

ALMA MATER STUDIORUM · UNIVERSITÀ DI BOLOGNA

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DOTTORATO DI RICERCA IN DIRITTO EUROPEO

Cv: DIRITTO ED ECONOMIA EUROPEA

CICLO: XXXII

Settore Concorsuale: 13A1

Settore Scientifico Disciplinare: SECS-P/01

## Essays on Migration and Institutional Change: Evidence from the UK

PRESENTATA DA: **Mariele Macaluso**

COORDINATORE:

**Prof.ssa Marina Timoteo**

SUPERVISORE:

**Prof. Riccardo Leoncini**

CO-SUPERVISORE:

**Prof. Gilberto Antonelli**

Esame finale anno 2020

## **Abstract**

This thesis is composed by three chapter. The first chapter is a survey of the literature on the selection and the economic impact of migration in the destination countries. The first part provides a review of the theoretical literature on the determinants and the selectivity of migration by focusing on how immigrants self select with respect to unobservable or observable characteristics. The second part presents the literature on the impact of immigration on the labor market outcomes of natives by taking into account the main theoretical models and discussing the challenges of the empirical evidences. Chapter 2 reviews the admission policies within the European Union (EU). In recent year, the EU has tried to harmonize the selection policies by promoting immigration of highly skilled people in order to compensate labor shortages in the face of a growing global competition. However, Member States appear to be reluctant to adopt common rules on admission of third country nationals. In recent years skill-selective immigration policies have been implemented in several developed countries. However, little evidence exists to date documenting their impact on the local labor markets. Chapter 3 aims to address this gap by focusing on a reform introduced in the UK in 2011 to re-orient economic migration towards skills that are the most in need of the economy. This analysis takes advantage of a 'natural' experiment in the UK by investigating how tightness in a selective policy affects the selectivity and the quality of immigrants and the effects on real shortages in the labor market. This challenge is possible under a difference-in-difference (DID) analysis and a triple-difference estimation, which estimates the impact of a policy interpreted as an exogenous shock made by the Government in the selection of people in the labor market.

## **Acknowledgment**

I am particularly grateful to my advisors, Prof. Antonelli and Prof. Leoncini, for their guidance in every step of this research. Their experience and their knowledge in the field are for me an exceptional source of inspiration and motivation. I thank Giovanni Guidetti for his valuable advices and insightful discussions throughout the project. I am very grateful to Giuseppe Pignataro for his invaluable guidance in the empirical research, and to Simona Fiore for the "econometric" support. I wish to thank Prof. Borraccetti for his advices in the "legal" part. Many thanks to Giulio Pedrini and Luca Cattani who shared with me comments and suggestions. I'd like to share my gratitude to Prof. Hillel Rapoport and Biagio Speciale for their mentoring and for making me feel comfortable during my stay at the Paris School of Economics. I thank to Gianluca Orefice, Zovanga Kone, Madeleine Sumption, Carlos Vargas-Silva, for the useful comments. I also wish to thank the numerous researchers and friends that I had the pleasure to meet during my PhD visiting periods and courses. All my gratitude to my mother and my brother, Marco, my friends, my hometown. All remaining mistakes are my own.

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# INTRODUCTION

*International migrations considered as a structure of global inequality that involves persons when migrate, but also when persons might migrate or have migrants in their household (Weiß, 2018).*

Millions of international migrants move each year across the world, seeking to reduce the gap between their own position and that of people in other, wealthier places in terms of wages, labor market opportunities, or lifestyles. Economic literature shows that immigration rate depends on international differences in the returns to factor supply, net of migration costs, skill levels, income inequality, and immigration policies. International migration of high-skilled individuals has risen dramatically in recent decades due to the rise in the demand for tertiary education. Between 2000/01 and 2015/16, the share of migrants with a high level of education rose from 27% to 35% for those born outside of the OECD, and from 21% to 30% for those born in an OECD country (OECD, 2019). Typically, migrants are perceived as 'highly skilled' when they have at least tertiary education, although other definitions are possible, notably on the basis of the nature of the occupation in which they are employed. The economic literature usually defines 'highly skilled migrants' on the basis of wages paid, consisting of persons earning above a threshold value (Chaloff and Lemaitre, 2009). Labor migration policies differer in the ways in which they try to attract workers. In particular, countries use two main ways of recruiting highly skilled workers from

abroad. One is supply-led systems, like points-based systems, which aim to increase the skill composition of international labor flows by selecting them on the basis of certain characteristics, like for instance age, educational attainment, language proficiency and occupation. A number of countries have labor immigration policies for admitting highly skilled migrant workers that are, in part, based on a human capital model. Instead, demand-driven systems are usually based on the principle of job contingency and are often supplemented by a labor market test or on shortage lists assessments of labor market needs. The argument that there is a ‘need’ for migrants’ skills is related to the aim of using migrant workers to reduce perceived specific labor and/or skills shortages. Most OECD countries are experiencing a growing shortage of highly-skilled labor and immigration is viewed as one way of addressing these. For this reason, most OECD countries have introduced policies aimed at facilitating the recruitment of such workers. Shortages and skills are hard to define and measure concepts. The European Commission (2004) states that *labor shortages occur where the demand for workers in a particular occupation exceeds the supply of workers who are qualified, available, and willing to do that job* (Boswell, Stiller, and Straubhaar, 2004). While, the common definition of shortage typically includes employers’ difficulties in finding workers to fill vacancies at current wage and employment conditions. In this respect, employers’ calls for migrants to help fill vacancies is that the demand for labor exceeds supply at the prevailing wages and employment conditions. According to the literature on labor economics, market economies include self-clearing mechanisms, such as the changes in wages and prices to bring supply and demand into equilibrium. If the request for labor exceeds the supply, as the term ‘shortage’ suggests, wages should rise, putting in motion forces that reduce the demand for labor via automation, job restructuring, or other adjustments, and increase the supply of workers (Ruhs and Anderson, 2010).

This thesis begins with a survey of the economic literature on immigration by looking at immigrants selection and socio-economic performance in the host labor markets. The first part of Chapter 1 examines why people become immigrants and whether immigrants are positively or negatively selected relative to the receiving country population. Migration theories focus on how income and wage levels and, to a lesser extent, income inequalities affect migration flows. In the models on migration decision, people's decision to migrate depends on their income in the origin and in the destination countries. One of the canonical assumptions of the neoclassical model is that people are utility maximizers. This means that people move if their income will be higher in the destination country, net of migration costs. Economists use the "utility-or income maximization model" at micro level and the "gravity model" at macro level to estimate the determinants of immigration by using micro-data in the first case and aggregate data in the second case. The literature that uses the individual-level data observes an individual in just one among the possible locations by using predicted incomes as determinants of the internal migration decision. At the macro-level, theory explains migration by geographical differences in the supply and demand for labor. Recent contributions make use of the Random Utility Maximisation (RUM) framework to model the individual migration decision by using bilateral data for the analysis of international migration. In this model, individuals base their decision to migrate in order to maximize their utility across all potential destinations. In economic models of the migration decision, cross-country differences in economic conditions play a central role in determine whether people move, predicting that changes in relative economic conditions lead to changes in migration flows. In this respect, the Hicks-Sjaastad model emphasizes the fact that mean income levels differ across regions, and these income differentials, net of migration costs, lead to unidirectional migration flows. Sjaastad (1962) pioneered the application of human capital

theory in order to understand migration. According to the human capital model, migration is the act of maximize utility by choosing the destination that offers the highest return to the skill. The most influential model on skill selection in immigration was elaborated by George (Borjas, 1987) based on a canonical model by Roy (1951). His application (1987, 1991), shows that international migration is not only influenced by net earnings differences between countries, but also by factors such as international differences in income inequality and the degree of skills transferability. According to this model, less-skilled people are better off in countries with a lower return to skill and less income inequality while more-skilled people are better off in countries with a higher return to skill and more income inequality. Although this framework has become a canonical model of selection in the literature on migration economics, the evidence of the existing cross-country studies is mixed. Assessing the overall net gain or loss to the economy from immigration is a challenging task both from a theoretical and an empirical point of view. The study of how immigration affects labor market in the destination countries is central in the economics of migration. The impact of immigrants on the destination economy is hotly debated among academics, especially concerning the impact of low-skilled immigrants on wages. Most recently, this debated has focused on the effect of an unexpected surge in Cuban migrants (so-called *Maríel boatlift*) to Miami in 1980. In 1980, Cuba's President, Fidel Castro, temporarily allowed people to leave to the US. This migration flow increased Miami labor force by 7%, and the labor supply to less-skilled occupations by even more, because most of the immigrants were mostly unskilled. In 1990, Card in the seminal work exploiting an exogenous supply shock concluded that the *Maríel* influx had virtually no effect on the wages or unemployment rates of less-skilled workers. However, in a revisited analysis, Borjas (2015) found that the increase in the number of the potential workers lowered the wages on high-school dropouts, namely of those

workers who faced the most competition from the new immigrants. Nevertheless, the debate is much broader (see Angrist and Krueger, 1999; Ottaviano and Peri, 2012; Borjas, 2015; Peri and Yasenov, 2015, for a reassessment of Card's (1990) "Mariel boatlift" article). Most researches find that immigrants have negative effects at least on some workers, as the economic theory typically predicts when immigration change the balance of skill in the destination countries. These contrasting findings depend mostly on two factors. The first concerns the definition of skilled/unskilled workers. Some researchers consider both high-school and dropouts together (see Card, 1990). While, Borjas's paper measured wages of two slices of that larger group, namely: (i) people who never finished high school, and (ii) people who finished high school but went no further. The second factor concerns whether migrants and natives are substitutes or complements for each other (see Ottaviano and Peri, 2012). If immigrants are substitutable for natives, foreign-born workers can replace native-born workers. In this case, employment of natives fall, and wages fall. If immigrants and natives are complements in production, an increase in the number of immigrants could increase natives' employment and wages. In this case, immigration can benefit natives who are complements to immigrants in the production process. The second part of the Chapter 1 provides a comprehensive overview of both economic theory and empirical evidence on the socio-economic impact of migration. Using the neoclassical model, this part focuses first on theoretical prediction and key assumptions in labor demand and supply that determines whether immigrants have a positive or a negative effects in the destination countries. Basic neoclassical model predicts that immigration have a negative effect on substitutable native workers, because it put downward pressure on wage and employment in the short run. Instead, immigration improves labor market outcomes for native-born who are complements to immigrants. However, the effect of immigration on labor market outcomes is more complex and theoretical models

often predict different results under different assumptions. Last part of the chapter explores the question on how immigration affects natives' wages and employment through the main methodologies that economists use to estimate the labor market effects of immigrations, namely: spatial correlation, natural experiments, skill cells and factor proportion models. These studies reach different empirical evidence on the wage effect of the native-born workers. Typically, analysis bases on the spatial correlation and natural experiments approaches tend to find smaller, if any, negative effects on labor market outcomes of native workers. Instead, studies that use the skill cells or factor proportion models usually find more evidence of adverse effects, although with some exceptions.

As the skill content of migration could change the degree of substitutability/complementarities with natives, it is a crucial point in determining the effect of immigration on income in destination countries. This is probably the reason why governments are recently looking at skill selective immigration policy setting. In fact, because the labor-market quality is of increasing concern to the governments of developed countries, it is important to know the determinants of the educational selectivity of immigration. The regulation of labor immigration is one of the most controversial public policy issues in high-income countries. European countries have been confronted for many years to the task of balancing the need for a qualified young labor force and the fear that large inflows of workers may create unemployment, lower wages and generally increase the competition for natives. Furthermore, as global migration has increased, so even the public concern about immigration. One of the roots of this fear consists of the speed at which immigration has grown, causing insecurities about social and cultural change. One of the main concerns regards the potential assimilation and integration process in societies and in their labor markets. For this reason, several member states have developed their legal framework in the attempt

to move from a situation of endured immigration towards a system of selective immigration. In fact, in Europe, both EU-wide and nation-wide legislations influence the entry and residence conditions for migrants (Burmam, Perez, Hoffmann, Rhode, and Schworm, 2018). While these measures are widely discussed in the policy arena, there is still a lack of rigorous evidence on their effectiveness. Chapter 2 aims to review the regulation at the EU level concerned the development of skill-selective policy. The immigration policies at the EU level have been traditionally characterized by a dualism. While internal labor mobility is subjected to the EU jurisdiction as it has one the main principle of the EU common market, the immigration from third-countries is a matter of each Member State policies. The EU has tried to harmonize migration policy, by promoting the immigration of highly skilled people in order to compensate the labor shortages in the face of a growing global competition. For this reason, the EU has undertaken several initiative in order to compensate the labor shortages in the face of a growing global competition and of a race to attract talents. One of the most influential was the so-called “EU Blue Card Initiative” introduced in 2009, with the aim to offset skill shortages and to address the problem of demographic aging. The EU Blue Card is an EU-wide work permit for highly qualified employment, aimed at making EU a desirable destination for skilled workers from third countries. The EU Blue Card was implemented by 25 EU member states, apart from Denmark, Ireland and the United Kingdom. It is designed to be demand-oriented, such that immigration follows the needs of the labor market. Restrictive admission conditions and the existence of parallel rules, conditions and procedures at national level have limited the use of the EU Blue Card scheme. Recently, the EU has made several efforts to create a more favorable framework for workers mobility, including negotiations for the revision of the EU Blue Card Directive. Although the competencies of the EU in the area of immigration policies have increased, the decisions on the actual selectivity of



immigration continue to be a domain of national governments. During the last years, a policy shift has occurred both at EU level and at that of its Member States. At the EU level, several action plans are attempts to attract highly skilled immigrants and to facilitate the mobility of third-country nationals once they have been admitted to an EU Member State. Nevertheless, the scope of these efforts is limited, because the immigration policies continue to remain by and large in the national domain. Moreover, in a climate of increased global competition, most countries have adopted measures aimed at attracting highly skilled individuals. The last part of the chapter looks at the development of selective-policies in the UK and in Germany. These policy initiatives raise some fundamental policy and economic questions. A central question in labor immigration policy is how to link the admission of new migrant workers to the 'needs' of the domestic labor market and the economy more generally.

Skill-selective migration policy is the target of the empirical analysis of this thesis. Currently, the traditional way of regulating labor migration in the UK is to require employers to sponsor workers if they want to hire a non-EU citizen. The Government's idea to link migration policies more explicitly to the UK's skills needs to prompt it to carry out a fundamental rethink of the rules around the selection of immigrants. In 2008, this idea led the UK to adopt a Points Based System for managing migration, with Tier 2 as the main route for selecting skilled non-EEA nationals into the country for work. The objective of the Labour government was to prioritize the selection of the most highly skilled and best-paid migrants through the PBS. Instead, the New coalition government came in power in 2010 based its immigration policies around the reduction of the net immigration "from the hundreds of thousands to the tens of thousands" (Conservative Party, 2010). The new system identified those migrants which the UK needs, ensuring they have the necessary English-language ability and can support themselves when they first arrived. In this way, the UK government gave

more emphasis on the concepts of 'skill needs' and 'skill shortages'. Since April 2011, in fact, the UK Government has developed an educational selectivity system, which looks at the labor-market quality of immigrants. In this respect, the government uses immigration as a tool to address labor shortages, through the shortage occupation list, which identifies occupations where there is an understanding both that a shortage exists and that this shortage should be addressed through labor immigration. Third chapter tests whether the policy was successful in meeting its declared goals, and has checked if this mechanism is working on the basis of this professional priority. This challenge is possible under a difference-in-difference (DID) analysis and a triple-difference estimation, which in this case estimates the impact of a policy interpreted as an exogenous shock made by the Government in the selection of people in the labor market. Such institutional changes have influenced access to some categories of works (treated) and not others (control) by observing both groups before and after the event of interest. The first causal identification regards the effect of a policy change on the average wages for the period between 2009 and 2013. Moreover, the second part of the analysis exploits the effect of Brexit Referendum in the UK labor market by considering the same occupational categories. Although Brexit has not still happened, the referendum can be already considered as a natural experiment. However, this analysis would find an "identifying" effect to test if the result of the referendum has already had an impact on the UK labor market. The contribution of this analysis mostly relies on a source of data that allows to exploit variations in high-skilled and especially in labor shortages at the occupation level conditioned on information on CoS granted as well as on minimum salary thresholds. To the best of my knowledge, this analysis represents the first exercise that exploits the exogenous reform in 2011 intending to understand the impact of an institutional change at a national level. In this setting, this implies to quantify how a policy change in the VISA

selection affects the group of shortage occupations compared with the differences in the other Tier 2 occupations before and after the 2011 Reform.

# Chapter 1

## IMPACT OF IMMIGRATION IN ECONOMIC THEORY

## **Abstract**

Destination countries are concerned about the composition and scale of migration flows as they contribute to shape both the overall economic impact of immigration and its distributional consequences. Immigration literature has broadly discussed about the mechanisms involved in immigrant selection. The debate has been fueled by concerns about the characteristics and the socio-economic performance of immigrants in the local labor markets. The general finding is that if the skills of immigrants are higher, then their earnings and employment probabilities are higher, and therefore their net fiscal contribution is more positive. This chapter aims to survey the literature on the impact of migration in the destination countries. An account of what economic theory would predict when immigration occurs is provided by explaining the selection models of immigration that look at immigrants' characteristics. The key questions on migration concerns its benefits and costs for the receiving economies. Fears that migration may, at least in the short run, have adverse effects on labor market opportunities of the resident working population are a main reason for opposition to more liberal migration policies. Research mostly focuses on the labor market effect of immigration and the main conclusion is that immigration has no effect or at least a small negative effect. The second part of this chapter reviews both the theoretical models and the empirical findings that focus on the mechanisms by which immigration may affect labor market outcomes of the native resident work force in the destination countries.

## **1.1 Introduction**

The theoretical and the empirical study of immigration has a long history in economic theory. Starting from the writings of Smith (1776) and the income-maximizing mod-

els provided by Hicks (1932) and Sjaastad (1962), early empirical research focused on explaining the size and the direction of migration flows, as well as on determining why certain groups of individuals are more likely to migrate than others. Then, later works have emphasized the role of the family in migration decisions, the role of consumption and various non economic factors. However, the fundamental premise of most studies is that migration is driven by spatial differences in the net returns to factor supply and it is a response to labor market disequilibrium (Bodvarsson, Simpson, and Sparber, 2015). An important step in the development of migration theory stemmed from Sjaastad (1962) who articulated a theory of migration as a form of human capital investment. Sjaastad's theory has become the suitable model for explaining both internal and international migration. The most influential analysis in this respect was provided by Borjas (1987, 1991, 1999, 2014), which embedding the Hicks-Sjaastad income-maximizing approach within the Roy's self-selection model providing some important new insights. In fact, Borjas (1987) applied the Sjaastad's model to argue that migration is not only influenced by net earning differences between countries, but also by factors like international differences in income inequality and the degree of skills transferability. Starting from Borjas (1987), there has been a great deal of interest in models that predict how migrants differ from non-migrants. Many of these studies rely on applications of the Roy model of occupational self-selection. In this respect, since the skills are sufficiently transferable across countries, the sorting of people is mainly determined by international differences in the rate of return to skills (Poutvaara, Borjas, and Kauppinen, 2015). Most of the literature on the impact of international migration on destination countries usually assumes that migration is exogenous, such as the flow of migrants across regions is fixed. However, more recently, some models are considering migration as endogenous in order to fully account for both the determinants and the consequences of migration. In this way,

some theoretical models are incorporating the decisions to migrate, the duration of migration and the return migration as well as factors like the role of migration costs, immigration policy, income inequality, network and family ties, political institution and trade (Bodvarsson, Simpson, and Sparber, 2015). The question of why people migrate has been central to migration research for many decades. The complexity of the phenomenon has been approached through different analytical approaches, providing evidence both at micro-level by exploring the migration decision-making by individuals and at macro level by analyzing the drivers of international migration flows between countries. The first part of this chapter provides a review of the theoretical literature on the determinants and the selectivity of migration. In particular, it deals with the literature that has tried to answer to “why people migrate” and “who immigrates”. It takes into consideration the theoretical literature on the economic determinants of international migration which stemmed from the much older theory of internal migration. The standard models imply that immigration rate depends on the international differences in the returns to factor supply, net of migration costs, skill levels, income inequality, and immigration policies. In particular, considering the cross-country differences in economic conditions, utility-or-income maximization model at micro level and the gravity model at macro level predict that changes in relative economic conditions lead to changes in migration flows determining whether people move. The economic incentives that influence immigration can be grouped in four categories: (i) negative incentives that push people to emigrate, (ii) positive incentives that pull immigrants to the destination country, (iii) positive incentives that induce people to stay at home, and (iv) negative incentives that cause people to stay away from a foreign country. If the factors related to the stay and stay away are stronger than the push and the pull factors, immigration is unlikely to occur on a large scale. On the contrary, when the push and pull factors are stronger than the

stay and stay away factors, immigration will increase (Van den Berg and Bodvarsson, 2009). In addition, this review takes into account the recent theoretical and empirical works that examine how immigrants self select with respect to unobservable or observable characteristics, focusing on how changes in relative economic conditions affect the composition and the characteristics of immigrants. A central finding in the economic literature on international migration is that immigrants are not randomly selected from the population of origin country and the nature of non-random selection affects the level and the distribution of welfare through the wage structure in both sending and receiving countries (Borjas, 2003). Specifically, the chapter examines how immigrants self-select in response to international differences in returns to skill and education, taking into account the Roy model elaborated by Borjas (1987, 1991, 1999, 2014) and the following extensions and alternative models.

The second part of the chapter is devoted to show the impact of immigration on labor markets. For a long time, economic research has focused on the labor market effect of immigration (see e.g. Card, 1990; Card and Lemieux, 2001; Card, 2005; Dustmann, Fabbri, and Preston, 2005; Aydemir and Borjas, 2007). Traditionally, economists considered the labor market as the main channel through which immigration affects the economy in the destination countries.

There is not a single right answer regarding the labor market effects of immigration on natives in the destination. The main conclusion of this stream of literature tend to find small effects of immigration on wages and employment in the destination countries. Although many studies find that immigration does not appear to have had negative labor market effects on natives the destination, some studies do find evidence that certain groups have seen their wages fall because of immigration. A number of different approaches have been taken in an attempt to overcome this challenge. They all generally rely on dividing up the labor market into segments. This segmentation



allows for the exploitation of differences in the extent of immigration within different parts of the labor market, controlling for a range of additional factors. Studies that use the spatial correlation and natural experiments approaches tend to find smaller, if any, negative effects on wages and employment of native-born workers. Studies that use the skill cells approach or factor proportions models tend to find more evidence of detrimental effects, although there are exceptions. The labor market effects of immigration thus remain open to debate. This ambiguity seems to be due to two main arguments that we will analyse in what follows: (i) immigrants and home-born individuals may be more or less substitute; (ii) empirical approaches present some problems to solve.

