014 for an overview of the economic impacts of immigration). It becomes critical then to understand all the dimensions of the interaction between immigration and labour market outcomes for both immigrants and natives, if we are to harness the benefits it brings about and limit the costs. By exploring precisely a number of aspects of this interaction, the dissertation makes a series of general contributions to both research and policy-making.

To begin with, from a research perspective, the project adds value to the existing literature by investigating processes in a systematic comparison, firstly between up to 30 countries, secondly, between different groups of immigrants (EU8 vs. EU2), and lastly between immigrants and the native population. Internationally comparative studies on immigration usually represent a challenge as they imply an alignment with regards to the definition of a immigrant, and the assumption that the data sources used are nationally representative. Fortunately, the European Union (and the EU Labour Force Survey) offers a rare opportunity to study the effect of policies and policy changes over time and across countries in a longitudinal approach which is hardly possible in other contexts.

[8] Economic disparities, aspirations, conflict and political instability creating supply in countries of origin, and demand for labour in countries of destination.

The second significant contribution to research concerns the integrated level of analysis approach that the dissertation takes. Research fragmentation has long been a defining characteristic of migration studies (Penninx, Spencer, and Van Hear 2008), with some disciplines preferring macro levels analyses, while others an individual-based approach, without much communication between them. This research project takes both a micro- and macro level approach, investigating both individual and country-level determinants. Moreover, by considering the EU member states, it takes an integrated view of national and supranational levels of analysis, which takes into account the inter-EU migration dynamic. For instance, one of the major findings in chapter 3 is the fact that immigration restrictions in one member state diverge flows to another member states; this finding would not be possible if only individual countries would be examined.

Lastly, the dissertation contributes to shifting the focus from immigrants to society, a line of research that has only recently started to develop. Much of the research on immigrant integration and on the effects of immigration focuses primarily on immigrants themselves, while the socio-economic and institutional system in which they are to be integrated is often taken for granted (Penninx et al 2008). This project contends that context matters; that regardless of the characteristics of immigrants – their entrepreneurial proclivities, their self-selection and human capital – thee extent to which they would be able to integrate into the host labour market and society is greatly determined by the institutions and policies that govern it. It is for this reason that two of the four chapters in the dissertation are dedicated to the effect of policies on immigrants' integration.

Each individual chapter also makes a series of more specific theoretical and policy contributions.

Chapter 2 investigates the effect of immigration policies on immigrant's economic activities, by considering the specific case of the 2004 and 2007 transitional arrangements and self-employment. The findings contribute to existing debates concerning the effectiveness of immigration policies and point to the existence of other factors driving immigration (language similarity, labour demand, geographical proximity, etc.) which interact with the absence/presence of restrictions and influence migration decisions. Moreover, they reveal the importance of immigration policies and the role they have in shaping the volume and skill composition of immigrants, as well as their labour market trajectories and subsequent economic activities. The chapter also points to the importance of synchronization and alignment in applying restrictions, and the importance for policy makers to look beyond their own borders when implementing immigration policies (Palmer and Pytliková 2015) and to anticipate how other countries' policies will interact with their own and affect immigration decisions. Lastly, the findings contribute to the existing literature on immigrant self-employment, which has preponderantly focused on personal characteristics of immigrants and available networks as determinants of self-employment, and less so on institutional and policy related factors, by showing that immigration policies, as the gatekeepers setting the conditions of entry and stay, can be an important determinant of immigrant self-employment.

Chapter 3 investigates the effect of labour market regulations on immigrant's labour market outcomes, by zooming in on the interaction between employment protection legislation and self-employment. The results point to the significance of considering the specificity of the migration experience and how it affects immigrants' experience and integration into the labour market. By showing that immigrants respond differently than the natives to labour market regulations, the findings underscore the importance of designing specific integration policies for

immigrants, policies that tackle head-on the barriers in their way to employment. Moreover, it becomes important to note the different effect that employment protection has on self-employment, when we distinguish between the two types of contracts, permanent and temporary. In particular, the effect of employment legislation for temporary contracts on immigrant and native self-employment rates is found to be positive; and there is some indication that the effect may be stronger for immigrants. This has important policy implications: the indicators of the strictness of the regulation of temporary contracts measure how easily firms can resort to alternative types of contract to meet their need for flexibility and ease the constraints imposed by regulations on regular contracts.

Chapter 4 investigates how immigrant overeducation interacts with self-employment, as compared to natives, in an attempt to enrich our understanding of three critical areas of policy interest: immigrant integration, skills mismatch and self-employment/entrepreneurship. The findings of the chapter add value to existing debates about overeducation and mismatch, which have for the most part focused on salaried employment. Moreover, as overeducation is a good indicator of the quality of employment and of the adequate matching of skills to labour, they provide insight on the one hand, into the extent of immigrants' labour market integration, and on the other hand, into the extent to which economies tap into the benefits of immigration. The results of the study also point to the importance of considering the nature of self-employment and the implications this has for economic growth and immigrant integration. While opportunity self-employment has the potential to contribute to the economy and smooth out the socio-economic integration for the immigrant itself, necessity self-employment is rather a survival strategy, a loss-loss situation for both the immigrant and the economy at large. The chapter also contributes to our understanding of whether start-up incentives, motivated by the belief that self-

employment diminishes overeducation and creates economic opportunities for both immigrants and the broader economy, could be effective in achieving this purpose.

Chapter 5 investigates how immigration affects natives in Germany. The findings contribute to our better understanding of the effect of immigration on the local labour market and help explain why the literature has so far found so negligible effects of immigration on wages or employment rates. In this particular case, while immigration might lead to a wage decline for low-skilled immigrants in manual-intensive tasks, the aggregate effect on wages will be small because it will be compensated by the skill and job upgrading of the displaced native workers. An important implication for policy is the fact that through adjustments in natives' task specialization and occupational upgrading, immigration may increase job mobility, improve the quality of job matches and contributing to increasing labour market efficiency (Amuedo-Dorantes and de la Rica 2009). Lastly, the study points to the importance of considering different group characteristics when investigating the impacts of immigrants' on natives' labour market outcomes. Particular attention should be paid to skill levels, gender differences and duration of stay in the host country, but other characteristics such as age should be accounted for too.

Methodology

The methodology employed throughout the dissertation varies within each chapter and corresponds to the research design and the nature of the data employed of each study. Both cross-sectional and longitudinal analyses are employed, as well as investigations at the macro and micro-level, which offer a more comprehensive understanding of immigrant labour market experiences.

Chapter 2 explores the effect of immigration policies on immigrant's labour market outcomes in a comparative analysis across the EU15[9] member states. The analysis employs the European Union's Labour Force Survey (EU LFS) data for the period 2004-2015, for which disaggregation between the two immigrant groups examined is possible. The EU LFS is a large household sample survey providing quarterly results on labour participation of people aged 15 and over as well as on persons outside the labour force. The EU-LFS covers the 28 Member States and Iceland, Switzerland and Norway, from 1983 onwards. The survey uses the same concepts and definitions, follows the International Labour Organization Guidelines, uses commons classifications (NACE, ISCED, NUTS, ISCO), and collects the same set of characteristics in each country, making it highly comparable across countries. To disentangle the effects of various factors on immigrants' self-employment, and the role of transitional arrangements in particular, the analysis employs a regression with fixed effects, which allows to control for the effect of time-invariant characteristics so to assess the net effect of the predictors. A Hausman (1978) specification test decisively confirms this is the right choice. Given that a lot of the time variation is captured by the transitional arrangements variable and the fact that there does not seem to be variation in self-employment rates that could be explained by overall time trends, the analysis does not use time fixed effects. An empirical test[10] confirms the choice.

Chapter 3 analyses the effect of employment protection legislation on immigrant self-employment rates, using OECD indicators on the strictness of employment protection legislation (EPL), in a longitudinal analysis covering 18 European countries over the period 1995-2013. The data source for this analysis is again the EU LFS, complemented by a number of control variables extracted from international databases like the OECD and the World Bank. The

[9] Austria, Belgium, Denmark, Greece, Finland, France, Germany, Italy, Ireland, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom

[10] With the stata command testparm.

analysis employs a panel regression with random effects as the baseline model, which is preferred due to the limited variation over time within the independent variable, EPL for permanent and temporary contracts. In order to test the robustness of the results, a model which includes fixed effects, controlling for country-specific time-invariant characteristics, is also tested. A third, very restrictive model which contains time fixed effects to eliminate the potentially spurious effect of aggregate trends, is also employed.

Chapter 4 explores the dynamic between overeducation and immigrant and native self-employment, in a cross-sectional study. This analysis too relies on the European Union Labour Force Survey's for the year 2012, which provides information on individual socio-economic characteristics, occupation, education, as well as on individual's country of birth, which enables the distinction between natives and immigrants. Further, the study only considers immigrants from outside the EU and EFTA[11], as the latter technically share the same labour market rights as the native population. There are thirty countries covered in the sample, the EU-28 Member States and Switzerland and Norway. The sample includes 73,571 non-EU immigrants, 12 percent of which are self-employed. This is a multilevel study, in which individual characteristics are complemented by general characteristics of the country of destination, for which information is derived from international databases like the World Bank. The analysis employs a probit as a baseline model, and a maximum likelihood bivariate probit model to control for a potential endogeneity bias. An OLS and a linear model with instrumental variables are also employed, for robustness testing purposes.

The analysis in chapter 5 is based on data derived from the German Labour Force Survey (DE LFS) and explores the period between 2002 and 2014, for which information at the regional level is available. The German LFS is carried out as part of the annual micro-census, which is

[11] European Free Trade Association

based on the 'micro-census law' (Eurostat 2007). The survey includes information on country of birth, on which the definition of immigrants is based. Only short term immigrants are considered (i.e., those with five or less years in Germany), as long-term immigrants are more likely to have acquired German proficiency and other human capital skills similar to those of natives.[12] The sample is also restricted to low-skilled immigrants, since this group is the focus of the analysis and theoretical framework. The sample is further confined to only those natives and immigrants which are either employed or self-employed, thus the working population. In order to measure the task content of occupation, the analysis employs the O*NET database, a US survey, the robustness of which is tested by using two other sources of survey data: the European Working Condition Survey (EWCS) and the Programme for the International Assessment of Adult Competencies (PIAAC). The methodology employed in the chapter addresses concerns that responses to immigration to a certain region from native workers (through inter-regional mobility) and from firms (through changes in production and output mix), diffuse the costs and benefits across the entire country (Bansak et al 2015). Moreover, it zooms in on skills cells in order to avoid complementarities and substitutabilities that cancel each other out (idem). Further, the analysis considers the often imperfect substitutability between native and immigrant workers within a particular skill cell.

No analysis is perfect, and the limitations of each methodology described above are further explored in each individual chapter.

Terminology and scope of the dissertation

The focus of the dissertation is on the dynamic between immigration and labour market outcomes. Given the often confusing terminology in migration research and the debates it causes,

[12] Results are robust to the inclusion of all the immigrants.

it becomes essential to be clear about the definitions of some of the most important concept employed throughout the dissertation, as well as the scope of the analyses.

Immigrants

All of the empirical analyses in the dissertation use as a starting point the European Labour Force Survey, which defines immigrants as individuals who have been born in another country. According to this definition, Eurostat approximates that in 2016, there were 54.4 foreign born individuals in the EU, 19.3 million of which were EU-28 nationals. Chapter 2 considers only EU immigrants, chapter 4 considers non-EU immigrants exclusively, while chapters 3 and 5 do not distinguish between the two types of immigrants. Moreover, unless specified in the analysis, no distinction is made between labour, family, study and humanitarian immigration.

EU-2 immigrants defines individuals originating from the 2007 accession countries, Bulgaria and Romania.

EU-8 immigrants defines individuals originating the 2004 accession countries, namely, Poland, Lithuania, Czech Republic, Hungary, Slovakia, Slovenia, Estonia and Latvia.

EU-15 immigrants defines immigrants originating from Austria, Belgium, Denmark, Spain, Germany, Italy, Ireland, Finland, France, Greece, Luxembourg, Portugal, Sweden, and United Kingdom.

Labour market integration

In the context of this study, immigrants are considered to be integrated into the labour market if they are employed (or self-employed) in jobs that adequately meet their level of skills and qualifications.

Self-employment

The definition of self-employment refers to those individuals that own a business, as identified by the European Labour Force Survey. Due to data limitations, the analyses do not distinguish between self-employment with employees or without employees.

Transitional arrangements

Transitional arrangements represent a series of labour market measures the incumbent member states have implemented during the enlargement rounds of 2004 and 2007. Example of the measures include work permit requirements, quotas or the requirement to prove no national has been eligible for the job, before hiring a new member state citizen.

Scope

It is essential to be clear about the scope and limitations of the research from the outset. First, although the issues analysed in the dissertation are relevant to all countries, all of my theoretical and empirical analyses focus on the EU member states, most of which are net receivers of immigrant workers. As mentioned elsewhere in the dissertation, the reason for this selection lies in the duality of mobility patterns to the EU, which include both the intra- and extra-European migration. Nevertheless, they are still useful to advance our understanding of the processes analysed in each chapter.

Second, while integration is a complex and multidimensional process, and thus other socio-economic outcomes such as health, income, or civic engagement are important indicators of it, I focus on labour market outcomes alone. The choice is motivated by the belief that finding a job is fundamental for the development of any type of broader socio-economic and political integration.

Third, it should be bore in mind that the effects of the dynamics between immigration and labour market outcomes are highly contingent on a mix between the skills of immigrants, the skills of the native workers, and the characteristics of the host economy (Ruhs and Vargas-Silva 2015). Research evidence that analyses any aspect of this interaction, becomes then highly dependent on time, place and context. Nevertheless, such research becomes important as it further our understanding of critical processes in the labour market.

Fourth, any analysis of immigrants and immigration is bound to have limitations stemming from the very definition of these two concepts. As previously mentioned, this study defines immigrants as individuals who are foreign-born, based on the labour force survey. A definition based on citizenship, for instance, which would greatly underestimate the number of immigrants, might have yielded slightly different results.

Lastly, I investigate labour market outcomes of immigrant workers who have been legally admitted in the country of destination, regardless of their reason for immigration. This means that I do not consider irregular immigrants or immigrants who do not have a legal status. There are two main reasons for this choice: firstly, while irregular migration is an important phenomenon that deserves to be further researched on its own, most of the immigration to the EU takes place through regular channels. Secondly, the data source on which all the analyses are based – the European Labour Force Survey – does not allow for the identification of immigrants who not have legal residence in the country.

Chapter 2 The effect of restrictive immigration policies on immigrant self-employment: the case of transitional arrangements[13]

Abstract
The chapter contributes to existing debates concerning the effectiveness of immigration policies, by investigating the particular case of transitional arrangements implemented during the European Union enlargement rounds of 2004 and 2007. A number of authors have argued that instead of deterring immigration, the arrangements have changed the channels EU8 and EU2 immigrants have chosen to enter the country of destination, by becoming self-employed. Self-employed individuals were not subjected to restrictions. Our results suggest that EU2 immigrants have indeed turned to self-employment as a way to circumvent the restrictions, and point to a substitution effect in the case of EU8 immigrants. The results have broader research and policy implications, revealing the importance of considering the effect immigration policies have in shaping the volume and skill composition of immigrants, as well as their labour market trajectories and subsequent economic activities.

Introduction

The chapter contributes to existing debates concerning the effectiveness of immigration policies, by investigating the particular case of the transitional arrangements implemented during the European Union enlargement rounds of 2004 and 2007.

Immigration seems to be a central issue in the contemporary media, policy and political debates. Although many studies have found repeatedly that it produces economic benefits for both the sending and receiving countries, oftentimes greater than those resulting from liberalizing trade (see Rodrik 2002), it seems increasingly difficult to strike a balance between these gains, the escalating nationalistic views of parts of the electorate and the security concerns it raises. Recent developments, including the successive European Union enlargements and what has been labelled the 'European migration crisis', have sparked vehement calls for more

[13] Paper written in collaboration with Martin Kahanec, professor, Central European University.

restrictive immigration policies all across Europe. As a consequence, European Union (henceforth EU) member states, which have become increasingly open to the free movement of goods, capital and services, have become more reluctant when it comes to the free movement of people, for the regulation and control of which they now commit significant resources and efforts[14] (Geddes and Scholten 2016).

However, even the most restrictive policies include loopholes that allow immigrants to enter the country and supply the much needed demand for labour in developed countries (see Mayda 2010, Freeman 1995, 2002). The paper investigates precisely one such loophole, namely, the self-employment channel available during the 2004 and 2007 EU enlargement rounds, when a series of labour market measures (transitional arrangements) were implemented to prevent a potentially non-manageable flow of EU8 (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia) and EU2 (Romania and Bulgaria) immigrants. A number of authors have argued that instead of deterring immigration, the arrangements have rather altered the channels EU8 and EU2 immigrants have entered the country. Namely, because self-employed individuals were not subjected to the labour market restrictions the transitional arrangements entailed, EU8 and EU2 immigrants have used self-employment as a mean to circumvent them. Our results suggest that EU2 immigrants have indeed turned to self-employment as a way to avoid restrictions, and point to a substitution effect in the case of EU8 immigrants. In the latter case, transitional arrangements seem to have diverted flows from the traditional immigration countries like Germany of Austria, to the United Kingdom or Ireland, which did not implement restrictions.

The paper makes a number of significant contributions to the existing literature on the effect of immigration policies. To begin with, it is the first to systematically investigate the effect that

[14] With third country nationals.

transitional arrangements have had on immigrant's self-employment rates, and in conducting a comparative analysis across the EU15 member states. By extending the focus of the analysis to a multitude of origins and destinations we can test the robustness and broader validity of the results found. The European Union offers a rare opportunity to study the effect of policies and policy changes over time and across countries in a longitudinal approach which is hardly possible in other contexts. Secondly, the paper exploits a unique policy change that affects a group of immigrants (EU citizens) in a similar way, shifting their regulation away from national rules to free movement, which was implemented across a set of EU member states similarly but at different points in time (sometimes even gradually). Third, our findings make a meaningful empirical contribution to the current debates on the effectiveness of immigration policies in curbing immigration. Moreover, we add great value to the current literature by investigating a case in which, while there is free mobility between sending and receiving countries, there is variation in terms of access to the labour market. This case allows for a more nuanced view on the effect and effectiveness of immigration policies and enables inferences about other pull factors (for instance, the overall attractiveness of the receiving country, labour demand, or cultural differences). Fourth, our results have broader research and policy implications, revealing the importance of considering the effect immigration policies have in shaping the volume and skill composition of immigrants, as well as their labour market trajectories and subsequent economic activities.

The further structure of the paper is as follows. Section II provides a review of the literature on the effect of restrictive immigration policies, while section III zooms in on the effect of the transitional arrangements implemented during the EU enlargement rounds in 2004 and 2007.

Sections IV presents the data and methodology, while section V examines the results. Section VI discusses the theoretical and policy implications of our findings.

The effect of restrictive immigration policies

Immigration policies regulate the conditions under which immigrants enter a country and the degree of access to key social institutions, such as the labour market and the welfare state (Geddes and Scholten 2016). They are usually implemented as a way to influence the behaviour of a target population, for instance highly skilled immigrants, in an intended direction (Czaika and de Haas 2013).

Recent developments, including the successive EU enlargements and what has been labelled the 'European migration crisis', have sparked vehement calls for more restrictive immigration policies. What seems like a novel trend is, however, a perpetuation of a longstanding process of tightening immigration policies, dating at least to the interwar period when first the USA and later Australia, implemented restrictive measures in the form of quotas and eligibility criteria (for an overview, see Hatton 2010). In Europe, countries have declared their intention to regulate labour immigration more strictly since at least the 1970s, although they have continued to accept immigrants to various degrees (Geddes and Scholten 2016).

The effects of immigration policies, as well as their objectives and criteria of success, have been however greatly questioned in recent times (see Czaika and de Haas 2013; Czaika and Hobolth 2016). There are two sides to this debate. A number of authors have argued that immigration policies have been mostly effective and that it has become more difficult for individuals to enter host countries due to restrictive visa policies and sophisticated border control systems (Carling 2002; Bonjour 2011; Geddes and Scholten 2016). Strikwerda (1999), for

instance, suggests that the major decline in immigration flows to the US after the implementation of the language test in 1917 and the quota system in 1921, points to the decisive power of the state to control migration and, by extension, the direction of economic development itself.

Other authors disagree and insist that we are experiencing a control crisis and people circumvent restrictions and migrate through irregular means (Bhagwati 2003; Castles 2004). Hollifield et al (2014), for instance, argue that the gap between the objectives and the outcomes of immigration policies is becoming increasingly wider in many receiving countries, which provokes greater public hostility towards immigrants and puts pressure on political parties and policy-makers to adopt even more restrictive policies. The question seems to remain, thus: do restrictive immigration policies actually deter immigrants from entering a country?

A small, but rapidly growing empirical literature seems to suggest they do, at least to some extent. Ortega and Peri (2013) find that when a typical immigrant destination, such as the USA, Canada, or Australia, tightens its entry laws immigration flows decline in the first year after implementation. More specifically, the introduction of measures that restrict the entry of immigrants to these countries reduces immigration by about 6 percent within the same year. Similarly, Czaika and de Haas (2016) find that visa policies significantly decrease immigration, although the net effect is undermined by the decline in outflows of the same immigrant group. They also find that inflows decline incrementally after the introduction of restrictions, but increase almost immediately after the restrictions are removed. They conclude that restrictions tend to decrease circulation and encourage long-term settlement, which in turn reduces the responsiveness of migration to economic fluctuations. Hatton (2005), Mayda (2010) and Beine et al (2011) too, find that immigration policies affect the magnitude of immigrant flows.

Restrictions, however, do not stop immigration altogether, and they tend to affect more the quality rather than the quantity of immigration. That is, they do not necessarily reduce the number of immigrants entering the country, but instead affect the channels people choose to enter, and the types of immigrants a country receives[15] (Czaika and de Haas 2013).

Immigration policies in the majority of EU member states are rather restrictive, which would mean that immigration flows should be severely reduced. Nevertheless, restrictive immigration policies are often characterized by loopholes that leave enough room for potential immigrants to take advantage of the existing economic incentives (Mayda 2010). One such loophole was to be found in the case of the transitional arrangements implemented by the incumbent member states during the EU enlargement rounds in 2004 and 2007, investigated in this paper. The following section reviews in more detail the transitional arrangements and the literature investigating their effects.

Transitional arrangements – an overview

Transitional arrangements are a series of labour market measures the incumbent EU member states have implemented in order to prevent a potentially non-manageable inflow of immigrants from the EU8 and EU2 accession countries. The restrictions themselves were not new – a series of coordinated restrictions have also been implemented when Greece, Spain and Italy adhered; the difference this time was that the new member states were jointly relatively populous and significantly diverged in terms of economic development and wage earnings from the incumbent member states, which constituted a powerful, if only potential, pull factor. Moreover, this time around, the decision on the implementation and the type of restrictions was

[15] Restrictions raise the costs associated with migrating, thus the returns from migration must now be high enough to make up for the risks and costs that it incurs.

left up to the national Governments to decide, with a 2+3+2 rule. The rule meant that Member States could impose such a transitional period for 2 years, then decide to extend it for an additional 3 years, and only if there was serious proof that labour from new member states was disruptive to the market in the incumbent member states, the period could be extended for the last 2 more years (European Commission, 2006). In what is by now history, all member states with the exception of Sweden, Ireland and the United Kingdom have decided to implement the restrictions for up to seven years for the first enlargement round, and with the exception of Sweden and Finland all member states have applied them for the second enlargement round. Table 2-1 below presents the year of when transitional arrangements were lifted by the EU-15 Member States for the two country groups.

Table 2-1 Transitional arrangements in place by country, for each enlargement round

	End year of transitional arrangements	
Country	EU-8	EU-2
Austria	2011	2014
Belgium	2009	2014
Denmark	2009	2009
Finland	2006	2007
France	2008	2014
Greece	2006	2009
Germany	2011	2014
Ireland	2004	2014
Italy	2006	2012
Luxembourg	2007	2014
Netherlands	2007	2014
Portugal	2006	2009
Spain	2006	2009/2011*
Sweden	2004	2007
United Kingdom	2004	2014

* Spain lifted restrictions for Romania and Bulgaria in 2009, but reintroduced them briefly for Romania in 2011. *Note*: The starting year of the transitional arrangements is 2004 for EU8 countries and 2007 for EU2 countries.

This incongruity was not without consequences in terms of both the scale and the composition of migration flows to the EU-15, from the EU-8 and EU-2 groups respectively. Namely, transitional arrangements have not as much as stopped migration, but have rather diverted flows away from regular countries of migration which have now applied restrictions (e.g. Germany, Austria) to countries which have decided to open their labour markets (e.g. Ireland, United Kingdom) (Boeri and Brücker 2005; Barrell et al 2007; Kahanec et al 2009). In a more recent study, Kahanec et al (2016) find that, nevertheless, east-west migration flows in the EU responded positively to the EU enlargement, which afforded employment and residential rights similar to those of the native population and the economic opportunities in receiving labour markets[16].