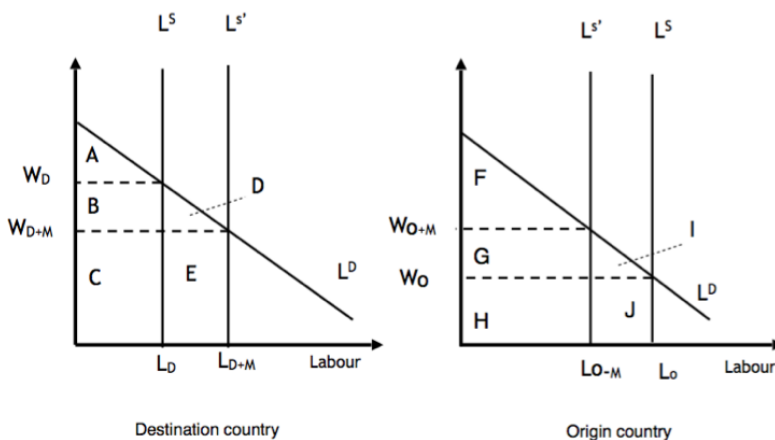
## 1.2 Basic Models of Immigration and the Development of the Migration Theory

The simplest models on migration were originally developed by Hicks (1932); Lewis (1954); Sjaastad (1962); Harris and Todaro (1970) in order to explain migration in the process of economic development. The basic model used to analyze the economic effects of immigration considers the immigrants as workers. This model is focused on the wage differences across countries that motivate people to migrate. It highlights that migration is driven by geographic differences in labor supply and demand and the resulting from actual wage differentials across countries (Kurekova, 2011). Under the assumption of full employment, it predicts a linear relationship between wage differentials and migration flows (Bauer and Zimmermann, 1998; Massey, 1993; Borjas, 2008).

Fig. 1.1 shows the labor markets both in the destination and in the origin countries before and after immigration. Before immigration, under the pre-immigration labor

market equilibrium,  $L_D$  workers are employed at  $W_D$  in the destination that represents the country with the higher wages. On the contrary, in the origin, such as the country with lower wages,  $L_o$  workers are employed at wage  $W_o$ . When immigration occurs,  $L_D + M$  workers result to be employed at wage  $W_D + M$  in the destination country, while  $L_o - M$  workers are employed at wage  $W_o - M$  in the origin country, generating a new equilibrium.

Figure 1.1: Basic Model of Immigration



The basic model predicts that immigration leads to an increase in the number of workers in the destination country and to a decrease in the number of workers in the origin country. This implies a fall of wage in the destination and a rise of wage in the origin country. As Fig.1.1 shows, the downward-sloping labor demand curves means that there is a demand for labor in each country based on the value of workers' output (Bansak, Simpson, and Zavodny, 2015). The supply of labor in this model is assumed to be perfectly inelastic and it does not depend on the wages. Other important assumptions of the model involve that: (i) immigrants are perfect substitutes for natives; (ii) workers are homogeneous; (iii) the amount of capital in each country is fixed; (iv) markets are perfectly competitive. Furthermore, this baseline model takes

into account the difference between the short run and the long run impact. These assumptions on labor demand and supply influence the different effects on natives' wages and employment, suffering some potential limitations. In particular, immigration is not random and may be correlated with positive labor demand shock both at the country level and across local labor market within countries. In addition, there is not only one type of labor, but there are different types of workers who have different skill levels (see for instance Card, Dustmann, and Preston, 2012). The assumption that immigrants and natives are perfect substitutes in production is criticized because immigrants and natives can be complements or substitutes in the production process<sup>1</sup>, as it will be showed in the second part of the chapter. Furthermore, immigrants can bring or attract capital, increasing the marginal productivity of labor in the receiving country, and changing the demand for labor (Bansak, Simpson, and Zavodny, 2015). Finally, the model assumes that immigrants can easily and without costs move from one country to another. This assumption can be relaxed as showed in the Appendix (Fig.A.2).

### 1.2.1 The Decision to Migrate: Push and Pull Factor

Migration is a global phenomenon caused by a number of reasons. Many factors contribute to the decision to migrate. These reasons may fall under economic factors, but also under socio-political, cultural, environmental, health and education factors. In this respect, migrants can be “pushed” out of their home countries or migrants are

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<sup>1</sup>The effect of immigration on natives' labor market outcomes depends critically on how much substitutable or complementary immigrants and natives are in the labor market. If immigrants are substitutable for natives, foreign-born workers can replace native-born workers (employment of natives fall, and wages fall. However, total employment of natives plus immigrants may not change indeed, it is likely to increase since wages are lower). If immigrants and natives are complement in production, an increase in the number of immigrants could actually increase natives' employment and wages. In this case, immigration can benefit natives who are complements to immigrants in the production process.

often “pulled” into destinations that offer high wages, good health care, and strong educational systems<sup>2</sup> (Simpson, 2017). Push factors are those that force the individual to move voluntarily, and in many cases, they are forced because the individual risk something if they stay. Push factors may include economic and non-economic factors. Most people migrate for economic reasons. Economic literature on the decision to migrate, focuses on the role of economic push and pull factors that influence whether people become immigrants. Economic push factors that lead people to become immigrants can include poor economic activity, poverty/low wages, high taxes, high unemployment, overpopulation and lack of job opportunities. However, labor market conditions and economic growth are considered the most relevant economic push factors in the analysis of work-based migration. Non-economic push factors include political and social factors<sup>3</sup>. Some of these could combine with economic factors influencing the decision to become immigrants. Pull factors are those factors in the destination country that attract the individuals or groups to leave their home. Economic pull factors include demand for labor, high wages, generous welfare benefits, good healthcare and education systems, strong economic growth, technology, low cost of living. While, non-economic pull factors can include: (i) family and friends/networks; (ii) rights and freedoms; (iii) property rights; (iv) law and order; (v) amenities (Simpson, 2017). Immigrants move for seeking to reduce the gap between their own position and that of people in other, wealthier, places in terms of wages, labor market opportunities, or lifestyles. In making their decision, individuals compare the net benefits of migration to the costs. A comprehensive assessment of the cost and benefit of migration is complex. Although there has been remarkable

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<sup>2</sup>A push factor induces people to move out of their present location, whereas a pull factor induces people to move into a new location.

<sup>3</sup>Non-economic push factors include: race and discriminating cultures, poor health care, corruption, crime, compulsory military service, natural disaster, famine, political intolerance and persecution of people who question the status quo.

progress over the last decades, the academic literature has not yet fully explored all channels by which migration can induce costs and benefits. First, the complexity and ever-changing features of migrations: modern technologies, decreasing costs of travel, global product competition, and internationalization of education, among others, have had a dramatic impact on the way migrations are conducted today. Consequently, the changing patterns of migration require a new thinking both on conceptual level, as well as on the level of empirical implementation. A second consideration is the fact that the way migration affects receiving and sending economies is complex and can change over time. The empirical research on the cost and benefit of migrations is related to the surplus migration, which generates through efficiency gains (see Dustmann, Frattini, and Preston, 2008). Costs play a role in determining the size and composition of immigrant flows. Migration costs may include: (i) explicit costs, such as travel costs and visa fees associated with a move; (ii) implicit costs, such as psychic costs or cultural adjustments that people experience when they move away from their family and friends; and (iii) associated costs, e.g. learning a new language and searching for a new job (Bansak, Simpson, and Zavodny, 2015). Instead, the net benefits to migration include the increase in income (or “utility”) gained by migration, or the difference between country where migrants are moving from (origin country) and destination country (where migrants are moving to) income (Simpson, 2017). Despite these shortcomings, the standard economic models that are used to analyze migratory phenomena are helpful to systemise the thinking about the costs and benefits migrations bring to the receiving country, and go a long way to structure and support empirical analysis (Dustmann, Frattini, and Halls, 2010).

### 1.2.1.1 Utility Function and Income Maximization Model

Seeking economic opportunities can be understood as a strategy of income maximization. Actual and expected wage differentials and differences in standards of living between communities of origin and destination are consistently considered as significant factors in shaping both internal and international human mobility (Lanau, 2019). In fact, nearly every economic model of migration incorporates income differentials and finds them to be an important factor when trying to explain migrant flows in a given period. Income can serve as a “push” factor: low income levels can push migrants out of their home country. Conversely, high income levels can serve to “pull” migrants into a specific country or region (Simpson, 2017). Studies of the determinants of migration commonly have been formulated in the context of individual utility maximization. These studies (Zipf, 1946; Jerome, 1926; Rubin and Kuznets, 1954; Sjaastad, 1962; Harris and Todaro, 1970; Piore, 1979; Clemens, 2011) have considered migration as driven by the desire to maximize one’s return to human capital investment. These analysis have highlighted that people respond to spatial differences in labor market opportunities by migrating if those opportunities dominate the costs of relocation (Bodvarsson, Simpson, and Sparber, 2015). In particular, individuals migrate when their Utility (U), depending on their income in the destination country, net of migration costs, is higher than the income obtained in the country of origin. According to this model, people decide to migrate if:

$$U(\text{Income in Destination} - \text{Migration Costs}) > U(\text{Income in Origin}) \quad (1.1)$$

Specifically, the “Utility of Income” or “Maximization Model” studies at the micro-economic level whether a person can benefit from migrating. In this model, people move if:

$$\sum_{t=1}^T = \frac{\widehat{Wage}_t * \widehat{ProbEmp}_t - \widehat{CostLiving}_t}{(1 - \delta)^t} - MigrationCost >$$

$$\sum_{t=1}^T = \frac{Wage_t * ProbEmp_t - CostLiving_t}{(1 - \delta)^t}$$
(1.2)

where  $t$  is the time horizon, which indicates that migration can occur only for a certain period; the term  $\delta$  is the discount rate since the model assumes that migration costs are a one-time cost paid when a person migrates. In this case, the terms on the left-hand side represent the destination country, while the terms on the right-hand side indicate the origin country, where  $Wage$  indicates earnings among people who are employed;  $ProbEmp$  is the probability to be employed; and  $CostLiving$  represents the cost of living. This model is mostly applied to economic migrants and predicts that people will be more likely to migrate as the wage in the destination country increases and as the probability of finding a job in the destination country increases. Instead, an increase in immigration costs makes it less likely a person to migrate.

### 1.2.1.2 The Gravity Model and the Random Utility Model (RUM) of Migration

In the “Gravity Model of Migration”, Zipf (1946) analyzes at the macro-economic level how changes in relative economic condition lead a proportion of a country’s population to become immigrants. By using aggregate data, the "gravity type" models suppose that migration is to be directly related to the size of origin and destination populations, and inversely related to distance. Based on Isaac Newton’s law of gravity<sup>4</sup>, according to this model, the volume of migration between two countries is

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<sup>4</sup>The gravity model of migration is based on the Isaac Newton’s law of gravity, which is used to predict the level of interaction between two bodies. In particular, the intuition behind this model is that since largest places attract people, ideas and goods more than smaller places, and more proximate places have a greater attraction, there should be more migration between two places that are more populated and/or more proximate (Bodvarsson, Simpson, and Sparber, 2015).

equal to a constant time the product of those countries' population, and inversely proportional to the distance between them:

$$Immigration = c * \frac{Population(Origin) * Population(Destination)}{Distance(Origin/Destination) \frac{Income(Destination)}{Income(Origin)}} \quad (1.3)$$

These studies show that migration diminishes rapidly with increased distance and that migration is greater between more populous regions. In this respect, migration did not always appear to be from low to high wage regions nor from those with high unemployment rates to those with low rates (Davies, Greenwood, and Li, 2001). This model implies some important economic implications. In fact, (i) it considers the distance as a proxy for the migration costs; (ii) it predicts that the volume of migration will be higher for origin and destination countries with large population; and (iii) including the product of the origin and destination population, the marginal effect of a change in the origin population on migration will depend on the size of the destination population and vice versa (Bodvarsson, Simpson, and Sparber, 2015). In order to go beyond the limitations of the original gravity model, an "augmented gravity model" has been implemented taking into account the literature on international trade<sup>5</sup>. RUM models stem from the income maximization framework developed by Roy (1951), and on discrete choice models elaborated by McFadden (1974, 1984). They have been introduced in the economics of migration by Borjas (1987, 1999) to study the determinants of migration flows. This model is typical of multivariate quantitative studies and is based on datasets covering as much of a global dimension as possible, comparative dimensions, or the different levels where decisions to

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<sup>5</sup>The "augmented gravity model" aims to mitigate the omitted variable bias stemmed from the original gravity model by introducing other variables.



migrate were made (see Bertoli and Docquier, 2016; Bodvarsson and Van den Berg, 2013; Clark, Hatton, and Williamson, 2007; Hatton and Williamson, 2005; Mayda, 2010). The canonical Random Utility Model (RUM) model of migration compute the utility of an individual  $i$  who was located in country  $j$  at time  $t - 1$  decides to move to a country  $k$  belonging to the choice set  $D$  at time  $t$  as follows:

$$U_{ijkt} = w_{jkt} - c_{jkt} + \epsilon_{ijkt} \quad (1.4)$$

where  $w_{jkt}$  represents a deterministic component of utility that can be modeled as a function of observed variables,  $c_{jkt}$  represents the time-specific cost of moving from  $j$  to  $k$ , and  $\epsilon_{ijkt}$  is an individual-specific stochastic component of utility. The distributional assumptions on the stochastic term in (1.4) determine the expected probability that opting for country  $k$  represents the utility-maximizing choice of individual  $i$  (Beine, Docquier, and Rapoport, 2008).  $\epsilon_{ijkt}$  is assumed to be an independent and identically distributed Extreme Value Type-1 distribution (McFadden, 1974). Most empirical models of international migration have specified regression models based on the gravity model. However, the use of the gravity models by international trade economists has revealed some potential sources of bias in the estimation results (see Lewer and Van den Berg, 2007). Despite the same basic structure, there are nevertheless many differences in the empirical models that researchers have used to estimate the determinants of international migration. Some of these differences potentially influence the differences in the empirical results that the models generated (Bodvarsson and Van den Berg, 2013).

### 1.2.1.3 The Human Capital Model of Migration

Migration as human capital investment is central in most current economic theories of migration. The development of the human capital investment model have started

since the 1960s and it was linked to the study of internal migration<sup>6</sup> (Van den Berg and Bodvarsson, 2009). Models that consider migration as a human capital investment highlight that migrants are expected to maximize their utility by choosing the location that offers the highest net return to human capital. In other words, these models at micro-level stress on the spatial differences in labor supply that lead people to maximize their utility through the maximization of their income<sup>7</sup>. This view of migration stemmed from Becker (1962), which hypothesized that people invest in their skills in order to maximize the net present value of their future earnings. In this respect, Sjaastad (1962) introduced human capital theory in the migration framework. According to his view, a migrant calculates the value of the opportunity at each alternative destination relative to the origin country, net of migration costs, and chooses the destination that maximizes the highest return. The innovative feature of this approach is related to the central role gained by personal characteristics in the evaluation of future earnings and costs following the decision to migrate (Cattaneo, 2007). This framework, in fact, is based on the neoclassical model (Fig.1.1), where migration is considered as an irreversible decision responding to differences in wages across labor markets in different geographic locations. As in the Gravity Model of migration, Sjaastad (1962) uses the distance as a proxy for migration costs pointing out that the greater is distance, the greater are the monetary costs of migration (Bodvarsson, Simpson, and Sparber, 2015). Therefore, the costs are assumed to be proportional to migration distance. An attempt to formalize Sjaastad's idea mathematically has been provided by Van den Berg and Bodvarsson (2009). Specifically, taking into account a discrete time, if a person lives  $T$  years, the present value of the

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<sup>6</sup>Before the late 1950s, theory of internal migration was closely linked to the location models from regional economics and economic geography.

<sup>7</sup>These models ignore the fact that people migrate for other reasons rather than income maximization, like for instance. family reunification, refugee flows or political asylum, etc. In fact, those reasons are not compatible with a simple assumption of income maximization (Van den Berg and Bodvarsson, 2009; Bodvarsson, Simpson, and Sparber, 2015).

net gain to migration ( $\pi$ ) is given by:

$$\pi = \sum_{t=1}^T \frac{(W_t^M - W_t^H)}{(1+i)^t} - \sum_{t=1}^T \frac{(CL_t^M - CL_t^H)}{(1+i)^t} - C(D, X) \quad (1.5)$$

where  $W_t^H$  denotes the earnings per period at home;  $W_t^M$  are the earnings per period if a person migrates to another market;  $CL_t^H$  is an index measuring the cost of living in the origin country;  $CL_t^M$  is an index measuring the cost of living in the destination country;  $i$  is the discount rate;  $C$  represents the cost of migration;  $D$  is distance between origin and destination;  $X$  is a vector of any other determinants of migration costs.

Taking into account a continuous time, the present value  $\pi$  is given by:

$$\pi = \int_{t=1}^T [W_t^M - W_t^H - CL_t^M + CL_t^H] - e^{-rt} dt - C(D, X) \quad (1.6)$$

According to this framework, people move if:  $\pi > 0$ . Although Sjaastad' model has influenced the following studies on migration economics, it presents some limitations that can be summarized as: (i) it is a single period model and it does not consider why some people migrate on multiple occasions during their lifetimes; (ii) it takes into consideration the individual as the unit of analysis in the migration decision; (iii) it assumes push and pull factors to be symmetrical not considering the differential effects; (iv), it assumes that migrants are perfectly informed while it does not consider the uncertainty in the migration decision; (v) it ignores remittances, exchange rates and financial sector innovation (see Van den Berg and Bodvarsson, 2009). In the attempt to improve this framework, most alternative models of migration are developed as extensions of Sjaastad's work starting from the labor supply view of migration in which an individual moves in order to improve the rate of the

return in human capital, net of migration costs<sup>8</sup>.

## 1.3 Selection and Assimilation in Immigration

### 1.3.1 Skill selection in Immigration

The development of theoretical models in economic theory of migration has continued through the centrality of human capital investment in the migration process. In particular, some models consider migration as a static decision determined by exogenous wages that vary across different levels of human capital (see Belot and Hatton, 2008; Borjas, 1987, 1991, 1999; Zavodny et al., 1997; Chiswick, 1999; Chiquiar and Hanson, 2005; Orrenius and Zavodny, 2005; Hunt, 2006; Ortega and Peri, 2009; Mayda, 2010; Grogger and Hanson, 2011; Simpson and Sparber, 2013); other models treat migration as a dynamic decision with endogenous wage determination and human capital accumulation (Galor, 1986; Djajić, 1989; Klein and Ventura, 2009; Chiswick and Miller, 2012; Dustmann, 2003; Beine, Docquier, and Rapoport, 2008; Dustmann, Fadlon, and Weiss, 2011; Dustmann and Glitz, 2011).

Human capital model offers insights on the determinants of the selectivity. In this respect, as the expected income, net of migration costs, influences the choice to migrate, the type of selectivity depends on how the skill levels are sorted in the alternative destinations and on how they affect the costs of migration (Cattaneo,

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<sup>8</sup>For a review, the development of migration theory has taken into consideration: (i) the migrant as consumer (see Rosen, 1974; Graves, 1983; Greenwood, 1997; Glaeser and Shapiro, 2003; Green, Deller, and Marcouiller, 2005); (ii) the influence of kinship and migrant networks (see Yap, 1977; Goodman, 1981; Taylor, 1984; Massey and España, 1987; Carrington, Detragiache, and Vishwanath, 1996); (iii) the migration decisions in a life-cycle context (see Polachek and Horvath, 1977); (iv) the effects of uncertainty on migration (see Todaro, 1969, 1976; Harris and Todaro, 1970; Pickles and Rogerson, 1984; McCall and McCall, 1987; Burda, 1993, 1995); (v) the family migration decision (see Sandell, 1977; Mincer, 1978; Stark and Levhari, 1982; Stark et al., 1984; Stark, 1991); (vi) the migration as a response to relative deprivation (see Stark et al., 1984; Stark, 1991; Katz and Stark, 1986; Stark and Taylor, 1989); (vii) the influence of age in the migration decision (Becker and Capital, 1964; Gallaway, 1969; David, 1974; Schwartz, 1976; Lundborg, 1991).

2009). While the economic models of migration decision look at the cross-country differences in the economic conditions to determine the migration flows, the “Selection Models” focus on immigrants’ skill levels and returns to skill in order to look at the immigrants’ characteristics. The concept of self-selection is a behavioural term linked to the statistical concept of selection bias and it implies some deterministic process to select *who does, and who does not, do something* (Van den Berg and Bodvarsson, 2009). In this case, self-selection acts as a mechanism where a group of migrants present personal characteristics that are distributed differently from that of the whole origin and destination country population. This is due to many factors that determine whether people decide to migrate or stay in the home country. For this reason, because immigrants self select, they are unlikely to be an unbiased sample of either the origin country’s population or the destination country’s population. The following paragraphs describe the models developed by the economists to explain the selection in immigrant flows, by focusing mostly on the Roy model elaborated by George Borjas and the extensions of this analysis.

### 1.3.2 Roy Model: Skill Selection in Immigration

The most influential model that predicts how migrants differ from non-migrants is the “Roy Model” elaborated by Borjas (1987). Based on the canonical model proposed by Roy (1951)<sup>9</sup>, Borjas’ version examines where immigrants are likely to be in the distribution of wages in the origin and in the destination countries, or the direction of

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<sup>9</sup>The Model elaborated by Roy (1951) focused on how the nature of the selection in the occupational choice influenced the distribution of income, providing an algorithm that analyzed how self selection into occupations affects the distribution of income. In Roy’s (1951) “Thoughts on the Distribution of Earnings,” he discusses the optimising choices of ‘workers’ selecting between fishing and hunting. In brief, Roy’s key observation is that there are three factors that affect this choice: fundamental distribution of skills and abilities and the correlations among these skills in the population; the technologies for applying these skills; consumer tastes that impact demand for different types of outputs. It helps understand the nature, determinants, and distribution of economic rents in labor markets and the distribution of incomes (Roy, 1951).

selection, on the basis of unobservable characteristics and skills that potential immigrants possess. In his first paper, Borjas (1987) studies the way in which the earnings of the immigrants may be expected to differ from the earnings of the natives due to the endogeneity of the decision to migrate. He assumed that individuals compare the potential incomes in the United States (destination country) with the incomes in the origin countries, and make the migration decision based on these income differentials, net of mobility costs. Furthermore, the skill distribution of immigrants at the time of entry depends entirely on the nature of the selection algorithm that separates who moves from the stayers (Borjas, 2014). His analysis takes into consideration a two-countries framework denoting the origin country (country 0) and the destination country (country 1), assuming that the migration decision is to be irreversible. In the origin country, the earning distribution is given by:

$$\log w_0 = \mu_0 + \epsilon_0 \tag{1.7}$$

where  $w_0$  gives the wage in the source country;  $\mu_0$  denotes the mean (log) earnings in the origin country;  $\epsilon_0$  is the random variable that measures the deviations from mean earnings and is normally distributed with mean zero and variance  $\sigma_0^2$  ( $\epsilon_0 \sim N(0, \sigma_0^2)$ ). In this model, workers earn the average wage in their country plus a random term. In this case, people that present positive value of  $\epsilon_0$  earn more than average, while people who present negative value of  $\epsilon_0$  earn less (Bansak, Simpson, and Zavodny, 2015).

If everyone from country 0 were to migrate to the destination country (country 1), their earnings distribution would be:

$$\log w_1 = \mu_1 + \epsilon_1 \quad (1.8)$$

where  $\mu_1$  denotes the mean (log) earnings in host country for a particular population and  $\epsilon_1$  is the random variable assuming that it is normally distributed with mean zero and variance  $\sigma_1^2$  ( $\epsilon_1 \sim N(0, \sigma_1^2)$ ).