Indeed, in Germany, the net inflow post enlargement was 2.5 times larger than in the four previous years (Brenke et al 2010), while in Spain, the percentage of EU-12 (EU2 and EU10 countries) immigrants increased from 10 per cent in 2004 to almost 20 per cent in 2008 of the total immigrant population (de la Rica 2010). The data for the United Kingdom (one of the countries that did not apply restriction for the EU-8 countries) shows that the stock of EU-8 immigrants has registered a significant growth, from around 50 000 in 2003 (including EU-2 immigrants too), to 704 000 in 2008, while the stock for EU-2 immigrants has grown from 34 000 in 2006, to 67 000 in 2008 (United Kingdom Migration Advisory Committee 2008). Sweden, the only country that opened its markets for both enlargement rounds registered only a slight increase in immigration from the accession countries, underscoring the fact that labour demand is also needed to attract immigrants, and that geographical distance and language skills can act as barriers (Galgóczi, Leschke, and Watt 2011). Another factor limiting immigration to

[16] They do find, however, that the potential through which migration helped to ease the imbalances across EU labour markets was hampered by transitional arrangements, which negatively affected the magnitude of east-west flows.

Sweden may have been strict labour market regulations and strong trade unions (Kahancova and Szabo 2015).

The transitional arrangements also affected the composition of post-enlargement migration. In the United Kingdom, the proportion of EU2 and EU8 immigrants with low education was smaller after enlargement, while of those with higher education was larger (Kahanec et al 2010). Moreover, EU2 and EU8 immigrants in both the United Kingdom and Ireland seemed to exhibit, on average, higher educational levels than other immigrant groups, although they were found to earn less than these groups (Barrett 2010; Holland et al. 2011). Conversely, in Germany, the share of EU8 post-enlargement immigrants with low education was substantially larger than the share of pre-enlargement immigrants with low skills suggesting a negative selection of immigrants (Kahanec et al 2010). Similarly, Elsner and Zimmermann (2013) found that the educational levels of the post-accession arrivals were higher than those of comparable natives, but lower than those of pre-accession cohorts, prompting the authors to conclude that Germany would have been better off without the introduction of restrictions, as it would have received younger and more highly educated individuals, like Ireland and the United Kingdom did.

In terms of labour market outcomes, although on average highly educated, the post enlargement immigrants tended to be employed in lower skilled jobs and had higher employment rates than other immigrant groups or natives (Drinkwater et al 2006). In the United Kingdom, both EU2 and EU8 immigrants were more likely to be in employment than immigrants from other countries and the native population (Holland et al. 2011). In Italy, around one third of EU2 immigrants were employed in craft and elementary occupations, while the construction sector

employed the largest share of EU2 immigrants, followed by manufacturing and the household sectors (idem).

There are no empirical studies to date investigating the effect of the transitional arrangements on immigrants' propensity to become self-employed, yet there are a number of studies observing increased self-employment rates for EU2 and EU8 immigrants, post enlargement. For example, in the United Kingdom, which more or less opened their labour market, EU10[17] immigrants had a particularly high probability of becoming self-employed (D. Blanchflower and Lawton 2010). In Germany, too, post enlargement immigrants were up to five times more likely to be self-employed than previous cohorts (Elsner and Zimmermann 2013), while in Austria, the number of self-employed Poles increased four times, and doubled for the EU-8 population as a whole, between 2003 and 2005 (Barrell, FitzGerald, and Riley 2007). Section 4 explores the post enlargement patterns of self-employment for the two immigrant groups and presents the methodology employed for the empirical analysis.

Immigration policies and self-employment

The literature exploring the effects of immigration policies more generally on immigrant self-employment is relatively scarce. Hunt (2010) explores the entrepreneurial propensities of immigrants compared to the native population in the US, looking at the different entry visas. She finds that immigrants entering under temporary work visas or as student/trainees perform significantly better that native college graduates in terms of wages, patenting and authoring books or papers. They also have a higher likelihood than natives to start-up companies. At the

[17] Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia.

other end of the spectrum, immigrant arriving under the family reunification visas perform similarly to natives.

Mahuteau et al. (2014) look at the effect of a change in Australia's immigration policy on immigrant's propensity to become entrepreneurs. They find that the policy change has resulted in a 2 to 4 per cent increase in the probability of attracting an immigrant who was already an entrepreneur in the origin country. Immigrants arriving under skilled independent visa have a 10 per cent higher probability to become an entrepreneur in Australia, while the likelihood increases to 18 percent for those entering under the business visa. Perhaps not surprisingly, immigrants entering under the family visa have only a 3 percent probability of becoming an entrepreneur. Constant and Zimmermann (2005) investigate the role of the legal status at entry, whether work permit, refugee, or kinship, in a comparative study between Germany and Denmark, and the effect it has on work participation and earnings. They find that, even after controlling for skill level, non-economic immigrants tend to be less active in the labour market and present lower earnings.

Data and methodology

The self-employment rates for the EU2 and EU8 immigrants in the EU15 countries are computed using the European Union's Labour Force Survey (EU LFS) data for the period 2004-2015, for which disaggregation between the two immigrant groups is possible. The EU-LFS is a large household sample survey that provides quarterly and annual results on labour participation of people aged 15 and over as well as on persons outside the labour force. The survey uses the same concepts and definitions, follows the International Labour Organization Guidelines, uses commons classifications (NACE, ISCED, NUTS, ISCO), and collects the same set of

characteristics in each country, making it highly comparable across countries. Moreover, the survey provides information on the country of birth of respondents, which we use to derive the two immigrant groups. The analysis considers the incumbent EU-15 countries, which have implemented the transitional arrangements. A number of control variables, which have been found to affect self-employment, have been included. They are outsourced from international databases, like the World Development Indicators and OECD Statistics.

Unemployment

Unemployment is a determinant of self-employment, with the direction of the effect depending on context and circumstances. High unemployment can lead to more self-employment as the opportunity cost of starting a business decreases, however, it also entails fewer resources available, which in turn could undermine the creation of new businesses (see for example Blau 1987; Blanchflower and Meyer 1994; Audretsch et al. 2002); and for an extensive review Thurik et al. 2008).

Gross domestic product per capita

The level of per capita GDP, a proxy for economic development, can be negatively associated with self-employment if it is associated with greater capital per worker, but it can be positively associated too, when it is the result of increased economic growth and demand for goods and services, encouraging business creation (Parker and Robson 2004). Further, an increase in the level of GDP per capita should be associated with a decrease in self-employment, as the returns from waged employment relative to self-employment are now higher (Lucas 1978).

Gross domestic product growth

GDP growth, a proxy for economic growth and level of entrepreneurial opportunities, should be positively associated with self-employment rates (see Acs, Audretsch, and Evans 1994; Dennis 1996; Robson 1996; D. G. Blanchflower 2000).

The share of services as percentage of Gross domestic product

A higher share of the services sector in the GDP should be conducive to or associated with more self-employment in the economy (see (Z. Acs, Audretsch, and Evans 1994).

Short term interest rates

Short term interest rates are used as a proxy for the costs associated with setting up a new business. In the absence of sufficient personal resources to finance a new business without borrowing, one of the most formidable entry barriers to self-employment is the cost of borrowing (Parker 1996). We would expect thus a higher interest rate to be negatively associated with the level of self-employment.

Robson (2003) finds that the *female labour force participation rate* is positively associated with self-employment rates. We also include as a control variable the *self-employment rate of the native population*, which stands in for other unobserved characteristics of the business environment, including opportunities and barriers.

Table 2-2 presents the evolution of self-employment rates by country group, before and after enlargement. It presents a more nuanced view for the EU2 immigrants group, where we can compute the average self-employment rate before enlargement, in 2007 - the year of the enlargement, between 2008 and the end of the transitional arrangements period (which varies by country) and for the period post-transitional arrangements. We cannot accomplish the exact same exercise for EU8 immigrants, since our data is available from 2004 onwards only, the year of enlargement for this group. With the exception of Italy, all countries register an increase, of

various magnitudes, in self-employment rates among the EU2 immigrant group in 2007, immediately after enlargement. An explanation for Italy's case might be the fact that a work permit was not needed in particular sectors such as agriculture, construction, domestic work and care services, where most of the EU2 immigrants, particularly Romanians were to be found disproportionately. Nevertheless, an interesting picture appears when looking at absolute numbers in this case too: the number of self-employed EU2 immigrants in the sample increases from 195 individuals in 2006 to 277 in 2007, to 339 in 2008, accompanied by a corresponding increase in the total number of EU2 immigrants in the sample, from 1477 in 2006 to 3285 in 2008.

Table 2-2 The evolution of self-employment rates for the EU2 and EU8 immigrant groups, pre- and post- enlargement

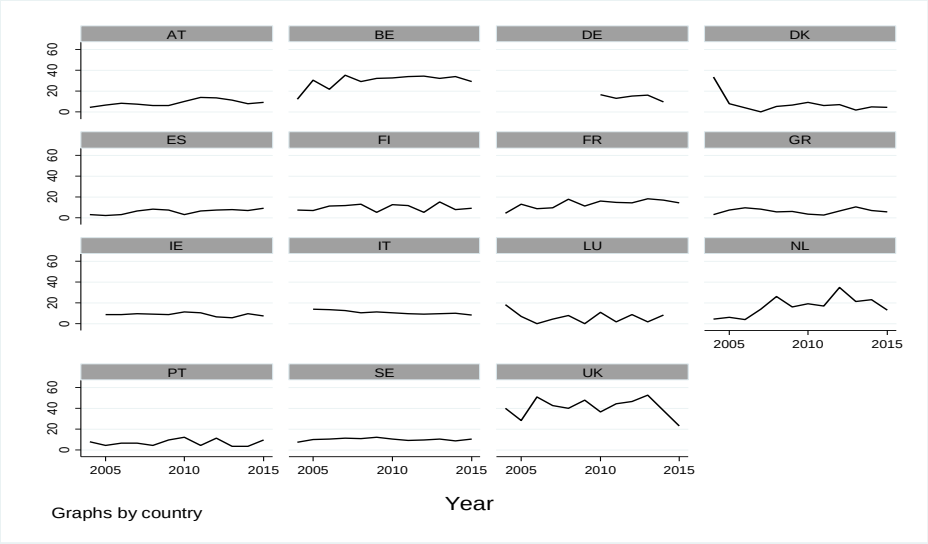
	EU2				*EU8*		
Country	2004-2006	2007	2008-end of TA	Post-TA	2004	2005-end of TA	Post TA
Austria	6.2	7.2	10.1	8.4	13.4	14.1	13.2
Belgium	21.3	35.3	32.4	31.6	4.5	24.7	17.1
Denmark	15.0	-	5.8	5.4	11.1	9.2	8.4
Spain	2.5	6.5	8.2	6.8	6.9	6.4	9.0
Finland	*n/a*	*n/a*	*n/a*	*n/a*	7.1	6.8	10.3
France	8.7	9.5	15.3	15.7	3.5	10.9	10.3
Germany	-	-	15.2	9.7	-	19.2	18.6
Greece	6.7	8.0	5.5	5.9	11.9	12.2	13.8
Ireland	8.7	9.4	8.5	8.4	*n/a*	*n/a*	*n/a*
Italy	13.5	12.7	10.2	9.2	-	19.8	13.0
Netherlands	4.7	13.9	22.3	17.9	6.4	13.0	14.6
Portugal	6.1	6.2	4.1	7.6	-	-	30.2
Sweden	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
United Kingdom	39.6	42.6	44.6	30.5	*n/a*	*n/a*	*n/a*

Source: Own computations using EU LFS data

Notes: N/A refers to cases when transitional arrangements when not in place. Data for Germany comes from the Federal Statistical Office. Due to the small sample, the values for Finland and Sweden are aggregated for EU8+EU2.

In a number of countries, the self-employment rates continue to register an upward trend up to the end of the restriction measures, while, where there is a slight decrease the levels are still generally above the pre-enlargement levels. Looking at the post transitional arrangements period, most of the countries register a decline in self-employment rates, sometimes with a rather spectacular magnitude: from 45 to 31 percent in the United Kingdom, from 15 to 10 percent in Germany, or from 22 to 18 percent in the Netherlands (figure 1).

Figure 1. The evolution of self-employment rates for EU2 immigrants, 2004-2015

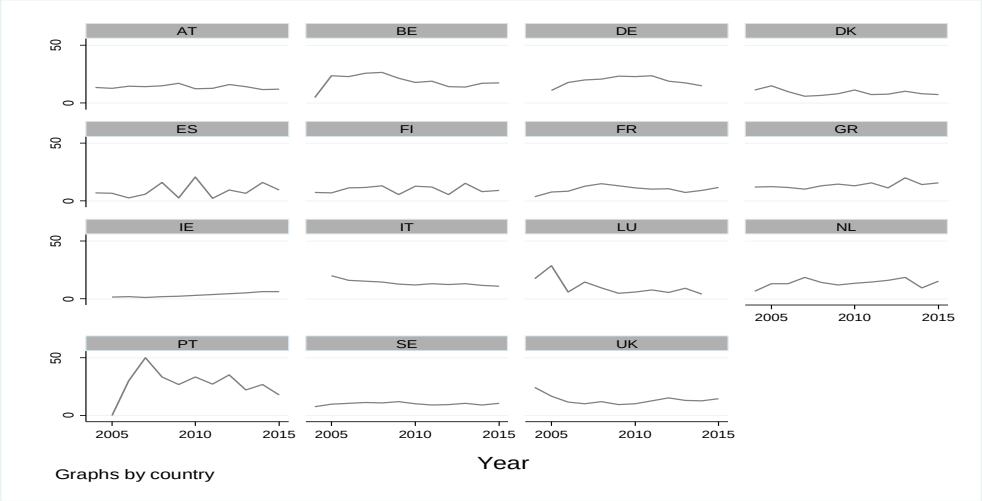


Source: Author computations and EU LFS data

Turning to the evolution of self-employment rates for the EU8 group, a pattern is less clear. While some countries experience substantial declines in self-employment rates post transitional arrangements (e.g. Austria, Germany, Italy), the post-TA rates are still higher than the pre-TA rates (table 2). Countries such as the United Kingdom, Ireland, which did not implement transitional arrangements for the EU8 immigrant group, but also Portugal, Greece, Netherlands or Spain, seem to exhibit higher self-employment rates for this particular group after the end of the transitional arrangements, around years 2008-2009 (figure 1). A potential

explanation might be the onset of the Great Recession – the recession reduces demand for wage workers, which, if salaries are rigid, forces workers to enter self-employment (Cho and Newhouse 2013; Koellinger and Thurik 2012; Finkelstein Shapiro 2014). This might be particularly true for immigrant workers, who might need to stay in self-employment if there are no alternative employment opportunities available, if they are to remain in the country (Millán et al 2012).

Figure 2. The evolution of self-employment rates for EU8 immigrants, 2004-2015



Source: Author computations and EU LFS data

The hypothesis that both EU2 and EU8 immigrant groups circumvented transitional arrangements by claiming self-employment – since the self-employed were not subjected to restrictions - seems highly plausible and the data exhibited above and in other sources seems to support it. Yet, to the authors' knowledge, no systematic study has been undertaken to prove its validity. The study intends to fill this gap in the literature, but also draw broader conclusions about the effectiveness of restrictive immigration policies in deterring immigration.

One of the advantages of the study is given by the fact that the effects of the policy changes are immediate, as shown by Table 2 and Figures 1-2. This makes the study less likely to miss out on long term effects which cannot be usually assessed because of the relatively short periods between policy changes. Moreover, because of the cross-country comparison, we are able to explore substitution effects, for instance, EU8 immigrants moving to United Kingdom instead of Germany, where transitional arrangements were in place.

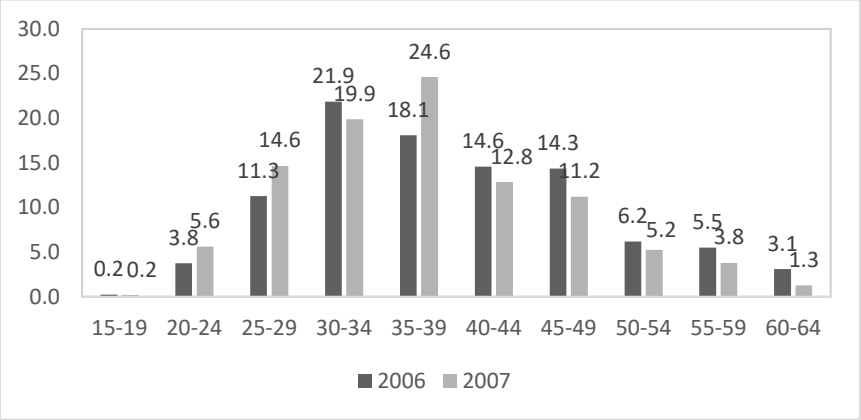
Descriptive statistics

Figures 3 to 5 examine changes in pre- and post-enlargement cohort characteristics for the self-employed individuals in the EU2 immigrant group, in terms of age, gender and educational level. Again, the same exercise is not possible for the EU8 group, because we do not have information on self-employment before the enlargement in 2004.

Figure 3 presents changes in the age structure of self-employed EU2 immigrants before and after enlargement. The average age for this group seems to be increasing from one cohort to the other. While before enlargement self-employed individuals were preponderantly in the 30-34 years old segment, after enlargement, we notice a significant increase in the 35-44 years age segments, coupled with a decrease in the self-employment for the 30-34 cohort. The post-enlargement trend seems to be much more in alignment with the existing literature which has found an inverse U-shaped relationship between age and self-employment (Bönte, Falck, and Heblich 2009). The increase in age is all the more interesting in light of previous studies which have found that post enlargement EU2 immigrants were predominantly young[18] (Holland et al. 2011).

[18] About 60 per cent of the migrating population was below 35 years old.

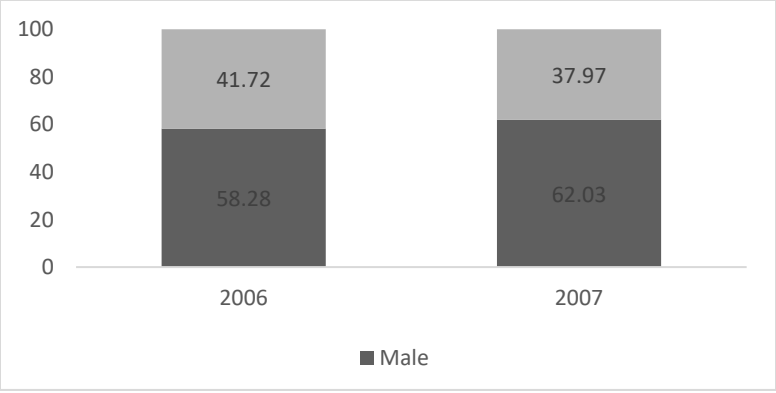
Figure 3. Change in the age structure of self-employed EU-2 immigrants pre- and post- enlargement



Source: Authors computations using EU LFS Data. *Note*: The data covers EU2 immigrants in the EU15 countries.

If we turn to gender disaggregation (figure 4), we notice that men have generally a greater likelihood of becoming self-employed than women, but the gender gap widens significantly after the enlargement; more than 60 percent of the EU2 immigrants self-employed in 2007 are men.

Figure 4. Change in the gender disaggregation for self-employed EU-2 immigrants, pre- and post-enlargement

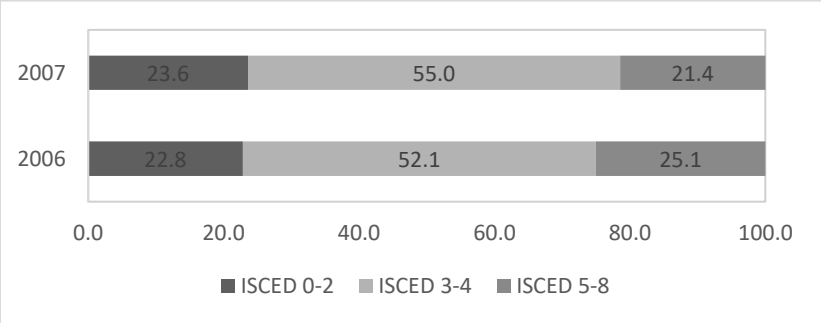


Source: Authors computations using EU LFS. *Note*: The data covers EU2 immigrants in the EU15 countries.

With regards to differences in terms of educational achievements (figure 5), there are some differences across educational levels. While the self-employment rate of individuals with

an upper secondary education seems to be changing only marginally from one period to the other, there is a significant decrease in self-employment rates among tertiary educated individuals, coupled with a corresponding increase of self-employment among lower secondary educated individuals. This trend could be a positive indication of a switch to a necessity type of self-employment, as, usually, the number of years of education is positively associated with the probability of becoming an entrepreneur, or starting an opportunity-based business (Robinson and Sexton 1994).

Figure 5. Change in the education trends for self-employed EU2 immigrants, pre- and post-enlargement



Source: Authors computations using EU LFS
Notes: ISCED 0-2 includes less than primary, primary and lower secondary education; ISCED 3-4 includes upper secondary and post-secondary non-tertiary education; ISCED 5-8 includes tertiary education (based on the International Standard Classification of Education (ISCED) 2011). The data covers EU2 immigrants in the EU15 countries.

Empirical model

To disentangle the effects of various factors on EU8 and EU2 immigrants' propensity to become self-employed, and the role of transitional arrangements in particular, we estimate the following model:

$$Y_{it} = \beta_0 + \beta_1 X_{i\,t} + \beta_1 Z_{i\,t} + \varepsilon_{it}$$

where Y_{it} is the dependent variable, either self-employment rates for EU2 or self-employment rates for EU8 immigrants, X represents the independent variable transitional arrangements, a dummy variable equal to 0 if no arrangements were in place and 1 if there were, β its slope, t refers to the time units, i to the cross-national units, while ε is the error term. Z represents a vector of control variables which have been found to be linked to self-employment in the existing literature. We include an enlargement dummy, equal to 1 if the year is bigger than 2004 or 2007, to control for the effect of free mobility.

The analysis employs a regression with fixed effects, which enable us to control for the effect of time-invariant characteristics so we can assess the net effect of our predictors. A Hausman (1978) specification test decisively confirm this is the right choice. Given that a lot of the time variation is captured by the transitional arrangements variable and the fact that we do not immediately see variation in self-employment rates that could be explained by overall time trends, we decide against using time fixed effects. We also test this option empirically[19], and the results confirm our choice.

Results and discussion

Table 2-3 presents the correlation matrix between EU2 and EU8 self-employment rates and the control variables employed in the empirical analysis. EU8 self-employment rates are most notably correlated with the self-employment rate of natives, and the level of GDP per capita, although the effects go in the opposite directions. EU2 self-employment rates in turn, are most notably correlated with transitional arrangements and services as a percentage of GDP. The

[19] We use the stata command testparm.

variables do not display signs of collinearity[20], thus using all the controls identified above at the same time should not constitute an issue.

Table 2-3 Correlation matrix

	EU8 SER	EU2 SER
Native SER	0.2058	-0.1816
Female LFPR	-0.0788	0.0789
GDP growth	-0.0873	0.0169
GDP per capita	-0.3144	-0.0455
Services % GDP	0.0912	0.2069
Unemployment	0.0186	-0.1922
Interest rates	0.1012	0.0542
Trans. Arrang.	0.1003	0.2454
Enlargement	-0.0891	-0.0067

SER = self-employment rate

Turning to our empirical analysis, column 1 of table 2-4 presents the results of a parsimonious model that explores only the effect of the transitional arrangements on EU2 immigrants' self-employment rates, while column 2 includes our control variables and an enlargement dummy proxying the effect of the opening of the borders. The effect of transitional arrangements is highly significant and positive across the two models[21]. It seems, thus, that Romanians and Bulgarians have indeed turned to self-employment as a mean to circumvent the restrictive labour market measures implemented by the incumbent member states. Surprisingly, with the exception of the female labour force participation rate, none of the other variables seem to have an effect, although they mostly register the sign predicted by the existing literature on self-employment.

[20] We test for both collinearity and multicollinearity and find no presence. We also regress the explanatory variables on one another, and obtain mostly R^2 values lower than 0.2. The highest value obtained (0.27) is when we regress transitional arrangements on all other explanatory variables. The coefficients in this regression suggest that transitional arrangements are most closely associated with the level of per capita GDP.

[21] A qualitatively similar result is obtained when using a random effects specification, however, the results of the Hausman test indicate that fixed effects is the specification to use.

Table 2-4 Determinants of EU2 self-employment rates

DV: EU2 self-employment rate	(1)	(2)	(3)
Transitional Arrangements	2.54***	3.49***	3.41***
	(0.89)	(1.11)	(1.13)
Enlargement		-0.96	-0.83
		(1.75)	(1.77)
Native self-employment		0.07	0.08
		(0.50)	(0.50)
Female labour force participation		0.78*	0.78*
		(0.41)	(0.41)
GDP growth		0.09	0.15
		(0.17)	(0.22)
GDP per capita		-0.0001	-0.0001
		(9.68)	(9.83)
Services as % of GDP		-0.23	-0.18
		(0.34)	(0.36)
Short term interest rates		-0.39	-0.39
		(0.39)	(0.39)
Unemployment rate		0.03	0.01
		(0.18)	(0.18)
The Great Recession			0.65
			(1.38)
Constant	11.94***	-8.27	-11.40
	(0.54)	(30.77)	(31.56)
Observations	170	170	170
R-squared	0.050	0.103	0.104
Number of countries	15	15	15
Country FE	YES	YES	YES

Source: Author computations using EU LFS 2004-2015. *Note*: Standard errors in parentheses. *Statistical significance at the 10% level. **Statistical significance at the 5% level. ***Statistical significance at the 1% level. The analysis covers the EU15 countries.

Table 2-5 presents the estimates for the determinants of self-employment among the EU8 immigrant group. The first thing to observe is that transitional arrangements do not seem to have had an impact on this groups' self-employment rates. As hypothesised in section 3, because there were countries like the United Kingdom or Ireland which did not implement restrictions, EU8 immigrants had alternative destination options to the now relatively closed Germany, Austria or the Netherlands, and did not need to turn to self-employment as a way to evade barriers. This

also implies that the observed increase in self-employment for this immigrant group is most likely motivated by existing opportunities and not merely a strategy towards salaried employment. In this case, two other factors seem to have mattered instead for their propensity to become self-employed, namely, GDP per capita, which affected this propensity negatively, and the level of interest rates, which surprisingly has a positive effect.

Table 2-5 Determinants of EU8 self-employment rates

DV: EU8 self-employment rate	(1)	(2)	(3)
Transitional Arrangements	0.22	-1.75	-1.79
	(0.92)	(1.27)	(1.27)
Enlargement		-2.35	-2.34
		(1.77)	(1.77)
Native self-employment		0.75	0.76
		(0.48)	(0.48)
Female labour force participation		0.17	0.17
		(0.38)	(0.38)
GDP growth		0.24	0.30
		(0.15)	(0.20)
GDP per capita		-0.0002**	-0.0002**
		(0.0001)	(0.0001)
Services as % of GDP		0.17	0.22
		(0.33)	(0.34)
Short term interest rates		1.09***	1.10***
		(0.34)	(0.34)
Unemployment rate		0.15	0.13
		(0.16)	(0.17)
The Great Recession			0.67
			(1.28)
Constant	12.74***	-14.05	-17.26
	(0.47)	(30.40)	(31.09)
Observations	174	174	174
R-squared	0.000	0.109	0.111
Number of countries	15	15	15
Country FE	YES	YES	YES

Source: Author computations using EU LFS 2004-2015. *Note*: Standard errors in parentheses. *Statistical significance at the 10% level. **Statistical significance at the 5% level. ***Statistical significance at the 1% level. The analysis covers the EU15 countries.

The period we analyse, 2004-2015, covers the Great Recession which has affected severely some of the countries we investigate (e.g. Greece, Spain, Ireland). Self-employment could have been a way for both groups to navigate the recession and still be able to remain in the country. As figures 1 and 2 showed, some countries experienced higher self-employment rates during this period, particularly for the EU8 immigrant group, despite the lifting of the restrictions in this case. To test the effect of the recession, we employ a dummy variable equal to 1 for the years the country has experienced negative real GDP growth (column 3). The Great Recession does not seem to have had a significant effect on self-employment propensities for neither of the two immigrant groups. What is more, when we control for its effect, our results do not change significantly; for EU2 immigrants, transitional arrangements and the share of women in the labour force still matter the most, while for the EU8 group, variation in self-employment is explained mainly by GDP growth and interest rates.

Conclusion

We live in complex times, when there is much fear about migration and demographic change, accompanied by rising inequality, shrinking welfare state and increased job instability (Peggy Levitt, 2017), leading to increased feelings of xenophobia and nationalism, and a great chasm between "us" and "them". These feelings have in turn translated into demands to policy-makers and politicians to manage and restrict migration, which has resulted in increasingly restrictive immigration policies. Do restrictions, however, actually limit immigration? It has been argued elsewhere (Mayda 2010) that even the most restrictive policies include loopholes that allow immigrants to enter the country and supply the much needed demand for labour in developed countries. This paper investigates precisely one such loophole, namely, the self-employment channel available during the 2004 and 2007 EU enlargement rounds, when a series

of labour market measures (transitional arrangements) were implemented to prevent a potentially non-manageable flow of E8 and EU2 immigrants. Much of the literature has argued that these two immigrant groups have turned to self-employment as a way to circumvent these restrictions. Our results suggest that this might indeed have been the case for the EU2 immigrant group, which registers a significant increase in self-employment rates post enlargement, yet it is not applicable to the EU8 immigrant group.

Our findings have broader research and policy implications. Firstly, they add value to existing debates concerning the effectiveness of immigration policies. By taking advantage of the self-employment loophole, EU2 immigrants have managed to circumvent the transitional arrangements and thus undermine their role in restricting immigration. The two post-enlargement effects also allow for a more nuanced view on immigration: in the context of free mobility and similar labour market restrictions, EU2 immigrants overwhelmingly migrated to Spain or Italy, countries with similar cultural affinities, while both EU8 and EU2 immigrants greatly overlooked Sweden, which did not implement restrictions in neither rounds. This points to the existence of other factors driving immigration (language similarity, labour demand, geographical position) which interact with the absence/presence of restrictions and influence migration decisions.

Secondly, the results contribute to our better understanding of the effect of restrictive immigration policies, revealing the importance of considering the effect they have in shaping the volume and skill composition of immigrants, as well as their labour market trajectories and subsequent economic activities. Our findings seem to point that restrictions do not necessarily stop immigration, but rather affect the channels people choose to enter, as Czaika and de Haas (2013) have previously asserted. Immigration is driven by strong social and economic forces that

are bound to compete with migration regulations (Palmer and Pytliková 2015). Indeed, when there are strong pull and push factors in place – as were the significant wage gaps in this case – restrictions do little to stop immigration.

Thirdly, we point to the importance of synchronization and alignment in applying restrictions, as we have seen, in the case of EU8 immigrants, the fact that the UK and Ireland did not implement restrictions meant that flows were diverted away from traditional immigration countries towards them instead. It becomes critical, thus, for policy makers to look beyond their own borders when implementing immigration policies (Palmer and Pytliková 2015) and to anticipate how other countries' policies will interact with their own and affect immigration decisions.

Fourth, the study sheds light on the role of the state in shaping the quantity and quality of immigration flows, an aspect which has been rather overlooked by the existing theories and research into the determinants of migration (Palmer and Pytliková 2015). As tables 3-5 show, there were significant differences in terms of gender, age and education distribution between the pre- and post-enlargement EU2 cohorts.

Lastly, the findings contribute to the existing literature on immigrant self-employment, which has preponderantly focused on personal characteristics of immigrants and available networks as determinants of self-employment, and less so on institutional and policy related factors. We show that immigration policies, as the gatekeepers setting the conditions of entry and stay, can be an important determinant of immigrant self-employment. However, this type of, rather, "necessity" self-employment, would arguably contribute less to the overall economy and create far less jobs that policy-makers expect. Furthermore, necessity self-employment is often associated with subsistence living and health issues for immigrants themselves. This should

constitute some food for thought for most developed countries, which see self-employment as a silver bullet to all-around socio-economic gains.

It is critical to acknowledge that any type of analysis, particularly when it involves migration, is bound to face methodological limitations. All evidence found on the effects of immigration policies is bound to be dependent on the context and the time of the analysis, and our study is no exception. The transitional arrangements are a very specific case of restrictive immigration policies, and the results might not translate beyond the borders of the European Union. Nevertheless, this case offers a rare opportunity to study the effect of policies and policy changes over time and across countries in a longitudinal approach which is hardly possible in other contexts.

Chapter 3 Does employment protection legislation promote immigrant self-employment?[22]

Abstract
The chapter investigates the effect of employment protection legislation on immigrant self-employment rates, using OECD indicators on the strictness of employment protection legislation (EPL), in a longitudinal analysis covering 18 European countries over the period 1995-2013. I employ an OLS model with random, country, and time fixed effects, and find that EPL does not affect immigrant self-employment rates, but it does affect native self-employment. This suggests significant differences between the determinants of self-employment for immigrants and natives, with implications for immigration and entrepreneurship policies. Further, I distinguish between regulations for permanent and temporary contracts and find the latter to have a positive and significant effect on self-employment rates for both immigrants and natives. Since temporary contracts are a flexible way for employers to deal with stringent regulations on permanent contracts, constrains imposed on temporary contracts might trigger dependent self-employment. The results also point to the interdependency between the two types of regulations and the fact that changes in one sphere should be interacting with changes in the other one, affecting immigrants and natives differently.

Keywords: immigrant self-employment; employment protection legislation;

JEL codes: J81, J88, J38, J15

Introduction

The chapter investigates whether more stringent employment protection legislation determines employers to contract out work to their own employees through dependent self-employment. If this is true, then employers can use self-employment as a mean to circumvent the existing legislation, and thus undermine its very purpose, that of protecting employees. Moreover, this makes opportunity (and independent) self-employment less likely, as the risk of

[22] Paper written in collaboration with Martin Kahanec, Professor, Central European University.

starting an own business are high, yet the benefits are not substantially greater. The study focuses on immigrants, who, by virtue of being outsiders to the labour market, are even more susceptible to this phenomenon. This phenomenon might explain the significantly higher self-employment rates that immigrants exhibit when compared with the native population.

The effect of labour market institutions on labour market outcomes has been the subject of extensive research and heated policy debates over the past decades. One of the most examined[23] such institution has been employment protection legislation (EPL) and its consequences on labour market processes. This focal point might not be surprising, as deciding on a degree of strictness of EPL is paramount to deciding between economic efficiency and labour market protectionism. The right degree of protection (Pissarides 2001) should strike a balance between the flexibility required by companies to adapt to changing labour demands and advances in technology, and the need to protect the workers from unfair behaviour from the employer.

At the same time, there has been a renewed interest among policy-makers in the role that self-employment and business creation can have in fostering economic growth and promoting job creation.[24] Yet, the changing nature of the labour markets requiring increased adaptation and flexibility have blurred the boundaries between actual business creation and dependent self-employment (OECD 2013a). A growing number of countries have seen a rising share of independent contractors who depend on a single employer for their income, but are legally self-employed (idem.). The phenomenon has important policy ramifications – dependent self-employment undermines the very purpose of EPL, as workers lose their rights under the labour

[23] In a review of existing EPL research, OECD (2013) included 149 references, almost 90 per cent of which were published since the turn of the millennium (Holmlund 2014).
[24] See, for instance, the European Commission's Entrepreneurship 2020 Action plan. Available here: http://ec.europa.eu/growth/smes/promoting-entrepreneurship/action-plan/

law and receive less favourable benefits from social security protection (Roman et al 2011). Furthermore, the contribution that dependent self-employment makes to economic growth is not very well understood and might be significantly lower than the ones resulting from [independent] self-employment. Thus, understanding the determinants of self-employment and business creation becomes pivotal to understanding and predicting the future performance of different economies (Kanniainen and Vesala 2005).

European Union member states have enacted various laws on employment protection[25] over the past several decades, requesting employers to provide, for instance, severance pay or notifications of termination of contract. Said legislation aims to protect workers from dismissal and wage loss, unfair behaviour from employers, to counter imperfection in financial markets that limit workers' ability to insure themselves against job loss. However, except for in a perfectly functioning market, we would expect consequences of employment legislation on labour market outcomes and dynamics (Lazear 1990). Because EPL increases firms' firing costs, it may impact on job flows and the level of employment (Sá 2011). Opponents of EPL argue that employment levels decrease, as given the costs of firing employees, attracting new workers is risky, and so, employers are reluctant to hire more of them (Liebregts and Stam 2016). Thus, by imposing costs on firms' adaptation to changes in demand and technology, employment protection legislation may affect not only job destruction but also job creation (Scarpetta 2014). A corollary of this phenomenon is that incumbent workers gain from stricter employment regulation which protects their employment, but outsiders lose from it, furthering inequality among various demographic groups unevenly affected (Heckman and Pagés 2004). Since

[25] Employment protection legislation refers to the rules governing the firing and hiring of employees (OECD 2013). See Annex A for more detailed information on the sub-dimensions each EPL indicator includes.

immigrants are generally outsiders in this context, we would expect EPL to have a more pronounced effect on their employment opportunities and their self-employment propensities.

The nexus between EPL and alternative forms of employment may indeed be particularly strong for immigrants, as they face multiple barriers to full integration in the labour market (Constant et al. 2011; Constant, Kahanec, and Zimmermann 2009). To the extent that EPL intervenes in the relationship between employers and employees, the former may be more reluctant to hire immigrants also due to informational asymmetries, or lack of trust, between employers and immigrant workers, as compared to native workers (Becker 2010). This effect may be amplified by the lack of comparable levels of social or human capital on the side of immigrants. Another barrier to immigrants' employment, possibly interacting with EPL, may be the lack of recognition of their qualification in the host country. As a result, immigrants can be expected to be more prone to seeking alternative forms of employment, including self-employment.

This is where the present study intends to make a meaningful contribution. It aims to disentangle the effect that employment protection legislation has on self-employment rates of immigrants, in a longitudinal analysis covering the EU-15[26] countries and Iceland, Switzerland and Norway for the period 1995-2013. The central contribution of the study is the focus on immigrant self-employment rates, which, to the author's knowledge, has not yet been attempted. Europe provides a rare opportunity to study how employment protection legislation affect immigrants' self-employment, as it allows to follow changes across relatively comparable countries and over time in a longitudinal approach. Random and fixed effects regression analyses

[26] EU-15: Austria, Belgium, Denmark, Germany, Finland, France, Ireland, Italy, Greece, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom

are used to disentangle country-level, time-varying determinants of immigrant self-employment rates.

The paper has a twofold contribution to the existing literature. First and foremost, it investigates the effect of employment legislation on immigrants' self-employment rates, the first study of its kind. By virtue of being outsiders to the local labour market, the hypothesis is that immigrants tend to be more affected by stringent EPL, with consequences for employment and business creation. Second, it investigates the effects of EPL for both regular and for temporary contracts[27], since their effects might be complementary up to a point. If regular contracts are highly regulated, individuals might turn to other forms of more flexible employment, temporary contracts included. Moreover, as seen in Figure 1, there seems to be an interdependency between the two indicators, with countries implementing strict regulation in one case and being more flexible in the other. The study also contributes to policy discussions concerning immigrant entrepreneurship, generally seen as an important vehicle for job creation and immigrant labour market integration.

Employment protection legislation and self-employment

Theoretical framework

The relationship between employment protection legislation and self-employment is not straightforward and is often contingent on context and timing. On the one hand, there are reasons to believe EPL has a negative effect on self-employment. Firstly, the degree of risk aversion and differences in risk between employment and self-employment has an important corollary: if

[27] As defined by the OECD indicators employed in the analysis.

stricter EPL has the effect of reducing the risk of earnings in waged employment relative to the risk of earning from self-employment, then we can expect EPL to decrease self-employment (Roman et al 2011; Parker 1997). Self-employment is an economic activity that entails a high degree of risk and uncertainty, thus individuals might be dissuaded from starting their own businesses if they have the safety of employment. Furthermore, high levels of EPL might discourage individuals already in paid employment from becoming self-employed, as it increases the individual's opportunity cost of changing employers or leaving a secure, salaried job (idem). For instance, severance pay usually protects workers with the longest tenure, who would lose their place in line if they were to try self-employment and return after to their former employer (Henrekson 2007; Henrekson and Roine 2007; Roman et al 2011). Finally, tighter labour regulations impose burdens disproportionately on smaller firms, which can least afford the costs of firing and hiring that stricter EPL imposes (Parker 2007). Moreover, it is significantly costlier to retain unsuitable workers in small firms where every employee counts, than in larger firms, therefore individuals who might consider becoming self-employed might refrain from doing so if they foresee considerable costs associated with labour regulations (Parker 2007; Roman et al 2011).

Employment regulation, however, can be positively related to self-employment too (Grubb and Wells 1993). The negative relation between self-employment and EPL presented above might be undermined if employers can circumvent employment protection legislation by outsourcing work to self-employed contractors, the so called dependent self-employees. In the context of stricter EPL, dependent self-employees might even earn more than if they remained employees, since contracting out allows employers to reduce labour costs (Roman et al 2011). Thus, stricter EPL is likelier to promote transitions from paid employment to self-employment,

by means of mutual arrangements between an employer and his employees, engendering and perpetuating the phenomenon of "dependent self-employment" (idem). If that is the case, it means that employers can significantly undermine the role of EPL – which is in place to protect the rights of waged workers – by substituting these very workers for self-employed contractors. This would also entail that a significant proportion of observed self-employment could be "false", and used to conceal what is essentially an employment contract (Robson 2003).

Self-employment is particularly significant for immigrants, for which it provides an alternative to the various labour market barriers (discrimination, non-recognition of diplomas and qualifications, under or over-qualification, etc.) they encounter on the path to employment. Thus, an over-representation of immigrants in self-employment could be seen as a rational response to adverse labour market conditions (Clark and Drinkwater 1998), such as the insider-outsider divide that high employment protection engenders. However, the relationship between EPL and immigrant self-employment is not clear-cut. Labour markets with strong employment protection may reduce mobility in and out of employment (D'Amuri and Peri 2012). As immigrants are usually newcomers, and thus outsiders in the labour market, the effect of employment protection on their probability of finding a job would then be most likely negative, even if the net effect of employment protection on aggregate employment is unclear (Bazilier and Moullan 2012). This would imply a positive relationship between EPL and self-employment, if immigrants turn to self-employment because of limited options in waged employment. More flexible labour markets, in turn, could promote immigrants' absorption, by facilitating job upgrading and job mobility, and thereby reducing self-employment since now there are waged employment opportunities for immigrants (Angrist and Kugler 2003). Similarly, as outsiders and new to the country, immigrants may be less informed about their rights and may, for instance, not claim

compensation for 'unfair' dismissal (Sá 2011). This would make them preferable employees to native workers, irrespective of the degree of EPL strictness, which again might lead to less self-employment since now there are opportunities in waged employment.

Empirical evidence

The empirical literature examining the effect of EPL on self-employment is relatively small, and has been inconclusive so far. In some of the earliest studies to investigate the relationship, and including agricultural self-employment, OECD (1992, 1999) and Grubb and Wells (1993) find a positive relation between EPL and self-employment rates in OECD countries. Still including agricultural self-employment, Van Stel et al (2007) and Bjørnskov and Foss (2010), however, find a negative relation between EPL and self-employment.

Excluding agricultural self-employment does not yield more conclusive findings. Investigating 19 OECD countries over the period 1978-1998, Kanniainen and Vesala (2005) find that labour market regulations reduce self-employment propensities, while Kugler and Pica (2008) find than an Italian reform in 1990 increasing dismissal costs reduced firms' entry rates. Torrini (2005) examines the role of institutional variables in determining the large disparities observed in self-employment rates across OECD countries and finds that the relationship between employment protection legislation and self-employment does not hold in a multivariate context. Similarly, Robson (2003), finds little evidence for a positive relationship between self-employment and the strictness of EPL. Moreover, he finds that, while the raw data suggests a positive relation might exist, once control variables are introduced, stricter employment protection legislation seems to actually decrease self-employment. Investigating the effect of dismissals protection on labour market dynamics, the speed of adjustment issue and on gross

flows, Addison and Teixeira (2003) find a positive association between employment protection and self-employment. Roman, Congregado, and Millan[28] (2011) find that the strictness of employment protection legislation encourages employers to contract out work to their own paid employees, promoting dependent self-employment. Moreover, their results suggest that stricter EPL makes transitions to independent self-employment less likely by altering the relative risk appraisal between salaried work and self-employment in favour of the former. More recently, looking at transitions in and out of self-employment for older workers, Christelis and Fonseca (2016) find that EPL is positively associated with self-employment, as stricter regulations make it more difficult to find paid employment. Disentangling between severance pay and notice period, they find that the former is positively associated, while the latter is negatively associated with self-employment.

The variation in results can be attributed to a significant degree to the variation in indicators used to measure the strictness of employment protection legislation across these studies. Moreover, as previously mentioned, the effect of EPL is contingent on geographical scope, the period under analysis, the methods utilised and the sources of the data – all are potential explanations of the extensive variation in results we observe.

Data, covariates and empirical model

Immigrant self-employment rates

The European Union Labour Force Survey (henceforth EUL FS) is employed to compute the dependent variables, immigrant self-employment rates. The EU LFS is a large household sample survey providing quarterly results on labour participation of people aged 15 and over as

[28] They distinguish between dependent self-employment, akin to contracting out, and independent self-employment, closer in meaning to what is considered entrepreneurship.

well as on persons outside the labour force. The EU LFS covers the 28 Member States and Iceland, Switzerland and Norway, from 1983 onwards. The survey uses the same concepts and definitions, follows the International Labour Organization Guidelines, uses commons classifications (NACE, ISCED, NUTS, ISCO), and collects the same set of characteristics in each country, making it highly comparable across countries. The analysis considers the EU-15 countries and Iceland, Switzerland and Norway only, as the dynamic between intra-EU and non-EU immigration distinguishes them from other advanced capitalist countries. The EU-10[29], EU-2[30] and Croatia are also excluded from the analysis, as they have only a more recent experience with immigration, thus a relatively small immigrant population and thus only imprecisely measurable immigrant self-employment rates. Moreover, since the indicator is compiled by the OECD, there is no EPL information for many of the new member states, which do not belong to the organization. The dependent variable, immigrant self-employment, is computed as the share of self-employed immigrants in the total immigrant active population, by country of birth, using the EU LFS, from 1995-2013.[31]

Employment protection legislation

Measuring employment protection legislation is not trivial. While quantitative measures can be readily computed for some aspects like the number of months' notice for termination, other aspects are more difficult to measure precisely, such as the willingness of labour courts to entertain law suits filed by fired workers or judicial interpretation of the notion of "just cause" for termination (Bertola et al 2000). The employment protection legislation indicators for regular

[29] Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia.
[30] Bulgaria and Romania.
[31] We do not have observations on self-employment and country of birth for the period before 1995, in the EU-LFS.

and temporary contracts used in the analysis originate from the OECD EPL database (2013) [32]. Despite its shortcomings (see Myant and Brandhuber 2016 for an in-depth discussion), its cross-country comparability makes it a very appealing indicator, and its use enables the comparison with previous studies which have employed it.

The indicators measure the procedures and costs involved in dismissing individuals and the procedures involved in hiring workers on fixed-term or temporary work agency contracts. The indicators have been compiled using the OECD Secretariat's own reading of statutory laws, collective bargaining agreements and case law as well as contributions from officials from OECD member countries and advice from country experts. These time-dependent indicators are compiled from 21 items covering different aspect of employment protection legislation, and take values between 0 and 6, from lower to higher protection of workers.

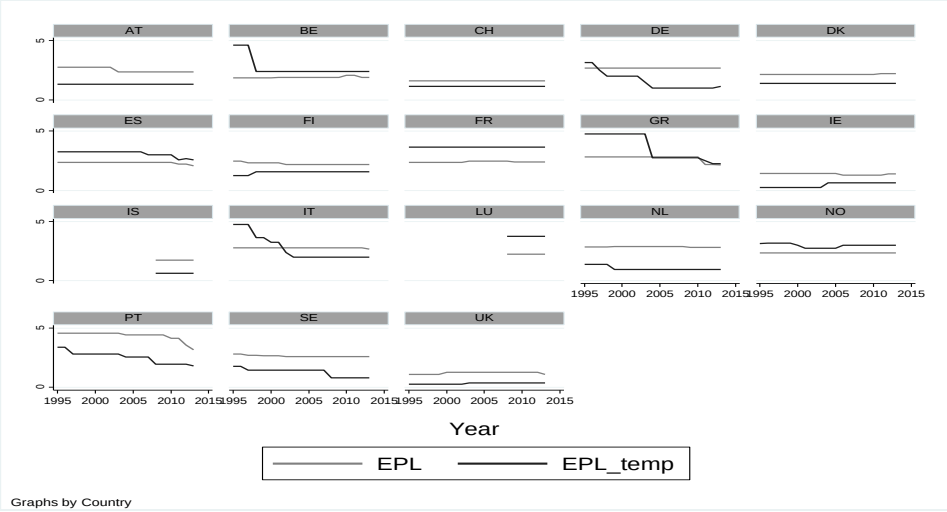
Figure 1 presents the evolution of employment protection legislation across the 18 countries under analysis for regular and temporary contracts. There is considerable variation across countries in the degree of strictness. The UK stands out as the least regulated country based on indicators for dismissals of individual workers on permanent contracts, followed by Ireland and Switzerland. By contrast, regulation in Portugal, Germany or the Netherlands is more stringent.