The model assumes then the destination country has higher wages than the origin country ( $\mu_1 > \mu_0 + \pi$ ), but the destination country may have a higher or lower return to skill than the origin country. To sum up, according to this model, people migrate if:

$$(\mu_1 - \mu_0 - \pi) + (\epsilon_1 - \epsilon_0) > 0 \quad (1.9)$$

where  $\mu_1 - \mu_0$  is the average wage in the destination country - the average wage in the origin country;  $\epsilon_1[(\epsilon_1 \sim N(0, \sigma_1^2))] - \epsilon_0[\epsilon_0 \sim N(0, \sigma_0^2)]$  are a measure of how the natural log of wages vary across individuals relative to the average in the destination and in the origin country. The correlation between origin and destination country earnings  $(\epsilon_0, \epsilon_1)$ , is  $\rho = \sigma_{01}/\sigma_0\sigma_1$ , where  $\sigma_{01}$  is  $cov(\sigma_0, \sigma_1)$ ;  $\pi$  is called by Borjas a “time equivalent” measure of migration costs and it is given by  $C(migrationcosts)/\mu$  (wages). In the previous papers, Borjas assumed that  $\pi$  is constant, meaning that  $C$  is directly proportional to  $w_0$ <sup>10</sup>. Then, the author considers the costs that vary among persons but, in his opinion, the nature of the correlation between costs and skills is unclear, making difficult any *a priori* inferences about this relationship (Borjas, 2014).

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<sup>10</sup>The “time equivalent measure of migration costs” is measured taking into account the wages in the origin countries.

In order to implement this model, it is important to consider the coefficient of correlation  $\rho$  is given by:

$$\rho = \frac{\sigma_{01}}{\sigma_0\sigma_1} \quad (1.10)$$

This coefficient that establishes a correlation between  $\epsilon_1$  and  $\epsilon_0$  can range from 1 to -1. Usually, when skills are valuable in the same way both in origin and in the destination countries,  $\rho$  is positive and it generally occurs when the two countries are more similar. In this case, people that have higher than average earnings in the origin country will have higher than average earnings in the host countries. On the contrary, people who have lower than average earnings in the origin country will have lower than average earnings in the destination country. If  $\rho$  is negative, people who have higher than average earnings in the origin country will present lower than average earnings in the host country. This can be the case of immigrants that move from developing countries to more developed countries (Bansak, Simpson, and Zavodny, 2015). This means that the relationship between earning in the origin and in the destination countries is higher when bigger are the numbers in absolute value. Taking into account the equation (1.8), Borjas defines the indicator variable  $I$ , equal to 1 if this selection condition is satisfied, 0 otherwise, such as a person move away if  $I > 0$ , while stay in the origin country otherwise (Borjas, 2014):

$$I = \log(w_1/(w_0 + C)) \approx (\mu_1 - \mu_0 - \pi) + (\epsilon_1 - \epsilon_0) > 0 \quad (1.11)$$

In terms of the probability, a person migrates if:

$$P(z) = Pr[I > 0] = Pr[\nu > -(\mu_1 - \mu_0 - \pi)] = 1 - \Phi(z) \quad (1.12)$$

where  $\nu = \epsilon_1 - \epsilon_0$ ;  $z = -(\mu_1 - \mu_0 - \pi)/\sigma_\nu$ ;  $\Phi(z)$  is the standard normal distribution



function (Borjas, 1987). The larger is  $z$ , the lower is the probability of migration because  $z$  is rising the mean earnings of the origin country and the cost of migration. According to the model, migration rate falls when: (i) the mean income in the origin country rises, (ii) the mean income in the destination country falls, and (iii) the mean of the time-equivalent migration costs rise (Borjas, 2014). Mathematically:

$$\partial P/\partial\mu_0 < 0, \partial P/\partial\mu_1 > 0, \partial/\partial\pi < 0^{11} \quad (1.13)$$

Taking into account the skill differentials between immigrants and natives, this model considers also the existence of different types of selection in order to determine which people find worthwhile to migrate. The following equations are the conditional expectation both in origin and in the destination countries:

$$E(\log w_0 | I > 0) = \mu_0 + \sigma_0\sigma_1/\sigma_\nu[(\pi_{01} - \sigma_0/\sigma_1) - \rho_{\pi_0}\sigma_\pi/\sigma_1]\lambda(z) \quad (1.14)$$

$$E(\log w_1 | I > 0) = \mu_1 + \sigma_0\sigma_1/\sigma_\nu[(\sigma_1/\sigma_0 - \pi_{01}) - \rho_{\pi_1}\sigma_\pi/\sigma_0]\lambda(z) \quad (1.15)$$

where  $\lambda(z) = \Phi(z)/(1 - \Phi(z)) \geq 0$ ;  $\Phi$  is the density function of the standard normal distribution; the parameters  $(\mu_0; \mu_1; \sigma_0^2; \sigma_1^2; \rho_{01})$  are constant; the random variables  $\epsilon_1, \epsilon_0, \epsilon_\pi$  are jointly normally distributed;  $\sigma_\pi$  is assumed to be equal to 0 ( $\sigma_\pi = 0$ ) that means that the time-equivalent migration costs are constant in the population (Borjas, 1987, 2014). Furthermore, in Borjas's model the direction of selection is influenced by the income inequality or the relative return to skill. In this respect, the return to skill is related to the extent of the income inequality, which is measured by the variance in wages in both countries so that the higher income inequality is, the higher is the return to skill (Bansak, Simpson, and Zavodny, 2015).

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<sup>11</sup>This result is the same as in Hicksian theory of migration.

Considering  $Q_0$  be the income differential between the average emigrant and the average person in country 0,  $Q_1$ , be the income differential between the average immigrant and the average native person, the model identifies three cases that are of interest.

In Borjas' model, "positive selection" occurs when immigrants are from the top part of the skill and wage distribution both in the origin and in the destination countries, such as when:

$$Q_0 > 0, Q_1 > 0, \text{if } \sigma_1/\sigma_0 > 1, \rho > \sigma_0/\sigma_1 \quad (1.16)$$

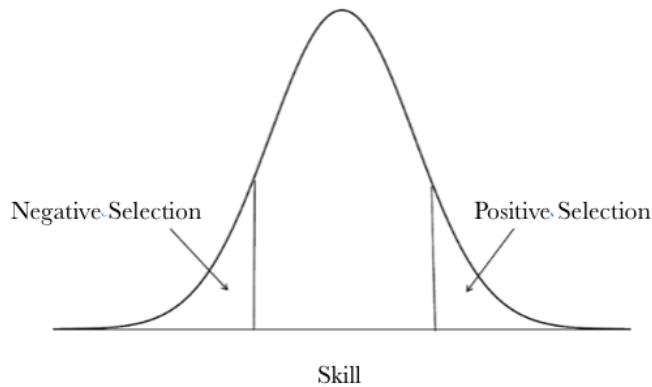
where  $\sigma_1 > 0$  implies that the destination country has a higher return to skill than the origin country;  $\rho > \sigma_0$  implies that the correlation between the skills valued in the destination and origin country is sufficiently high; the income inequality is higher in the destination country than in the origin country. In this case, high skilled workers want to migrate to take the opportunity to earn high returns in the destination country. In fact, a skilled worker in the origin country would not want to migrate to a destination country with a very high return to skills if the skills valued in the host country were uncorrelated or negatively correlated with skills value in the origin country (Autor, 2003). A case of positive selection is the so called "brain-drain" migration. When in the destination country, migration is positively selected and income inequality continues to increase, migration increases further and becomes less "positively selected".

The second case is the "negative selection" that occurs when immigrants are at the lower end of the skill and the wage distribution both in the origin and in the destination countries, presenting below-average earnings in both countries:

$$Q_0 < 0, Q_1 < 0, \text{if } \sigma_0/\sigma_1 > 1, \rho > \sigma_1/\sigma_0 \quad (1.17)$$

where  $\sigma_0 > 1$  means that origin country has higher return to skill than destination  $\sigma_1$  country;  $\rho > \sigma_1$  the correlation between skills valued in the origin country and the  $\sigma_0$  in the destination country is sufficiently high. In this case, skills are transferable but the income inequality is higher in the origin country rather than in the destination country, so that the origin country becomes unattractive to low skilled workers because of high wage dispersion. Again assuming that wages are sufficiently correlated between the origin and destination country, less skilled workers want to migrate to take advantage from a more equal distribution of wage in the destination country. Instead, the more qualified workers are encouraged to remain in the origin country because they have a higher return to their skill. According to Borjas, this is the potentially unattractive case where a compressed wage structure draws low skill workers from abroad (Autor, 2003). However, when the income inequality increases further in the origin country, migration decreases and becomes even more negatively selected (Bansak, Simpson, and Zavodny, 2015). Figure (1.2) shows the direction of selection in a normal distribution of skill. As said before, when negative selection occurs, low skilled people choose to migrate, while in the presence of positive selection, high skilled people choose to migrate.

Figure 1.2: The direction of selection in a normal distribution of skill

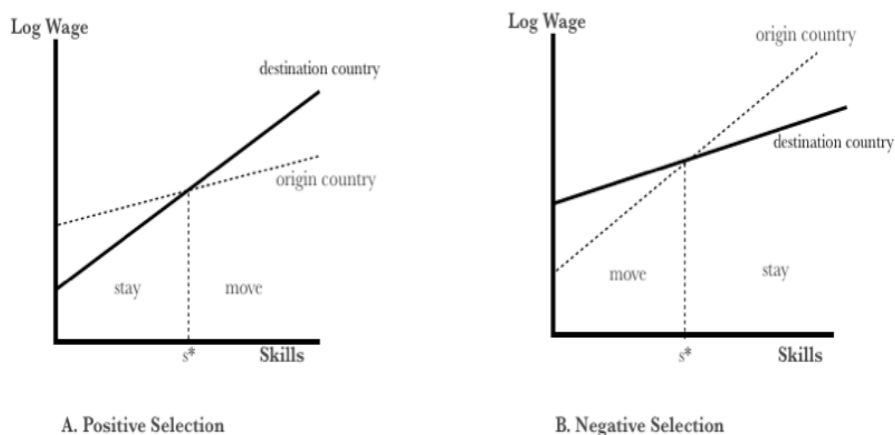


A special case of the Roy Model occurs when the correlation coefficient  $\rho$  is equal to 1, such as when skills are perfectly transferable across countries. This assumption implies also that wages increases linearly with skill. In this respect, the income distribution in the two countries can be write as:

$$\log w_0 = a_0 + r_0 s \quad \log w_1 = a_1 + r_1 s \quad (1.18)$$

where  $s$  represents the number of efficiency units embodied in the worker;  $r_0$  and  $r_1$  denotes what are the return to skills in both countries. The two figures below (1.3A and B) illustrate how the return to skill influences the direction of the selection, showing a linear relation between a worker's log wage and skills for each of the countries and assuming that incomes are perfectly correlated across countries (Borjas, 2014). Figure (1.3A) highlights that the rate of return to skills is higher in the destination countries as showed by a more steeply sloped skill-wages curve in the destination (dashed line) than in the origin country (solid line).

Figure 1.3: The direction of selection and the relative returns to skill



Initially assumed that workers do not incur any costs when they move, people who present a skill level fewer than  $s^*$  stay in the origin country because they earn more

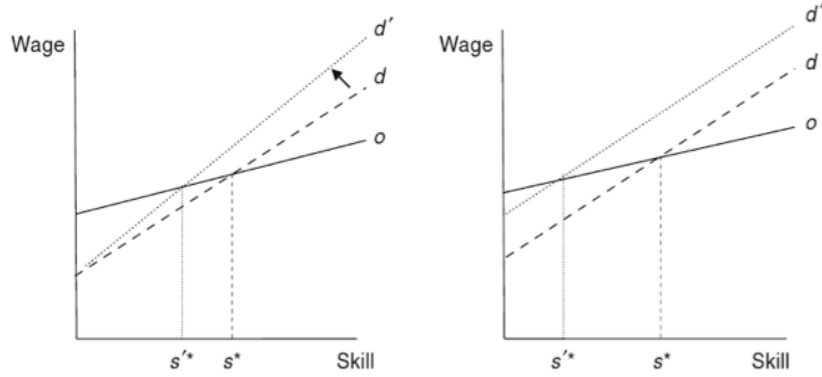
if they stay there, while people with higher level migrates. In this case, considering that the rate of return to skills is higher in the destination than in the origin country, immigration is positively selected because workers come from the upper tail of the skill distribution (Borjas, 2014). Instead, in the Figure (1.3.B) workers whose skill level is below  $s^*$  migrate because they will earn more in the destination country, while people with a higher skill level stay in the origin country. In this case, the return to skill is higher in the origin than in the destination country as indicated by a more steeply sloped skill-wage curve in the origin country (the dashed line) than in the destination country (the solid line). For this reason, the flows are composed by the low-skilled workers and immigrants are negatively selected (Borjas, 2014; Bansak, Simpson, and Zavodny, 2015). When migration causes a change in the relative return to skill one of the skill-wage lines in both figures (1.3 A and B) is pivoted while the other line leaves unchanged. Figures (1.4 A and B) show the effect of changes in the relative return to skill or in the average income in the destination that can influence the direction of selection<sup>12</sup>. In particular, Fig. (1.4A) highlights that an increase in the relative return to skill in the destination country decreases the skill threshold for migrating if there is already positive selection. So that, more people migrate and migration becomes less positively selected. In Fig. (1.4B), an increase in the average wage in the destination country decreases the skill threshold for migrating. In this case, migration becomes less selective because as a result of a change in the average income in already positive selection, changing  $s^*$ , this leads to a fall of the skill threshold for migrating and more people migrate<sup>13</sup>.

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<sup>12</sup>The direction of selection can change only if the change in the relative return to skill is so large that the country that previously had the lower return to skill now has the higher return to skill and vice versa (Bansak, Simpson, and Zavodny, 2015).

<sup>13</sup>The change in average income does not affect the direction of selection but it leads to a change in the magnitude of migration and in the skill level of the marginal immigrant and the average of immigrant due to the change of  $s^*$  (Bansak, Simpson, and Zavodny, 2015).

Figure 1.4: The effect of changes in relative return to skills



Taking into considerations the Fig. 1.3 A and B and the assumption that  $\rho = 1^{14}$ , the effect of migration costs can be incorporated shifting one the lines related to the skill- wage profile. For instance, an increase in constant time-equivalent migration costs would lead to a downwards shift in the skill-wage line in the destination country. However, according to the analysis provided by Borjas, the costs does not change the nature of selection rather than the intensity due to a change in the number of immigrants (Borjas, 2014). Taking into consideration this special case where  $\rho = 1$ , Borjas (1992, 2014) extends the analysis from a two country to a multi-region framework . In this respect, individuals can choose not only if migrate but also the location that maximize their earnings opportunities (Borjas, Bronars, and Trejo, 1992). Assuming that costs are equal to 0 and that the initial distribution of individual skills is the same in all regions such as people are randomly allocated across regions in term of skills, the earnings distributions in each of the potential region  $i$  is:

$$\log w_k = \mu_k + r_k \nu, k = 1, \dots, n; \quad (1.19)$$

where  $n$  is the potential geographical regions;  $\mu$  is the mean income that would

<sup>14</sup>The assumption that  $\rho = 1$  denotes a simple separation of the pools of immigrants and stayers. According to Borjas (2014), this assumption is useful because it permits several generalization.

be observed in region  $k$  in the absence of any internal migration;  $r_k$  denotes the return to skills in region  $i$  and for convenience the regions are ranked such that  $r_1 < r_2 < \dots < r_n$ ;  $\nu$  is assumed to be a continuous random variable with mean 0 and a range defined over the real number line. An individual that would maximize the income choose to migrate in a country  $j$  whenever:

$$low_j > \max_{k \neq 0}(low_k) \tag{1.20}$$

The model assumes that individual earnings are perfectly correlated across regions ( $Corr(\nu_i, \nu_j) = 1$ ) for all  $i, j$ <sup>15</sup>. This assumption implies that skilled workers are attracted to a country that offers a relative higher rate of return to skill because people who rank highly in the income distribution in one country will also rank highly in the income distribution of any other regions (Borjas, Bronars, and Trejo, 1992; Borjas, 2014). On the contrary, low-skilled workers will move to countries that minimise their lack of human capital (Borjas, 2014). In this respect, skill prices play an important allocative role in the internal migration decision as well as in the sorting equilibrium (Borjas, Bronars, and Trejo, 1992).

The last case is defined by Borjas as "inverse sorting" or "refugee sorting" and occurs when immigrants are from the low end of the wage distribution in the origin country while are in the upper end of the distribution in the destination country. In this case, the destination country attracts people who have below-average earnings in the origin country but do well in the destination country:

$$Q_0 < 0 \text{ and } Q_1 > 0, \text{ if } \rho < \min(\sigma_1/\sigma_0; \sigma_0/\sigma_1) \tag{1.21}$$

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<sup>15</sup>The income-maximising behaviour creates a positive correlation between the average skill level of a country's inhabitants and the country's rate of return to skills, given by  $E(\nu \text{ choose } j) > E(\nu \text{ choose } k)$  if and only if  $r_j > r_k$ .

This means that the correlation between earnings in the two countries is sufficiently low, such as when  $\rho$  is small or negative (Borjas, 1987, 2014). This might occur, for example, for a minority group whose opportunities in the host country are depressed by prejudice like in the case of the refugees. However, because refugee migration is not motivated by potential economic reasons, this migration is unlikely to be selected on characteristics that are valued in the destination<sup>16</sup>. Another case of inverse sorting concerns the migration from a non-market economy where the set of skills rewarded is quite different from the economy in the receiving country (Autor, 2003).

There could be a fourth case, such as when  $Q_0 > 0, Q_1 < 0$ . But this case would suggest the existence of an "irrational migration", such as if people leave the upper tail of the source country income distribution to join the lower tail of the host country distribution. This is inconsistent with the income maximisation. In fact, mathematically, this case would require that  $\rho > \max(\sigma_1/\sigma_0; \sigma_0/\sigma_1)$  which would imply that  $\rho > 1$ , which cannot be true for a correlation coefficient (Autor, 2003). The Roy model has more precise predictions about the self-selection of migrants. The conditions on positive or negative selection in terms of expected earnings also imply a stochastic dominance relationship between the earnings distributions of migrants and non-migrants (Borjas, Kauppinen, and Poutvaara, 2018). The main finding of the Borjas model is that immigration occurs when the destination offers higher relative returns to the individual's skills (human capital), assuming mean wages are higher. Consequently, differences in income inequality and transferability of the skills are important determinants of immigration. In Borjas (1991), earnings variance is driven in part by observable characteristics (education and experience) such that the migration decision varies by the mean educational level in each region, for example.

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<sup>16</sup>In this case, the direction of selection among refugees depends on the nature of the refugee-producing event and other idiosyncratic factors (Chin and Cortes, 2015).



This extension allows the model to predict that migration rates rise/fall with the mean education level of the origin region. This has important implications for what types of individuals (skilled or unskilled) have an incentive to migrate (Bodvarsson, Simpson, and Sparber, 2015). In conclusion, the application of the Roy model is a special case of the human-capital model. The Borjas's mathematical model is a close derivative of the neoclassical basic model (Fig.1.1), which is a close relative of the maximization hypothesis provided by the Sjaastad's migration model (1962). However, according to Borjas (1987); Borjas and Trejo (1991), the Hicks-Sjaastad framework paid little attention to the selection biases and presented too restrictive predictions focused exclusively on the size and direction of population flows across regions<sup>17</sup>. In this respect, Borjas does add some innovations allowing to highlight the characteristics of immigrants related to those of non-immigrants. In this respect, the Roy model stresses on regional differences in the returns to skills as well as on regional differences in mean income so that the skill-price differentials determine the skill composition of migration flows. Therefore, regions that pay higher returns to skills attract more skilled workers than regions that pay lower returns (Borjas and Trejo, 1991).

### 1.3.3 Roy Model: extensions and alternative frameworks

Although Roy Model has become a canonical model of selection in the economic literature on migration, some comments stress on the partial equilibrium framework for identifying the types of workers who find it most worthwhile to move (Borjas, 2014). In particular some comments are related to the prediction that there exist plausible conditions under which the immigrants may be negatively selected as well

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<sup>17</sup>The Hicks-Sjaastad model is based on the prediction that persons migrate from low-income regions to high-income regions and that increases in mobility costs deter migration, generate unidirectional migration flows.

as that migrant selectivity is due to distributional assumptions on wage components. For instance, Chiswick (1999) highlights that migration costs play an important role in determining which types of immigrants have an incentive to migrate<sup>18</sup>. In particular, the model elaborated by Chiswick shows how immigrants tend to be favorable self-selected in terms of labor market success due to their higher level of ability, ambition and hard working. Discussing the Borjas' findings, the author argues that a larger skill differential in the origin country than in the destination country does not necessarily imply negative selectivity, but rather only less favorable selectivity. In brief, assuming that wages in the origin and destination countries are invariant to the amount of labor market experience as well as that age is irrelevant, according to Chiswick's model, the rate of return to migration is given by:

$$r = \frac{W_D - W_S}{C_I + C_E} \quad (1.22)$$

where  $W_D$  denotes the destination earnings,  $W_S$  are the earnings in the source,  $C_I$  represents the implicit opportunity migration costs, and  $C_E$  denotes the explicit out-of-pocket costs. In this framework, migration occurs when  $r > i$ <sup>19</sup>, such as when the rate of return  $r$  from investing  $C_I + C_E$  in relocation is greater than the opportunity cost of the interest that could be earned from investing the funds in human capital (Van den Berg and Bodvarsson, 2009).

Supposing that there are two types of workers (low-skilled and high-skilled workers) and skills are fully observable, Chiswick defines  $r_L$  as the return to skill for

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<sup>18</sup>One of the main contribution on immigrant selection comes from Chiswick (1978). He presented evidence that, in the United States, immigrants tended to be relatively more productive and earn more than American natives. On the contrary, Borjas (1987, 1991) found that immigrants from developing countries tend to be less productive and earn less than natives in more developed destination countries. These discussions on immigrant labor market performance have become one of the main debated topic on whether immigration is beneficial or harmful for a destination country (Van den Berg and Bodvarsson, 2009).