There does not seem to be much time variation of employment protection of permanent contracts within countries, however. Whereas five countries (Germany, Island, Luxembourg, Norway, and Switzerland) experienced no change in employment protection of permanent contracts, other countries experienced small changes and Portugal, but also Ireland, Greece, and France, exhibit significant variation in employment protection of permanent contracts over time.

[32] Please see Annex 1 for sub-components. The indicators and details on how they are constructed are available in OECD (1999) and OECD (2004).

Concerning regulation governing temporary contracts, a clear pattern of increased flexibility can be noticed across the board. What is more, countries with stricter EPL seem to have increased flexibility over temporary contracts (see Portugal, Austria or the Netherlands). Thus, while the protection afforded by regular contracts remains more or less constant over time, we observe a larger time-variation of protection of temporary contracts. This observation is in line with Scarpetta's (2014) assessment that in countries with rigid regulations on permanent contracts, the hiring and firing of temporary workers accounts for a large majority of gross worker flows.

Figure 1. Evolution of EPL for regular and EPL for temporary contracts, 1995-2013



Source: OECD Indicators of Employment Protection Legislation, 2017

Union density

Most EPL indicators are based on the legal constraints that apply in each country, which makes them less suited for tracking asymmetries across countries and over time in the degree of enforcement of employment protection (Bertola et al 2000). For this reason, the analysis includes

a measure of union density, employed here as a proxy for the degree of enforcement of employment protection. The source of the indicator is the OECD Database.

Unemployment rate

A number of studies suggest that the rate of self-employment may be related to the rate of unemployment. Unemployment is a determinant of self-employment, with the direction of the effect depending on context and circumstances. High unemployment can lead to more self-employment as the opportunity cost of starting a business decreases, however, it also entails fewer resources available, which in turn could undermine the creation of new businesses (see for example Blau 1987; D. Blanchflower and Meyer 1994; Audretsch et al. 2002); and for an extensive review Thurik et al. 2008). The source of the indicator is the OECD Database.

GDP per capita

GDP per capita is employed to measure the effect of economic development on immigrant self-employment. The source of the indicator is the OECD Database. GDP per capita can be negatively associated with self-employment if it is associated with greater capital per worker, but it can be positively associated when is the result of increased economic growth and demand for goods and services, encouraging business creation (Parker and Robson 2004). Further, an increase in the level of GDP per capita should be associated with a decrease in self-employment, as the returns from waged employment relative to self-employment are now higher (Lucas 1978).

Interest rates

Interest rates are used as a proxy for the costs associated with setting up a new business. In the absence of sufficient personal resources to finance a new business without borrowing, one of the most daunting entry barriers to self-employment is the cost of borrowing (Parker 1996). We would expect thus a higher interest rate to be negatively associated with the level of self-employment.

The analysis also includes as a control variable the self-employment rate of the native population, which proxies other unobserved characteristics of the business environment, including general business opportunities and enablers and barriers to self-employment.

Empirical model

To discern the effects that employment protection legislation has on immigrant self-employment rates, the following model is estimated:

$$Y_{it} = \beta_0 + \beta_1 X_{i\,t} + \beta_1 Z_{i\,t} + \varepsilon_{it}$$

where Y_{it} is the dependent variable, namely immigrant self-employment rates (and native self-employment rates for comparative purposes), X_{it} represents the independent variable, employment protection legislation for regular contracts and employment protection legislation for temporary contracts in the respective models, t refers to the time units (years), i to the cross-national units (countries), and ε is the error term. Z_{it} represents a vector of control variables which have been found to be associated with self-employment in the existing literature.

The analysis employs a panel regression with random effects as the baseline model, which is preferred due to the limited variation over time within the independent variable, EPL

and EPL temporary. In order to test the robustness of our results, a model which includes fixed effects, controlling for country-specific time-invariant characteristics, is also employed. Lastly, time fixed effects are added to eliminate the potentially spurious effect of aggregate trends, which is the most restrictive model of this study.

Results

This section presents the results of the empirical analysis, investigating first the effect of EPL for regular contracts and then the effect of EPL for temporary contracts. It begins by exploring the correlation between immigrant self-employment with the variables used in the empirical specifications (Table 3-1). Most notably, immigrant self-employment seems to be negatively correlated with GDP per capita, and positively correlated with the native self-employment rates. The correlation with employment protection legislation seem to be relatively low. The variables in the correlation matrix are far from being perfectly collinear, thus using the controls identified above at the same time should not constitute an issue.[33]

Table 3-1 Correlation matrix

	1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**
1. Immigrant SER	1						
2. Native SER	0.3832	1					
3. GDP per cap	-0.4116	-0.4589	1				
4. Unemployment	0.395	0.4415	-0.388	1			
5. EPL_regular	0.0474	0.3631	-0.3398	0.0122	1		
6. EPL_temp	0.0767	0.2763	-0.1466	0.3013	0.3808	1	
7. Interest rates	0.1498	0.3322	-0.4606	0.4364	0.115	0.1106	1

Note: SER= self-employment rate

Tables 3-2 and 3-3 present a comparative analysis on the effect that EPL for regular contracts has on both immigrant and native self-employment rates. The first three columns in

[33] We test for both collinearity and multicollinearity and find no indication of it being present.

each table present a parsimonious equation, in which EPL is included, across three different models using random effects, fixed effects, and fixed effects with time fixed effects models. Employment protection legislation for regular contracts does not seem to have a significant effect on immigrant self-employment rates, although all the point estimates are negative[34]. A positive and highly significant effect of the native self-employment rate on the dependent variable, effect that holds even in the most restrictive model (6), implies that by and large, immigrants respond to similar underlying unobserved contextual factors to become self-employed as those of the native population.

Table 3-2 The effect of EPL for regular contracts – immigrants

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	RE	FE	FE	RE	FE	FE
EPL_regular	-0.31	-0.99	-1.98*	-1.26	-1.66	-2.59
	(0.80)	(1.04)	(1.12)	(0.92)	(1.61)	(1.68)
Native SER				0.41***	0.96***	0.77***
				(0.11)	(0.18)	(0.18)
GDP per cap				-1.68	-2.37	5.72**
				(1.38)	(1.59)	(2.64)
Unemployment				0.02	-0.07	-0.01
				(0.06)	(0.07)	(0.08)
Union density				-0.01	-0.06	-0.21***
				(0.03)	(0.07)	(0.08)
Interest rates				0.05	0.06	0.05
				(0.09)	(0.09)	(0.12)
Constant	11.66***	13.46***	16.55***	8.21***	3.86	12.67**
	(2.05)	(2.46)	(2.79)	(3.15)	(4.32)	(5.392)
Country FE		Yes	Yes		Yes	Yes
Time FE			Yes			Yes
Observations	263	263	263	257	257	257
R-squared	0.004	0.004	0.123	0.129	0.153	0.256

Source: Author computations using EU LFS 1995-2013. *Note:* Standard errors in parentheses. *Statistical significance at the 10% level. **Statistical significance at the 5% level. ***Statistical significance at the 1% level. The analysis covers 18 countries: Austria, Belgium, Switzerland, Germany, Denmark, Spain, Finland, France, Greece, Ireland, Iceland, Italy, Luxembourg, Netherlands, Norway, Portugal, Sweden, United Kingdom.

[34] An Arellano-Bond dynamic panel-data estimation confirms both the direction and the non-significance of the result, both for native and immigrant self-employment rates (tables 2 and 3).

Interestingly, however, there seems to be a positive and significant effect of EPL on self-employment rate for the native population (in a multivariate context). The reason may be that employers make an effort to circumvent the EPL in place, by outsourcing work to self-employed contractors. Native workers may also be incentivized to take up this type of contracts, as they are often better paid, at least in net terms, to compensate for the loss of rights and benefits associated with employment. Further research is needed, however, to address the causes of this difference between native and immigrants.

Table 3-3 The effect of EPL for regular contracts - natives

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	RE	FE	FE	RE	FE	FE
EPL_regular	0.43	0.33	0.61	2.73***	2.66***	2.18***
	(0.41)	(0.42)	(0.43)	(0.55)	(0.59)	(0.62)
GDP per cap				1.87	2.84	7.14
				(5.90)	(6.03)	(9.90)
Unemployment				0.15***	0.15***	0.12***
				(0.02)	(0.02)	(0.03)
Union density				-0.09***	-0.09***	-0.13***
				(0.03)	(0.03)	(0.03)
Interest rates				0.09***	0.09***	0.07
				(0.04)	(0.04)	(0.05)
Constant	14.16***	14.41***	14.51***	10.62***	10.29***	14.12***
	(1.93)	(0.99)	(1.07)	(1.98)	(1.47)	(1.77)
Observations	279	279	279	273	273	273
R-squared	0.002	0.002	0.181	0.217	0.217	0.313
Number of countries	18	18	18	18	18	18
Country FE		Yes	Yes		Yes	Yes
Time FE			Yes			Yes

Source: Author computations using EU LFS 1995-2013. *Note* Standard errors in parentheses. *Statistical significance at the 10% level. **Statistical significance at the 5% level. ***Statistical significance at the 1% level. The analysis covers 18 countries. For the list of countries see Table 3-2.

Estimates for the effect of EPL for temporary contracts are presented in Tables 3-4 and 3-5, where again a comparison between immigrant and native self-employment rates is presented. EPL for temporary contracts, unlike EPL governing regular contracts, has a positive effect on

immigrant self-employment rates. The effect carries on for native self-employment rates too, although of a somewhat lower magnitude and statistical significance. One potential explanation might be the fact that highly regulated temporary contracts become less attractive employment options, making self-employment a better alternative.

Table 3-4 The effect of EPL for temporary contracts - immigrants

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	RE	FE	FE	RE	FE	FE
EPL_temp	0.94***	1.08***	0.67*	0.62*	0.85**	0.33
	(0.32)	(0.35)	(0.39)	(0.33)	(0.37)	(0.42)
Native SER				0.34***	0.85***	0.71***
				(0.10)	(0.17)	(0.18)
GDP per cap				-9.14	-2.00	4.93*
				(1.37)	(1.59)	(2.67)
Unemployment				0.07	0.004	0.03
				(0.06)	(0.06)	(0.08)
Union density				-0.01	-0.11*	-0.25***
				(0.03)	(0.06)	(0.07)
Interest rates				0.07	0.10	0.15
				(0.09)	(0.09)	(0.12)
Constant	9.10***	8.95***	10.14***	4.44*	1.25	7.48
	(1.08)	(0.71)	(1.15)	(2.69)	(3.86)	(5.04)
Observations	263	263	263	257	257	257
R-squared	0.037	0.037	0.122	0.139	0.168	0.250
Number of countries	17	17	17	17	17	17
Country FE		Yes	Yes		Yes	Yes
Time FE			Yes			Yes

Source: Author computations using EU LFS 1995-2013. *Note* Standard errors in parentheses. *Statistical significance at the 10% level. **Statistical significance at the 5% level. ***Statistical significance at the 1% level. The analysis covers 18 countries. For the list of countries see Table 3-2.

For immigrants the direction and magnitude of the effect of EPL for temporary contracts holds even when we employ the most restrictive models with country and time fixed effects. Moreover, the positive effect holds in a multivariate context. It should be noted, however, that perhaps partly due to limited variation in the explanatory variable, adding fixed effects or other control variables results in less precise estimates of the effect of EPL of temporary contracts. On

the other hand, for the natives there are only significant effects for EPL temporary in models controlling for key contextual variables. These results indicate that employment protection of temporary contracts increases self-employment rates for both immigrants and natives. Although the point estimates indicate a higher sensitivity to EPL, in terms of self-employment rates, for immigrants, these differences are not statistically significant as soon as controls for contextual variables are included.

Table 3-5 The effect of EPL for temporary contracts - natives

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	RE	FE	FE	RE	FE	FE
EPL_temp	0.07	0.06	-0.08	0.30**	0.28**	-0.03
	(0.14)	(0.14)	(0.15)	(0.14)	(0.14)	(0.16)
GDP per cap				2.30	4.97	1.15
				(6.17)	(6.27)	(1.03)
Unemployment				0.12***	0.12***	0.09***
				(0.02)	(0.02)	(0.03)
Union density				-0.05*	-0.03	-0.09***
				(0.02)	(0.03)	(0.03)
Interest rates				0.05	0.05	0.002
				(0.04)	(0.04)	(0.04)
Constant	15.02***	15.09***	16.18***	15.06***	14.27***	18.58***
	(1.75)	(0.28)	(0.43)	(1.77)	(1.15)	(1.41)
Observations	279	279	279	273	273	273
R-squared	0.001	0.001	0.175	0.165	0.166	0.277
Number of countries	18	18	18	18	18	18
Country FE		Yes	Yes		Yes	Yes
Time FE			Yes			Yes

Source: Author computations using EU LFS 1995-2013. *Note* Standard errors in parentheses. *Statistical significance at the 10% level. **Statistical significance at the 5% level. ***Statistical significance at the 1% level. The analysis covers 18 countries. For the list of countries see Table 3-2.

Finally, Table 3-6 presents the estimates of a model in which both indicators are included (EPL of permanent contracts and EPL of temporary contracts). As discussed above, there may be a high degree of complementarity between the two indicators, as oftentimes temporary contracts are a way to meet the need for flexibility for firms and ease the constraints imposed by the

regulation of regular contracts (Scarpetta 2014). The results are again compared across three different models, to test their robustness. When taken together, in a parsimonious model (columns 1 to 3), both indicators are significant and retain the magnitude and direction of their effect. These effects are robust in a multivariate random effects and fixed-effects models, although, not surprisingly given the sample and limited variation of EPL, the estimates lose significance when time fixed effects are introduced.[35]

Table 3-6 The effect of EPL and EPL for temporary contracts – immigrants

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	RE	FE	FE	RE	FE	FE
EPL_regular	-1.33	-2.33**	-2.58**	-1.88*	-2.31	-2.68
	(0.85)	(1.08)	(1.14)	(0.98)	(1.61)	(1.68)
EPL_temp	1.13***	1.35***	0.88**	0.80**	0.93**	0.37
	(0.34)	(0.37)	(0.39)	(0.35)	(0.38)	(0.42)
Native SER				0.43***	0.91***	0.77***
				(0.11)	(0.18)	(0.12)
GDP per cap				-1.32	-1.90	5.35**
				(1.38	(1.59)	(2.67)
Unemployment				0.03	-0.03	-0.01
				(0.06)	(0.07)	(0.08)
Union density				-0.01	-0.06	-0.19**
				(0.03)	(0.07)	(0.08)
Interest rates				0.04	0.05	0.06
				(0.09)	(0.09)	(0.12)
Constant	11.80***	13.91***	15.88***	7.41**	3.89	11.39**
	(2.06)	(2.41)	(2.79)	(3.22)	(4.28)	(5.58)
Observations	263	263	263	257	257	257
R-squared	0.053	0.055	0.141	0.155	0.175	0.259
Number of countries	17	17	17	17	17	17
Country FE		Yes	Yes		Yes	Yes
Time FE			Yes			Yes

Source: Author computations using EU LFS 1995-2013. *Note* Standard errors in parentheses. *Statistical significance at the 10% level. **Statistical significance at the 5% level. ***Statistical significance at the 1% level. The analysis covers 18 countries. For the list of countries see Table 3-2.

It may be very well that the legislation on employment protection responds to supply shocks brought about by immigration, in an effort to protect the insiders – native workers. This seems rather unlikely considering that countries such as Germany, Spain or Italy, which have

[35] Given the little within country variation, the introduction of the restrictions crowds out the remaining variation.

received substantial immigration flows, have made few changes to their employment legislation over the past 20 years. Nevertheless, if this would be the case, then immigrant self-employment and EPL would be endogenous. In order to test this possibility, another model is estimated[36], this time including union density as an instrument for EPL for regular contracts, on the assumption that more stringent employment legislation can be a government response to declining union presence (union density has been successfully employed as an instrument for employment legislation by Olney 2013; Besley and Burgess 2004). A post estimation test of endogeneity (Durbin-Wu-Hausman) indicates this step to be superfluous, as immigrant self-employment rate and EPL for regular contracts are not endogenous (Durbin test p-value=0.8604; Wu-Hausman test p-value=0.8624).

Conclusions

This chapter has investigated the relationship between immigrant self-employment rates and the strictness of employment protection legislation, across 18 European countries, in a longitudinal analysis. The base model uses a random effects regression, complemented by a country and time fixed effects model. The findings suggest that regulations governing permanent contracts do not have an effect on immigrants' self-employment rates, but they affect self-employment rates for natives positively. Instead, there seem to be significant results on the effect of EPL for temporary contracts for both natives and immigrants. While these results suggest that stricter regulation on temporary contracts makes them less attractive and pushes individuals into self-employment, further analysis is required to investigate the behavioural aspects of this effect

[36] Using the stata command ivregress 2sls.

as well as the possible non-monotonicity or nonlinearity of the magnitude of this effects across different contexts.

The chapter makes a number of significant contributions to research and policy-making. First, the fact that EPL seems to not affect immigrants, but to have a positive effect on natives' self-employment rates, points to the importance of considering the idiosyncrasy of the migration experience and how it affects immigrants' journey and integration into the labour market. In this case it may signal that immigrants' choices are more limited than those of the natives, who seem to respond to EPL of regular contracts more flexibly. This effect on self-employment might be triggered by contracting out of the previously employed (Scarpetta 2014), resulting in increased shares of dependent self-employment.

Second, it is important to note the different effect that employment protection has on self-employment, when a distinction between the two types of contracts, permanent and temporary, is made. In particular, the effect of employment legislation for temporary contracts on immigrant and native self-employment rates is found to be positive; and there is some indication that the effect may be stronger for immigrants. This has important policy implications: the indicators of the strictness of the regulation of temporary contracts measure how easily firms can resort to alternative types of contracts to meet their need for flexibility and ease the constraints imposed by regulations on regular contracts. If temporary contracts are in turn more stringently regulated, employers will turn to other flexible alternatives to adjust to economic fluctuations, namely dependent self-employment. This in turn implies that much of the registered self-employment rates are actually "false" self-employment, which is expected to contribute less to economic growth, and in the case of immigrants, labour market integration.

However, further progress in understanding the relationship between EPL and immigrant self-employment requires more research into other factors, such as the link between labour and product market regulation, as the policies that make it more difficult to start and operate a business will limit the growth in self-employment, and the opportunity cost of self-employment, including the relative level of security contributions that have to be to the self-employed (J. T. Addison and Teixeira 2003).

No study is without limitation and the present one is no exception. Firstly, the study employs the OECD indicators because of their comparability across countries and across studies, however, their shortcomings are greatly acknowledged. As mentioned previously, employment protection legislation entails a complex and varied array of measures, many different types of atypical contracts and many country-specific idiosyncrasies, which makes harmonizing all this information, a difficult task. It is perhaps not surprising, then, that the number of previous studies have not reached a conclusion with regards to its effect. These findings, thus, contribute to the literature and to our understanding of the dynamic between the two processes, but should also be interpreted considering this fact in mind. Secondly, the results could be driven by the presence of other labour market variables whose effect is difficult to disentangle from the effect of employment protection. Nevertheless, introducing country and time fixed effects, and thus controlling for time trends and time-invariant country differences, helps alleviate some of these concerns. Lastly, the indicators on employment protection that are employed in the analysis, are aggregated at the country level. However, as Liebregts and Stam (2016) point out, this might be misleading and not an accurate representation of the extent of stringency, because, for instance, in the Netherlands, most employment protection regulations are laid down in collective

agreements, in addition to the existing legislation. This aspect deserves to be further investigated at a more disaggregated level.

Annex A. Sub-components of EPL for regular and temporary contracts

Strictness of employment protection – individual dismissals (regular contracts)	Procedural inconvenience	Notification procedures
		Delay involved before notice can start
	Notice and severance pay for no-fault individual dismissal	Length of the notice period at 9 months tenure
		Length of the notice period at 4 years tenure
		Length of the notice period at 20 years tenure
		Severance pay at 9 months tenure
		Severance pay at 4 years tenure
		Severance pay at 20 years tenure
	Difficulty of dismissal	Definition of justified or unfair dismissal
		Length of trial period
		Compensation following unfair dismissal
		Possibility of reinstatement following unfair dismissal
		Maximum time to make a claim of unfair dismissal
Strictness of employment protection – temporary employment	Fixed-term contracts	Valid cases for use of fixed-term contracts
		Maximum number of successive fixed-term contracts
		Maximum cumulated duration of successive fixed-term contracts
	Temporary work agency employment	Types of work for which temporary work agency (TWA) employment is legal
		Restrictions on the number of renewals of TWA assignments
		Maximum cumulated duration of TWA assignments
		TWA: authorisation or reporting obligations
		Equal treatment of regular and agency workers at the user firm

Source: OECD 2004

Chapter 4 Self-employment as a stepping stone to better labour market matching: a comparison between immigrants and natives

Abstract
The chapter investigates how self-employment interacts with overeducation, in a comparative analysis between immigrants and natives. Using the EU Labour Force Survey for the year 2012, and controlling for a list of demographic characteristics and general characteristics of the destination country, the analysis shows that being self-employed decreases the likelihood of being overeducated, in the case of immigrants. The chapter employs two alternative approaches to overeducation, and finds that the incidence of overeducation is sensitive to its definition and measurement. In accordance with the existing literature, overeducation is also likelier for women and decreases with age.

Keywords: overeducation, skills mismatch, self-employment, immigrants

Introduction

Immigrants generally exhibit a higher incidence of overeducation *and* self-employment than the native population. This might not be a coincidence. When immigrants arrive in a new country, they often find it difficult to carry over their human capital to the new labour market. This can happen for many reasons[37] - like in the case of language abilities - or because the skills they have acquired in the country of origin are not perfectly transferable to the new context (Chiswick and Miller 2009, 1992). Thus, at least in the short run, immigrants are likely to be employed in jobs for which they have more years of education than their native counterparts. Chiswick (1978) also notes that since immigrants are usually positively self-selected, their average educational level will likely be higher than that of the native population. But, overeducated individuals often endure wage penalties, experience less job satisfaction and have a

[37] Reasons may include no recognition of qualifications, lack of language skills, delayed adjustment to the new context, etc.

higher probability to quit than well-matched individuals[38]. It seems thus intuitive to assume that they would try to find or create opportunities that would match their level of education and skills.

One such opportunity is self-employment. On the one hand, immigrants may turn to self-employment in order to avoid overeducation. If the existing paid employment opportunities do not adequately meet their educational level and experience, by starting a business, they can create a job for themselves that matches their level of skills and education. In this case, self-employment becomes a strategy through which they reduce the incidence of overeducation. On the other hand, however, there is the possibility that immigrants become self-employed because they cannot find *any* paid employment, not necessarily an ill-fitted one. This becomes a type of necessity self-employment[39], in which case the incidence of over-education may in fact increase. *Is self-employment, therefore, increasing or decreasing skills mismatch?* Moreover, is this *effect stronger for immigrants than for the native population*?

The present study intends to provide an answer to precisely these questions. It investigates how immigrant overeducation interacts with self-employment, in an attempt to enrich our understanding of three critical areas of policy interest: immigrant integration, skills mismatch and self-employment/entrepreneurship. I employ two different measures of overeducation, in an attempt to test the robustness of the results. Moreover, the analysis compares immigrant and native self-employment, comparison motivated by the assumption that by virtue of being outsiders to the labour market, immigrants encounter more barriers to finding a job, which might increase their mismatch and by extension their propensity to become self-employed. This phenomenon might help explain the significantly higher incidence of both

[38] See Mavromaras and McGuinness 2012; Verhaest and Omey 2010; Bennett and McGuiness 2009; Battu and Sloane 2004; Chevalier 2003; Allen and Van der Velden 2001; Hartog 2000; Tsang and Levin 1985; Duncan and Hoffman 1981.
[39] See Reynolds et al. 2005.

overeducation and self-employment that immigrants generally exhibit compared to the native population.