<sup>19</sup> $i$  is the rate of interest faced by the would-be migrant.

low-skilled migrants and  $r_H$  as the rates of return to immigration for high-skilled persons. If both persons have the same interest cost, the individual with the higher rate of return will have a greater likelihood to migrate. Considering that the origin and destination country wages are  $k$  percent higher for the high-skilled, then follows that:

$$W_{D;h} = (1 + k)W_{D,1} \quad (1.23)$$

$$W_{S;h} = (1 + k)W_{S,1} \quad (1.24)$$

where  $h(l)$  stands for high (low) skills. Therefore, Chiswick initially assumes that direct migration costs  $C$  do not vary with skill levels. In this case, high-skilled workers have higher implicit opportunity costs, namely  $C_{i,h}(1+k)C_{i,1}$  because they earn more in their native countries. Therefore, the return to migration for high-skilled migrants is given by:

$$r_h = \frac{(1 - k)[W_{D,I} - W_{S,I}]}{(1 + h)[C_{I,l} + C_E]} = \frac{W_{D,I} - W_{S,I}}{C_{I,l} + C_{E,l}/(1 - k)} \quad (1.25)$$

Equation (1.25) implies that high-skilled migrants experience higher rates of return than low-skilled migrants if: (a) mean earnings in the destination are higher ( $W_{D,l} > W_{0,l}$ ), (b) the labor market rewards higher skilled workers more ( $k > 0$ ), and (c) there are positive out-of-pocket costs of migration ( $C_E > 0$ ). To sum up, given the three assumptions, the probability of migration is higher for high-skilled and migrants that exhibit self-selection bias. Chiswick then examines how changes in various assumptions and variables lead to different type of selectivity<sup>20</sup>. Therefore,

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<sup>20</sup>Chiswick's model (1991) shows that under many plausible circumstances, higher migration costs are associated with a selectivity bias towards those who expect to earn the highest wages in the destination country, which probably is the relatively high-skilled, highly-educated, and well-connected immigrant (Van den Berg and Bodvarsson, 2009).

positive selectivity occurs when the greater the effect of ability on lowering the costs of migration, and the smaller the relative skill differentials in the lower-wage origin relative to the destination. In this respect, a positive selectivity can be expected to be less intense for non-economic migrants, such as refugees, tied movers, and ideological migrants, and for short-term migrants and illegal immigrants (Chiswick, 1999).

Borjas (1987, 1991, 1999) developed several closely-related models to counter Chiswick's conclusion that self-selected immigrants tend to be positively selected and therefore, likely to be highly successful in the destination countries. In particular, he countered that positive selection is used to explain that immigrant earnings can overtake those of the natives with the same observed characteristics, such as age and education (Borjas, 1987). In addition, the "k" in Chiswick's model which represents the skill premium varies across countries. In this respect, he finds that immigrants who self-select in response to the skill premium, the observed distributions of skills across the source and destination countries' populations, and their perceptions of their own skills, cannot earn high incomes in the destination country (Van den Berg and Bodvarsson, 2009). To sum up, Borjas counters the assumption that positive selection may exist for all cohorts of immigrants, finding which determinants and factors can determine whether immigrants can be positively as well as negatively selected from a population in the origin country<sup>21</sup>. (Borjas, 1991).

Borjas' (1987) model has been extended by relaxing the assumption that a migrant's cost constraint is unrelated to earnings, skills, or other characteristics. Specifically, the model has been extended to allow for variation in migration costs across members of the immigrant pool Chiquiar and Hanson (2005); Grogger and Hanson (2011). Then, the model has been extended to include the credit constraints and the

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<sup>21</sup>Borjas (1986, 1987) discussed that most of the literature in that period used to analyse the immigrant earnings through the study of single cross-sectional data sets confounding aging and cohort effects (Borjas, 1991).

ability of would-be migrants to cover the costs of their investment in migration (Orrenius and Zavodny, 2005; Hunt, 2006; Pedersen, Pytlikova, and Smith, 2008; Belot and Hatton, 2008; Warin and Svaton, 2008; Zaiceva and Zimmermann, 2008; Mayda, 2010; Hatton and Williamson, 2011).

Empirically, a large part of the empirical literature has studied migration to the United States. In particular, most empirical papers on international migrant selection study settings where migrants face legal barriers to migration and migration costs are relatively high (Parey, Ruhose, Waldinger, and Netz, 2017). While, different papers use different skill measures to evaluate selection, other papers study migration flows between a varying sets of countries. In this respect, while some papers find evidence for negative selection as predicted by the basic Borjas's model (Ibarraran and Lubotsky, 2007; Moraga, 2011), other papers find intermediate selection<sup>22</sup> that suggests that migration costs vary with skills (Chiquiar and Hanson, 2005; Orrenius and Zavodny, 2005). A number of other papers investigate migrant selection between other pairs of countries (Ramos, 1992; Borjas, 2008; Abramitzky, Boustan, and Eriksson, 2012; Gould and Moav, 2016), while a number of papers investigate migrant selection between multiple countries. The evidence of the existing cross-country studies is mixed. Some papers find support for the model predictions (Borjas, 1987; Poutvaara, Borjas, and Kauppinen, 2015; Stolz and Baten, 2012), while other cross-country studies find only partial support for the basic Roy/Borjas model (Belot and Hatton, 2012), or reject the model predictions (Feliciano, 2005; Grogger and Hanson, 2011). Lastly, a paper by Parey, Ruhose, Waldinger, and Netz (2017), focuses on the role of inequality for the selection of high-skilled migrants in order to understand how they face low legal barriers to migration and relatively small migration costs. In conclu-

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<sup>22</sup>Chiquiar and Hanson (2005) find intermediate selection. Intermediate selection is when immigrants are from the middle of the skill and the wage distribution, if migration costs depend on skill.

sion, re-elaborations of the Roy model, (Borjas, 1989; Bratsberg, 1995; Dustmann and Gorlach, 2014) provide some empirical evidences on selection in return migration.

### **1.3.4 Assimilation in the Labor Market**

Economic assimilation establishes how immigrants' outcome compare with natives' soon after immigrants arrive and as their duration of residence in the destination increases, according to two points of view: (i) labor market assimilation, and in particular what the economists call "age-earnings" profile; (ii) how the dynamics that affects the different types of immigrants have an impact on natives' labor market (Borjas, 1985, 1995; Duleep and Regets, 1996; Schaafsma and Sweetman, 2001; Barth, Bratsberg, and Raaum, 2004; Lubotsky, 2007, 2011). Then, the determinants of migrants' integration are taken into account, focusing on language abilities, education, enclaves and participation in public assistance programs (see Chiswick and Miller, 1995; Borjas and Hilton, 1996; Antecol, 2000; Friedberg, 2000; Zimmermann, Bauer, and Lofstrom, 2000; Hansen and Lofstrom, 2003; Dustmann, Frattini, and Halls, 2010; Hatton and Leigh, 2011; Docquier and Rapoport, 2012; Abramitzky, Boustan, and Eriksson, 2013; de la Rica, Glitz, and Ortega, 2013; Furtado and Trejo, 2013; Ortega and Verdugo, 2015; Lochmann, Rapoport, and Speciale, 2019). In fact, there are several factors that negatively affect the economic integration of immigrants in the host countries. The analysis of language barriers and the literature on evaluation of the integration plans are considered in most of these studies. Knowledge of the host country's language is an important determinant of immigrants' labor market outcomes and occupational downgrading. In particular, several works on the relationship between language skills and labor market outcomes in different immigration countries have proved the lack of the host country language skills as a main obstacle of immigrants' economic integration (Chiswick, 1991; Chiswick and Miller, 1995;

Dustmann and Soest, 2001; Dustmann and Fabbri, 2003; Bleakley and Chin, 2004). These works have highlighted a positive and significant effect of host country language skills on immigrants' wages and on probability of employment. Furthermore, they focus on the endogeneity of language skills due to the self-reported assessments of language proficiency (measurement error) and omitted variables correlated with language skills and labor market outcomes. In order to solve the problem of the endogeneity of language skills, previous literature are developed different methods, like, for instance, the IV estimation with parents' education level as instrumental variable (Dustmann and Soest, 2001). Other methods include the information on whether the interview was done in the host country language only as IV (Dustmann and Fabbri, 2003), and the age at arrival interacted with a dummy for non-English-speaking country as instrumental variable (Bleakley and Chin, 2004). To improve the immigrants' labor market integration, governments may use a wide range of active labor market programs, such as: (i) the implementation of some language courses; job search assistance (e.g. counselling and monitoring of job search efforts); (ii) training programs (e.g. computer courses or courses providing specific occupational knowledge); (iii) subsidised public and private sector employment (e.g. wage subsidies for employers who hire disadvantaged workers; (iv) temporary job opportunities in community services). According to Borjas (2017), if immigrants find it profitable to assimilate, they will take actions that facilitate the assimilation process rather than immigrants that find it worthwhile to remain a group apart, facing renewed incentives to acquire new types of human capital in the destination country. For this reason, assimilation differs across national origins and fluctuates over times as economic, structural, cultural and political conditions change and depends on the factors, including skill level, size of the ethnic group, and geographic clustering, that will speed up or slow down the assimilation process (Borjas, 2017).

## 1.4 Impact of Immigration on Labor Market: Theoretical and Empirical Models

### 1.4.1 Impact of Immigration on Wages and Employment

Public concerns about immigration in developed countries are mostly related to the impact of immigrants on the labor market outcomes of natives. However, assessing how much immigrants change the economic opportunities of natives still poses many empirical challenges. While the standard model of a competitive labor market predicts that an increase in immigration should lower the wages of competing workers, how to identify the groups of natives that are competing for the same jobs as immigrants remains a controversial issue (Ortega and Verdugo, 2015). The second part of this chapter stresses how immigration affects the labor market in the destination country. The literature on the impact of immigration on the labor market outcomes of natives is presented taking into account the main theoretical models and discuss the challenges of the empirical models. The effect of immigration on natives' labor market outcomes and wages represents one of the main debated topics in contemporary economics of migration. In debates concerning immigration, questions on whether immigrants displace native workers and cause wages to fall are among the most frequently and controversially discussed topics. While the estimated impacts of immigration on the labor market are typically small, there is no consensus about the mechanisms and the distribution of benefits and costs of immigration. A lot of empirical and theoretical works have been written on the effect of immigration on local labour market (see Borjas, 1995, 1999; Card and Lemieux, 2001; Card, 2005; Ottaviano and Peri, 2006; D'Amuri, Ottaviano, and Peri, 2010); most of them concern the effect of immigration on US labour market (typically on micro data) and the main result of these works is that the impact of immigration on national wage



is negative, rarely positive, but always small (see Card, 1990; Ottaviano and Peri, 2012; Borjas, 2015; Peri and Yasenov, 2015; Card and Peri, 2016; Clemens, Hunt, et al., 2017). In fact, while adopting certain production functions, immigration adversely affects native wages and employment, with other production functions some economists find zero, small adverse effects or even a positive effect of immigration on natives' labor market outcomes (see Card, 2009; Peri and Sparber, 2009; Ottaviano and Peri, 2012; Borjas, 2013). The debate over the wage effects of immigration is driven by the concern that immigration makes some native groups worse off. On the whole, immigration increases the wealth of natives, and the difference between what the winners win and the losers lose is called “the immigration surplus”.

### **1.4.2 Labor Market effects of Immigration: Theory**

This section explores the labor market impact of immigration taking into account the main theoretical predictions on the demand and the supply of labor. The theoretical model is, first, explored by looking at the neoclassical model<sup>23</sup> by looking at the difference between substitutability and complementarity in the production process, as well as the difference between skilled and unskilled labor. Then, the main theoretical contributions on the effects of immigration on destination countries are showed.

The theoretical framework on the effects of immigration on host countries strictly depends on the assumptions made in developing the model. These assumptions especially concern: (i) whether foreign and native workers are assumed to be perfect substitutes or complements in production process and (ii) how to define immigrants

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<sup>23</sup>Appendix A to this chapter includes the graphical representations of the immigration model, including when assumptions are relaxed. In particular, the graphical representations consider: (i) the costs, (ii) the supply and the demand of labor when immigrants and natives are perfect substitutes, (iii) the labor supply when immigrants and natives are complements, (iv) the skill levels and wages through the skill premium and the return to skill, and (v) the role of physical capital in the production process.

“skilled” or “unskilled” immigrants. The basic model of immigration<sup>24</sup> predicts that an increase of workers in the labor force due to immigration, will have a downward pressing effect on the price of labor, such as on wages. When immigration occurs, in fact, immigrants will earn higher wages than in origin countries, while native-born people will be worse off because they will earn less than the period before migration. However, the basic model includes strictly assumptions. First of all, the model assumes that there are involved exclusively two countries: origin and destination. Then, it assumes that immigrants and natives are perfect substitutes and labor supply in both the destination and the origin is perfectly inelastic, which means that workers will work at any wage. Under these assumptions, theory predicts that an increase in labor supply due to immigration will result in an increased competition on the labor market. This competition in the short run will lead to a decrease in wages while the production will increase. Although native workers sustain a welfare loss due to the lower wages, total income will increase (immigration surplus), with the welfare gains accruing to the (native) capital owners (Dustmann, Glitz, and Frattini, 2008). Then, the model assumes that immigrants move without incurring migration costs or facing immigration restrictions. However, when migration costs are added, the net gain of migration is smaller and the wage effects of immigration on native workers is smaller as well (see Appendix, Fig. A.2). Before migration, wage in the destination country is predicted to be higher than in the origin country. Once migration occurs, “unskilled” workers will move from origin to destination countries and the wage in receiving country will decrease (see Hanson, 2009). In this case, migration leads to equalize the labor price, such as the wages, between the destination and the origin countries<sup>25</sup> and there is no more incentive to migrate. According to the literature on

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<sup>24</sup>Appendix A (Fig. A.1)

<sup>25</sup>This process is known as “factor price equalization” and it is common in international trade models. In these models, the prices of identical factors of production (wage, in case of migration), will be equalized across countries as a result of international trade.

international trade, in an open economy, the endowments of each country and the production functions for goods and services dictate how immigration affects natives' wages and employment<sup>26</sup>. In this framework, immigration will lead to an increase in labor supply but wages may remain unchanged in equilibrium because immigration leads the host country to export more of the labor intensive good. As mentioned before, once factor price equalization occurs, there is no incentive for international migration. In this case, immigration occurs if and only if a wage differential exists, which exists if and only if trade is not free or when there are some wage rigidities (Orefice, 2010). Instead, in case of close economy, namely when goods and services cannot freely move across countries, an increase in labor supply due to immigration could lead to lower wages for natives. In fact, assuming that in the host economy there are capital and both unskilled and skilled workers, if an unskilled flow of immigration occurs, the wage of this factor of production will decrease, and the effects on the other two factors are ambiguous. In this respect, the production function is important as well, because it determines if immigrants and natives are perfect or imperfect substitutes for natives. In fact, since the assumption of closed economy is less plausible, the key question in determining how immigration affects natives' labor market outcomes concerns whether immigrants and natives are substitutes or complements in the production process.

### **1.4.3 Immigrants and Natives as Substitutes or Complements**

Neoclassical model of immigration assumes that immigrants and natives are perfect substitutes in the production process. However, the effect of immigration on natives' labor market depends on how substitutable or complements are immigrants and na-

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<sup>26</sup>In an open economy, trade is driven by difference in factor endowments and factor price equalization occurs. In particular, each country is endowed with an initial amount of labor and capital and produces goods and services in which they have a comparative advantage based on endowments (see Bansak, Simpson, and Zavadny, 2015; Orefice, 2010).

tives in the labor market (see Appendix, Fig. A.1 and A.5). If natives and immigrants are perfect substitutes, this means that foreign-born workers can replace native workers. In this case, the increase in the number of workers will push wages down, and employment of natives should fall as well. Nevertheless, the total employment of natives plus immigrants may not change although the wages are lower. While, if immigrants and natives are complement in production, an increase in the number of immigrants could actually increase natives' employment and wages. In this case, immigration can benefit natives who are complements to immigrants in the production process. Some of the benefits come from the complementarities between immigrants and natives: immigrants may make some natives more productive or may increase the profits of native-owned firms. When relaxing the assumption of a homogeneous workforce and labor supply presents some elasticity, this means that some workers are no longer willing to work if wages fall. In this case, the labor supply curve slopes up. This means that people are willing to work more when their wages increase. When migration occurs, there is a downward pressure on wages. Nevertheless, in this case, some natives can decide not work at the lower wage. This is a key difference with the basic neoclassical model that assumes that natives and immigrants are perfect substitutes, which means that all workers are willing to work at any wage. In the literature, the effect of migration on wages and employment is usually analyzed in a two-sector labor market setting with skilled and unskilled labor. If these two types are not substitutable, an increase in the unskilled labor supply decreases wages only in the unskilled sector (substitution effect). It would also increase production, which could lead to an increased demand and higher wages for skilled labor (scale effect). The opposite mechanism would take place if there were a strong inflow of skilled workers. The substitution effect will depend on the degree to which migrants differ from native workers in their labor market relevant characteristics such as schooling,

language abilities, attitudes and preferences, creativity, tacit knowledge, reservation wage and work experience. The size of these effects depends on the elasticity of the labor demand. A low wage-elasticity entrains smaller losses for native workers, but also a smaller overall immigration surplus.

Therefore, a key concept in the theoretical framework is whether a migrant is a complement or a substitute to native worker because immigration of one type is likely to worsen outcomes for native workers who are similar but improve them for other types of natives. However, evidence on the substitutability of migrants and native workers remains mixed. There is a large literature testing the degree of complementarity/substitution between native and foreign workers at different level of analysis. For instance, exploiting variations across US cities, Kerr and Lincoln (2010); Peri, Shih, and Sparber (2015) reject the substitution hypothesis between native and foreign workers. Ottaviano and Peri (2012) provide evidence for imperfect substitutability, whereas Borjas, Grogger, and Hanson (2011) finds perfect substitutability between immigrants and low-skilled native workers. Most of these studies are focused on the United States. Manacorda, Manning, and Wadsworth (2012) suggest that immigrants and natives are imperfect substitutes in the UK and that immigration has no impact on the returns to education of native workers. Moreover, they show some evidence for the substitutability between former and recent immigrants.

In order to measure if the effects of immigration on natives' outcomes are positive or negative, some economists have developed a "Constant Elasticity of Substitution" (CES) production function (Card, 2009; Ottaviano and Peri, 2012; Borjas, 2013). The form of CES production function is:

$$Y = A[\mu L_N^\sigma + (1 - \mu)M^\sigma]^{1/\sigma} \quad (1.26)$$

where  $Y$  is the output of the destination country;  $L_N$  represents the numbers of

the native-born workers;  $\mu$  is the share income of the native workers and  $1/1 - \mu$  represents the elasticity of substitution between natives and immigrant. Furthermore, it is important to highlight whether a country is an open or a closed economy, because the endowments of the country and the production functions for good and services give an account of the immigration impact on wages and employment. The “CES Approach” initially proposed by Borjas (2003) and inspired by Katz and Murphy (1992); Card and Lemieux (2001) on the wage structure, was initially motivated by understanding the skilled biased technological change, using mostly OLS to identify elasticities of substitution between groups. Using estimates of the elasticity of substitution between skill groups, Borjas (2003) compares the actual supplies of workers in particular skill groups to those that would have prevailed in the absence of immigration. Then, he computes the change in wages of native workers through the estimates for the elasticity of substitution between skill groups (Dustmann and Preston, 2012). In this respect, crucial is how to define the groups and “nests” of the CES (?). In fact, the idea is that different types of labor, different nests, allows for complex patterns of substitution and complementaries. The recent literature explicitly strives to estimate the various elasticities of substitution that are mainly responsible for the presence or absence of an impact of immigration on the native wage structure. In particular, a more complicated model has been extended by Ottaviano and Peri (2012); Manacorda, Manning, and Wadsworth (2012), with three elasticities of substitution. Some criticisms (Dustmann and Preston, 2012) highlight that this approach imposes strong assumptions about the separability among groups of inputs. It also relies on assumptions about the nesting structure and about the definition a priori on who’s competing with whom across cells. Some elasticities are hard to estimate because of the lack of degree of freedom (Borjas, Grogger, and Hanson, 2008), downgrading immigrants and natives that can be assigned to education–experience cells, based on their observed

characteristics even though immigrants typically downgrade upon arrival (Dustmann and Preston, 2012). In this way, this approach does not identify the total effects of immigration but the effect of similar immigrants in a particular cell.

In order to demonstrate how native and foreign-born workers with little formal education are imperfect substitutes in production, Peri and Sparber (2008) develop a new theory performed by an empirical analysis. “Task approach” is rooted in the literature on skilled biased technological change (Autor, Levy, and Murnane, 2003). This method takes into account not only the concept of skilled and unskilled workers. They extend this concept distinguishing among (i) routine manual tasks, (ii) non-routine manual tasks, and (iii) abstract tasks. In their seminal work, production combines the different tasks, classifying the comparative advantages of immigrants on two types of tasks: those who do manual tasks, and those whose tasks require more communication:

$$Y_L = \left[ \beta_L M^{\frac{\theta-1}{\theta_L}} + (1 + \beta_L) C^{\frac{\theta-1}{\theta_L}} \right]^{\frac{\theta-1}{\theta_L}} \quad (1.27)$$

These tasks combine to produce  $Y_L$  according to the CES function in equation (1.26), where  $\beta_L \in (0, 1)$  captures the relative productivity of manual skills, and  $\theta_L \in (0, \infty)$  measures the elasticity of substitution between M and C (Peri and Sparber, 2009). The authors show that immigrants with little educational attainment have a comparative advantage in manual and physical tasks, while natives with similar levels of education have a comparative advantage in communication and language-intensive tasks. When immigration generates large increases in manual task supply, the relative compensation paid to communication skills rises, thereby rewarding natives who progressively move to language-intensive jobs (Peri and Sparber, 2009). Therefore, unskilled immigration leads to a change in the productive specialization

and to increase the overall labour productivity. In this respect, immigration may influence the host economy performance by increasing the labor productivity by task specialization. Peri and Sparber (2009) also provide empirical evidence to show that immigration changes the task specialization in the host country.

Finally, the canonical model has been described by Dustmann and co-authors in a recent JEP (2016) as “*a partial equilibrium model that combines one or various types of labor with capital in a constant-returns-to-scale production function*”. This model combines one or various types of labor with capital in a constant-returns-to-scale production function (see Altonji and Card, 1991). This implies that an expansion of a certain type of labor will lead to a decrease in the wage of native labor of the same type, in absolute terms and relative to other types of labor, and an increase in the marginal productivity of capital. This model has led to the common view of immigration being potentially harmful for individuals whose skills are most similar to those of immigrants, but possibly beneficial for those whose skills are different. Moreover, this is used to take into account the downgrading and allows to measure the total effect of immigration by estimating the total effect on different groups of natives (Dustmann, Schönberg, and Stuhler, 2017). However, when this canonical model is implemented through empirical models, some studies find a sizeable effect of immigration on wages of native workers, while others do not.

## **1.5 Empirical Approaches: The Methodologies to estimate the Labor Market Effects of Immigration**

Although basic economic theory suggests that immigration increases the labor supply, leading to an adjustment of employment and wages, the empirical literature shows more complex evidences. This last part of the chapter focuses on the empirical



strategies and the main findings on the labor market impact of immigration in the destination countries. A review of the main methodologies used by the researchers is showed by presenting the four main strategies, namely: (i) spatial correlation approach, (ii) natural experiments approach, (iii) skill cells approach and (iv) factor proportions models. While the estimated effects of immigration on labor markets through the first two approaches are usually close to zero (see Card, 1990; Borjas, 1994, 2014; Friedberg and Hunt, 1995; Hanson, 2009; Kerr and Kerr, 2011; Longhi, Nijkamp, and Poot, 2005, 2010), the last two approaches tend to find that immigration can result in a negative impact on the employment prospects and wages of native workers (see Borjas, 2003; Bonin, 2005; Aydemir and Borjas, 2007; Orrenius and Zavodny, 2007). However, there are some exceptions (see Card, 2009; Ottaviano and Peri, 2012). One reason for these contrasting results is that different studies use different methods, each of which with several potential problems and limitations (Bansak, Simpson, and Zavodny, 2015). Schematically, a brief survey of empirical findings is provided, highlighting the different empirical approaches along the discussion in the literature.

The most used approach in the literature is the "spatial correlation approach", which exploits the cross-sectional variations in the density of immigrants across cities or regions within a country to identify the effect of immigration on the outcome of interest. The definition of "spatial correlation" (see Borjas, Freeman, Katz, DiNardo, and Abowd, 1997; Borjas, 2003), refers to a method that measures the relationship between the native wage in a locality and the relative number of immigrants in that locality<sup>27</sup>. In particular, this approach examines the correlation, or relationship, between the number of immigrants in an area and the labor market outcomes of natives in that area, using the comparison between local labor markets and appropriate con-

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<sup>27</sup>The empirical studies in the literature, which exploit the "demographic" feature to identify the labor market impact of immigration started with Grossman (1982).

trols (Bansak, Simpson, and Zavodny, 2015). The way in which they compare the wages across those labor markets can be summarized as:

$$w_k = \theta_{\rho k} + \sum a_h z_{kh} + \nu_k \quad (1.28)$$

where  $w_k$  indicates the log wage in labor market  $k$ ;  $\rho_k$  is the fraction of the labor force in the labor market;  $z_{1k}, \dots, z_{Hk}$  are control variables that may include period fixed effects, region fixed effects, skill fixed effects and/or any other variable that generates differences in wage levels across labor markets; and  $\nu_k$  is an i.i.d. error term with zero mean and variance  $\sigma^2$  (Aydemir and Borjas, 2011). The wage elasticity to immigration can be obtained as  $\epsilon = \theta/(1+m)^2$ , where  $m = \rho/(1+\rho)$  is the average ratio of immigrants over natives (Borjas, 2003). Early studies defined labor markets in terms of geography. Seminal papers by Grossman (1982); Borjas (1987) estimated elasticities from different production functions using Census data variation (Llull, 2011). The idea of this approach is that the additional variation within regions<sup>28</sup> allows for conditioning on region specific fixed effects. In addition, this approach is used to study the distributional effects of immigration both between education and experience groups, and about its absolute effects. The main strengths related to this model can be summarized as follow:

- It is straightforward and it is credible as an exogenous shocks to local labor market and the use of instrumental variables based on « shift-share » (identification);
- Researchers find a region that experiences immigrant inflows and look to see what happens in that labor market. Then, they compare it to what happens in a nearby or in a similar region;

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<sup>28</sup>The additional variation within regions is obtained by observing outcomes as well as immigrant ratios at two points in time.

- Researchers use a regression analysis to estimate the impact of an increase in the immigrant share on wages or employment, holding constant the other variables;
- Typically, there is only one parameter of interest, such as the elasticity of wages or employment with respect to immigration.

In absence of longitudinal data, other approaches are possible to eliminate such permanent region specific effects if additional variation within regions is available. For instance, Card and Lemieux (2001) “shift share” approach exploits historical distribution of immigrants across destinations and allocates immigrants and natives in six different skill groups, assuming that within each skill group, immigrants and natives are perfect substitutes (Dustmann, Frattini, and Glitz, 2007). Using this approach, Altonji and Card (1991) find total wage estimates for white male high school dropouts of about  $-1.1$ , while Dustmann, Frattini, and Preston (2012) find negative total wage effects of about  $-0.5$  at the 10th percentile, and positive wage effects of  $0.4$  at the 90th of the earnings distribution. Card (2009) finds small positive total wage effects ( $0.06$ ) for natives on average (Dustmann, Schönberg, and Stuhler, 2016). However, this approach does not consider the interaction between wages and employment and the cross-effects of labor supply shifts in different segments of the labor market (Edo and Rapoport, 2019). Table 1.1 reports the main techniques, problems and weakness of this approach.

Table 1.1: Spatial Correlation Approach

<b>MAIN PROBLEMS</b>	<b>TECHNIQUES</b>	<b>WEAKNESS</b>
It assumes that changes in the immigrant share are exogenous and the location choice is not endogenous, or that immigration is a supply “shock” to the labor market.	Instrumental variables that requires to find a variable correlated with immigration but not directly related to the strength of the labor market in the destination. Good instrumental variables are difficult to find.	If the economic conditions that attracted immigrants historically permit over time and continue to attract new immigrants, the shift share approach is biased.
It assumes that natives do not respond to immigration by moving out an area, underestimating the labor market effect of immigration.	Most researchers use the historical immigration patterns to predict contemporaneous patterns. This approach sometimes referred as the “shift share approach”exploits the tendency of new immigrants to locate in ethnic enclaves.	
It assumes that industries and occupations remain fixed in areas experiencing immigration.	The labor supply side curve shifts to the right side as immigrants move in and then back to the left side as natives move out.	
Small sample sizes, spillover, mobility, difficulties of finding a control group.	This approach compares regions, such as states or metropolitan areas.	Even large-scale surveys may not have large sample enough at the regional level to detect meaningful relationships.

The “natural experiments approach” is often a variant of the spatial correlation approach (see Table 1.2). In this approach, researchers find a plausible “control group” or an area that is similar to the treatment group in all ways except for the immigration inflows (Bansak, Simpson, and Zavodny, 2015). The main estimation methodology used to analyze a natural, or quasi- experiment is a “difference-in-differences” (DD) estimator, which allows to estimate the change or difference in an outcome, such as the average wage, in the treatment group before and after the immigrant inflow. A number of studies that use "natural experiments" in immigration are able to reduce the problem of biases in cross-section analysis arising because immigrants choose the location based on their labor market needs (Hunt, 1992). The seminal work in this respect is considered the paper elaborated by Card (1990) that analyses the impact of the Mariel boatlift from Cuba to the metropolitan area of Miami during the 1980s. In particular, Card asks whether the Mariel immigration, which increased the Miami labor force by about 7% between May and September of 1980, reduced the employment or wages of non-immigrant groups. An important component of this identification strategy is the selection of comparison cities that can be used to estimate what would have happened in the Miami labor market if the Mariel immigration had never occurred. In this work, although this exogenous shock raised the local workforce quite dramatically, Card (1990) found this influx had no adverse effect on natives’ employment and wages (see also Hunt, 1992; Friedberg, 2001; Borjas and Monras, 2017; Dustmann, Schönberg, and Stuhler, 2017) .

Table 1.2: Natural Experiments

STRENGTHS	LIMITATIONS
DD is computationally straightforward.	It may not be truly exogenous. If this is the case, the results of D-in-D estimates may be biased. Finding a true natural experiment is quite difficult. If government policy creates the variation in labor market outcomes, the timing of the policy enactment, implementation and impact are not always clear. The spatial approach may yield biased results. In fact, immigrants tend to arrive in areas where the potential return to their particular skills is especially high (Borjas, 2001). This may lead to a spurious positive correlation between the share of immigrants and the labor market outcomes of locals, which is difficult to control (Altonji and Card, 1991).
It aims to avoid endogeneity by exploiting exogenous sources of variation.	It is difficult to find a valid control group. The labor supply shift may not be the only response to immigration. There may also be variations in supply and demand across regions that create confounding results (see Angrist and Krueger, 1999). Furthermore, the effects of a local supply shock from international migration may spread beyond the locality, if capital or native workers respond by relocating.
This approach tells a story and gives economists, policymakers and students the opportunity to make a convincing argument as to why the labor supply shift is truly exogenous.	Concerns when natural experiments are used to make cross-area comparisons.

The “skill cell approach” is used to exploit the distribution of immigrants across age and education groups that is different from the distribution of natives. Therefore, immigration increases the labor supply more in some skill groups than in other skill groups (see Table 1.3). Arguing that the spatial correlation approach may lead to an underestimation of wage and employment effects, Borjas (2003) suggests to use an analysis based on the national level and therefore robust to the problem of

out-migration or, for that matter, other ways of adjustment of local labor markets (Dustmann, Frattini, and Glitz, 2007). In order to measure the effect of immigration on local work opportunities, Borjas (2003) looks at how the relative remuneration of different skill groups is affected as a response to changes in supply within these skill groups. He uses the skill groups defined by education and experience at the national level to examine the impact of immigration. In particular, his paper focuses on the relative supply shifts within skill groups, identifying the relative wage effect of immigration by experience. He, in particular, calculates the correlation between the magnitude of immigration and the effect on the wage level of competing native workers, as in the equation 1.29.

$$\Delta \log w_{gat} = \theta^{skill} \Delta p_{gat} + \Delta \pi_t + (s_g * \Delta \pi_t) + (x_a + \Delta \pi_t) + \Delta \varphi_{gat} \quad (1.29)$$

$\Delta \log w_{gat}$  denotes the change in native wage (in logs) in education group  $g$ , experience group  $a$  at time  $t$ , and  $\Delta p_{gat}$  is the education-experience specific immigration shock, defined as the difference in the ratio of immigrants to all labor in each education-experience group  $g_a$  between two time periods. The variables  $s_g$ ,  $x_a$ , and  $\pi_t$  are vectors of education, experience, and time fixed effects. In the case of two education and experience groups, the parameter  $\theta^{skill}$  is thought of as a triple difference estimator where differences are given by time, experience groups, and education groups (Dustmann, Fabbri, and Preston, 2011). The underlying idea of this approach is that workers with the same level of education take part in the national labor market, becoming imperfect substitutes if they are endowed with different levels of work experience. According to this assumption, if the immigrant supply shock is not evenly balanced across schooling and experience cells, and over time, there may be sufficient exogenous variation to identify an effect on competing natives. Using

this methodology, the size of the native workforce in each skill cell is almost fixed (Bonin, 2005). Using this national-level skill cells approach, Borjas finds evidence of a sizable adverse impact of immigration on natives' wages, suggesting that the movements by natives and firms in response to immigration cuts the national estimate of the impact of immigration. Orrenius and Zavodny (2007) through a skill-cells approach find evidence that immigration has had an adverse impact on the wages of workers in manual labor occupations but not in the wages of workers in service or professional occupations. Llull (2017) proposes a new approach to identify the effect of immigration on native male wages correcting for the non-random allocation of immigrants across skill cells. His identification strategy considers an exogenous variation obtained from the interaction of three sources: (i) the push factors provide a time-series variation. In particular, four push factors are separately considered: wars, political regimes, natural disasters, and economic variables; (ii) the distance, which mitigates the effect of push factors, adding a destination country variation; (iii) the skill-cell dummies to capture that the mitigating effect of distance after push factor is more severe for specific groups of workers. Empirically, this is the case for less educated and middle-aged/ middle-experienced individuals. In essence, the resulting interactions provide an exogenous variation in immigration across skill cells, destination countries, and over time, which allows identification of wage elasticities to immigration in very demanding models (Llull, 2017). He estimates the following equation:

$$\begin{aligned}
p_{ijqkt} = & \alpha_{ij} + \lambda r_{qt} + \gamma \ln g_{qk} + \vartheta_i + \varphi_j + \xi_k + \zeta_q + \varrho_t + (\xi_k * \varrho_t) + \\
& (\xi_k * \zeta_q) + (\zeta_q * \varrho_t) + (\vartheta_i * \xi_k) + (\vartheta_j * \xi_k) + (\vartheta_i * \zeta_q) \\
& + (\varphi_j * \zeta_q) + (\varphi_j * \zeta) + (\vartheta_i + \varphi_j) + \nu_{ijqkt}
\end{aligned} \tag{1.30}$$



where  $p_{ijqkt}$  is the share of the population with education  $i$  and experience  $j$  living in a country/region  $k$  in year  $t$  that is from country  $q$  (for  $q=1, \dots, Q$ );  $\ln g_q k$  is the log of the physical distance between origin country  $q$  and destination country/region  $k$ ;  $r_{qt}$  is an exogenous push factor;  $\hat{\alpha}_{ij}$  is the coefficient associated to  $r_{qt} \ln g_q k$  for education-experience cell  $i, j$ ;  $\vartheta_i + \varphi_j + \xi_k + \zeta_q + \varrho_t$ , and all pairwise combinations are fixed effects; and  $\nu_{ijqkt}$  is a zero mean error term, potentially correlated with  $\nu_{ijkt}$  in equation;  $E[\nu_{ijqkt} \nu_{ijkt} | \text{fixed effects}] \neq 0$  (Llull, 2017). As said before, the four different push factors taken into account are presented by wars, political regimes, natural disasters and economic variables:

$$p_{ijkt} = \sum_{q=1}^Q p_{ijqkt} \tag{1.31}$$

Table 1.3: Skill-cell approach

<b>STRENGTH</b>	<b>LIMITATIONS</b>
By dividing workers into groups, it may better focus on natives and immigrants who are substitutable for each other.	It requires to assuming that natives do not change their skill levels in response to immigration. This is reasonable in the short run but perhaps not in the long run.
It can be performed at the national and regional level.	Like the spatial correlation approach, it requires assuming that immigrant inflows are exogenous or finding a good instrument to use in order to control for the endogeneity bias. However, endogeneity is far less of a concern at the national level than at the regional level.
	The skill cells approach does not account for possible complementarities between cells.

The spatial correlation, the natural experiments and the skill cells are called “reduced form” approaches because of the economists decide on a linear relationship to estimate and then turn to the data (Bansak, Simpson, and Zavodny, 2015). Furthermore, these approaches impose very little structure on the equation that economists estimate. An alternative approach would impose more structure by specifying the technology of the aggregate production function (Borjas2003).

The last approach deals with the structural estimates and it includes the “factor proportion models” (see Table 1.4). In order to estimate the cross effects, researchers need to make assumptions about the production process to make the estimation tractable, or possible given the data available. The intuition at the basis of the model concerns three assumptions that have some huge consequences for the estimated effects of immigration. First, the choice of a production function, which specifies how many types of labor there are and how many types interact with each other and with capital. The production function has elasticities of substitution between the various types of labor and capital. Second, the assumption that workers are paid the value of their marginal product of labor and estimate or simulate a complete set of cross effects. Third, although the assumption that workers earn the value of their marginal product is standard, there is a considerable disagreement about how many types of labor there are and what the various elasticities of substitution should be (Bansak, Simpson, and Zavodny, 2015). According to Borjas (2003), this structural approach would make it possible to estimate not only the effect of a particular immigrant influx on the wage of competing native workers, but also the cross-effects on the wage of other natives. Empirically, this approach assumes that the aggregate production function can be represented in terms of a three-level CES production function:

1. The elasticity of substitution across experience groups within an educational group;

2. The elasticity of substitution across educational groups;
3. The elasticity of substitution between capital and labor.

Formally:

$$Q_t = f(K_t, L_t, \lambda_t) \quad (1.32)$$

$$L_t = g(L_{1t}, L_{2t}, \dots, L_{jt}; \theta_t) \quad (1.33)$$

$$L_{et} = h(L_{e1t}, L_{e2t}, \dots, L_{eKt}; \alpha) \quad (1.34)$$

where  $K_t$  represents the capital in year  $t$ ;  $L_t$  represents the aggregate labor input;  $L_{1t}, L_{2t}, \dots, L_{jt}$ , are the aggregate amounts of labor in each of  $J$  education classes;  $L_{eKt}$  is the amount of labor in education/experience class  $ex$  in year  $t$  (for  $e=1, \dots, J$  and  $x=1, \dots, K$ ),  $\lambda_t$  represents a 2-dimensional vector of technology parameters;  $\theta_t$  is a  $J$ -dimensional vector of education- group specific technology parameters, and  $\alpha_t$  is a  $JK$ -dimensional vector of experience- group specific parameters. For his baseline simulations, Borjas assumes that  $f$  is Cobb-Douglas (with labor's share equal to  $s$ ),  $g$  is a CES function with elasticity of substitution parameter  $\sigma_e$ , and  $h$  is a CES function with elasticity of substitution parameter  $\sigma_x$  (Card and Peri, 2016). According to this model an increase in labor supply, regardless of skill mix, has no long run effect on average wages in the economy if the cost of capital is held constant. Instead, the elasticity of average wages regarding the aggregate labor supply is  $-(1 - s)$ , in the short run with fixed capital, which Borjas sets to  $-0.3$ . The skill-group specific impacts of different labor inflows depend on the two parameters  $\sigma_e$  and  $\sigma_x$ . Once these elasticities are computed, the next step is to simulate how immigration affects the wage structure (Card and Peri, 2016). This leads to a wide variety of wage effects in factor proportions models (See Borjas about the US high school dropouts). Studies

using these models usually simulate the impact of historical immigrant inflows. These simulations are typically conducted for both the short run and the long run. The capital stock is held constant in the short run, but in the long run the capital stock can change in response to changes in labor supply or wages. Ottaviano and Peri (2012); Manacorda, Manning, and Wadsworth (2012) change the assumption that immigrants and natives are highly substitutable even with education and experience groups. They introduced the idea that, using a 4-level nested production function, it is possible to incorporate an imperfect substitution between immigrants and natives. Furthermore, they show that even a small degree of imperfect substitution can alter the conclusions about the wage impacts of immigration. To do so, they introduce a 4-level of nesting to allow for complementarities (or imperfect substitution) between immigrants and natives within cells. They find evidence of complementarities in this framework as seen by an increase in the wages of natives within a skill cell in response to an influx of immigrants (Bansak, Simpson, and Zavodny, 2015). Meanwhile, Borjas, Grogger, and Hanson (2012) report opposing results. In particular, their results indicate that there is a significant substitutability between immigrants and natives within a skill cell. Other studies have pointed out the importance of treating high school graduates and high school dropouts as different education groups versus pooling them together. For instance, Card (2009) suggests to add yet another level of nesting to the theoretical model because not all skill groups are equally substitutable. In particular, he argues that high school dropouts are highly substitutable for high school graduates (ex. in US). For this reason, determining the elasticity of substitution between high school dropouts and graduates is difficult. Results are sensitive to the specification used and to the assumption made about the relative demand for the two groups. As a result, it is unclear what elasticity factor proportions models should use for these two groups.

In conclusion, the identification of empirical models is one of the main problem

Table 1.4: Factor proportions model

<b>STRENGTH</b>	<b>LIMITATIONS</b>
It is strongly rooted in economic theory.	The results of these models depend critically on the assumption made about the substitutability of different groups of workers.
It estimates a general equilibrium model of the labor market and then use the parameter to simulate the impact of immigration on the wage structure.	These models tend to be sensitive to the form of the production function.
	The construction of this models reduces the dimensionality of the parameter space and built a closer link between the key theoretical concepts and the variables that are actually used in the empirical research.

in the literature. The main econometric issues in the estimation of the labor market effects of immigration include: (i) the diffusion effect caused by the native migration response; (ii) the endogeneity of immigration to labor market conditions, and (iii) the institutional factors that limit wage flexibility, which may prevent wage adjustments to immigration (Edo and Rapoport, 2019). While studies that consider labor markets as spatial units typically use past settlement of immigrants as an instrumental variable (see Altonji and Card, 1991; Card and Lemieux, 2001), studies that imagine labor market into skill groups typically assume that immigrant inflows are exogenous (Lull, 2017). Typically, the skill-cell approach tends to produce more negative wage effects for natives in response to immigration than the mixture approach. Instead, empirical results obtained from the spatial approach vary widely depending on which skill group is studied. However, the skill-cell and the mixture approach identify a relative wage effect of immigration, while the spatial approach recovers the total wage effect of

immigration on a particular native skill group that consider complementarities across skill cells and across labor and capital (Dustmann, Glitz, and Frattini, 2008).

## 1.6 Conclusions

Since assessing the overall net gains or losses to the economy from immigration is one of the most debated issue, the first chapter of the Thesis has provided an overview of the main theoretical and empirical contributions for explaining the socio-economic impact of immigration from the receiving country perspective. Starting from the basic model of immigration, the chapter has provided a synthetic review of the literature on the determinants of migration starting from the basic models elaborated by Hicks (1932); Lewis (1954); Sjaastad (1962); Harris and Todaro (1970) until the recent contributions. Economic models of the migration decision predict that cross-country differences in economic conditions play a central role in determine whether people move. The first part has presented the economic model of individuals' decision to migrate, which answers to the question about why people migrate and who are the immigrants. This model of immigration considers immigrants as workers and it focuses on the wage differences across countries which motivate people to migrate. The models of migration decisions considers then both the micro level, which explore whether a person benefits from migrating (utility-or-income maximization model), and the macro level, which respond to the question about how many people become immigrants (gravity model). These models show that differences in relative economic conditions lead to change in migration flows. In particular, the utility-or-maximization model and the gravity model predict that changes in relative economic conditions lead to changes in migration flows, such as how changes in relative economic conditions affect the number of people who migrate. The Hicks-Sjaastad model emphasizes that mean income levels differ across regions, and these income differentials, net of migra-

tion costs, lead to unidirectional migration flows. Sjaastad (1962) pioneered the application of human capital theory in order to understand migration which has become the most fundamental idea underlying most current economic theories of migration. According to the human capital model, migration is the act of maximize utility by choosing the destination that offers the highest return to the skill. Then, the chapter has described the selection models in which people decide whether to move based on their income in the origin and in the destination countries. If their income will be higher in the destination, net of migration costs and adjusted for the cost of living, they move (Bansak, Simpson, and Zavodny, 2015). The aim of these models is, in fact, to describe how changes in relative economic conditions affect the composition and the characteristics of immigrants. The most influential model on skill selection in immigration was elaborated by Borjas (1987). It is based on a canonical model by Roy (1951). His application (1987, 1991), shows that international migration is not only influenced by net earnings differences between countries, but also by factors such as international differences in income inequality and the degree of skills transferability. In particular, Borjas examines where immigrants are likely to be in the distribution of wages in the origin and in the destination countries, or the direction of selection, finding the existence of a positive selection, a negative selection, and an inverse sorting. In particular, according to Borjas, the skill distribution of immigrants at the time of entry depends entirely on the nature of the selection algorithm that separates who moves from the stayers (Borjas, 2014). Using this framework, Borjas (1987, 1994, 1999); Borjas, Bronars, and Trejo (1992) find that the adjusted wage differential for recent immigrants to the US depends negatively on origin country inequality and positively on average origin country income. This implies that immigrants from poor and unequal countries are negatively selected relative to immigrants from other origin countries. This last finding that there exist plausible conditions under which

the immigrants may be negatively selected has been criticized as well as that migrant selectivity is due to distributional assumptions on wage components. For instance, Chiswick (1999) highlights that a larger skill differential in the origin country than in the destination country does not necessarily imply negative selectivity, but rather only less favorable selectivity. In the Roy model, the number of immigrants depends not only on relative incomes in the origin and destination countries, but also on the variances of those income or the relative return to skill. This model stresses on the nature of the selection that generates a non random sample of immigrants, taking into account, not only the number of immigrants, but also their composition and their skill levels. To sum up, less-skilled people are better off in countries with a lower return to skill and less income inequality while more-skilled people are better off in countries with a higher return to skill and more income inequality. The Roy model has more precise predictions about the self-selection of migrants than previously realized. The conditions that result in positive or negative selection in terms of expected earnings also imply a stochastic dominance relationship between the earnings distributions of migrants and non-migrants. Although the Roy model has become the most used framework in literature on selection in immigration, other recent models elaborated by economists have captured some of the additional complexities of immigration.