Given the high policy relevance of matching skills to jobs and promoting self-employment, we know surprisingly little about the way these two phenomena interact. To date, there are only two studies that analyse directly the relationship between mismatch and self-employment, and they present contradictory results. In a cross-sectional study, and using a sample of workers in the science and engineering fields, Bender and Roche (2013) investigate whether mismatch differs across different types of employment – salary and self-employment jobs – and what are the effects of mismatch on wages and job satisfaction. They focus on the US and utilize the 2003 National Survey of College Graduates, from the US National Science Foundation. The dataset comprises workers who have obtained at least a Bachelor's degree in hard or social science, technology, engineering or mathematics field and/or are currently working in that field. The study employs a subjective measure of mismatch[40], and the analysis is conducted using three models: a probit, a linear model with instrumental variables[41] and a recursive bivariate probit model. They find that self-employed individuals are more likely to report being mismatched than employed individuals. Moreover, there seems to be a larger wage penalty for mismatched self-employees, although they find this does not affect job satisfaction.

In a longitudinal study this time, Sanchez et al (2015) analyse the impact of the transition from salaried employment to self-employment on self-reported skill mismatches. They employ

[40] Defined by the question "Thinking about the relationship between your work and your education, to what extent is your work related to your highest degree? Closely related, somewhat related, or not at all related.''

[41] They use as instruments: (1) the number of published articles (grouped at zero, 1–10, 11–20, and 21 plus), assuming that research is less likely to be necessary in self-employment, and (2) the month that the highest degree was awarded, assuming that firms will hire entry level jobs cyclically and so wage and salary jobs will not be as available in nonstandard graduation months (such as May, June, or December) (Bender and Roche 2013, p90).

the European Community Household Panel (ECHP) for the period 1994-2001, for the EU-15[42] countries. They too use a subjective measure of mismatch, and estimate a random effects probit model, complemented by a pooled bivariate probit model to account for endogeneity[43]. They find that self-employed individuals are less likely to declare being skill mismatched, and that individuals who transition from salaried employment to self-employment reduce their probability of being mismatched after the transition.

The two studies present a rather inconsistent picture of the relationship between skills mismatch and self-employment, which might be explained by significant differences in their respective research designs. While Bender and Roche (2013) focus on the US, analyse a specific dataset of college graduates and employ a cross-sectional analysis, Sanchez et al (2015) analyse the EU-15 member states, utilize a representative sample of these countries' populations and conduct a longitudinal analysis. Nevertheless, the contradictory results of these two studies reflect our lack of clear understanding of the self-employment-overeducation relationship. In this context, the current study intends to improve our current knowledge of the dynamic between the two processes, and to further it, by systematically comparing both natives and immigrants. Since the latter generally exhibit a higher incidence of overeducation than the native population, I expect to observe significant differences between the two groups.

The paper is structured as follows. Section 2 provides a theoretical incursion into the existing knowledge of immigrant overeducation and the potential mechanism behind the overeducation-self-employment relationship. Section 3 presents the data sources with descriptive statistics of the main variables, and the methodology employed. Section 4 presents the results of

[42] Denmark, the Netherlands, Belgium, France, Ireland, Italy, Greece, Spain, Portugal, Austria and Finland

[43] The authors use a variable that indicates whether the individual holds a permanent labour contract, as an exclusion restriction. A Wald test leads them to conclude there is no endogeneity.

the analysis, while section 5 discusses the implications and relevenace of these results and identifies new research directions.

A theoretical perspective on immigrant overeducation

Four main theories have been put forward to explain the existence of overeducation in the labour market, and their hypotheses can be extrapolated to explain immigrant overeducation too: search and match theory, human capital theory, signalling theory and technological change theory.

According to *search and match theory*, immigrant overeducation is the result of imperfect (and asymmetric) information in the labour market. When immigrants arrive into a country, as outsiders, they have limited knowledge of the available jobs and of the functioning of the local labour market. To get their foot in the door, they may take up jobs for which they are overqualified, with the intention of advancing up the occupational ladder once they get acquainted with the new labour market structure and gain local job experience (see Groot and Maassen van den Brink 2000). The adjustment process is especially pronounced among immigrants originating from countries with significantly different labour markets and institutions (Chiswick and Miller 2009). According to the *search and match theory,* thus, overeducation appears as a necessary adjustment to new employment environments. The *searching* ability is impaired as compared to locals. Once immigrants familiarize with the local job market and have removed the necessary hurdles in adjusting to the new environment, they should, the theory concludes, be able to match employment to their education level. Overeducation in this case is viewed as a temporary phenomenon, as immigrants are expected to eventually find jobs that match their level of education.

The *human capital theory*[44], too, considers overeducation to be a temporary phenomenon. When they arrive in the destination country, immigrants often find it difficult to transfer (or have recognized) the skills they have acquired in the country of origin (Chiswick and Miller 2009). Overeducation becomes then an adjustment mechanism, a strategy they employ to enter the new labour market, with the purpose of gaining experience that smooths out the path for a matching job in the future. Thus, in time, with residence length and the accumulation of locally recognized human capital, the incidence of overeducation is likely to decline (Piracha and Vadean 2013).

In a similar vein, the *screening theory* (Arrow 1973; Spence 1974) considers education to be a signal individuals send concerning their labour productivity and abilities. The theory presupposes that hiring someone represents an investment involving risk and uncertainty and that formal education reduces uncertainty by sending a signal about a person's abilities and skills. The theory is rooted in the asymmetric nature of information about employees' skills and the fact that employers face lots of uncertainties in assessing job applicant, thus they rely on their educational degrees, in which case they assume that individuals with a higher educational level (an observable signal) also have higher skills (initially difficult to observe for employers) (Ghaffarzadegan et al 2017). Formal education becomes particularly relevant for immigrants, as they need to signal employers – who might be apprehensive about the quality and content of foreign education - a measure of their ability. Therefore, recent immigrants would experience a higher incidence of overeducation, which should however decrease over time once their skills are recognized.

[44] The premise of the human capital theory is similar to that of the career mobility theory of Sicherman and Galor (1990), according to which workers accept jobs for which they are overqualified in order to acquire work experience and enhance the chances of finding a better job match.

The above theories of overeducation can be extrapolated to motivate the decision to become self-employed too. Self-employment itself can be a transitional process towards finding paid employment. Particularly for immigrants, who as outsiders often lack information about the local labour market, and whose hiring constitutes an investment implying greater risks, self-employment can represent a period of transition, in which they get accustomed to the new labour market and build up the necessary human capital to acquire paid employment in the new destination.

A latest explanation for the overeducation phenomenon focuses on the effects of *technological change* (see Mendes de Oliveira, Santos, and Kiker 2000; Kiker, Santos, and de Oliveira 1997). This theory argues that the rapid pace of technological development generates the need for more school-acquired skills than those possessed by other employees in the same position. If the requirements for the same positions are higher today than they used to be in the past, then those people employed today may seem overeducated in comparison to their older colleagues who were employed at a time at which the required skill level was lower. But, in this case overeducation is more of a perceived phenomenon rather than an actual one; individuals in fact have the required level of education to keep up with technological advancements, they just seem overqualified when compared to previous employee cohorts. This implies that the incidence of overeducation is not expected to decrease with time, as there was none to begin with. According to this theory, the perceived incidence of overeducation is expected to be higher the larger the discrepancy in terms of technological advances between the immigrants' origin and destination countries.

The above theories and their predictions are not mutually exclusive, but rather different facets of the same process of immigrant labour market integration. When first arriving in the

destination country, immigrants do have a limited knowledge of the local labour market (search and match theory), for which they need a strategy (human capital theory), while employers have limited knowledge of their abilities for which they need a signal (screening theory). Overeducation becomes thus an adjustment mechanism to overcome existing labour market inefficiencies, which should in time disappear. There is plenty of empirical evidence, however, to suggest this is not always the case. Rather, immigrant overeducation has been found to persist and not diminish with the length of stay in countries such as Italy (Dell'Aringa and Pagani 2011), Spain (Fernández and Ortega 2008), Sweden (Joona, Gupta, and Wadensjö 2014), or in a multi-country context (Visintin, Tijdens, and van Klaveren 2015).

These papers, however, do not explicitly study the self-employed. Yet, the nature of self-employment could have important spillover effects on the incidence of overeducation. If self-employment is necessity-based because there are no opportunities in paid employment (or if the gain associated with self-employment surpass those associated with a well-matched job), then the incidence of mismatch might increase. Conversely, if self-employment is taken up as an alternative to a mismatched job, then the incidence of overeducation might decrease. The next sections attempt to provide more information with regards to the direction of the self-employment-overeducation relationship.

Measuring overeducation

The concept of overeducation, as employed in this paper, refers to the instance in which workers have more years of education than required for the job they are performing. Relatively unambiguous and with an intuitive interpretation, the concept has been employed extensively in studies of mismatch over the past decades. Yet measuring overeducation is not straightforward

and previous studies have shown that the incidence of overeducation is sensitive to the method of measurement (see Groot and Maassen van den Brink 2000). Currently, four main approaches to mismatch measurement have been identified in the existing literature.

The *job analysis* (or normative) approach is an objective method that derives information concerning the required level of education for an occupation from occupational classification databases, like the O*NET or ISCO (e.g. Chevalier 2003; Piracha and Vadean 2012). The *realized matches* (statistical) approach derives the level of education necessary for a particular occupation by taking the mean (or mode) of years of schooling of all individuals employed in that occupation. Individuals with a standard deviation above the mean (mode) are considered overeducated (e.g. Chiswick and Miller 2007, 2009). The *income-ratio* approach equates overeducation with income inefficiency and computes overeducation as the ratio between potential and actual income (e.g. Jensen, Gartner, and Rässler 2010; Guironnet and Peypoch 2007). Proponents of this measure argue that income maximization is an important reason why individuals invest in education, and that this measure "allows the inclusion of income and efficiency aspects of overeducation ignored by the well-established objective or subjective measures focusing on some (ordinal) matching aspects" (Jensen, Gartner, and Rässler 2010, p. 34). The *self-assessment* approach consists in asking individuals whether they have more or less education than required for the job (direct assessment) or the minimum level of education required for the job they perform (indirect self-assessment).

In order to determine which immigrants and natives are overeducated, I employ both the normative and statistical approaches. Each method presents a number of benefits and drawbacks (Verhaest and Omey 2010; Hartog 2000)., therefore the comparison enables me to test the robustness of the results. For the normative (job analysis) measure, I compare the required level

of education for an occupation against the current level of education of the individual. For this purpose, I use the International Standard Classification of Occupations (henceforth ISCO-08) and the International Standard Classification of Education (henceforth ISCED-97) and their correspondence as developed by the ILO (ILO 2012, 2014). The nine Major Occupational Groups in ISCO correspond to four skills levels, which in turn correspond to the six educational classifications (see Annex A for correspondence). Individuals which exhibit an educational level above the corresponding one are considered overeducated. The approach has been successfully employed elsewhere, to measure skills mismatch and its determinants (see, for instance, Chevalier 2003; Sutherland 2012; Tarvid 2012). It presents a number of advantages, including a relative easiness to measure mismatch and consistency over time. In addition, unlike the self-assessed and the income-ratio approaches, for instance, it is a rather objective measure. However, the approach has a number of limitations too. Firstly, it assumes constant mapping over all jobs of a given occupation, not taking into account that in some countries with a high share of educational attainment, the average educational level for a job would be higher (ILO 2014). Moreover, the approach clusters together groups of occupations for which the educational level required varies significantly (for instance, there is substantial variation between ISCO groups 4-8, which results in an underestimation of the number of overeducated individuals in this case).

For the realized matches approach (statistical measure), I compute the mode[45] of educational level for each particular occupation and consider those individuals that present an educational attainment level one standard deviation above this mode, to be overeducated. The approach has been successfully employed elsewhere (e.g. Chiswick and Miller 2009; Kiker,

[45] To reflect the most common level of education for an occupation.

Santos, and de Oliveira 1997) and presents the advantage of considering the actual educational level of workers within a particular occupation, at any given time.

Data and methodology

The data

The analysis in this paper relies on the European Union Labour Force Survey's (EU LFS) for the year 2012. The EU LFS is the largest European household sample survey, providing annual data on labour participation of people aged 15 and over and on persons outside the labour force (Eurostat 2007). The data provide information on individual socio-economic characteristics, occupation, education, as well as on individual's country of birth, which enables the distinction between natives and immigrants, and length of residence in the country. Further, the study only considers immigrants from outside the EU and EFTA[46], as the latter technically share the same labour market rights as the native population. There are thirty countries covered in the sample, the EU-28 Member States and Switzerland and Norway. The sample includes 74,727 non-EU immigrants, 12 percent of which are self-employed.

The dependent variable

The dependent variable is overeducation, a dummy variable equal to 1 if the individual is overeducated and 0 otherwise. The variable is derived using information on occupations, educational levels and country of origin from the EULFS. Tables 4.1-4.3 compare the incidence of overeducation between immigrants and natives across a number of demographic characteristics, using both the normative and the statistical approach to compute overeducation.

[46] European Free Trade Association

Table 4-1 presents the incidence of overeducation disaggregated by major region of origin. By far the highest incidence of overeducation seems to be experienced, surprisingly, by immigrants from the EU10 Member States[47], followed by immigrants from South East Asia, South America, and the Near Middle East. Perhaps not surprisingly, the native population exhibits the lowest incidence of mismatch. There are substantial differences in the incidence of overeducation for each region, when we compare the two different measurements, yet no clear pattern emerges. If we compare the statistical measure of overeducation against the baseline normative measure, some origin regions or group of countries experience an increase in the incidence of overeducation (e.g. Australia and Oceania, EU10 and EU15), while others experience a decrease (e.g. East Asia, EU3 or South East Asia).

Table 4-1 The incidence of overeducation by major region of origin

Major Geographical Region	Normative measure of overeducation %	Statistical measure of overeducation %	Total obs.
Native	16	19	1,511,594
EU15	21	22	30,079
EU10	45	48	10,546
EU3	34	28	9,896
EFTA	19	19	2,641
North Africa	25	20	10,931
Near Middle East	34	33	2,143
East Asia	25	22	2,148
South East Asia	38	29	8,329
North America	29	32	1,547
Central America	33	27	855
South America	34	26	4,648
Australia and Oceania	22	28	542
Total	17	19	1,642,096

Note: The figures cover 30 destination countries. *Source*: Own calculations using EU LFS 2012

In terms of occupations (table 4-2), immigrants register a significantly higher level of overeducation in all but one major occupational group. Notably, individuals employed in elementary occupations present a disproportionate level of overeducation compared with the

[47] Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia

other major groups, and in this case only, more natives seem to be mismatched than immigrants. The incidence of overeducation for both groups increases substantially when the statistical measure of overeducation is employed, sometimes significantly so, as in the case of natives skilled agricultural, forestry and fishery workers. The disparity is to be expected if we bear in mind that the normative measure groups a number of occupations into the same skill level (see Annex A for reference), which means less variability and by extension, a tendency to underestimate the level of mismatch.

Table 4-2 The incidence of overeducation by major occupational ISCO-08 group

ISCO-08	Immigrants			Natives		
	Norm	Stat	Obs.	Norm	Stat	Obs.
1. Managers	0	1	2,883	0	1	81,254
2. Professionals	9	9	10,184	5	5	266,457
3. Technicians and Support Workers	31	46	6,565	20	36	241,464
4. Clerical Support workers	37	38	3,836	21	23	143,813
5. Services and sales workers	20	21	17,127	12	14	251,448
6. Skilled agricultural, forestry and fishery workers	11	33	1,081	5	29	93,099
7. Craft and Related trades workers	9	12	9,512	5	9	184,632
8. Plant and Machine operators and assemblers	13	16	6719	4	6	118,622
9. Elementary occupations	79	43	16,449	88	50	117,201

Note: The figures cover 30 destination countries. *Source*: Own calculations using EU LFS 2012. Norm=normative measure of overeducation; Stat= statistical measure of overeducarion.

In terms of gender, women experience more overeducation than men, although interestingly, there does not seem to be much of a difference between native and immigrant women. The incidence of overeducation among self-employed immigrants is higher that of the corresponding native population, and almost half of all recent immigrants (with less than 5 years residence in the destination country) are mismatched. There are interesting differences to be noted between the two measures of overeducation, especially the sudden increase in the incidence of overeducated self-employed natives.

Table 4-3 The incidence of overeducation by gender and occupations status

	Normative	Statistical
Female Native	53.9	51.0
Female Immigrant	53.8	51.8
Self-employed native	10.7	18.3
Self-employed immigrant	20.5	20.1
Recent immigrant	40.4	36.6

Note: The figures cover 30 destination countries. Source: Own calculations using EU LFS 2012

Independent variables

The existing theories of immigrant overeducation already point to a number of relevant explanatory factors. The incidence of over-education should decrease with age, which enables the accumulation of local work experience and human capital. Previous literature has also found significant differences in mismatch by gender (see Groot and Maassen van den Brink 2000). General characteristics of the destination country economies, such as gross domestic product per capita and the unemployment rate of the native population, are also considered, factors found relevant by the existing literature. High levels of unemployment have direct implications for the assignment of workers to available jobs (Sattinger, 1993). Competition for jobs is more intense generally, and educated workers may compete with the less educated for any job available, irrespectively of occupation. Hence, we expect a higher overall incidence of over-education in an economy with higher levels of unemployment (Aleksynska and Tritah 2013).

The Empirical Model

In order to disentangle the effects of various factors on individual's propensity to be overeducated, I estimate the following empirical base model:

$$Y_i = I(Y_i > 0) = I(\beta_1 X_i + \beta_2 Z_i + \varepsilon_i > 0) \qquad (1)$$

Where Y_i is the main outcome variable, a dummy equal to 1 if the individual is overeducated and zero otherwise; $I(.)$ is a binary indicator function taking the value 1 if the argument is true and 0 otherwise; X_i represents the explanatory variable self-employment, a dummy variable equal to 1 if the individual is self-employed, β_1 its slope and the main parameter of interest, i refers to the cross-national units, while ε is the error term. Z_i represents a vector of the control variables previously mentioned, which include both individual and country level characteristics. Since the dependent variable has a discrete outcome, a probability model is more suitable than a linear regression model. Using the latter would result in biased and inconsistent estimates, because the fitted probabilities can be less than 0 or greater than 1 (as they are not constrained to the unit interval), the model imposes heteroscedasticity and the partial effect of the explanatory variables (appearing in level form) is constant (Wooldridge 2013).

Equation (1) does not account for a potential endogeneity issue, which might stem from the fact that a number of unobserved factors could affect both the probability of being self-employed and the probability of being overeducated. If left unaccounted for, endogeneity will lead to inconsistent and biased estimates of equation (1). Given that both the dependent and the independent variables have discrete outcomes, thus both the first stage and the second stage equations are probit models, a maximum likelihood bivariate probit (Heckman 1978) is the optimal choice. Any other two-stage model which would mimic 2SLS would produce inconsistent estimators[48] (Greene 2012; Wooldridge 2002). To account for endogeneity bias, I estimate the following empirical model, which simultaneously estimates equation (1) and the stage defined below, which includes the additional instrumental variables:

$$X_i = I(X_i > 0) = I(\beta_3 Z_i + \mu_i > 0) \qquad (2)$$

[48] Sometimes called the "forbidden regression" (Wooldridge 2002)

Where X_i is a dummy variable equal to 1 if the individual is self-employed and 0 otherwise, Z_i is a vector of the same explanatory variables as used in equation (1), and μ_i is the error term. As mentioned, I obtain unbiased and asymptotically efficient estimates of the simultaneous equation model consisting of equations (1) and (2), by employing a maximum likelihood estimation of a bivariate probit model.

Results

The paper investigates the effect of self-employment on immigrant's and natives' probability to be overeducated. This section presents the results of the empirical analysis.

I begin by exploring the correlation between overeducation and the variables used in the empirical specifications (Table 4-4). Self-employment appears to be negatively correlated with both measures of overeducation, albeit rather weakly. Overeducation also seems to be higher among women and to decrease with age.

Table 4-4 Correlation matrix

	Normative measure of overeducation	Statistical measure if overeducation
Self-employment	-0.0681	-0.0111
Age	-0.0610	-0.062
Female	0.0682	0.044
Married	-0.0350	-0.0208
GDP per capita	0.0241	0.0452
Unemployment	0.0283	0.0216

The probability of an immigrant or a native being overeducated as a function of self-employment is summarized in table 4-5, where both measures of overeducation are presented, for comparison purposes (the table presents average marginal effects; for coefficients please refer to Annex B). There are a number of interesting observations one can infer from these results. To begin with, if we consider the normative measure, the probability of being overeducated

decreases for the self-employed, by 9 percentage points for immigrants and 5 percentage points for natives. For immigrants, the effect seems to be slightly larger, although a t-test indicates that the difference is not statistically significant. Being female increases the likelihood of being overeducated for both immigrants and natives, likelihood that seems to slightly decrease with age for natives.

Most of these results are confirmed by the estimates using the statistical measure of overeducation. Self-employment decreases the probability of being mismatched for immigrants, although it seems to increase it for natives, in this case. Moreover, a t-test indicates that the difference between the two coefficients is statistically significant when using this measurement to mismatch. Again, women have a higher likelihood of being overeducated, in accordance with the existing literature, and GDP per capita, a proxy for the level of economic development of a country, seems to positively contribute to mismatch.

Table 4-5 Determinants of overeducation

	Normative measure of overeducation		*Statistical measure of overeducation*	
	Probit immigrant	Probit natives	Probit immigrant	Probit natives
Self-employed	-0.092***	-0.051***	-0.042***	0.020**
	(0.01)	(0.01)	(0.01)	(0.01)
Female	0.093***	0.040***	0.059***	0.031***
	(0.02)	(0.003)	(0.02)	(0.004)
Age	-6.91	-0.001***	0.0004	-0.002***
	(0.001)	(0.0002)	(0.001)	(0.0003)
Married	0.0046	-0.015***	0.002	0.010
	(0.008)	(.002)	(0.01)	(0.003)
Unemployment	0.001	0.003***	0.005*	0.003
	(0.002)	(0.001)	(0.003)	(0.002)
GDP per cap	3.19	1.68	2.02**	1.13**
	(7.91)	(2.99)	(9.24)	(4.99)
Observations	73,571	1,501,433	73,571	1,501,433

Data Source: Data are from the 2012 EU LFS and cover 30 destination countries.
Note: Robust standard errors in parentheses, clustered at regional level. All coefficients have been transformed in average marginal effects. *Statistical significance at the 10% level. **Statistical significance at the 5% level. ***Statistical significance at the 1% level

Endogeneity

As previously mentioned, immigrants might become self-employed precisely because they are overeducated for the job they perform, in which case over-education has an influence on the decision to become self-employed. Thus, the dependent and main explanatory variables might be endogenous. To account for a potential endogeneity bias, I employ a maximum likelihood bivariate probit model. While the data source does not contain suitable candidates for a strong instrument[49] that would satisfy the exclusion restriction, two potential variables, derived from external sources, are included: (1) the number of patents per million population, and (2) expenditure on research and development as percentage of GDP, both variables at the regional level.[50] There is an extensive literature that positively links the number of patens to increased entrepreneurship and self-employment (see Acs and Sanders 2012; Acs et al. 2009; Allred and Park 2007; Lee, Florida, and Acs 2004). The underlying mechanism behind this relationship has been formalized in innovation driven models which argue that intellectual property rights, and thus patents, are key institutions that allow investors to market their inventions and thereby recover their costs (Acs and Sanders 2012). Patent creation should thus provide incentives for business formation to collect the benefits of this initial investment (Kitch 1977). The second instrument is derived from previous studies which have found that spill over effects from research and development contribute to business creation (see Kirchhoff et al. 2007; Acs and Varga 2005). Research and development produces knowledge and ideas, which contribute to the creation of new services or goods, and thus new entrepreneurial opportunities. Expenditure on research and development as a percentage of GDP is employed in this context as a proxy for

[49] Since the survey (EU LFS) concerns labour market conditions and experience, most variables are related to both overeducation and self-employment.
[50] Data sourced from Eurostat's regional statistics.

these entrepreneurial opportunities. The Wald statistic reported in table 4-6 indicates the presence of endogeneity for all but the biprobit immigrant model that uses the normative measure of overeducation. With the addition of the two instrumental variables W_i, equation (2) becomes:

$$X_i = I(X_i > 0) = I(\beta_4 W_i + \beta_3 Z_i + \mu_i > 0) \qquad (2')$$

The estimates of the biprobit models, which control for endogeneity, generally confirm the estimates of the probit models. A notable difference is the negative effect that self-employment has on overeducation, for natives, with the statistical measure: the probability of being overeducated seems to decrease by 9 percentage points for native self-employees, in this case.