Traditionally, economists considered the labor market as the main channel through which immigration affects the host economy: immigrants increase the unskilled labor supply decreasing its price. The debates concerning whether immigrants have adverse effects on native workers and cause wages to fall are among the most frequently and controversially discussed topics. While the estimated impacts of immigration on the labor market are typically small, there is no consensus about the mechanisms and the distribution of benefits and costs of immigration. Although basic economic theory suggest that immigration increases the labor supply, leading to an adjustment



of employment and wages, the empirical literature shows that the estimated effects of immigration on labor markets are usually close to zero (Borjas, 1994; Friedberg and Hunt, 1995; Hanson, 2009; Kerr and Kerr, 2011; Longhi, Nijkamp, and Poot, 2010; Borjas, 2014). However, while some studies find a positive effect on local labor market, other some studies find that migration results in a negative impact on the employment prospects of native workers (even if close to zero). More broadly, the extensive literature on the economic effects of foreign worker flows mostly focuses on uneducated migrants and still lacks a consensus. Economic theory usually predicts that immigrants flows harm at least some workers because immigration changes the balance of skills in an economy. However immigration can have different effects depending on the assumptions made about demand and supply of labor. Under the case of a small economy with competitive markets and a fixed capital stock, theory predicts that the increase in the labor supply due to immigration will result in increased competition on the labor market. This will lead to a decrease in wages but to an increase in production in the short run. Although native workers will suffer a welfare loss due to the lower wages, total income will increase (immigration surplus). The size of these effects depends on the elasticity of the labor demand, namely a low wage-elasticity lead to smaller losses for native workers, but also a smaller overall immigration surplus. As showed in the chapter, the effect of immigration on natives in the labor market depends on how different types of labor are considered. The survey of theoretical and empirical models have showed ambiguous results, which mostly depend on two factors: (i) how to define skilled and unskilled workers; and (ii) whether migrants and native-born workers are substitutes or complements for each other. The chapter has discussed the main theoretical models and empirical conclusions by focusing on how immigration affects natives' outcomes in the labor market.

## Chapter 2

# FACTS, POLICIES AND INSTITUTION IN THE CONTEMPORARY CONTEXT OF MIGRATION

## Abstract

A growing number of OECD countries are likely to adopt more restrictive and increasingly quality-selective immigration policies, with the aim to confer better chances of admission to those applicants with a higher level of education. The changes in immigration law, which favor high-skilled immigrants relative to less educated ones, are considered among the most important and robust factors affecting the selection of immigrants. Countries typically want to attract immigrants whose skills are in relatively short supply and who are relatively wealthy. The aim of this chapter is to review the admission policies within the European Union (EU) that affect the size and the characteristics of the immigrant inflows. Within the EU, countries currently allow the EU citizens to enter freely to work but they have relatively strict policies for immigrants from non-EU countries. This chapter focuses on the attempts of the European Commission (EC) to harmonize the selection policies for purposes of labor, research and study, by promoting the immigration of highly skilled people in order to compensate the labor shortages in the face of a growing global competition. The last part discusses the different approaches to selecting and admitting immigrants both in the UK and in Germany.

## 2.1 Introduction

During the last decade, most high-income countries have adopted policies aimed at attracting highly educated immigrants. As many scholars show (see Brücker, Bertoli, Facchini, Mayda, and Peri, 2012), economic immigrants should be potentially more successful in host-country labor markets, positively contributing to the economy by bringing valuable skills, stimulating investments and growth, promoting innovation, and raising productivity. According to Borjas (2000), skilled immigrants are likely

to be more beneficial for the host country's economy because (i) they pay higher taxes, (ii) they require fewer social services and (iii) they integrate faster than unskilled immigrants. In fact, economic immigrants who rationally decide to maximize their lifetime utility should be more ambitious and risk taking individuals (Constant and Zimmermann, 2013). Economic immigrants are said to be positively selected not only with regard to unobserved determinants of labor market success but also to observed characteristics, such as higher levels of education or the ability to speak the destination country's language (Chiswick, 1978, 1986, 1999). Similar positive selection patterns could be expected from student migrants, even though their utility maximization should be primarily directed towards skills' accumulation and then for long-term labor market success (Kogan, 2011). Responses to these crucial challenges require evidence on the economic mechanisms of migrant selection and policy analyses about potential selection strategies. To answer to the question if the new immigrants are skilled or unskilled, it is important to know what kind of workers, consumers, and innovators are among the immigrants arriving in the countries, such as how they self-select and how they fare in the destination countries (Bodvarsson and Van den Berg, 2013; Borjas, 2016). On the other hand, highly educated immigrants move in relation to better incentives, such as the wage structure at destination, lower costs of moving and, in general, better opportunities in the destination country. In presence of externalities, natives may benefit from immigrants' set of knowledge and abilities<sup>1</sup>. In addition, an inflow of skilled immigrants may have favorable effects on the distribution of income. An increase in the supply of skilled workers might decrease the wage of highly educated workers due to the higher supply of skilled labor, and

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<sup>1</sup>This may happen if, for instance, native and immigrant workers are complements in the production function. As mentioned in the first chapter, native and immigrant labor are complements in the production function means that the additional input of one production factor raises the marginal productivity of the other.

consequently reduce income inequality<sup>2</sup>. The influence of immigration policies on migrants' selection on education has been analyzed both from a theoretical (see Bertoli and Brücker, 2011; Brücker, Bertoli, Facchini, Mayda, and Peri, 2012; Bertoli and Rapoport, 2015; Bianchi, 2013; Beine, Docquier, and Rapoport, 2008) and from an empirical perspective (Antecol, Cobb-Clark, and Trejo, 2003; Aydemir, 2011; Belot and Hatton, 2012; Jasso and Rosenzweig, 2008; Bertoli, Dequiedt, and Zenou, 2016). As showed by Brücker, Bertoli, Facchini, Mayda, and Peri (2012), the change in immigration law which favor high-skilled immigrants relative to less educated ones are among the most important and robust correlates which affect the positive selection of immigrants. Moreover, they find that laws that limiting the access of immigrants to welfare benefits and increasing the restrictions for residence permits or the requirements for political asylum produce a small total inflow of immigrants and a stronger selection bias of the immigrant population towards the highly educated. However, some negative factors may emerge from the introduction of a selective immigration policy. The latter is probably considered the best way to maximize the economic well-being of the native population. But, according to Speciale (2010), the introduction of policies that screen applicants by education is not a Pareto improvement, because it may negatively affect the welfare of other groups of people. For instance, the origin country may lose its best individuals, a phenomenon that is known as "brain drain". A recent study by (Docquier, Ozden, and Peri, 2010) highlights that immigration in Europe from 1990 to 2000 had a positive effect on the average wage of native workers,

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<sup>2</sup>Borjas, Freeman, Katz, DiNardo, and Abowd (1997) show that the growth of unskilled migration may exacerbate the income gap between high-skilled workers and those less educated. Other researches have shown that an inflow of low-skilled immigrants that reduces low-skilled wages would increase income inequality while an increase in high-skilled immigrants would reduce income inequality, depending on the relative return to skill (Bansak, Simpson, and Zavodny, 2015). However, empirical results are ambiguous under different assumptions. Therefore, immigration can have a very little or zero effect on income and wage inequality (see e.g. Card, 2009) or that it generates a downwards pressure on inequality, especially when the levels of education and professional experience of immigrants are very high (see e.g. Kahanec and Zimmermann, 2011).

while the extent of wage losses due to emigration was close to or greater than the gains generated by immigration (Villani, Ferrara, and Liotti, 2016).

Labor migration policies differ in the ways in which they try to attract workers. In this respect, countries use a variety of admission policies in order to affect the size and the characteristics of their immigration inflows. A growing number of OECD countries are likely to adopt more restrictive and increasingly quality-selective immigration policies, with the aim to confer better chances of admission at destination to those applicants with a higher level of education<sup>3</sup>. These policies become clear from the gradual introduction of points-based immigration systems, first in Canada in 1967. Countries with a long history of point-based systems include Australia and Canada and New Zealand. These countries award points to potential permanent immigrants based on various characteristics, such as age, education and occupation. Elsewhere, immigration policies have also evolved towards becoming more restrictive quantitatively and more selective qualitatively, through the introduction of specific visa categories for highly skilled professionals (e.g., the H1-B visa category in the US, or the European “Blue Card”) or through the introduction of biased selection criteria, making low-skill immigration more difficult while at the same time encouraging permanent high-skill immigration. Countries within the EU currently allow citizens to enter freely to work within the territory of the Member States but have relatively strict policies for non-EU nationals. The United States admits permanent immigrants primarily on the basis of family ties to US citizens or permanent residents. It also admits some immigrants, particularly relatively highly-skilled immigrants, temporarily and permanently based on employment (Bansak, Simpson, and Zavodny, 2015).

The policy argument that immigration is required because of "skills needs" in the

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<sup>3</sup>The decline in the level of education of immigrants (Borjas, 1999), with its possible contribution to rising inequality and increased pressure on underprivileged segments of the native population, has prompted proposals to increase the degree of selectivity of immigration policies (Bertoli and Rapoport, 2015).

domestic economy is connected to the presence of a high level of "human capital" in order to promote long-term economic growth and competitiveness. This argument is typically based on endogenous growth models that emphasize the importance of human capital, knowledge, research and development for economic growth (Romer, 1986). Therefore, human capital models suggest that the immigration of highly skilled workers is to be encouraged<sup>4</sup>. In these supply-driven, immigrants themselves launch the admission process and pass it based on their education, abilities and potential to successfully integration. A number of countries have labor immigration policies for admitting highly skilled migrant workers that are, in part, based on a human capital model. Canada and Australia's point-based system are examples of a labor immigration policy based on the human capital model. Instead, demand-driven systems<sup>5</sup> that are usually based on the principle of job contingency and which are often supplemented by a labor market test or on shortage lists assessments of labor market needs, are shown to have rather little, and potentially even a negative effect. However, these policy tools differ across the countries. The argument that there is a "need" for migrants' skills is related to the aim of using migrant workers to reduce perceived specific labor and/or skills shortages. This issue has been addressed by a number of countries by establishing special government units and/or independent advisory bodies that are tasked to help in the analysis of shortages in the domestic labor market<sup>6</sup>. Studies on the role of immigration policy on the socio-economic performance of

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<sup>4</sup>The human capital model offers insights upon the determinants of the selectivity. In brief, given that the expected income, net of migration costs, influences migration, the type of selectivity depends on how the skill levels are rewarded in the alternative locations and on how they affect the costs of migration (Cattaneo, 2009)

<sup>5</sup>Demand-driven policy means that an employment offer and contract triggers the decision to admit a migrant.

<sup>6</sup>For instance, the UK has established the Migration Advisory Committee (MAC) in 2008, which is a small independent body of economists that advises the government on migration issues, addressing the immigration from outside the European Economic Area (EEA) in the areas of skilled labor shortages (OECD, 2014). Other countries include Australia, Canada and Spain.

immigrants in their destination countries and how has immigration impacted these countries' economies have highlighted the importance of skill and geographic compositions of immigrant cohorts and how it can be affected through policy tools <sup>7</sup>. Despite the concurrent rise in the number of high-skilled immigrants worldwide and the proliferation of selectivity immigration policies, the degree to which high-skilled immigration policies have been effective remains contested (Bhagwati and Hanson, 2009).

In Europe, both the EU-wide and national legislations are reflected by the implementation of demand-driven systems that prioritize labor market outcomes over the numbers of migrants actually recruited (Czaika and Parsons, 2017; Burmann, Perez, Hoffmann, Rhode, and Schworm, 2018). Several Member States are addressing their policies on efforts to facilitate admission and stay of highly qualified workers as part of the global competition for talent. These include: (i) amending legislation to attract highly qualified third-country nationals, (ii) establishing services for these third-country nationals to enable easier access to information and giving additional rights such as access to self-employment, but also (iii) restrictions on routes for highly qualified third-country nationals (European Migration Network, 2017). In order to foster the cooperation between Member States and the EU, one of the main argument at the center of the debate is the need to make Europe more attractive to highly skilled migrants as favourite migration destinations such as Australia, Canada and the USA. However, labor migration in the European Union (EU) has altered in recent

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<sup>7</sup>Borjas (1991) finds that immigration policy can be one of the reasons why the earnings of immigrants and natives in Canada are more similar than in the US. Green and Green (1995) find that changes in Canadian immigration policy in 1960s account for shifting the immigrant composition from low skilled to high skilled in Canada. Constant and Zimmermann (2005) advocate the introduction of a selective immigration policy that addresses the demands of the labor market in EU. Czaika and de Haas (2017) find strong evidence that supply-led systems, like points-based systems, aim to increase both the absolute numbers of high- skilled migrants and the skill composition of international labor flows.



years due to a number of reasons. The decline and aging of the European population has contributed to an increased awareness concerning the need for immigration. In combination with increasing demand for skilled workers due to demographic challenges and growing innovation pressures, key sectors of the EU's economy suffer from specific labor and skill shortages (European Commission, 2019). These factors, which has dramatically changed but the nature, scale and direction of the migration flows, coupled with its foreseeable implications has provoked increased debate concerning immigration within EU institutions and Member States (Barslund and Busse, 2016).

The rest of the chapter focuses on the review of the admission policies within the European Union (EU) that affect the size and the characteristics of the immigrant inflows. Within the EU, countries currently allow EU citizens to enter freely to work but have relatively strict policies for immigrants from non-EU countries. The first part focuses on the development of the EU internal mobility Law, which allows EU citizens to move freely within the EU and to benefit from the right to free movement. In this respect, EU citizens are entitled: (i) to look for a job in another EU country; (ii) to work in another EU country without needing a work permit; (iii) to reside in another EU country for that purpose; (iv) to stay there even after employment has finished and (v) to enjoy equal treatment with nationals in access to employment, working conditions and all other social and tax advantages. The second part provides an analysis of the regulation of labor immigration for third-country immigrants within the EU. In this respect, migration policy is more restrictive and limited to specific categories of third-country nationals, such as: (i) long-term residents, (ii) highly skilled workers, (iii) researchers and students. They may benefit from the possibility to move within the EU, but under defined conditions. This chapter focuses on the attempts of the European Commission (EC) to harmonize the selection policies for purposes of labor, research and study, promoting the immigration of highly skilled people in order

to compensate the labor shortages in the face of a growing global competition. The last part aims to discuss at least two different approaches to selecting and admitting immigrants in the EU by looking at the UK and Germany skill-selective immigration systems.

## 2.2 Skill-Selective Immigration Policies in the EU Framework

European Union has been shaped by a long history of internal migration flows, often occurred in response to the constant shifts of economic and geopolitical power across Member States (de la Rica, Glitz, and Ortega, 2013). Immigration policies at the EU level have been traditionally characterized by a dualism: while internal labor mobility is subjected to the EU jurisdiction as it is one of the cornerstones of European integration, immigration from third-countries is primarily a responsibility of each Member State (Brücker, Bertoli, Facchini, Mayda, and Peri, 2012). In this respect, intra-EU mobility<sup>8</sup> is characterized by the presence of two different schemes. The first scheme includes the EU citizens who benefit from the right to free movement. The second scheme is more restrictive and limited to specific categories of third-country nationals. The legal migration Directives provide specific provisions solely for the following categories of third-country nationals and their families: (i) long-term residents; (ii) highly skilled workers; (iii) researchers; and (iv) students. Each of these categories of workers may benefit from the possibility to move from one Member State to another, but under defined conditions. However, non-EU immigrants face strong legal obstacles in exercising freedom of movement (Pascouau, 2013).

Free movement of persons for reasons of work is one of the fundamental freedoms

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<sup>8</sup>Intra-European mobility means the possibility for one person to move to another member state in order to seek a job, and reside there for this purpose.

set out in the 1957 Treaty of Rome: the free movement of people, capital, goods and services. These freedoms are also closely interlinked when it comes to the completion of the internal market. Under Article 45 of the Treaty on the Functioning of the European Union (TFEU), EU citizens have the right to look for a job in another Member State and to receive assistance from the employment services when looking for a job. In addition, they have the right to be treated equally in access to employment and with regard to working conditions and all other social and tax advantages. Finally, EU workers have a right of residence for themselves and their family members. The idea behind EU mobility was to create a dynamic labor market where work and skills are allocated more efficiently in sectors and occupations where labor shortages need to be filled, so that shortages in one country can be offset by unemployed workers from other countries (Holtslag, Kremer, and Schrijvers, 2013). Although the mobility of workers within the EU is free and not skill-selective, the EU has initiated programs that contribute to improve the mobility of labor between Member States. Earlier programs were focused on culture, training, education and language. Policymakers in EU, in fact, aimed to improve the competitiveness and attractiveness of European higher education, especially through enhanced mobility of students and staff. The so-called "Bologna Process" was an attempt to define a new model of mobility in higher education across Member states. It was an agreement between 48 European countries in the field of higher education. Under the Bologna Process, European governments engage in discussions regarding higher education policy reforms and try to overcome obstacles to create a European Higher Education Area. In particular, a core mission of the Bologna Process is to harmonize the study programs and the mutual recognition of study periods and qualifications earned abroad. However, the European Commission has promoted learning mobility for many decades. Since 1980s, the Erasmus Program, now part of the EU's Lifelong Learning Program, has been pos-

itively affecting learning mobility thanks to the support to people wishing to study or train abroad and to projects fostering cross-border cooperation between higher education institutions. More recently, programs have been introduced to improve the portability of skills. In particular, the European Commission adopted a renewed EU agenda for building inclusive and connected higher education systems in May 2017, in line with the "Education and Training 2020 strategy" (ET2020). The Commission's Europe 2020 Strategy considers learning mobility as a means to address future skills mismatches and promote excellence in skills development. However, since this process is ongoing and many of the decisions are relatively recent, the Commission receives a number of complaints from citizens who encounter difficulties having, for instance, their academic qualifications recognized<sup>9</sup>. Since 2000, European countries have been experiencing both an increase in the average level of education of the labor force and an increase in emigration rates, mainly concentrated among the young and highly educated cohorts (OECD, 2013). The main drivers of this process have been identified in several factors including: (i) the internationalization of labor markets and educational systems; (ii) the enlargement and integration processes of the European Union; (iii) the asymmetric consequences of the economic crisis in European countries; and (iv) the diffusion of policies for acquiring human capital from abroad in many high-income countries (Antonelli, Binassi, Guidetti, and Pedrini, 2016).

The EU has recognized the economic importance of labor mobility in driving economic development in the long term and in addressing current and future demographic challenges. For this reason, European Commission has worked on a number of measures which cover the conditions of entry and residence for certain categories of non-EU workers such as highly qualified workers, seasonal workers and intra-corporate transferees. The strategy of the European Commission become to create a package

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<sup>9</sup>SEC(2010) 1047, Commission Staff Working Document - Youth on the Move: A Guide to the Rights of Mobile Students in the European Union.

of multiple directives targeted at specific subjects for purposes of labor, research and study in order to move forward with the harmonization efforts in this area (Boeles, den Heijer Maarten, and Kees, 2014). Attempts in this respect were focused on the promotion of immigration of highly skilled people and to provide for measures and sanctions against the illegal employment.

Figure 2.1: Number of first residence permits issued by reason

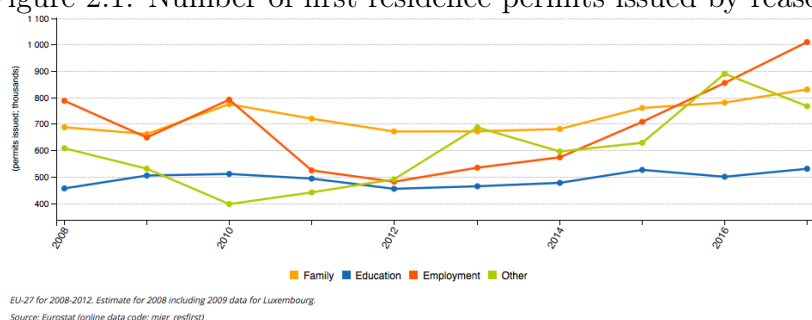


Figure 2.1 shows that 2.6 million single permits were issued in the EU in 2017. First permit refers to a single procedure and a set of rights based on a common set of rights for third-country workers legally residing in an EU Member State. About 1.8 million single permits were issued in the EU in 2013<sup>10</sup>. This number increased during the following two years reaching its peak in 2015, at 2.9 million. During 2016, the number of single permits decreased and in 2017 it were at 2.6 million (Eurostat, 2019b).

After the Treaty of Amsterdam (May,1999) and the Tampere Conclusions (October, 1999), the Commission recognized the necessity of a common approach in the

<sup>10</sup>At the end of 2013, the EU Single Permit Directive was transposed into the Member States' national systems. Single permit is not as such a permit but rather a single procedure, which includes a number of rights that apply to: (i) third-country nationals who apply to reside in a Member State for the purpose of work; (ii) third-country nationals who have been admitted to a Member State for purposes other purposes in accordance with Union or national law, who are allowed to work and who hold a residence permit; (iii) third-country nationals who have been admitted to a Member State for the purpose of work according to the Union or national law (EUROSTAT, 2019).

matters of immigration and asylum<sup>11</sup>. On 11 July 2001, the Commission presented a draft directive on the conditions of entry and residence of third country nationals for the purpose of paid employment and self-employed economic activities (COM (2001) 386, 11 July 2001), where proposed a common admission procedure for a single permit valid both for residence and work, considering yet the degree of flexibility of the Member States in the admission criteria related to their labor markets. However, in order to go beyond the concerns expressed by the Member State, the Commission proposed a new Communication in 2003 on immigration, integration and employment in order to provide a common pathway for residence and work permit. Although it did not affect the Member States' responsibility in terms of admission procedure<sup>12</sup>, the Communication did not receive sufficient support. For a common migration policy targeting the admission of economic immigrants, the Commission launched the Policy Plan on Legal Migration in 2005, but only in 2006 the Commission decided to formally withdraw the proposal for a draft Directive on the conditions of entry and residence of third-country nationals for work purposes in the European Union and the rights in employment of a third-country national once admitted in the territory of a Member State. Three new Directives followed the Policy Plan of 2005: (1) a proposal for a Directive providing for sanctions against illegal employment (COM (2007) 249 final, 16 May 2007); (2) a draft Directive concerned a "Blue Card" work permit for highly qualified employment (COM (2007) 637 final, 23 October 2007); (3) a proposal for a set of common rules for a single permit and rights for third-country nationals to reside and work in the territory of a Member State (Boeles, den Heijer Maarten, and Kees, 2014). However, most Member States are reluctant to harmonize rules on access of third country nationals to their labor markets in order to preserve their sovereign discretion.

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<sup>11</sup>Communication on a Community immigration policy (2000), 757 final, 22 November 2000.

<sup>12</sup>COM (2003) 336 final, 3 June 2003, 1.1.