Table 4-6 Determinants of overeducation, accounting for endogeneity

	Normative measure of overeducation		*Statistical measure of overeducation*	
	Biprobit immigrant	Biprobit natives	Biprobit immigrant	Biprobit natives
Self-employed	-0.06**	-0.05***	-0.08***	-0.09***
	(0.03)	(0.02)	(0.02)	(0.02)
Female	-0.04**	-0.03***	-0.05***	-0.05***
	(0.02)	(0.01)	(0.02)	(0.01)
Age	0.002***	0.002***	0.002***	0.003***
	(0.001)	(0.0004)	(0.001)	(0.001)
Married	0.01**	0.0003	0.01**	0.01***
	(0.004)	(0.002)	(0.004)	(0.003)
Unemployment	0.001	0.002***	0.001	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
GDP per cap	-7.70**	-5.56***	-7.60*	-7.86***
	(3.63)	(1.60)	(4.34)	(2.91)
Observations	73,571	1,501,433	73,571	1,501,433
Wald statistic	P=0.111	P=0.001	P=0.039	P=0.001

Data Source: Data are from the 2012 EU LFS and covers 30 destination countries.
Note: Robust standard errors in parentheses, clustered at regional level. All coefficients have been transformed in average marginal effects. *Statistical significance at the 10% level. **Statistical significance at the 5% level. ***Statistical significance at the 1% level

Linear regression – a comparison

For all the reasons presented under the methodological section, linear regression models tend to produce biased and inconsistent estimates when the outcome of interest is a discrete variable, such as in this case. Nevertheless, for comparison and consistency purposes, both an OLS model and a linear model with instrumental variables are explored, the results of the former presented in table 4-7.

The results of the OLS regressions are similar to the average marginal effects of the probit models presented in table 4-5. In this case too, the likelihood of overeducation seems to increase for self-employed natives, as well as for women in both groups, and appears to decrease with age for natives.

Table 4-7 Determinants of over-education, linear regression

	Normative measure of overeducation		Statistical measure of overeducation	
	OLS immigrants	OLS natives	OLS immigrants	OLS natives
Self-employed	-0.089***	-0.048***	-0.041***	0.015**
	(0.01)	(0.01)	(0.01)	(0.01)
Female	0.09***	0.041***	0.059***	0.032***
	(0.02)	(0.003)	(0.02)	(0.004)
Age	-2.29	-0.001***	0.0004	-0.002***
	(0.001)	(0.0002)	(0.001)	(0.0003)
Married	0.005	-0.015***	0.002	0.005
	(0.01)	(0.002)	(0.01)	(0.003)
Unemployment	0.0007	0.003***	0.005*	0.003
	(0.002)	(0.001)	(0.003)	(0.002)
GDP per cap	2.83	1.65	2.01**	1.13**
	(7.88)	(2.97)	(9.36)	(5.10)
Constant	0.25***	0.18***	0.08	0.20***
	(0.05)	(0.02)	(0.06)	(0.0)
Observations	73,571	1,501,433	73,571	1,501,433

Data Source: Data are from the 2012 EU LFS and cover 30 destination countries.
Note: Robust standard errors in parentheses, clustered at regional level. *Statistical significance at 10% level. **the Statistical significance at the 5% level. ***Statistical significance at the 1% level

A linear regression model with instrumental variables is employed next, in order to account for endogeneity. The same two instruments are utilized this time too, namely, the number of patents per million population, and the level of expenditure on research and development as percentage of GDP, both variables at the regional level. The test of overidentification indicates that the two variables perform rather well as instruments, with no significant p-values for the Hansen J statistics. However, the Kleibergen-Paap F statistic, which tests for weak identification, presents rather low values, indicating that the two instruments are only weakly correlated with self-employment (indeed, research and development as percentage of GDP presents a correlation value of -0.06, while the number of patents per million population presents a correlation value of -0.003). This might help explain why, under the instrumental variable model, there appears to be no significant relationship between self-employment and overeducation. Nevertheless, if we ignore for a moment the lack of statistical significance, and consider strictly the direction and magnitude of the effect, then under the instrumental variable estimation, too, the probability of being overeducated decreases for self-employed immigrants. Considering that instrumental variables estimations are generally less robust to weak instruments, and that one can expect coefficients to lose significance when instrumenting (Nichols 2011), the effect that self-employment has on overeducation for immigrants holds remarkably well.

One might argue that the weak instruments will bias the results of the maximum likelihood bivariate probit models too. However, in this case, only the exclusion condition must be fulfilled, namely, that the instruments are not correlated with the error term. The Hansen J Statistic indicates that this is the case, therefore the instruments employed are valid and can be confidently utilized in the biprobit estimations.

Discussion

The paper explores how overeducation interacts with self-employment in a comparative analysis between immigrants and natives, in an attempt to enrich our understanding of three critical areas of policy interest: immigrant integration, skills mismatch and self-employment/entrepreneurship. Controlling for a list of demographic characteristics and general characteristics of the destination country, the results seem to suggest that being self-employed reduces the probability of being overeducated, at least for immigrants. This probability seems to decrease with age for the native population, and to be higher for females in both groups. This study confirms the findings of Sanchez, Diaz-Serrano, and Teruel (2015), who conduct a similar analysis in a longitudinal study. If correct, the results would imply that self-employment represents a strategy to minimize overeducation, at least for immigrants. By virtue of being outsiders to the labour market, immigrants encounter more barriers to employment, which make them more likely to be overeducated. In order to minimize or avoid overeducation altogether, immigrants can become self-employed. This hypothesis could help explain the higher incidence of self-employment that immigrant exhibit, when compared to natives. To confirm it, however, a longitudinal study, in a similar fashion to Sanchez et al (2015), following immigrants in and out of self-employment and investigating how overeducation fluctuates, would be necessary and desirable. Nevertheless, the results are important and provide insight into a phenomenon which has been long hypothesised, but little researched.

The findings have also broader research and policy implications and contribute to scholarship in a number of ways. To start with, they confirm overeducation's sensitivity to definition and measurement. The normative measure of overeducation seems to underestimate the incidence of overeducation, although there are some exceptions. Further, while self-

employment seems to decrease the probability of an individual of being overeducated when we employ the normative measure, the results are not as clear-cut when the statistical measure is used instead. This sensitivity has been remarked in previous studies (see CEDEFOP 2010; Groot and Maassen van den Brink 2000), and should be accounted for when translating these studies into policy-making.

Second, despite this sensitivity, the effect of self-employment in reducing the probability of being overeducated seem to hold for immigrants regardless of the approach to overeducation employed. This robustness to measurement and estimation models suggests a strong negative relationship between the two concepts for this particular group. Given the observed high incidence of both phenomena that immigrants generally experience, these results would seem to suggest a mechanism through which they minimize mismatch, by becoming self-employed.

Further research, however, should look into the nature of this type of self-employment, as it is unclear at the moment whether this type would be productive, or more akin to necessity self-employment. The difference has important implications for policy making. The latter has been associated with low productivity, low job creation and low job satisfaction, which in the long term would represent an underutilisation of human resources and a failure to tap into the potential that immigration brings about. The former is the type of self-employment that policy-makers would want to incentivize, that brings about innovation and job creation.

Another implication of these results is that, by implementing measures to promote opportunity self-employment, policy-makers could achieve two objectives with one instrument – increase entrepreneurship *and* decrease mismatch. There is no doubt that if countries intend to make themselves attractive destinations for "the best and the brightest", they need to tackle these labour market inefficiencies and promote a business creation-friendly environment. This in turn

would help smooth out the socio-economic integration of immigrants, who could more easily become productive members of society. More research, however, is needed to understand the exact dynamic between these two labour market processes and how it changes over time and space.

No study is bound to be without limitations, and the present one is no exception. One significant issue right from the start is the potential endogeneity bias, addressed in the methodological section with maximum likelihood bivariate probit estimation. This is the most fitting model for analyses including both a binary dependent and a binary independent variable, as it is this case. The model includes two additional variables used as regressors of self-employment, which fulfil the exclusion restriction of not being correlated with the error term. This bring me to the second limitation of the study, which is the weakness of the instruments used in the linear regression model. Although biased and inconsistent under these term, the IV model was used for comparative and robustness testing purposes. However, the fact that the instruments, while valid, are weakly correlated with self-employment, means that the results are rather imprecise. Nevertheless, the magnitude and direction of the effect of self-employment on overeducation seem remarkably stable under all models employed, at least in the case of immigrants. Further analysis, ideally in a longitudinal setting, with stronger instruments, should be pursued to confirm the robustness and accuracy of these results. Lastly, the results of the study and their implications are bound to be dependent on the context and the time of the analysis.

Annex A. Correspondence between ISCO-08 and ISCED-11

International Standard Classification of Occupations Major Groups (ISCO-08)	ISCO-08 Skill Level	International Standard Classification of Education (ISCED-97)
9. Elementary Occupations	**1**	1. Primary level of education
8. Plant and Machine Operators, and Assemblers 7. Craft and Related Trades Workers 6. Skilled Agricultural, Forestry and Fishery Workers 5. Services and Sales Workers 4. Clerical Support Workers	**2**	2. Lower secondary level of education 3. Upper secondary level of education 4. Post-secondary, non-tertiary education
3. Technicians and associate professional	**3**	5b. First stage of tertiary education (short or medium duration)
2. Professionals 1. Managers[51]	**4**	5a. First stage of secondary education, 1st degree (medium duration) 6. Second stage of tertiary education (lading to an advanced research qualification)

Source: ILO 2012

[51] Managers fall under the 3+4 Skill levels.

Annex B. Coefficients for probit and biprobit regressions

Table 4-8 Normative measure of overeducation

	(1) probit immigrants	(2) biprobit immigrants	(3) probit natives	(4) biprobit natives
Self-employed	-0.28***	-1.18***	-0.23***	-1.03***
	(0.03)	(0.41)	(0.03)	(0.19)
Female	0.27***	0.17*	0.17***	0.07*
	(0.05)	(0.09)	(0.02)	(0.03)
Age	-2.02	0.003	-0.006***	-0.0001
	(0.002)	(0.002)	(0.001)	(0.002)
Married	0.014	0.02	-0.06***	-0.05***
	(0.02)	(0.02)	(0.01)	(0.01)
Unemployment	0.002	0.003	0.01***	0.02***
	(0.005)	(0.005)	(0.004)	(0.004)
GDP per cap	9.29	-5.32	6.97	-9.36
	(2.30)	(2.44)	(1.24)	(1.16)
Constant	-0.7***	-0.60***	-0.91***	-0.92***
	(0.14)	(0.15)	(0.06)	(0.06)
Observations	73,571	73,571	1,501,433	1,501,433

Data Source: Data are from the 2012 EULFS and covers 30 destination countries.
Note: Robust standard errors in parentheses, clustered at regional level. * Statistical significance at the 10% level. ** Statistical significance at the 5% level. *** Statistical significance at the 1% level

Table 4-9 Statistical measure of overeducation

	(1) probit immigrants	(2) biprobit immigrants	(3) probit natives	(4) biprobit natives
Self-employed	-0.14***	-1.39***	0.06**	-1.25***
	(0.03)	(0.26)	(0.02)	(0.16)
Female	0.19***	0.03	0.12***	-0.07*
	(0.05)	(0.09)	(0.01)	(0.05)
Age	0.001	0.01***	-0.01***	0.003
	(0.002)	(0.002)	(0.001)	(0.003)
Married	0.01	0.02	0.02*	0.03**
	(0.03)	(0.03)	(0.01)	(0.01)
Unemployment	0.02*	0.02*	0.01	0.02***
	(0.01)	(0.01)	(0.01)	(0.01)
GDP per cap	6.43**	3.27	4.27**	4.75
	(2.84)	(2.86)	(1.83)	(1.78)
Constant	-1.21***	-1.01***	-0.85***	-0.86***
	(0.18)	(0.17)	(0.09)	(0.08)
Observations	73,571	73,571	1,501,433	1,501,433

Data Source: Data are from the 2012 EULFS.
Note: Robust standard errors in parentheses, clustered at regional level. * Statistical significance at the 10% level. ** Statistical significance at the 5% level. *** Statistical significance at the 1% level

Chapter 5 The effect of immigration on natives' task specialization. The case of Germany[52]

Abstract
The chapter explores the effect of an increase in the relative supply of immigrants on the natives' task reallocation. We focus on Germany, a country with a relatively rigid labour market and increased immigration flows, and on low-skilled immigrants, whose contribution to the host economy is usually more controversial and oftentimes thought to be negative. We hypothesise that as low-skilled immigrants enter the labour market into predominantly manual-intensive occupations, natives will relocate to occupations which make use of their comparative advantage, communication skills. We find that an increase in the share of immigrant population has a negative effect on the native populations' relative supply of manual and communication skills, with significant gender differences. Moreover, recent immigrants seem to supply more manual skills relative to communication skills than long term immigrants, while natives supply the least manual skills, or, conversely, the most communication skills.

Keywords: immigration, tasks, manual skills, communication skills, low-skilled immigrants, recent immigrants

Introduction

The potential negative effects of immigration on the labour market outcomes of native workers is one of the major concerns of researchers and policy makers alike. While the theoretical aspects of the possible effects of immigration on the receiving economies' labour markets are well understood (Dustmann et al 2008), in practice, the effects are contingent on a number of factors, from the skills of immigrants, those of the native workers and the institutional context, to the measures governments and firms enact in response to immigration. This multiplicity of factors might explain why the existing empirical studies (with estimates in the hundreds as per Longhi et al 2008) have found often confusing and contradictory effects.

This paper attempts to advance the existing literature by taking a more refined look at the

[52] Paper written in collaboration with Raquel Sebastian, PhD Candidate, University of Salamanca.

effect of immigration on labour markets. Specifically, we investigate whether natives, as a response to increased migration, tend to specialize in communication-intensive occupations, where they arguably have a comparative advantage due to language proficiency.[53] We define immigrants as foreign-born individuals and look specifically at the lower educated immigrant group, as their contribution to the economy is usually more controversial and oftentimes thought to be negative (see Dustmann and Glitz (2011) for a comprehensive literature overview on lower educational attainment of immigrant workers). We follow the methodology developed by Peri and Sparber (2009) for the US. This methodology addresses concerns that responses to immigration to a certain region from native workers (through inter-regional mobility) and from firms (through changes in production and output mix), diffuse the costs and benefits across the entire country (Bansak et al 2015). Moreover, it zooms in on skills cells in order to avoid complementarities and substitutabilities that cancel each other out (idem). The methodology also considers the often imperfect substitutability between native and immigrant workers within a particular skill cell.

We conduct our analysis for Germany, a country that has received increasingly high numbers of immigrants over the past few decades (see Bauer et al. (2005) for more detailed information on immigration to Germany). Given that the wage structure in Germany is more rigid, that employment protection legislation is rather high (as measured by OECD indicators[54]) and that unions still play a relatively large role in the wage-setting process (Burda 2016; Pischke and Velling 1997), we expect immigration to have a more significant effect on natives' employment than in the US context.

[53] Aldashev et al. (2009) document that language proficiency significantly increases employment probability and occupational choice for immigrants to Germany. Dustmann et al. (2010) show that employment rate and wage differentials in Germany and the UK are larger for immigrants from non-OECD countries.

[54] In 2013 the strictness of employment protection indicator had of 2.7 for Germany, compared to only 0.3 for the US (OECD 2013b).

We find that an increase in the share of low-skilled immigrants is indeed associated with an increase in the share of natives specializing in communication-intensive occupations, and our results are in line with studies conducted for the US (Peri and Sparber, 2009) and Spain (Amuedo-Dorantes and de la Rica, 2011).

The rest of the paper is divided as follows. Section 2 provides an overview of the recent immigration trends to Germany, while section 3 reviews the existing literature on the effects of immigration on the labour market. Section 4 presents the data employed in the analysis and corresponding descriptive statistics. It also looks at the intensity of tasks by occupational group following the methodology employed by Peri and Sparber (2009). Section 5 presents the model and the results of our empirical analysis. Section 6 provides an alternative analysis using the PIAAC and EWCS datasets, to test the robustness of our results, while in Section 7 we conclude the research and provide a discussion on the implications of our findings.

Recent immigration trends to Germany

Net immigration flows to Germany have increased substantially since 1995, with a sharp increase being observed from 2010 onwards (Figure 1). The most recent increase can be attributed to the significant numbers of refugees coming from conflict-affected countries such as Syria, Iraq or Afghanistan. Significant growth can also be observed after the first enlargement round of the EU in 2004 and the second enlargement round in 2007, with a small decline during the Great Recession, in 2009.

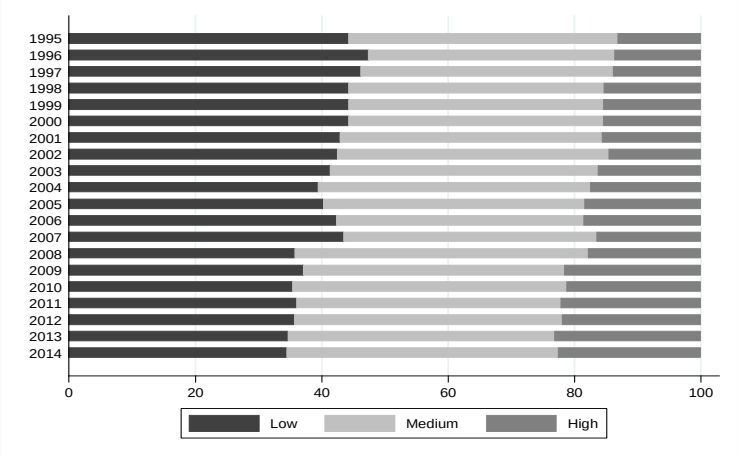
In terms of the skill composition of the immigrants in Germany (Figure 2), there seems to be a small shift from low-skilled to high skilled immigration during the period analysed. If in 1995, the share of highly skilled immigrants was only 13 per cent while the share of low-skilled

immigrants 44 per cent, by 2014, 23 per cent of the immigrant population was now highly skilled, with 34 per cent being low-skilled (a transfer of almost 10 per cent). The share of medium skilled immigrants seems to have been more or less constant over the same time period.

Figure 1. The evolution of the share of immigrants in Germany's working age population

Notes: Percentage of immigrants in working age population 16-65.
Source: German Labour Force Survey (DE LFS) 1995-2014 and author's calculations.

Figure 2. Share of immigrants by educational level, 1995-2014



Notes: Educational attainment based on three values: high, medium and low educated (skilled). The derived categorical variable for education takes value of 1 for low educated (ISCED 0-2; i.e., primary and lower secondary education), 2 for medium (ISCED 3-4; i.e., upper secondary and post-secondary non-tertiary education) and 3 for high (ISCED 5-7; i.e., tertiary education).
Source: German Labour Force Survey (DE LFS) and author's calculations.

In light of the above observation, the information from Figure 3, which compares the share of immigrants by broad occupational group[55], between 1995 and 2011, becomes even more interesting[56].

Figure 3. Share of immigrants by occupation, years 1995 and 2011

Notes: ISCO-88 occupations at one-digit level.
Source: German Labour Force Survey (DE LFS) and author's calculations.

To begin with, despite the fact that the share of low-skilled immigrants in the total immigrant population decreases overall in the past two decades, the share of immigrants in elementary occupations increases over the same time period (by 26 percent). Moreover, compared to other occupational groups, immigrants in Germany seem to be disproportionally found in lower skilled occupations, such as elementary and service and sale workers, pointing to a substantial skill mismatch. Skilled agricultural and fishery workers by far register the largest

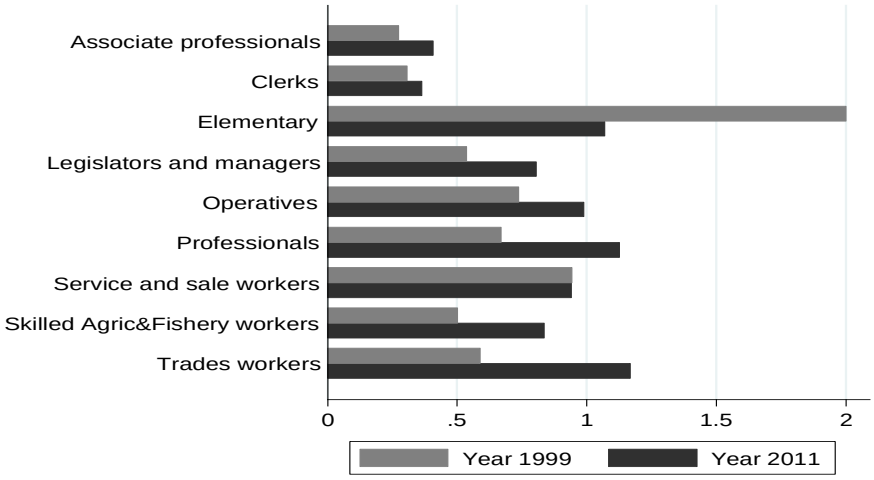
[55] Examples of occupations within each occupational group: clerks – secretaries, customers service; service and sale workers – cooks, shop salesperson; skilled agricultural and fishery workers – market gardeners, fishery workers, subsistence crop farmers; trades workers – blacksmiths, handicraft workers; professionals – health, teaching, business administration professionals; operatives – assemblers, heavy truck and bus drivers, mining and mineral processing plant operators; legislators and managers – hotel, sales, professional services managers; elementary – cleaners and helpers, manufacturing labourers, etc.

[56] Percentage change by occupation: legislators +50%, professional +84%, associate professionals +30%, trades workers -38%, clerks +251%, operatives -71%, skilled agricultural workers +307%, services and sale workers +69%, elementary occupations +26.

increase (over 300 percent), followed by clerical occupations which more than doubled between 1995 and 2011. Highly skilled job categories such as professionals, associate professionals or managers also register growth, however, not of the same magnitude as lower-skilled occupations. This is an interesting trend, considering that the share of highly skilled immigrants has increased over the same time period, while the share of low-skilled immigrants has decreased.

The picture changes significantly, however, if we look only at recent immigrants (i.e., immigrants with less than five years in Germany) (Figure 4)[57].

Figure 4. Share of recent immigrants (less than 5 years) by occupation, years 1999 and 2011



Notes: ISCO-88 occupations at one-digit level. Recent immigrants are defined as those with at most five years of residence in Germany. *Source:* German Labour Force Survey (DE LFS) and author's calculations.

Whereas in 1999, most recent immigrants would be employed in elementary occupations by a high margin, in 2011, immigrant employment was more or less divided between professional, trades and machine operations occupations (the baseline period changes to 1999

[57] Percentage change by occupation: elementary -46%, professionals +69%, associate professionals +51%, clerks +16%, service and sales -1%, skilled agricultural and fishery workers +68%, trades workers +98%, operatives +34%, legislators +48%.

due to data availability). Interestingly, while the overall share of immigrants in Figure 3 pointed to a decrease by almost 40 percent in trade occupations between 1995 and 2011, the share among recent immigrants is significantly larger, and doubles from one period to another. Moreover, the share of immigrants in elementary occupations drops by almost 50 percent from one period to another, if we consider recent immigrants only. Recent immigrants, thus, seem to be relatively better matched with their level of education, since there seems to be more or less an equal distribution between types of occupations.

The effect of immigration on labour markets

The impact of immigration on the hosts country's labour market depends critically on the skills of immigrants, the skills of the native workers, and the characteristics of the host economy, including its institutions (Ruhs and Vargas-Silva 2015; Angrist and Kugler 2003). We should also distinguish between immediate and delayed effects, since in time the labour market can adjust to immigration.

The immediate effects are shaped significantly by the extent to which the skills immigrants possess are substitutes or complements to the skills of the native workers (Borjas 1995). If the skills of the immigrants and natives are substitutes, the laws of supply and demand imply that an increase in immigration could results in increased competition for jobs and a decline in wages (Borjas 2003). The extent to which the decrease in wages will in turn lead to a rise in unemployment depends on the native's willingness to accept the lower wages. Alternatively, complementarity between the skills of immigrants and natives could lead to increased productivity and subsequent increases in wages for native workers.

The existing, rather vast literature, however, seems to contradict the neoclassical model - immigration has been found to have little or no effect on wages and employment. As Borjas (2003) points out, the measured impact of immigration on natives fluctuates significantly from study to study, but seems to be clustering around zero.

One explanation for the limited evidence of a negative effect of immigration on native worker's employment and wages may have to do with the underlying assumptions of the models employed.

For instance, a great number of empirical studies use the spatial correlation method, which examines the relation between the share of immigrants and the labour market outcomes of native workers in a particular region. Examples include Dustmann et al (2005) in the UK, Card (2005) in the US or Addison and Worswick (2002) in Australia, which find little or no evidence that immigration has an effect on employment or wages at the aggregate level. Yet, one of the major weaknesses of the spatial correlation method is its assumption that the effects of immigration are not offset by the internal migration of native workers (Bansak at al 2015). If native outflows are larger than immigrant inflows, then the effects of immigration would be indeed underestimated.

The skills cell approach, which implies that that the national labour market is divided by skill groups (education-age or experience cells), was developed as a way to overcome this particular issue of internal mobility of native workers as a response to immigration. Examples of studies using the method include the seminal work of Borjas (2003) for the US, or more recently Card and Peri (2016) for the same country.[58] However, this approach depends on the assumption that immigrants and natives are perfect substitutes within pre-defined skill categories, which does not hold if immigrants considerably downgrade after arrival, as shown by Dustmann,

[58] As far as our understanding goes there is no research of this type for Germany.

Frattini, and Preston (2013) in their analysis for Britain, or if natives change their skills in response to immigration.

Ottaviano and Peri (2008, 2006) build on this previous body of work and tackle the issue of perfect substitutability between native and immigrant workers, an assumption many of the previous models take for granted. They argue that immigrant and native workers with the same educational background can differ in their skills, leading them to different task specialisations. This in turn means that immigrants and natives compete for different jobs and occupations, therefore the effect of migration on the native labour market should be minimal, if at all.

Peri and Sparber (2009) complement and extend the analysis of Ottaviano and Peri (2006, 2008) by focusing on workers without a college education in the US. Their principal contribution is the use of the "task biased technological change" framework to argue that the way in which occupations are affected by the arrival of immigrants depends to a large extent on the comparative advantage of the tasks they perform, rather than on their educational level. They predict a progressive substitution of immigrants for native labour in physical tasks. On the one hand, less educated immigrant workers have a comparative advantage in occupations demanding physical tasks, mainly because of limited language proficiency. On the other hand, less educated native workers will reallocate to complex tasks under the assumption that their relative comparative advantage is higher in "communication tasks" than in "physical tasks". They empirically show that less educated recent immigrants specialise in physical occupations, while less educated native workers respond to the influx of immigrants by increasing their supply of complex tasks.[59]

[59] Similarly, Ottaviano et al. (2013) document that occupations characterized by low cognitive intensity, low communication intensity, high manual intensity and low overall complexity have a larger share of hours worked by immigrants.

Amuedo-Dorantes and de la Rica (2011) build on the Peri and Sparber (2009) model by adding a gender dimension and looking at the case of Spain. The authors provide evidence that native men (women) reallocate to occupations with complex content in response to an increase in male (female) migration.

To the best of our knowledge, theirs is the only study using this model to show the effect of migration on natives' task allocation. The present paper builds on this existing literature and it advances it by looking at the case of Germany, a country with a significantly different labour market structure and dynamic than either Spain or the US.

The effect of immigration on the German labour market

A number of studies have looked specifically at the German context. Investigating geographical substitution effects between immigrants and natives across local labour markets in Germany, Pischke and Velling (1997) find little effects for displacement due to immigration. They conclude that the small or no effects of immigration previously observed in Germany cannot be explained by a reallocation of natives to other geographical areas. Similarly, using administrative data for the period 1987–2001 and a labour-market equilibrium model, D'Amuri, Ottaviano, and Peri (2010) find that the substantial immigration of the 1990s had very little adverse effects on native wages and on their employment levels. Glitz (2012) finds evidence of adverse employment effects but no detrimental effects on wages. Winkelmann and Zimmermann (1993) and De New and Zimmermann (1994) find that immigration has negatively affected the unemployment rate and wages of the native population, with some industries being hit harder than others. What is more, De New and Zimmermann (1994) distinguish between white collar and blue collar jobs and find that the effect is negative only for blue collar, a finding that points

to the importance of distinguishing between skilled and unskilled workers. More recently, Brücker et al. (2014) find that in the short term, wages are significantly affected in Germany, however, in the long term, under the empirically supported assumption that capital stocks adjust to shocks in labour supply, immigration does not affect wages. They also find that, since the elasticity of substitution between immigrants and the native population is relatively low, the impact of immigration on both wages and employment is higher.

Data and descriptive statistics

We base our analysis on data derived from the German Labour Force Survey (DE LFS) and explore the period between 2002 and 2014, for which information at the regional level is available. The German LFS is carried out as part of the annual micro-census, which is based on the 'micro-census law' (Eurostat 2007). The survey has been carried out since 1957 in West-Germany, and since 1991 in the new Bundesländer and East-Berlin. Quarterly data has been available from 2005 onwards, when the survey has been organised as a continuous survey covering all weeks of the year. The survey includes information on country of birth, on which we base our conceptualization of an immigrant. Hence, we define immigrants as those individuals who are foreign-born. We drop from our analysis long-term immigrant workers (i.e., those with five of more years in Germany), as they are more likely to have acquired German proficiency and other human capital skills of natives.[60] Additionally, since we are most interested in analysing the effect that low-skilled immigrants have on low-skilled natives' task specialization, we restrict the data to only this educational group. We exploit information on the highest

[60] Our results are robust to the inclusion of all the immigrants.

qualification achieved.[61] Moreover, since we look at the effect on task specialization, we confine our sample to only those natives and immigrants which are either employed or self-employed, thus the working population. We use the NUTS1 regional disaggregation as available in the LFS, for a total of 16 regions.

Table 5-1 displays the descriptive statistics of low-skilled immigrants and natives. Both groups seem to share similar characteristics, in terms of the average age in the sample or the share of younger adults (less than or 42 years old). The most substantial difference appears with regards to the share of women in the low-skilled bracket, which represents more than half for the native population, while only 44 per cent for immigrants.

Table 5-1 Characteristics of low-skilled immigrants and natives, low-skilled only

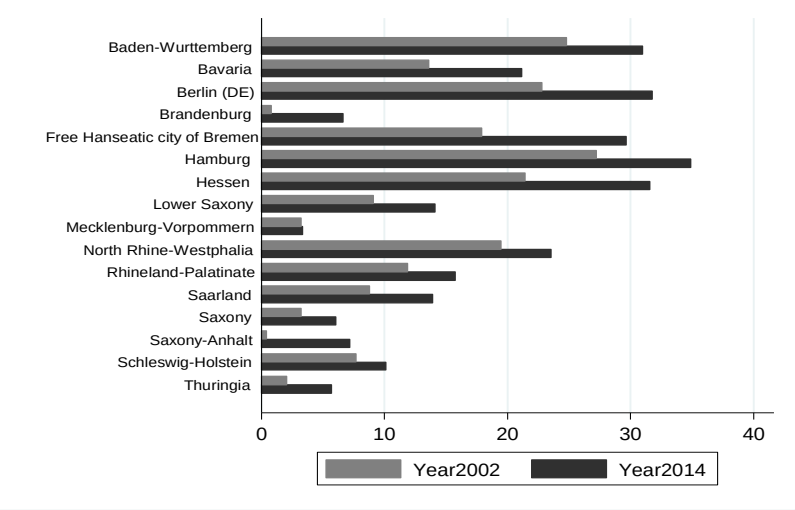
Characteristics	Natives	Immigrants
Average age	37.1	39.8
Female (per cent)	51.3	43.5
Less than or equal to 42 years old (per cent)	61.9	62.9
Total number of observations	206,208	49,800

Notes: Workers (employed or self-employed) between 17 and 67.
Source: German Labour Force Survey (DE LFS) 2002-2014 and author's calculations.

Figure 5 looks at the change in the geographical distribution of less educated immigrants across German regions. Although all regions register increases in the share of less educated immigrants over the analysed period, the magnitude of the increase differs significantly. While regions such as Hamburg, Berlin, Hessen or Baden-Wurttemberg exhibit large shares of immigrants over both time periods, regions such as Brandenburg or Saxony-Anhalt register differences between the two, with a significant upsurge from one period to the other.

[61] We use the variable *hatlevel* to measure the highest level of education

Figure 5. Share of less educated immigrants, by region, in years 2002 and 2014



Source: German Labour Force Survey (DE LFS) and author's calculations.

Task-intensity variables

In order to investigate the effects of immigrants on natives' task specialisation, we need information on the activities performed by workers on the job. Unless otherwise noted, and in a similar fashion to previous studies on migration and task-specialisation, we rely on the US Department of Labor's O*NET abilities survey to derive data on job tasks requirements. [62] Hence, we work under the assumption that task composition is the same in the US and in Germany. This database makes our results easily comparable with other studies.

Applying the O*NET survey to our data poses some challenges. Mainly, the O*NET codify 812 occupations based on 2000 standard code (SOC) which we had to convert into ISCO-88, as we only have the occupation in ISCO. Therefore we convert occupational codes from SOC into ISCO using the crosswalk made available by the Center for Longitudinal Studies in the

[62] We use version 11.0 of the survey. It is available at: http://www.onetcenter.org/

UK.[63] We aggregate the 812 occupations into 67 ISCO codes (3-digit level), and then into 25 ISCO codes (2-digit level).

We merge the O*NET abilities data with the German Labour Force Survey by occupation using the ISCO codes. In order to show the importance of each particular ability in Germany, we properly weight each occupation's ability raw scores. To facilitate the interpretation of our results, we transform the ability scores into percentages. This is done by dividing each weighted ability score by the maximum score of the ability in question in other occupation. As such, each final ability score ranges between 0 and 1, and is indicative of the relative importance of that particular task in the occupation at hand –as opposed to its importance in other occupations.

In order to establish the task content of each job's measures, we use the same framework as Peri and Sparber (2009). Their classification is based on a two-dimensional typology: manual as opposed to communication. We define manual skills using the following abilities: [1] dexterity ("limb, hand, and finger dexterity", "body coordination and flexibility", and "strength"), [2] coordination ("multilimb coordination, and gross body coordination) and [3] strength (static and dynamic). Interactive skills include measures of oral and written expression and comprehension.

Table 5-2 presents the manual and the interactive tasks values, together with their ratio, for each of the two-digit ISCO-88 occupations included in the analysis. This aggregation offers a clear interpretation of tasks content of the occupations. As one would expect, high-skilled occupations, "Corporate managers" (ISCO 12), "Physical, mathematical and engineering science profession" (ISCO 21) and "Life science and health professionals" (ISCO 22) are those ones having the greatest level of interactive tasks and a smaller content of manual tasks. At the other

[63]Available at: http://www.cls.ioe.ac.uk/page.aspx?&sitesectionid=351&sitesectiontitle=O

Table 5-2 Task intensities by occupation

Occupations (ISCO-88 code)		M	C	M/C
12	Corporate managers	0.35	0.83	0.43
13	General managers	0.38	0.72	0.53
21	Physical, mathematical and engineering science profession	0.29	0.82	0.35
22	Life science and health professionals	0.55	0.81	0.67
23	Teaching professionals	0.36	0.73	0.49
24	Other professionals	0.21	0.77	0.28
31	Physical and engineering science associate professionals	0.53	0.73	0.73
32	Life science and health associate professionals	0.63	0.72	0.87
33	Teaching associate professionals	0.28	0.61	0.47
34	Other associate professionals	0.27	0.71	0.38
41	Office clerks	0.27	0.65	0.42
42	Customer services clerks	0.36	0.60	0.59
51	Personal and protective services workers	0.64	0.56	1.13
52	Models, salespersons and demonstrators	0.56	0.58	0.97
61	Market-oriented skilled agricultural and fishery workers	0.87	0.46	1.86
71	Extraction and building trades workers	0.86	0.45	1.93
72	Metal, machinery and related trades workers	0.90	0.50	1.78
73	Precision, handicraft, printing and related trades worker	0.69	0.44	1.54
74	Other craft and related trades workers	0.79	0.43	1.83
81	Stationary-plant and related operators	0.79	0.49	1.62
82	Machine operators and assemblers	0.89	0.45	1.97
83	Drivers and mobile-plant operators	0.84	0.49	1.70
91	Sales and services elementary occupations	0.59	0.47	1.25
92	Agricultural, fishery and related labourers	0.98	0.31	3.18
93	Labourers in mining, construction, manufacturing and transport	0.80	0.45	1.74

Notes: Workers between 17 and 67 with little educational attainment (hatlevel=1). The manual (M) and communication (C) indexes are derived averaging tasks measures and weighting with the DE LFS.
Source: Authors computations using O*NET database and DE LFS 2002-2014 (German Labour Force Survey)

end of the spectrum, low-skilled occupations like "Agricultural, fishery and related labourers" (ISCO 92), "Metal, machinery and related trades workers" (ISCO 72) among others have high levels of manual tasks and smaller content of interactive tasks. As a result, the values of C/M are lowest among craft and trade workers, and in operative and elementary occupations. Managers and professionals score instead among the highest.

We use the O*NET database, a US survey to measure the task content of occupations. In section 5, we test the robustness of these results by using the task content of occupations from two other sources of survey data: the European Working Condition Survey (EWCS) and the Programme for the International Assessment of Adult Competencies (PIAAC). Unlike the O*NET, the EWCS and PIAAC are workers' survey data. More information on the items selected is found in section 5.

The effect of immigration on the relative task supply of natives

The empirical model

Thus far, we have provided preliminary evidence of the greater relative supply of manual tasks by immigrants compared to native throughout the descriptive statistics in Table 1 and Table 2, along with Figure 1 through Figure 5. We now proceed to test whether less-skilled natives respond to increasing migration inflows by shifting to jobs characterized by a lower manual to communication ratio.

To test the previous hypothesis we follow Peri and Spaber (2009). We use data from the 16 German regions from 2002 to 2014, and we estimate the following regression equation:

$$\ln\left(\frac{M_D}{C_D}\right)_{rt} = \alpha_r + \beta_t + \gamma\left(\text{share}_{\text{foreign}}\right)_{rt} + \varepsilon_{rt} \quad (1)$$

where $ln\left(\frac{M_D}{C_D}\right)_{rt}$ is the logarithmic average ratio of manual to communication supply at the regional (r)/year (t) level. We apply region fixed effects α_r to control for regional unobserved characteristics that might also affect task reallocation, and time fixed effects β_t to control for time-varying factors common to all regions.

Equation (1) examines the impact of the supply shock on the provision of relative manual tasks by less educated natives in the economy. If natives specialize in occupations requiring fewer manual, as opposed to interactive, tasks as the share of immigrant workers increases, the coefficient γ should be negative and statistically different from zero.

Following Peri and Sparber (2009), we can go further and estimate whether the negative effect is due to a decrease in the native supply of manual tasks or an increase in the native's supply of communication tasks. Therefore, we separately estimate equations (2) and (3):

$$\ln(M_D)_{\mathrm{rt}} = \alpha_{\mathrm{r}} + \beta_{\mathrm{t}} + \gamma_m\left(\mathrm{share}_{\mathrm{foreign}}\right)_{\mathrm{rt}} + \varepsilon_{\mathrm{rt}} \quad (2)$$

$$\ln(C_D)_{\mathrm{rt}} = \alpha_{\mathrm{r}} + \beta_{\mathrm{t}} + \gamma_c\left(\mathrm{share}_{\mathrm{foreign}}\right)_{\mathrm{rt}} + \varepsilon_{\mathrm{rt}} \quad (3)$$

when we measure the effect of immigrants on native workers on local labour markets, the literature has defined two identification assumptions that must hold in order to estimate properly the previous equations. The first one concerns the inter mobility of native-born workers as a result of immigrant-born workers flows. If there were internal migration of native-born workers, this would disperse the effect of immigrant across the German economy and undermine the effect of it. The second issue deals with the potential endogeneity of immigrant workers. We need to ensure that the variation of the share of less-educated immigrant workers is exogenous and is driven by supply shifts (not by any unobserved employment opportunity). In the next two sections, we discuss more in depth these two problems.

Native-born mobility

Evidence on native-born mobility responses to immigrant's inflows is mixed in the US. On the one hand, Frey (1995) and Borjas (2003) find evidence of an adverse effect of immigration on native internal mobility. On the other hand, Wright, Ellis, and Reibel (1997), Card and DiNardo (2000) and Card (2001) consider inter mobility of native-born workers an irrelevant issue. With regards to the UK, the results are clearer. Using the International Passenger Survey (IPS), Hatton and Tani (2005) show a negative correlation between net migration rate from abroad and inter-regional net migration rates. This relationship is however significant only for the southern regions. In a later paper, Wadsworth (2012) re-examined the relationship between immigration and interregional mobility. They show a weak correlation between UK-born mobility and immigrant inflows during the period 2004-2008.

As far as Germany is concerned, Pischke and Velling (1997) examined the impact of increased immigration on employment outcomes of natives in Germany at the local labour market.[64] Their analysis, which covers the period from 1985 to 1989, shows that there is little evidence for displacement effects due to immigration, and this is particularly true for unemployment rates. It must be noted that Pischke and Velling (1997) use smaller units than we do (167 regions versus NUTS-2). More recently, Glitz (2012) examines the specific issue of the impact of ethnic German immigration on the relative skill-specific employment and wage rates of the resident population in different geographic areas between 1996 and 2001. He finds evidence of adverse employment effects but no detrimental effects on average wages. We can therefore argue that the assumption that labour markets are regional in scope is a reasonable one.

[64] It must be noted that Pischke and Velling (1997) use a more disaggregated level of regionalisation than us, therefore the internal mobility of German workers will be even less at a more aggregated level.

Endogeneity and measurement error

As previously stated, the endogeneity of immigrants share could make our estimations inaccurate. Immigration does not take place in a vacuum, rather the decision of whether to migrate and where to migrate are made simultaneously. Therefore, characteristics which might explain the allocation of the immigrant share cross regions in Germany may also help explain the allocation of manual to communication tasks as immigrants would migrate to areas which offer suitable or desirable employment opportunities. Many of these characteristics are unobservable, such as immigrant abilities, risk aversion or labour demand conditions at regional level. This uncertainty makes it difficult to establish a causal relationship and tends to bias the estimations.

To address the potential endogeneity issue, we construct an instrumental variable for the share of low-educated immigrant workers. We draw on Amuedo-Dorantes and De la Rica (2011) and use the share of low-educated long-term immigrants – a group that was excluded from the analysis, as an instrument. The underlying assumption behind the choice of the instrument is that settlement patterns of previous migration cohorts are a main determinant of immigrants' location choices (Card 2001; G. Ottaviano and Peri 2006; Amuedo-Dorantes and de la Rica 2011).

Results and discussion

The following section empirically explores the relation between less-educated native workers and the corresponding group of less-educated immigrants' skills supply, across the 16 regions in Germany, over the period 2002-2014. Specifically, we investigate whether there has been a reallocation of less educated native workers to jobs characterized by a higher share of non-manual tasks, as a result of a rise in the share of immigrants with similar skills.

Before moving on to the actual analysis, however, in a similar fashion to Peri and Sparber (2009) and Amuedo-Dorantes and de la Rica (2011), we control for a potentially spurious relationship between the immigration shock and natives' provision of manual to non-manual tasks.

Table 5-3 Task supply "cleaned" of demographic effects

	Manual	Communication
Female	-0.060***	0.027***
	(0.000)	(0.000)
Age	-0.002***	0.001***
	(0.000)	(0.000)
Low Education	0.059***	-0.077***
	(0.000)	(0.000)
Constant	0.256***	0.494***
	(0.000)	(0.000)
N	1,873,287	1,873,287

Notes: We use the "cleaned" residuals from the above regressions to compute the manual and communication task supply measures. Significance levels * p<0.1; ** p<0.05; ***p<0.01.
Source: German Labour Force Survey (DE LFS), O*NET, and author's calculations.

To do so we first regress each individual task supply on a number of personal characteristics, namely gender (female dummy), age (four age groups) and education level (dummy equal to 1 for a low level of education and 0 otherwise). We then obtain the "cleaned" residuals by subtracting the predicted task supply from the individual's observed task supply, which we use in the final regression analysis. Table 5-3 displays the coefficients of the personal characteristics variables used in the "cleaning" procedure. The estimated coefficients seem to largely confirm our expectations - women generally tend to occupy jobs where communication

skills are predominantly used while manual skills less so, a trend confirmed by a positive and a negative association, correspondingly. Age is negatively associated with manual-intensive tasks too, an intuitive find since manual tasks usually require more physical strength and vigour. Again not surprisingly, communication-intensive tasks are associated with higher levels of education, the effect being the strongest across all three indicators.

Table 5-4 presents the results of our regression analysis. We begin our exploration with a basic ordinary least square model (OLS, column 1), and continue with an OLS which includes our control variables age and educational attainment with a 1 year lag (column 2). Column 3 presents our estimates for an OLS which includes as control a 1 year lag of the dependent variable, since we assume that the current level of native skill allocation can be influenced by its past level. Column 4 presents a linear model with instrumental variables.

Looking first at the effect of the immigrant share on native's ratio of manual to communication skills, there seems to be a negative effect which holds across both static and dynamic versions of the OLS (columns 1-3). Specifically, a one unit increase in the relative supply of immigrants is associated with between 79.6 to 79.2 percentage point decrease[65] in the supply of manual versus communication tasks for the native population. We notice a similar consistency of results concerning the relative supply of manual and communication tasks for natives. Specifically, the findings suggest that a one unit increase in the supply of immigrants decreases the supply of natives' manual tasks by between 71.6 to 73.6 percentage points, while it increases the supply of native's communication tasks by between 28.4 and 39.1 percentage points. As hypothesised previously, the magnitude of the effects of immigration of natives' relative supply of tasks in Germany is substantially higher than in the case of the US (see Peri

[65] Percentage estimates computed as [e^(-1.59)-1]*100=79.5.

and Sparber 2009), or the case of Spain (see Amuedo-Dorantes and de la Rica 2011), the difference being largely due to variation across labour market systems.

Table 5-4 The effect of the immigrant share on the relative task supply of less-educated native workers

Dependent variable	OLS (1)	OLS with 1 year lag controls (2)	OLS with 1 year lag DV (3)	IV (4)
Ln(M/C)	-1.59*	-1.57***	-1.59*	-1.52***[66]
	(0 .84)	(0 .46)	(0 .88)	(0 .25)
Ln(M)	-1.27*	-1.33***	-1.26*	-1.30***[67]
	(0 .67)	(0 .35)	(0 .71)	(0 .19)
Ln(C)	0 .32	0 .25**	0 .33*	0 .22[68]
	(0 .19)	(0 .12)	(0 .18)	(0 .08)
Observations	208	192	192	177

Notes: All regressions include controls for average educational attainment and age at the cell level (i.e. region and year). Regressions (1) and (3) also include regional and year fixed effects. Standard errors, clustered by region, and robust to serial correlation and hetereskedasticity are reported in parentheses. Significance levels *p<0.1; **p<0.05; ***p<0.01 *Source:* German Labour Force Survey (DE LFS), O*NET, and author's calculations.

To address any potential endogeneity between the relative supply of manual and communication tasks and variation in the share of immigrants, we use two instrumental variables. Specifically, we use the share of long-term low-educated migrants as an instrument, and a version of it with a 1-year lag. Long-term low-educated immigrants as a group were excluded from the sample used in the analysis. The choice of this instrument is motivated by the numerous studies showing that settlement patterns of previous immigrants have an influence on immigrants' location choices. The phenomenon is akin to the network effect, whose influence on migration patterns to Germany has been previously acknowledged (see Epstein 2008). The instrument has been successfully employed by Card 2001; G. Ottaviano and Peri 2006; Amuedo-Dorantes and de la Rica 2011; Peri and Sparber 2009, among others. The instrument is strongly

[66] The F-statistic is equal to 12.82 with Prob>F=0.0050.
[67] The F-statistic is equal to 17.45 with Prob>F=0.0006.
[68] The F-statistic is equal to 7.04 with Prob>F= 0.0706.

correlated with our exogenous variable (corr=0.96), and the first stage regression from the two stage instrumental variable estimation yields coefficients that are statistically significant at the 1 percent level. The results of the instrumental variable regression are presented in column 4. The estimates confirm the significance, magnitude and direction of the effect found in the previous OLS regressions Thus, the effects hold true regardless of the methodology employed.

The analysis in table 5-4 explores the effect of an increase in the relative supply of the general population of immigrants, however, it seems rather intuitive to expect different effects when distinguishing between recent and long-term immigrants. We define recent immigrants as those who have been living in the country for less than 5 years. We expect long-term immigrants, by virtue of having lived in the destination country for a longer time, to accumulate more specific human capital and become comparable to native workers in terms of knowledge of the local language and the local labour market. From this perspective, long-term immigrants become less complementary and more substitutes to the native population.[69] However, because of the high collinearity between these two immigrant groups, we cannot test empirically this effect; what we do instead, in a similar fashion to Amuedo-Dorantes and de la Rica (2011), is to explore the average relative supply of manual to communication tasks for natives, recent and long-term immigrants (Table 5-5). Although not significant, the sign and magnitude of the estimates confirm the effects found above. Specifically, recent immigrants seem to supply more manual relative to communication skills than long term immigrants, while natives seem to supply the least manual skills, or, conversely, the most communication skills.

[69] The terms skill and education are interchangeable in our context.