## 2.3 Overview of Intra-EU Mobility Policy and Law

The right to free movement granted to all EU citizens has been part of the European project since its inception. The 1957 Treaty of Rome establishing the European Economic Community referred to the free movement of workers as (i) the right to accept job offers, (ii) the right to move freely within the territory of Member States to seek a job, (iii) the right to reside in a member state for the purpose of employment<sup>13</sup> (Pascouau, 2013). In the history of the European Union such assimilation has represented not only an objective of legislative policy, but also an instrument of affirmation of the Union as a unitary and identity space (Adam and Tizzano, 2017). The right of free movement and residence for persons in the EU represents the cornerstone of Union citizenship. It was established by the Treaty of Maastricht in 1992 and implemented by the gradual phasing-out of internal borders under the Schengen agreements. The rights of the EU citizens to move and reside freely within the EU become central by the adoption of Directive 2004/38/EC.

### 2.3.1 The Development of the EU Internal Mobility Law

Before 2004, a patchwork of several Regulations, Directives and European Court of Justice (ECJ) judgment represented the law governing the free movement of EU citizens. Article 18 of the EC Treaty (TEC) emphasized the right of the Union

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<sup>13</sup>Article 48 Treaty of Rome states: (1) Freedom of movement for workers shall be secured within the Community by the end of the transitional period at the latest; (2) Such freedom of movement shall entail the abolition of any discrimination based on nationality between workers of the Member States as regards employment, remuneration and other conditions of work and employment; (3) It shall entail the right, subject to limitations justified on grounds of public policy, public security or public health: (a) to accept offers of employment actually made; (b) to move freely within the territory of Member States for this purpose; (c) to stay in a Member State for the purpose of employment in accordance with the provisions governing the employment of nationals of that State laid down by law, regulation or administrative action; (d) to remain in the territory of a Member State after having been employed in that State, subject to conditions which shall be embodied in implementing regulations to be drawn up by the Commission.

citizens “to move and reside freely within the territory of the Member States”. The TEC guaranteed the free movement of workers (Articles 39-42), of self employed persons wishing to settle in another Member State (Articles 43-48) and the freedom to provide cross-border services (Articles 49-55). Furthermore, Article 39 provided the right for equal treatment in working conditions. This principle was marked also with the adoption of Regulation 1612/68/EC, which prevent discrimination among workers based on nationality. In addition, EC adopted a secondary legislation that provided corollary rights of residence and aimed to remove administrative formalities in employment, such as the mutual recognition of diplomas and qualifications.

The development of free movement rights has followed the judgments of the European Court of Justice, which clarified and expanded the scope of the right to freedom of movement and to legal residence in the host Member State<sup>14</sup>. Although only the movement of economically active persons was pursued in order to create a “common market”, the evolving ECJ case law and the gradual adoptions of several directives have resulted in the extension of free movement rights to other category of nationals, as in the case of students (Directive 90/366, 1990 replaced by Directive 93/96, 1993), pensioners (Directive 90/365, 1990) and a general category of nationals who are able to financially support themselves (Directive 90/364, 1990).

One of the key milestone in establishing an internal market with free movement of persons was the conclusion of the two Schengen agreements (1985 and 1990), which

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<sup>14</sup>The case law on free movement of workers can be found in the *Reyners* judgment (ECJ 21 June 1974, *Reyners*, Case 2-74), where the Court established that having regard to the fundamental character of freedom of establishment and the rule of equal treatment, all restriction on the freedom of movement must be restrictively interpreted. The same conclusion can be found in ECJ 4 December 1974, *Van Duyn*, Case 41/74; and in ECJ 12 February 1974, *Sotgiu*, Case 152/73. In addition, ECJ established that the terms connected with fundamental freedom must have a community meaning and may not be interpreted by the Member States within the national legislation, as in the case of the term “worker” (meaning and purposes can be traced in ECJ 3 July 1986, *Lawrie-Blum*, Case 66/85; ECJ 26 November 1998, *Birden*, C-1/97; ECJ 23 March 1982, *Levin*, Case C-53/81; ECJ 26 February 1992, *Raulin*, Case C-357/89) determined within the meaning of the Community Law.



abolished the Union’s internal border controls. In this respect, any person, irrespective of nationality, may cross the internal borders without being subjected to border checks. The concept of “nationality” of a Member State was marked with the introduction of Citizenship of the European Union by Treaty of Maastricht in 1992. The adoption of the Directive 2004/38/EC “on the right of citizens of the Union and their family members to move and reside freely within the territory of the Member States” marked an important development in the integration process. The Directive consolidated most of the existing regulations on free movement of Union citizens and considered the large body of ECJ case-law linked to the free movement of persons. In particular, the Directive introduces EU citizenship as the basic status for EU nationals when they exercise their right to move and reside freely in the EU territory<sup>15</sup>. Specifically, the Directive states that workers who are citizens of another Member State cannot be treated differently from national workers on the basis of their nationality. Migrant workers’ right to reside for more than three months remaining subject to certain conditions, which vary depending on the citizen’s status<sup>16</sup>. In addition, the Directive was designed to reduce administrative formalities, to provide a better definition of the status of family members, and to limit the scope for refusing entry or increasing protection against expulsion<sup>17</sup> (Marzocchi, 2017). The Directive

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<sup>15</sup>Directive 2004/38 entails that for the first three months, every EU citizen has the right to reside in the territory of another EU country with no conditions or formalities other than the requirement to hold a valid identity card or passport. For longer periods, the host Member State may require to register the presence of the citizen within a reasonable and non-discriminatory period of time.

<sup>16</sup>In Article 7(1) Directive 2004/38 self-employed persons are granted the same rights as workers, in accordance with Article 43 TEC. The right of residence depends on their having sufficient resources not to become a burden on the host Member State’s social assistance system, and having sickness insurance (Articles 6-18). EU citizens acquire the right of permanent residence in the host Member State after a period of five years of uninterrupted legal residence (Art. 16).

<sup>17</sup>According to the Directive 2004/38, nationals of one Member State working in another have the same social and tax benefits and access to housing as national workers, and are entitled to equal treatment in respect of the exercise of trade union rights. Concerning the right to remain in the host country after stopping work, job seekers have the right to reside for a period exceeding six months (see ECJ, Case C-292/89, Antonissen) without having to meet any conditions if they continue to look for an employment in the host Member State and during this time they cannot be expelled.

allows a Member State to refuse an EU national the right of entry or residence on the grounds of public policy, public security or public health, providing for a series of procedural guarantees (Articles 27-33). However, although the importance of this Directive, substantial implementation obstacles persist. The Commission reports and Parliament studies on the application of the directive highlights the serious shortcomings in implementation and continuing obstacles to free movement. Different serious deficits in national transposition in the framework of protection provided by Directive 2004/38 has opened infringement proceedings against Member States, which apply a whole range of exceptions to the granting of EU rights on free movement (Carrera and Atger, 2009).

### **2.3.2 Mobility of EU Workers: Facts and Recent Developments**

Today, the bulk of labor mobility within the EU, which guarantees EU citizens the right to look for a job and work in another Member State, is laid down in Article 3(2) of the Treaty on European Union (TEU); Articles 4(2)(a), 20, 26 and 45-48 of the Treaty on the Functioning of the European Union (TFEU). These Articles entails the abolition of any discrimination based on nationality between workers of the Member States. This principle guarantees EU citizens the right to equal treatment in accessing employment, working conditions and all other social and tax advantages. In particular, free movement of workers includes the right to benefit from the same treatment as citizens of that country as regards access to: (i) employment; (ii) work conditions, such as salary and grade; (iii) recognition of professional experience and seniority; and (iv) any other social or tax advantage, as well as (v) the right to stay

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After acquiring the right of permanent residence in the host Member State, EU citizens are no longer subject to any conditions but can, if necessary, rely on social assistance in the host Member State in the same way as its nationals can (Kraatz, 2018).

even after occupying this post. Therefore, European citizens have the right to seek employment in another EU country and to work there without requiring a work permit<sup>18</sup>. Article 21 of the TFEU expressly provides that the right of EU citizens to move and reside freely within the territory of the Member States is *subject to the limitations and conditions laid down in the Treaties and by the measures adopted to give them effect*<sup>19</sup>. Member States are authorized to reserve certain public service employments for their own nationals. Article 45 of the TFEU establishes that free movement of workers entails the right to accept job offers made within the territory of Member States, with the exception of certain jobs in public service. This principle was recognized by the EU Court of Justice: *the rights of nationals of a Member State to enter the territory of another Member State and to reside there for the purposes mentioned in the Treaty follows [...] directly from the Treaty*<sup>20</sup>. Nevertheless, the mobility of EU workers remains limited (Menghi and Quéré, 2016). In fact, only the 3.8% of EU citizens working age take advantage of this right, and reside and work in another EU Member State.

Mobility patterns within the EU have changed considerably during the last decade. Whereas intra- EU mobility remains low among the older Member States, the process of enlargement (EU-15 and eastern enlargement) has been accompanied by a substan-

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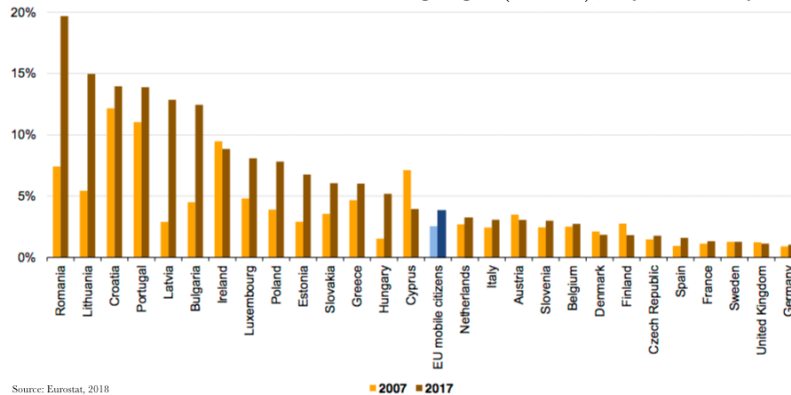
<sup>18</sup>EU citizens do not need a work permit both for purposes of salaried employment and of self-employment. When a European citizen works in another EU country automatically acquires the right to reside there. Family members also have the right to reside and work in that country.

<sup>19</sup>The purpose of the freedom of movement for workers is to allow European citizens to have access to employment in another Member State other than their own. Article 1 of Regulation 492/2011/EU of the European Parliament and the Council of 5 April 2011, on freedom of movement for workers within the Union stipulates that: *Any national of a Member State shall, irrespective of his place of residence, have the right to take up an activity as an employed person, and to pursue such activity, within the territory of another Member State in accordance with the provisions laid down by law, regulation or administrative action governing the employment of nationals of that State. He shall, in particular, have the right to take up available employment in the territory of another Member State with the same priority as nationals of that State.*

<sup>20</sup>ECJ, 14 July 1977, Concetta Sagulo, Gennaro Brenca and Addelmadjid Bakhousse, case 8/77, Rec. p. 1495, point 4.

tial increase in intra-EU mobility as people from new Member States are moving to work in the older Member States (see Fig.2.2).

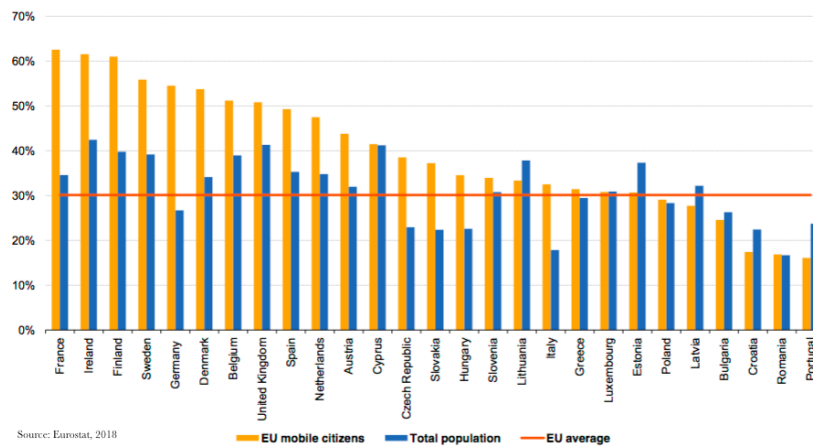
Figure 2.2: EU mobile citizens of working age (20-64), by country of citizenship



Source: Eurostat, 2018

Tertiary graduates result to be more mobile than the rest of the population. Fig. 2.3 shows that the share of people with tertiary education for working age citizens living outside their Member State exceeds the tertiary education share of the resident population by 2.3 pp (Eurostat, 2018).

Figure 2.3: Tertiary educational attainment of persons aged 20-64, by country of citizenship



Source: Eurostat, 2018

### 2.3.3 The Right of Learning Mobility in the EU

The right for EU citizens to stay in another Member State for the purposes of study is established in Article 7 (1)(c) of the Directive 2004/38. However, the grounds for establishing students' right to free movement have evolved over time. Initially, learning mobility in the EC Treaty were limited to vocational training (Article 128 EEC). Since 1980s, the Court of Justice judgments have progressively stressed the right of EU students, whether in general, vocational or university education, to move freely across the Union for purposes of study<sup>21</sup>. The 1992 Maastricht Treaty, which introduced the concept of European citizenship, extended the EU action on education, encouraging cooperation between Member States and the mobility of students and teachers. Considering the students' right to equal treatment in access to education, the Court found in the *Raulin* case the right to access and residence in another Member State for the purposes of studying, invoking the principle of non discrimination<sup>22</sup>. The rights for students and their family members to move and reside within the Union are set out in Directive 2004/38/EC, which guarantees to any EU student the right to study and to stay in another Member State under certain conditions<sup>23</sup>.

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<sup>21</sup>ECJ, *Forcheri*, Case 152/82, ECR 1983 02323; ECJ, *Gravier*, Case 293/83, ECR 1985 00593; ECJ, *Blaizot*, Case 24/86, ECR 1988 00379; ECJ, *Grzelczyk*, Case C-184/99 ECR 2002 I-00663; ECJ, *Bressol*, Case C-73/08.

<sup>22</sup>ECJ, *Raulin*, Case C-357/89, ECR 1992 I-01027. Following the case law establishing the right to equality of treatment regarding the conditions of access to vocational training, higher education and university education, the Court held in the early 1990's that this right applied not only to the requirements laid down by the educational establishment in question, such as enrollment fees, but also any measure that may prevent the exercise of that right. The Court decided that the principle of non-discrimination with regard to conditions of access to vocational training deriving from Articles 18 and 166 TFEU (ex Articles 7 and 128 EEC) implied that a national of a Member State who has been admitted to a vocational training course in another Member State enjoys, in this respect, a right of residence for the duration of the course.

<sup>23</sup>According to the Directive 2004/38/EC, any EU student has the right to stay in another Member State for longer than three months, but under certain conditions that include (i) be enrolled in a course of study at an educational establishment, whether private or public, accredited or financed by the host Member State; (ii) have comprehensive sickness insurance cover in the host Member State, and must inform the relevant national authority in line with the national rules; and (iii) have

A Member State can require the student to register with the authorities. Like any other EU citizen, a student who has resided legally for a continuous period of five years in the host Member State acquires the right to live there permanently (Article 16). In addition to labor migration policies, regulations aimed at retaining students, since the international mobility of students can benefit a country from their skills since transitioning into the labor market. While learning mobility can benefit the EU by fostering a sense of European identity and contributing to the internal market, education and training are responsibility of each Member States. Although any EU citizen should be able to practice the profession freely in any Member State, the practical implementation of this principle is often hindered by national requirements for access to certain occupations. The rights of students have developed and broadened progressively over time<sup>24</sup>. As mentioned before, early attempts to encourage mobility by the Commission included exchange programs for students and staff from educational institutions to study or work in another member state (see Par. 2.2). Recently, Directive 2005/36/EC (now Directive 2013/55/EU) has reformed the system for recognition of professional qualifications to encourage more automatic recognition of qualifications and to make labor markets more flexible<sup>25</sup>. Under the Regulation (EU) 2016/589 (replacing former Regulation (EU) No 492/2011), European Employment Services (EURES) has become a real Europe-wide job mobility portal. This introduces automated matching of job seekers' skills and job openings thanks to the

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enough resources not to become an unreasonable burden on the social assistance system of the host Member State.

<sup>24</sup>The rules are generally based on Treaty provisions interpreted by Court decisions. Since this process is ongoing and many of the decisions are relatively recent, the rights of mobile students are not always clear (COM(2010) 477 final).

<sup>25</sup>Directive 2005/36/EC (now Directive 2013/55/EU) on the recognition of professional qualifications consolidates and updates the 15 existing directives, covering most all recognition rules and provides for innovative features. It introduced measures as the European professional card and the mutual evaluation of regulated professions.

self-service tools on its digital platform<sup>26</sup>. In addition the portal aims to provide general information on living and working conditions in the country of destination, including language courses, and provide more personalized career and recruitment advice. However, Member States should make an effort to improve the mechanism by making all job vacancies and job applications published at national level. Recently, the EU has made several efforts to create a more favorable framework for workers mobility, including: (i) a European health insurance card and a Directive on cross-border healthcare; (ii) a coordination of social security schemes (Regulation (EC) No 883/2004 and Regulation (EC) No 987/2009); (iii) the adoption of the Directive 2014/50/EU on minimum requirements for enhancing worker mobility by improving some supplementary pension rights; (iv) the adoption of the Directive 2014/54/EU on measures facilitating the exercise of rights conferred on workers in the context of freedom of movement for workers. In addition, the European Commission proposed to the European Parliament and the Council a Regulation for a European Labor Authority in March 2018. This new decentralized EU agency ensure better enforcement of EU law and provide supporting services for workers and employers. In conclusion, to strengthen labor mobility, the Commission is working on a proposal to establish a European Social Security Number (spring 2018), aiming to facilitate administrative cooperation across national borders.

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<sup>26</sup>The EURES (European Employment Services) cooperation network involves the Commission, the public employment services of the EU and EEA Member States and other partner organizations, and Switzerland.

## 2.4 High-skilled third-country mobility within the European Union

The regulation of labor immigration is one of the most controversial public policy issues in the EU. European countries have been confronted for many years to the task of balancing the need for a qualified young labor force and the fear that large inflows of workers may create unemployment, lower wages and generally increase the competition for natives. While the immigration of non-EU workers is at the competence of the national member states, various EU policies and directives have been introduced to make the European Union more attractive for highly skilled third-country nationals. Labor immigration is considered an important means in an overall economic and social context characterized by a number of skill and labor shortages, an accelerating demographic ageing and a competition for the "best and brightest"(Frattini, 2005). Therefore, the EU encourages several initiative to make the Union internationally more competitive in the face of a worldwide race to attract talents (Boeri, Brücker, Docquier, and Rapoport, 2012). At the 1999 Tampere (Finland) Council meeting, leaders of the EU Member States discussed a common immigration policy, including to improve the EU's capacity to attract the highest skilled migrants. The underlying idea was to enable EU to respond quickly and efficiently to labor market requirements at national, regional and local level. In this respect, third-country workers should enjoy the same working conditions, rights and responsibility as the EU nationals<sup>27</sup>.

In January 2005, the Commission launched a new debate on the need to build up a European migration policy regarding the admission of third-country nationals. The European Commission published a Green Paper (EC, 2004) on economic migration following a proposal for a Directive on the conditions of entry and residence of third-

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<sup>27</sup>COM (2000) 757 final, 22 November 2000.



country nationals for the purpose of paid employment and self-employed economic activities<sup>28</sup> (Münz, 2008). The Green Paper on economic migration has triggered a debate<sup>29</sup> on what rules should apply to the admission of migrants for economic purposes. The Commission proposes a European system of selection, according to criteria of experience, education, language skills and job offers in order to meet the needs of specific skills<sup>30</sup>. It proposed a list of several approaches to the management of economic migration. One of this approach would take into account the competition between the EU countries to attract migrants and the needs of their economies to address specific labor and skills gaps (Friðriksdóttir, 2017). In June 2005, the Commission launched a discussion, involving EU institutions, Member States and civil society actors in order to adopt a common immigration policy for admitting economic migrants. However, the Green Paper failed to get sufficient support in the Council. Eventually, the Commission decided on a sectoral approach<sup>31</sup>, such as a ‘partitioning strategy’ where its initial proposal had to allocate into various drafts on particular labor migration categories, including a directive on migrant workers’ rights (Carrera, Guild, and Stefan, 2017). The consultation promoted during the Green Paper discussions led to the adoption in December 2005 of a Policy Plan on Legal

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<sup>28</sup>The idea behind both the Green Paper and the he proposal for the Directive was: *both to provide a pathway for third-country workers which could lead to a more permanent status for those who remain in work, while at the same time giving a secure legal status while in the EU to those who return to their countries of origin when their permit expires* (European Commission 2003a).

<sup>29</sup>The European Commission set out several options for further discussion, including a horizontal approach on the conditions of entry and residence or a series of sectoral regulations focusing on different types of labor migrants. The horizontal approach, which could be complemented by specific provisions to cover the particular needs of certain groups, aimed to create a common framework on economic migration, with a high degree of flexibility. Instead, a sectoral approach expected to develop a series of sectoral legislative proposals on admission of third-country nationals, especially on highly qualified workers.

<sup>30</sup>Green paper - on an EU approach to managing economic migration presented by the Commission, COM(2004) 811 final, available at: [http://europa.eu/legislation\\_summaries/other/c11331\\_en.htm](http://europa.eu/legislation_summaries/other/c11331_en.htm)

<sup>31</sup>CEC (Commission of the European Communities) (2004) Green paper on an EU approach to managing economic migration (Brussels), COM(2004) 811 final, 1 November 2005

Migration (EC 2005). The Commission prepared a proposal for a directive on a single application procedure for a single work and residence permit and a common set of rights for third-country nationals legally residing in an EU Member State, including admission procedures able to respond to fluctuating demands in the labor market. Three goals can be traced back to the 2005 Commission Policy Plan on Legal Migration: the first was to address the decline in working age population; the second was to meet current and future labor demand; the third was to build a more dynamic knowledge-based economy. In fact, the Policy Plan described the EU labor market as a “need” scenario where some Member States were experiencing a substantial labor and skill shortages in different sectors of the economy, *“which cannot be filled within the national labor markets”*, by asserting the need of labor immigration for the EU economic growth. The Policy Plan proposes several measures to regulate the entry and the residence conditions of admission for few selected categories of economic immigrants including (1) a directive on the conditions of entry and residence of highly skilled workers, (2) a directive on the conditions of entry and residence of seasonal workers, (3) a directive on the procedures regulating the entry into, the temporary stay and residence of intra-corporate transferees; and (4) a directive on the conditions of entry and residence of remunerated trainees. Therefore, the Policy Plan proposed a selective approach, by considering (1) few selected categories of economic immigrants and (2) granted the rights only to immigrants belonging to each group (Friðriksdóttir, 2017). The policy development on the selection of the high-skilled immigrants have been take through two initiatives, which are considered particularly relevant. The first one involves two Council directives in order to regulate the admission of third-country students (European Council, 2004) and researchers (European Council, 2005). The second important initiative concerns the adoption of the European Council Directive 2009/50/EC (“Blue Card Initiatives”). More recently, the Directive

2016/801/EU “on the conditions of entry and residence of third-country nationals for the purposes of research, studies, training, voluntary service, pupil exchange schemes or educational projects and au pairing” was adopted to improve provisions and protection for intra-EU mobility. To conclude, in June 2016, the European Commission suggested a number of proposals to revise the Blue Card Directive in order to increase the attractiveness of the EU highly skilled migration scheme.