Table 5-5 Average relative task supply for different groups of low educated workers

Variable	Natives	All immigrants	Recent immigrants	Long-term immigrants
M/C	0.857	0.919	0.934	0.917
	(0.41)	(0.37)	(0.37)	(0.36)
Observations	203,093	49,627	4,801	44,826

Notes: Recent immigrants are those with at most 5 years of residence in Germany. Standard errors, clustered at regional level, in parentheses.
Source: German Labour Force Survey (DE-LFS), O*NET, and author's calculations.

Similarly, we expect to observe notable differences between female and male immigrants' effect on native female and male's task supply. The underlying assumption is that women tend to perform jobs which require less manual and more communication and interaction skills, therefore they tend to be more substitutes and less complementary to the native female workforce. We thus expect this occupational segregation by gender to lead to a lower effect of skills reallocation from manual to communication for women

Indeed, the results in Table 5-6 seem to confirm our assumptions. Firstly, female immigrants seem to exert no effect on the task supply of native females, confirming our hypotheses of substitutability. More interesting, however, is the fact that the situation changes when we consider only recent female immigrants – they seem to have a positive effect on the supply of manual versus communication skills of the native females and a negative effect on the supply of communication skills. Again, no effect on the supply of manual skills of the native female workers. This is a most fascinating finding. If we interpret it correctly, then recent female immigrants are direct substitutes to native female workers because in terms of communication skills, which might explain the negative effect. The same cannot be said about male immigrants, which seem to be complementary to the native male workforce even after long-term residency;

we find a significant, negative effect on the supply of skills for both long-term and recent immigrants.

Table 5-6 The effect of all immigrants and of recent immigrants on the relative task supply of less-educated native workers from a gender perspective

Dependent variables	OLS – all immigrants	OLS – recent immigrants
$\ln(M/C)_{Female}$	-1.57	1.89**
	(1.02)	(0 .75)
$\ln M_{Female}$	-1.45	0 .47
	(0.97)	(0.79)
$\ln C_{Female}$	0 .12	-1.42***
	(0.25)	(0.45)
$\ln(M/C)_{Male}$	-1.82*	-3.07**
	(0 .86)	(1.16)
$\ln M_{Male}$	-1.32**	-2.17**
	(0.51)	(0.79)
$\ln C_{Male}$	0 .50	0.89**
	(0.37)	(0.41)
Observations	208	163

Notes: Each cell contains estimates from separate regressions and ln(m/C) is calculated for each specific demographic group of natives. All regressions include controls for average educational attainment and age at the cell level (i.e. region and year), and year and region fixed effects. Standard errors, clustered at regional level, and robust to serial correlation and hetereskedasticity are reported in parentheses. Significance levels *p<0.1; **p<0.05; *** p<0.01. *Source:* German Labour Force Survey (DE-LFS), O*NET, and author's calculations.

Sensitivity analysis: EWCS and PIAAC tasks variables

The previous section has pointed to a negative relationship between the increase in the share of immigrant workers and the relative task supply of the native workers. However, as already mentioned, we have used the O*NET data from the US to conduct our analysis, a major reason being the possibility to compare our results to other existing studies. We now conduct a sensitivity analysis to test the robustness of our findings using two alternative datasets: the European Working Condition Survey (EWCS) and the Programme for the International Assessment of Adult Competencies (PIAAC). One advantage of these datasets is the fact that we do not need to assume the same task composition between the US and Germany any longer, as both the EWCS and PIAAC collect information on the latter.[70] However, there is no perfect correspondence between the three datasets, therefore we have selected the items that most resemble each other.[71]

Table 5-7 reports OLS, WLS and IV estimates using the EWCS. In this case, we select the items on "skill in using hands or fingers" (e.g. repetitive hand or arm movements), "physical strength" (e.g. carrying or moving heavy loads), and "physical stamina" (e.g. tiring or painful positions) to represent manual skills, and "dealing directly with people who are not employees at your workplace" and "Using internet / email for professional purposes" to represent communication skills. The results resemble the baseline model with regards to the significance and magnitude of the effect. The OLS estimates are almost identical to those obtained while using O*NET. When we instrument the share of immigrant workers, the results are statistically significant, still positive, the magnitude is higher but the Ln(C) is not significant. The main

[70] See Appendix A for more information on the construction of the indexes.
[71] See Appendix C for a complete mapping between task variables in the three dataset.

differences appear when using the weighted least square regressions: WLS estimators are not statistically significant and the magnitude is lower.[72]

Table 5-7 The effect of migration on the relative task supply of less-educated native workers, OLS, WLS and IV using EWCS

Dependent variable	OLS	WLS	IV
Ln(M/C)	-1.089*	-0.135	-7.342**
	(0.549)	(0.376)	(2.604)
Ln(M)	-0.913**	-0.300***	-4.511***
	(0.365)	(0.105)	(0.949)
Ln(C)	0.176*	0.235	2.831
	(0.437)	(0.134)	(1.815)
Region and year fixed effects	Yes	Yes	Yes
First stage F-statistics (p-value)			32.4
Observations	208	199	199

Notes: Standard errors, clusterest at regional level, and robust to serial correlation and hetereskedasticity are reported in parentheses.
Significance levels *p<0.1; * **p*<0.05; *** *p*<0.01.
Source: German Labour Force Survey (DE-LFS), EWCS, and author's calculations.

In Table 5-8 we repeat the same regressions, this time using the PIAAC dataset, after a suitable conversion of occupational codes[73]. In this case, we define manual skills using the following items: "how often does/did your job usually involve using skill or accuracy with your hands and fingers at your workplace?" and "how often does/did job usually involve working physically for a long period?". Communication skills are defined using the items "how often does/did job usually involve making speeches or presentations in front of five people or more?" and "how often does/did job usually involve selling a product or a service?" In this case, too, we

[72] See Appendix B, Table 9, for the first stage regression.
[73] ISCO-08 occupational codes in PIAAC were matched to the ISCO-88 classification using the crosswalk made by Harry Ganzeboom.

find a negative effect of an increase of the immigrants' share of the relative task supply of the natives, although the magnitude of the effects seems to be significantly higher. We therefore conclude that the results presented in the previous section are robust to the choice of the database, and using the EWCS or PIIAC does not significantly alter our results.[74]

Table 5-8 The effect of migration on the relative task supply of less-educated native workers, OLS, WLS and IV using PIAAC

Dependent variable	OLS	WLS	IV
Ln(M/C)	-29.920**	-11.961	-7.106**
	(12.105)	(7.785)	(2.564)
Ln(M)	-22.645**	-14.084***	-4.331***
	(8.934)	(3.521)	(0.908)
Ln(C)	4.829	-1.490	2.776
	(6.821)	(5.399)	(1.828)
Region and year fixed effects	Yes	Yes	Yes
First stage F-statistics (p-value)			32.8
Observations	208	199	199

Notes: Standard errors, clustered at regional level, and robust to serial correlation and hetereskedasticity are reported in parentheses. Significance levels *p<0.1; * *p<0.05; *** *p*<0.01.
Source: German Labour Force Survey (DE-LFS), EWCS, and author's calculations.

Conclusion

There is now a heightened interest in migration-related research, hoping for findings that will guide immigration policies in receiving countries. This paper aims to contribute to the existing literature and provide evidence for sound policy-making.

[74] See Appendix B, Table 9, for the first stage regression.

Using an approach developed by Peri and Sparber (2009), the paper explores the effect of an increase in the relative supply of immigrants on the natives' task reallocation. The hypothesis is that, as low-skilled immigrants enter the labour market into predominantly manual-intensive occupations, natives will self-relocate to occupations which make use of their comparative advantage, namely communication skills. The paper focuses on Germany, a country with an increasingly high immigrant population, and a relatively rigid labour market, which would imply a more significant effect on natives' task reallocation. Using the German Labour Force Survey (De-LFS) and the O*NET database, our results show that an increase in the immigrant share has a significant and negative effect on the native's relative task supply. The effect of immigration on natives' task reallocation in Germany is substantially higher than the effect found in the US and Spain. Moreover, the effect is significantly larger for recent and for male immigrants, pointing to an assimilation effect taking place over time, and gendered effects. These particular findings confirm that the impacts of migration depend on the skills of immigrants and their familiarization with the labour market.

The study contributes to our better understanding of the effect of immigration on the local labour market. Specifically, it helps explain why the literature has so far found so negligible effects of immigration on wages or employment rates. In this particular case, while immigration might lead to a wage decline for low-skilled immigrants in manual-intensive tasks, the aggregate effect on wages will be small because it will be compensated by the skill and job upgrading of the displaced native workers.

An important implication of our findings is that through adjustments in natives' task specialization and occupational upgrading, immigration may increase job mobility, improve the

quality of job matches and contributing to increasing labour market efficiency (Amuedo-Dorantes and de la Rica 2009).

Furthermore, our findings point to the importance of considering different group characteristics when investigating the impacts of immigrants' on natives' labour market outcomes. Particular attention should be paid to skill levels, gender differences and duration of stay in the host country, but other characteristics such as age should be accounted for too.

It is essential to acknowledge that any type of labour market analysis, particularly when it involves migration, is bound to face a number of methodological limitations. Firstly, all evidence found on the effects of immigration on native's labour market outcomes is bound to be dependent on context and the time of the analysis, and our study is no exception. Secondly, as immigrants often go to areas which are experiencing both economic growth and strong labour demand, immigration can be both a cause and consequence of changes in wages and employment, which makes it difficult to establish causality (Ruhs and Vargas-Silva 2015). Thirdly, our study overlooks other responses to immigration as for instance, labour demand responses, changes in industry mix, choice of production technologies, as well as native labour supply, which when accounted for might make estimates of the wage impact of immigration cto vary (Bodvarsson and Van den Berg 2009).

Last but not least, the outcomes of any study on the impacts of migration is highly dependent on the definition of "immigrants".

Annex A: The construction of the indexes

The procedure we have followed for constructing the indices can be summarized in a number of steps:

[1] Identification of variables: we first identified the variables that could match the elements in our model. [2] Normalization of variables to a 0-1 scale: in the original sources, the individual variables use different scales which are not directly comparable. Therefore, they had to be normalized before they could be aggregated. We opted for a normative rescaling to 0-1, with 0 representing the lowest possible intensity of performance of the task in question, and 1 the highest possible intensity. [3] Correlation analysis: once the variables related to an individual element in our model were normalized, we proceeded to analyse the correlations between them. In principle, different variables measuring the same underlying concept should be highly correlated, although there are situations in which they may legitimately not be (for instance, when two variables measure two compensating aspects of the same underlying factor). Beside standard pairwise correlations, we computed Cronbach´s Alpha to test the overall correlation of all the items used for computing a particular index, and a Principal Components Factor Analysis to evaluate the consistency of the variables and identify variables that did not fit our concept well. [4] Once we selected the variables to be combined into a single index, we proceeded to combine them, by simply averaging. Unless we had a particular reason to do otherwise, all the variables used for a particular index received the same weight. [5] Finally, we proceeded to compute their average scores for all the occupation combinations at the two-digit level and one-digit level. When the data source included the information at the individual worker level, we computed also the standard deviation and number of workers in the sample, for later analysis. [6] Data from the EPA on the level of employment in each job was added to the dataset holding the task indices. These employment figures were later used for weighting the indices

Annex B: Table 9. First Stage regressions for 2SLS models

First stage regression - Instrumental variables using O*NET

DV=Ln(M/C)	O*NET
Long-term migrant share	0 .57***
	(0 .06)
1 Year Lagged Long-term migrant share	-0.09**
	(0 .04)
Hansen J stat	4.49
	(0.03)
Klanbergen-Paap F stat for weak instruments	380.66

Notes: Standard errors robust to serial correlation and hetereskedasticity are reported in parentheses. Significance levels ***p<0.01; **p<0.05; *p<0.10.

First stage regression – Instrumental variables using EWCS and PIAAC

DV=Ln(M/C)	EWCS	PIAAC
Long-term migrant share	0.17***	0.15***
	(0.02)	(0.76)
Klanbergen-Paap F stat for weak instruments	31.16	41.50

Notes: Standard errors robust to serial correlation and hetereskedasticity are reported in parentheses. Significance levels ***p<0.01; **p<0.05; *p<0.10.

Annex C: Task items among O*NET, EWCS, and PIAAC

Task items among O*NET, EWCS, and PIAAC

Type of skill	Skill sub-type	O*NET	EWCS	PIAAC
Manual	Dexterity	1) Finger dexterity 2) Arm-hand steadiness 3) Manual dexterity 4) Wrist-finger speed	1) Repetitive hand or arm movements	1) Skill use work - How often - Using hands or fingers
	Coordination	1)Multi-limb coordination 2)Gross body coordination	1) Tiring or painful positions	
	Strength	1) Static strength 2) Dynamic strength	1) Carrying or moving heavy loads	1) How often - Working physically for long period?
Communication	Oral	1) Oral comprehension 2) Oral expression	1) Dealing directly with people who are not employees at your workplace	1) How often does/did job usually involve making speeches or presentations in front of five people or more?"
	Written	1)Written comprehension 2) Written expression	1) Using internet / email for professional purposes	1) How often does/did job usually involve selling a product or a service?".

Notes: Items selected in O*NET, EWCS, and PIAAC.
Source: O*NET, EWCS, and PIAAC.

Chapter 6 Conclusion

This dissertation examines a number of aspects of the dynamic between immigration and labour market outcomes, for both immigrants and the native population. The four substantive chapters, all self-contained, are designed as to mimic an immigrant's journey towards labour market integration and one of the consequences of this integration. What follows presents a summary of the results, which are discussed more in-depth in the individual chapters.

The journey begins at the border, in chapter 2, where I contend that immigration policies fundamentally affect the opportunities and constraints that immigrants encounter in the host labour market. To explore this line of inquiry, I consider the particular case of the transitional arrangements implemented during the 2004 and 2007 enlargement rounds and their effect on the EU2 and EU8 immigrant self-employment rates in the EU15 countries. The results suggest that EU2 immigrants have indeed turned to self-employment as a way to circumvent the restrictions, and point to a substitution effect in the case of the EU8 immigrants. In this latter case, because there were countries like the UK or Ireland which did not implement restrictions, EU8 immigrants had alternative options to the now relatively closed Germany, Austria or the Netherlands, and did not need to turn to self-employment as a way to evade barriers. This implies that the observed increase in self-employment for this immigrant group is most likely motivated by existing opportunities and not merely a strategy towards salaried employment. The results have broader research and policy implications, revealing the importance of considering the effect immigration policies have in shaping the volume and skill composition of immigrants, as well as their labour market trajectories and subsequent economic activities.

The immigrant journey continues in chapter 3, which finds them upon entry into the labour market, where, I argue, policies and regulations can greatly affect whether and what type

of employment immigrants can take up. To explore this line of inquiry, I examine the effect of employment protection legislation (EPL) on immigrant self-employment rates, in a comparative study of 18 European countries. It is important to make a distinction here between employment legislation for permanent and for temporary contracts – often, legislation will be more stringent on permanent contracts and more lenient on temporary contracts, which affords more flexibility to employers and enables adjustment to economic fluctuations. The results of the study indicate that EPL for permanent contracts does not affect immigrant self-employment rates, but it does affect native self-employment. The reason may be that employers make an effort to circumvent the EPL in place, by outsourcing work to self-employed contractors. Native workers may also be incentivized to take up this type of contracts, as they are often better paid, at least in net terms, to compensate for the loss of rights and benefits associated with employment. Further research is needed to address the causes of this difference between native and immigrants, but they are important as they suggests significant differences between the determinants of self-employment for the two groups, with implications for immigration and entrepreneurship policies. Further, regulations for temporary contracts seem to have a positive and significant effect on self-employment rates for both immigrants and natives. One potential explanation might be the fact that highly regulated temporary contracts become less attractive employment options, making self-employment a better alternative. Finally, the results also point to the interdependency between the two types of regulations and the fact that changes in one sphere should be interacting with changes in the other one, affecting immigrants and natives differently.

Chapter 4 investigates how immigrant and native overeducation interacts with self-employment, in an attempt to enrich our understanding of three critical areas of policy interest: immigrant integration, skills mismatch and self-employment/entrepreneurship. The analysis

covers 30 European countries, and uses the EU Labour Force Survey data for the year 2012. Controlling for a list of demographic characteristics and general characteristics of the destination country, the analysis finds that self-employed individuals have a lower probability of being overeducated, likelihood that decreases with age for natives. In accordance with the existing literature, overeducation is also likelier for women. The findings add value to existing debates concerning overeducation and mismatch, which have for the most part focused on paid employment. Moreover, they provide important insight into the quality of immigrant self-employment, which is an important indicator of their labour market integration, as well as of the capacity of the state to tap into the benefits that immigration brings about. Further, the findings seem to confirm a hypothesis for which there are very few empirical studies, namely, that self-employment is more of a coping strategy rather than the result of an entrepreneurial spirit and immigrant-specific risk-taking behaviour.

Chapter 5 explores the effect of an increase in the relative supply of immigrants on natives' task reallocation. The hypothesis is that, as low-skilled immigrants enter the labour market into predominantly manual-intensive occupations, natives will self-relocate to occupations which make use of their comparative advantage, namely communication skills. The paper focuses on Germany, a country with an increasingly high immigrant population, and a relatively rigid labour market, which would imply a more significant effect on natives' task reallocation. Using the German Labour Force Survey and the O*NET database, the results show that an increase in the immigrant share has a significant and negative effect on the native's relative task supply, an effect substantially higher than the one found in similar studies for the US and Spain. Moreover, the effect is significantly larger for recent and for male immigrants, pointing to an assimilation effect taking place over time, and gendered effects. These particular

findings confirm the consensus that the impacts of immigration depend on the skills of immigrants and their familiarization with the labour market.

There are a number of general conclusions that can be derived from the four studies. Chapters 2 and 3 highlight the essential role of the state in shaping the quality and quantity of immigration flows, a role that has been rather overlooked by existing theories and research on the determinants of immigration and integration (Palmer and Pytliková 2015). Chapter 2 finds interesting differences in terms of age, gender and educational attainment between the pre- and post-enlargement cohorts for the EU2 immigrants, meaning that the measures put in place by states dissuaded some individuals from migrating, but not others.

Chapters 4 and 5 point to the importance of considering the duration of stay in the country when analysing immigrant labour market outcomes. Both studies conclude that the longer immigrants live in a country, the more familiar they get with the local labour market, and they improve their language abilities and human capital. For chapter 4, this implies that skills mismatch and overeducation will decrease in time. For chapter 5, this implies that the longer the immigrants have been living in the destination country, the more similar they are in terms of skills to the native population, and the closer they are to perfect substitutability.

Further, more consideration should be given to the gendered aspects of the interaction between immigration and labour market outcomes. Chapter 4 shows that overeducation, a phenomenon that delays immigrant's adequate integration into the labour market (and society) by underutilising their skills, is more probable for women. Thus a policy measure that targets the reduction of overeducation amongst immigrants should account for the factors that contribute to increased mismatch for women, and the female immigration experience in general. Similarly, chapter 5 finds that female immigrants seem to exert no effect on native female task

specialization, whereas the effect for men immigrants is rather high and significant. One reason for the former is that women tend to perform jobs which require less manual and more communication and interaction skills, thus immigrant women are a better substitute for native women than immigrant men are for native men. This essential difference should be considered in further research investigating the effects of immigration on any kind of native labour market outcome, as well as future policy measures.

Lastly, the analyses in the dissertation have shown that both immigrants and natives adjust their behaviour in response to external interventions. These adjustments, however, can be costly, both for individuals and for the economy as a whole. For instance, EU2 immigrants did adjust to the transitional arrangements by becoming self-employed. This however implied costs for immigrants, who were now deprived of the social benefits associated with salaried employment, and for the economy, as post-enlargement immigrants were older and less educated (figures 3 and 5 in chapter 2). New immigrants can also adjust by taking up a job for which they are overeducated, but this again implies costs both for the individual and society, as presented in chapter 4. Native workers adjust to supply shocks, as seen in chapter 5, but we know little about the costs these adjustment incurs.

It is critical to acknowledge that any type of analysis is bound to face methodological limitations. All evidence found on the effects of immigration policies, employment protection legislation, overeducation, as well as immigration itself, are bound to be dependent on the context and the time of the analysis, and the analyses in this dissertation are no exception. The European Union and the dual type of immigration within and towards it represent a very specific case, and the results might not translate beyond its borders. Nevertheless, the EU offers a rare

opportunity to study the effect of policies and policy changes over time and across countries in a longitudinal approach which is hardly possible in other contexts.

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Chapter 8 General conclusions

Profound socio-economic inequalities, aspirations, and persistent conflicts on the one hand (push), and labour market shortages coupled with an increasingly aging population on the other (pull), imply that immigration towards Europe is not likely to decrease in the near future. Even if that would be the case, and from tomorrow on all European Union Member States would halt immigration, they would still need to engage with the economic, social and political effects that the significant migrant inflows of the past several decades have triggered. Such engagement is essential if governments are to minimize the negative effects of immigration and effectively harness its positive effects. Good policy measures, however, must rely on sound and reliable facts, which is where the present study intends to contribute.

The dissertation focuses on a specific subset of such effects, namely, the interaction between immigration and the labour market. It investigates aspects of how immigrants themselves adjust to the local labour market conditions (chapters 2-4), as well as how the arrival of new immigrants affects native labour market outcomes (chapter 5). Although the analysis and overall argument of the dissertation are developed in four rather self-contained chapters, they should nevertheless be seen as different parts of a whole. By observing the immigration-labour market relationship from a variety of angles, the dissertation intends to provide a more holistic picture and fill in knowledge gaps that are currently plaguing both policy-making and research. The dissertation engages with theoretical arguments concerning the importance of host country policies and the way they impact immigrants' employment, and ultimately their productivity and contribution to economic development. Based on the distinctive theoretical aspects discussed in each chapter and the corresponding empirical analyses, the dissertation aims to contribute to

normative and policy debates about the effects of immigration on the one hand, and immigrant labour market integration on the other hand.

The latter is one of the major contributions of the study. Much of the literature of immigrant integration into the host labour market has focused on investigating whether there is a reduction of differences between immigrants and natives over time (Venturini 2017), with little investigation into immigrant behaviour and the strategies they themselves employ to overcome potential barriers into the labour market. By contrast, three of the chapters in this study (chapters 2-4) look precisely into this matter. For instance, while research generally looks at whether immigrants have a higher incidence of overeducation than the native population, chapter 4 in the dissertation goes one step further and explores one avenue that immigrants might employ to overcome this mismatch, namely self-employment. Similarly, while studies might identify employment protection legislation as a barrier to employment for (particularly recent) immigrants, chapter 3 advances this line of thought and investigates whether immigrants themselves circumvent this obstacle by becoming self-employed. This approach shifts the perspective on how immigrants are seen: from passive individuals merely reacting to external factors, to individuals who are proactively trying to overcome hurdles that might come their way, individuals with agency. From a policy perspective, this perception shift might add another layer of complexity to the already intricate matter that is immigrant integration, yet at the same time may constitute a step further to ensuring that the right mix policy measures is proposed, which in turn is successful in achieving their objectives. As an illustrative example, finding out that the likelihood of being overeducated decreases for self-employed immigrants might imply that the right mix of start-up incentives can not only promote business and job creation, but could also be an effective tool for minimizing mismatch.

The different levels of analysis that are employed throughout represent another significant value added of the dissertation. The various aspects of the relationship between immigration and the labour market are analysed at the regional, national and European level, which allows us to get a better grasp of the interaction between the various levels. For instance, in chapter 2, the finding that a lack of synchronicity of transitional arrangements during the 2004 European Union enlargement round led to a divergence of immigration flows from traditional destination countries like Germany and Austria, to Ireland and the UK instead (which did not implement restrictions), would not have been possible in a single country study.

Lastly, the dissertation significantly advances our understanding of the determinants of immigrant self-employment. Much of the existing literature has focused on immigrants' personal characteristics to explain the substantially higher shares of self-employment that they generally exhibit when compared with the native population, and not enough attention has been paid to external factors, such as policies and institutions. Three of the four substantive chapters (chapters 2-4) explore the role of self-employment as a strategy immigrants can employ in order to overcome or circumvent various (institutional) barriers they may encounter in the labour market. The fact that all three analyses seem to confirm the role of self-employment as strategy has far reaching policy implications. On the one hand, this might represent a red flag, indicating that more self-employment is not better, and might actually be detrimental to both immigrant integration and the economy at large, if it arises out of necessity and/or is a form of disguised employment. On the other hand, and as previously noted, the results of the three studies further reveal the intricate nature of labour markets and all the aspects that effective policy measures have to take into account. In this sense, each study contributes a piece to the great puzzle that is immigrant labour market integration.

The rather limited success of the policies implemented in destination countries to support immigrants' integration in the labour market and in society at large demonstrates the need for a better understanding of the type of labour market and integration policies necessary (Venturini 2017). This dissertation represents a step further towards this understanding.