#### **2.4.1 The Admission of Highly-Qualified Students and Researchers**

*“One of the objectives of Community action in the field of education is to promote Europe as a whole as a world center of excellence for studies and vocational training. Promoting the mobility of third-country nationals to the Community for the purpose of studies is a key factor in that strategy. The approximation of the Member States’ national legislation on conditions of entry and residence is part of this”<sup>32</sup>.*

The Council Directive 2004/114/EC of 13 December 2004 “on the conditions of admission of third-country nationals for the purposes of studies, pupil exchange, unremunerated training or voluntary service” promotes the mobility of students as a key element in the strategy of the European Union<sup>33</sup>. The immediate purpose was to create a common legal framework to promote EU as a world center of educational excellence (OECD, 2016). In this respect, Member States should facilitate the participation of third-country students in EU mobility programs. These programs were considered, by definition, temporary and were not explicitly related to the labor-market situation

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<sup>32</sup>Council of European Union, Preamble of the Directive 2004/114, 6.

<sup>33</sup>The Directive 2004/114/EC does not apply to: (i) asylum seekers; (ii) those whose expulsion has been suspended; (iii) family members of union citizens who have exercised their right to free movement; (iv) those with long-term resident status; and employed or self-employed third-country nationals; (v) third-country nationals who fall into the categories of unremunerated trainees and volunteers and who are considered as workers under the national legislations.

in the host country. To be admitted to the EU for the purpose of study, third-country applicants must meet a number of general conditions<sup>34</sup> and of certain further specific conditions. In particular, students were required to fulfill certain specific conditions, including sufficient resources to cover subsistence, study and travel costs, and sufficient knowledge of language of the higher education course<sup>35</sup>. Students' residence permits are to be valid for at least one year, and are to be renewable. They can be withdrawn where the holder does not respect conditions, or where the holder does not make acceptable progress in the studies<sup>36</sup>. While the directive lays down binding rules on admitting students who are nationals of third-countries, it leaves it up to EU countries to decide whether or not to apply its provisions to the other categories, such as for school pupils, trainees, and volunteers. For non-EU nationals who are secondary school pupils, the Directive covers only organized travel through exchange schemes run by specialized organizations<sup>37</sup>. However, the admission of school pupils participating in an exchange scheme may be confined by Member States to nationals

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<sup>34</sup>Under the Directive, general conditions require to a third-country applicant: (i) to present a valid travel document, (ii) to present parental authorization, in case of minors, (iii) to have a sickness insurance, (iv) not to be regarded as a threat to public policy, security or health, and (v) to provide a proof, if requested, that any processing fee is paid (Directive 2004/114/EC , Article 6).

<sup>35</sup>To be admitted, applicants who are not EU citizens must: (i) have been accepted by a higher education establishment; (ii) have enough resources to cover their subsistence, study and return travel costs; (iii) have enough knowledge of the language of the course to be followed; (iv) pay the fees charged by the establishment concerned before traveling to the EU (a flexible condition left to the discretion of individual EU countries). Some flexible conditions are left to the discretion of individual EU countries (Directive 2004/114/EC , Article 7)

<sup>36</sup>A third country national who has already been admitted as a student and applies to follow in another member state part of the studies already commenced, or to complement them with a related course of study in another member state, shall be admitted by the latter member state within a period that does not hamper the pursuit of the relevant studies, whilst leaving the competent authorities sufficient time to process the application (Directive 2004/114/EC, Article 8).

<sup>37</sup>According to the Article 9, *school pupils* must not be below the minimum age nor above the maximum age set by the Member State and must provide evidence related of: (i) a secondary education establishment; (ii) a recognized pupil exchange scheme program operated by an organization recognized by the Member State national legislation; (iii) a subsistence, study, healthcare and return travel costs responsibility accepted by pupil exchange organization (iv) accommodation in accordance with the rules of the pupil exchange scheme. School pupils' permits can last for no more than one year (Directive 2004/114/EC , Article 9 (2)).

of third countries which offer the same possibility for their own nationals (Article 9). The directive sets out the conditions for admitting non-EU nationals to take up remunerated traineeships that need a training agreement for an unremunerated placement with a public or private sector enterprise or vocational training establishment<sup>38</sup>. The directive provides also for the conditions where a non-EU national applies to be admitted to a voluntary service scheme<sup>39</sup>. In this case, Member States can specifically requires a basic introduction to the language, history and political and social structures of host country (Article 11). The main innovation under the Directives was the provisions to allow students, already admitted by a Member State, to be granted a right to mobility in the other Member States. However, Member States are allowed to impose a number of restrictions (OECD, 2016). EU countries may withdraw or refuse to renew a residence permit when the holders did not longer meet the conditions for residence and when a third-country national is considered as a potential threat to public policy or public security<sup>40</sup>. Moreover, Member State may take into account the situation of the labor market, and may restrict access to economic activities for the first year of residence. In addition, the length of procedures for delivering visas to enter EU countries has sometimes prevented students from benefiting from EU

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<sup>38</sup>Article 10 includes the specific conditions for *unremunerated trainees* that need a training agreement for an unremunerated placement with a public or private sector enterprise or vocational training establishment approved by the relevant authority, according to a Member State legislation. Furthermore, they must provide evidence about sufficient resources to cover the subsistence, training and return travel costs and, if required by the Member State, they may receive a basic language training needed for the purposes of the placement. Trainees' permits can be for one year, extendibles once only for as much time as is needed to acquire a vocational qualification.

<sup>39</sup>Volunteers, that may not be below the minimum age nor above the maximum age set by the Member State, must produce an agreement giving a description of tasks, supervision, working hours, resources for his travel, subsistence, accommodation costs and pocket money available during the voluntary service. They must also provide evidence that the organization is responsible for the voluntary service programs, including subsistence, healthcare and return travel costs and has subscribed a third-party insurance policy. Volunteers' permits can be for one year, extendibles in exceptional cases to correspond to the period of the relevant program (Directive 2004/114/EC, Article 11).

<sup>40</sup>The notion of public policy may cover a conviction for committing a serious crime. Furthermore, this notion also may cover cases in which a third-country national belongs or has belonged to an association which supports terrorism, or has or has had extremist aspirations.

programs<sup>41</sup>.

The Researchers Directive 2005/71/EC on a specific procedure for admitting third-country nationals for the purposes of scientific research aimed to make the European Union more attractive for researchers from around the world. In line with the objective of a most competitive knowledge-based economy agreed in Lisbon European Council (March 2000), the Directive was conceived for third-country nationals who apply to be admitted to the territory of a Member State for more than three months for the purpose of carrying out a research project<sup>42</sup>.

Any public or private research organization wishing to host a researcher under the admission procedure approved by the Member State can make a host agreement with a researcher granted the right to residence<sup>43</sup>. If the conditions for admission are met, a Member State shall be admitted the researcher in its territory, granting a residence permit for a period of at least one year<sup>44</sup>, if they prove to have sufficient financial resources and are not considered to pose a threat to public policy, public security or public health<sup>45</sup>. Unlike for Student's Directive, researchers are afforded more EU-mobility rights (OECD, 2016). Although the Directive does not include a specific right for family reunification, for instance, if a Member State grants a resi-

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<sup>41</sup>COM(2010) 477 final.

<sup>42</sup>Directive 2005/71/EC does not include: (i) third-country nationals that apply for international protection or temporary protection; (ii) third-country students applying for a doctoral degree (Directive 2004/114/EC); (iii) third-country nationals whose expulsion has been suspended for reasons of fact or law; (iv) researchers seconded by a research organization to another research organization in another Member State (Article 3).

<sup>43</sup>Directive 2005/71/EC, Article 5(1) and (2).

<sup>44</sup>In the case of a research project is scheduled to last less than one year, the residence permit shall be issued for the duration of the project (Directive 2005/71/EC, Article 8 on the Duration of residence permit).

<sup>45</sup>A third-country national who applies to be admitted shall: (i) present a valid travel document, as determined by national law; (b) present the hosting agreement together with a statement of financial responsibility according Articles 6(2) and 6(3); and (iii) present a statement where he/she does not pose a threat to public policy, public security or public health (Directive 2005/71/EC, Article 7).

dence permit to the family members of a researcher, the duration of validity of their residence permit shall be the same as that of the permit issued to the researcher<sup>46</sup>. Moreover, Chapter IV of the Directive lays down other researchers' rights, including the activity of teaching (Article 11); equal treatment with nationals regarding recognition of qualifications, working conditions and social security (Article 12); and mobility between EU countries (Article 13). Member States may withdraw or refuse to admit or renew a residence permit for a number of reason. They may refuse to renew a residence permit when it has been fraudulently acquired or wherever it appears that the holder did no longer meets the conditions for entry and residence (Articles 6 and 7); or if residing for other purposes than for which the applicant was authorized; or for reasons of public policy, public security or public health. However, the Directive was designed to make EU a more competitive and dynamic knowledge-based destination rather than to improve the rights for third-country researchers already resident (OECD, 2016). For this reason, Member States are concentrated more on the admission of certain third-countries nationals and they maintain a high degree of discretion in the process of harmonization of admission policies.

#### **2.4.1.1 The New Directive on Immigration of Students and Researchers**

In 2011, the EU Commission produced two implementation reports on the 2005 Researchers' Directive and the 2004 Students' Directive, identifying the weaknesses of the existing legislation for admitting third-country nationals for research or study purposes<sup>47</sup>. The assessment provided for by the Commission demonstrated that both

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<sup>46</sup>Directive 2005/71/EC, Article 9. In some justified cases, however, a Member State may shorten the duration of the residence permit of the family member (Article 9).

<sup>47</sup>Report from the Commission to the Council and the European Parliament on the application of Directive 2005/71/EC on a specific procedure for admitting third-country nationals for the purposes of scientific research. COM(2011) 901 final; Report from the Commission to the European Parliament and the Council on the application of Directive 2004/114/EC on the conditions of admission of third-country nationals for the purposes of studies, pupil exchange, unremunerated training or voluntary service. COM(2011) 587 final.

Directives had a modest impact on attracting more students and researchers to the EU due to some problems of transposition in some Member States. The implementation reports identified a number of areas where transposition was insufficient mainly in relation to admission conditions, rights, procedural safeguards, students' access to the labor market during their studies and intra-EU mobility provisions. Specifically, the 2011 implementation reports highlighted: how lengthy and complicated administrative are the procedures for admission; the lack of opportunities to be integrated in the labor market of the EU; difficulties in exercising intra-EU mobility. In addition, they pointed out certain limitations in the rights for researchers (teach and family reunification); and for students (restricted economic activities). For all these reasons, the Commission proposed to review the existing legislation in March 2013 and to merge the two Directives into one single text. The European Parliament adopted a first position on 25 February 2014, including several amendments to improve the situation of students and researchers<sup>48</sup>. The Parliament and the Council only recently agreed on the text of this proposal. Moreover, the European Parliament and the Commission approved a joint statement on the ground for rejection<sup>49</sup>. The aim of this statement was to clarify the provision which allowed Member States to reject an application only on a case-by-case basis, taking into account the specific circumstances of the third-country national and the principle of proportionality, as well as on the basis of evidence or serious reasons. Highlighting the positive implications of

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<sup>48</sup>The amendments to improve the situation of students and researchers proposed by European Parliament included: (i) extending to 18 months the period during which students and researchers can look for work after the end of their study or research period (the Commission had proposed 12 months); fees for handling applications should not be as excessive or disproportionate as to hinder the aims of the legislation, adding that if fees are paid by the person concerned, he or she should be reimbursed by the host entity or the host family; Extending the right to volunteers to move to other EU countries and carry out their activities there; 30-day deadline (compared to the 60 days proposed by the Commission) for member states to accept or refuse applications. They also added a 30-day deadline for deciding on an appeal against a refusal.

<sup>49</sup>Article 20(2), point (f).



international student mobility and the importance of their transition into the labor markets, the European Parliament and the Council Directive on *“the conditions of entry and residence of third-country nationals for the purposes of research, studies, training, voluntary service, pupil exchange schemes or educational projects and au pairing”* (Directive 2016/801) was officially adopted in May 2016 (EU Publications 2016). Member States had two years to translate the Directive into their national laws (before 24 May 2018). Moreover, some Member States - the UK and Denmark and Ireland - did not take part in the adoption of the new Directive<sup>50</sup>. The final version of the Directive is part of the effort to address shortages in specific skills, as well as to make the EU a more attractive destination for talents. It provides harmonized conditions of entry and residence in the EU for third-country researchers, students, trainees and volunteers taking part in the European voluntary service scheme. It also improves the situation of researchers and students in several aspects including mobility, entry of family members and access to work. In addition, the Directive extends its purposes to two new categories of third-country nationals, such as remunerated trainees and au pairs.

While in the previous Directives, each Member State decides whether students and researchers could stay on after their studies or research have ended, the new Directive makes easier for students and researchers to move within the EU during their stay<sup>51</sup>. Moreover, the Directive is more explicit in terms of labor market aspect. It provides students the right to work while studying for a minimum of 15 hours a week. In

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<sup>50</sup>The UK and Denmark opted out of both 2004 Student’s Directive and 2005 Researcher’s Directive, while Ireland opted in to the Researchers’ Directive. All three countries have opted out of the new law (Peers, 2015).

<sup>51</sup>Under the new rules, they will have to notify only the Member State to which they plan to move, instead of submitting a new visa or residence permit application and wait for it to be processed. Researchers will also be able to move for longer periods than those currently allowed and have the right to bring their family members with them, also when they move within the EU, and these family members will also have the right to work during their stay in Europe.

addition, it allows both students and researchers to stay at least nine months after finishing their studies or research to look for a job or to set up their own business. It also includes some provisions for interns, school pupils, volunteers under the European Volunteer Scheme, and au pairs. This is the first time that third-country au pairs have been included in a EU law<sup>52</sup>. In addition to obtaining a job-search permit, countries may incorporate additional incentives into their national policies to make it more attractive for students to stay in their country. Common incentives among EU member states include simplified application procedures to stay for working, which could entail the exemption from labor market tests or examinations; lowered salary requirements; full access to the labor market without restrictions, or limitations in terms of working hours; additional incentives like reducing the number of years one must reside in the country to qualify for a permanent residence permit (Burmans, Perez, Hoffmann, Rhode, and Schworm, 2018).

#### **2.4.2 The Blue Card Directive 2009/50 on the Admission of Third-Country Workers**

The second important initiative in the field of labor migration was the European Council Directive 2009/50/EC, mostly noted as “Blue Card Initiatives”<sup>53</sup>. It was adopted by the Council on 25 May 2009 (European Council 2009a, 2009b)<sup>54</sup>. This initiative represents a EU attempt to attract high-skilled workers from non-EU countries in a context of a more and more high international competition. It aimed at adopting a common policy for the entry and the residence of high skilled third-country

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<sup>52</sup>European Parliament (2018), Legislative train schedule: Towards a new policy on migration, <http://www.europarl.europa.eu/legislative-train/>.

<sup>53</sup>This visa is inspired by the US Green Card, and the “Blue” comes from the color of the EU flag.

<sup>54</sup>Directive 2009/50/EC was adopted by the Council once obtaining the opinion of the Parliament under the legislative procedure set forth in Article 251 of the TEC (now Article 294 TFEU). The legal basis for the Directive is stemmed from Article 63(3) (a) and (4) of the TEC which now is the Article 79(2)(a) and (b) TFEU (Friðriksdóttir, 2017).

nationals, leading to the introduction of a temporary work permit (the blue card) for the purpose of highly qualified employment<sup>55</sup>. In particular, the main goal is to develop a legislation for increasing the contribution of economic immigration in the EU economic growth through a set of policies and measures for a full economic and social integration of highly qualified workers. Furthermore, in order to respond to fluctuating demand for high-qualified workers, to offset skill shortages and to address the problem of demographic ageing, the Directive would facilitate and harmonize the admission of highly skilled workers “*by promoting the allocation and re-allocation on the EU labor market*”<sup>56</sup>. Specifically, the Directive aims to create a common integration policy on third-country highly qualified workers on a needs-based approach in order to promote their economic and social integration, to foster intra-EU mobility, remove barriers and allow a more efficient allocation within EU<sup>57</sup> (Friðriksdóttir, 2017) by making their legal status fully transferable within the EU<sup>58</sup>. The Directive include a fast-track procedure for admission based on common criteria: (i) non-EU citizenship; (ii) completed higher education; (iii) a work contract or a binding job offer in at least one year in the member state (Bansak, Simpson, and Zavodny, 2015). In addition, it provides several provisions for the access to the EU territory<sup>59</sup>. The scheme is

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<sup>55</sup>The Directive refers to high qualified employment of a person that “has the required adequate and specific competence, as proved by higher professional qualifications” (Article 2(b)). In fact, after some reservations among the member states about both higher education qualifications and years of professional experience, the definition does not establish a common set criteria applying to highly qualified employment (Friðriksdóttir, 2017).

<sup>56</sup>Proposal for a Council Directive on the conditions of entry and residence of third-country nationals for the purposes of highly qualifies employment, COM (2007) 637, 23 October 2007, 2.

<sup>57</sup>Commission Staff Working Document, Accompanying document to the Proposal for a Council Directive on the conditions for entry and residence of third-country nationals for the purpose of highly qualified employment, Summary of the Imparc Assessment, SEC (2007) 1382, 23 October 2007, 4.

<sup>58</sup>Before the introduction of the Blue Card, some EU member states adopted policies aimed in attracting skilled immigrants. In 2008, UK became the first European country to discuss for a point-based system. Czech Republic, Germany and the Netherlands have used “green card” or work permit systems, in partnerships with employers, to attract and select highly educated workers (Brady, 2008).

<sup>59</sup>According the Directive, the conditions of admissions require to provide: (i) documents attesting the higher professional qualifications; (ii) a valid travel document as established by national law and

demand-driven, which means that a job offer by an employer determines admission. Therefore, the main element for admission is a valid one-year work contract with a gross annual salary that is not inferior to a relevant salary threshold defined by the Member States. After a controversial discussion, Article 5 (3) establishes that the gross minimum salary threshold must not be inferior at 1.5 times the average gross annual salary in the state as set by national law (Speciale, 2010).

The EU Blue Card is valid for up to two years and can be renewed. However, the provision in the Article 7(2) leaves the Member States a great flexibility in setting the standard validity of the EU Blue Card between two and four years<sup>60</sup>. More freedom of movement is established after period, including the possibility of the migrant gaining access to a second member country's labor market. Immigrants may gain permanent residency after five years (article 16). Once receiving a blue card, workers can benefit from the right to equal treatment, family reunification rules and geographic mobility within EU. According to the Commission's proposal, equal treatment with nationals must be recognized by the Member States in order to establish the "*most favorable conditions possible*". However, the right to equal treatment was restricted by the Member States during the negotiations<sup>61</sup>. Therefore, the Directive allows for several derogations from the principle of equal treatment, especially for education and good and services. In addition, it does not provide for equal treatment with respect to tax

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if required evidence for a valid residence permit; (iii) evidence of a sickness insurance for the applicant and his/her family members; (iv) evidence that the applicant is not a threat to public policy, public security or public health.

<sup>60</sup>After some concerns expressed both by some member states and the Commission about the duration of the work permit, the Presidency suggested that the "initial validity of an EU Blue Card shall be of two years and shall be renewed for at least the same duration with a maximum of four years" and if "the work contract covers a period less than two years, the EU Blue Card shall be issued or renewed for the duration of the work contract plus three months" (Council of European Union, Note from the Presidency to the Working Party on Migration and Expulsion 7(2) of the Directive). However, the adopted Directive leaves the Member States greater flexibility than suggested by the Presidency, diminishing the level of harmonization regarding Blue Card program.

<sup>61</sup>The most discussed topics among the Member States were related to equal treatment with respect to education, housing, pensions, tax benefits and social assistance.

benefits and social assistance (Friðriksdóttir, 2017). The rights of family reunification for a EU Blue Card holder in the territory of a Member State stem from the Family Reunification Directive 2003/86/EC with some important derogations in terms of duration of the residence permit, integration measures and access to labor market, in order to foster the integration of third-country nationals who could reasonably become permanent residents<sup>62</sup>. As mentioned before, the Directive was introduced to address an identified “needs” context of the EU labor market and to relieve the labor shortages in certain areas/sectors. For this reason, one of the most discussed aspect by the Member States was the access for highly qualified third-country nationals to the national labor markets. The Proposal for a Council Directive elaborated by the Commission included three Articles, which regulated the labor market access (draft Article 13), the temporary unemployment (draft Article 14) and the access to the labor market if the second Member State (draft Article 20)<sup>63</sup>. During the negotiations, however, Member States granted a high degree of discretionary and derogative power. The most important concession was that the Blue Card may not prevent any parallel national programs for the same category of workers (OECD, 2016). Moreover, Member States may decide on the numbers of admissions. Article (8) of the Directive which provides the grounds for refusal shows that a Member State shall reject an application for a number of reasons including: (1) when the documents have been fraudulently acquired, falsified or unauthorized changes; (2) whenever the concerned vacancy is not filled by national or Community labor market; (3) when the application is inadmissible in accordance the Article 6<sup>64</sup>; (4) when the

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<sup>62</sup>Proposal for a Council Directive on the conditions of entry and residence of third-country nationals for the purposes of highly qualified employment, COM (2007) 637, 23 October 2007, 11. Article 18 of the Directive states that after 18 months of legal residence in the first member state as a EU Blue Card holder, the person concerned and the family members may move to another member state for the purpose of highly qualified employment.

<sup>63</sup>Proposal for a Council Directive on the conditions of entry and residence of third country nationals for the purposes of highly qualified employment, October 2007,3.

<sup>64</sup>Article 6 determines the volume of admission of third-country nationals entering the territory

application avoid an ethical recruitment<sup>65</sup> in sectors suffering from a lack of qualified workers in the countries of origin<sup>66</sup>; (5) if the employer has been sanctioned by the national law for undeclared or illegal employment (Art.8 of the Directive). For the same reasons, the EU Blue card can be revoked or refused to renew by a Member State<sup>67</sup>. In addition, a withdrawal or a non-renewal can occur for reasons of public policy, public security or public health (Friðriksdóttir, 2017). Since 2014, all Member States except for Denmark, Ireland and the United Kingdom have taken part in the EU blue card program. These countries has favored their own visa systems over the EU-wide program. In this respect, UK and Denmark have adopted a point-based work visa system in order to select high-skilled workers, while Ireland grants work permits in skilled occupations experiencing labor shortages. The other Member States, many with considerable delay, have transposed the Blue Card Directive into national legislation. Therefore, while all Member States must comply with the blue card's central principles, the implementation of the Directive has been very divergent because each country is allowed to retain high margins of discretion.

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for the purpose of highly qualified employment.

<sup>65</sup>In the adopted Directive, ethical recruitment has replaced “brain drain” as suggested by the European Parliament (Report on the proposal for a Council directive on the conditions of entry and residence of third country nationals for the purposes of highly qualified employment 10 November 2008, 23.

<sup>66</sup>The Directive condors the “brain drain” as dangerous and costly for developing countries. In order to solve this inconvenience, the article 22 states that EU countries should refrain from pursuing active recruitment in developing countries in sectors suffering from a lack of personnel and key sectors. Moreover, the directive encourages the development of appropriate mechanisms to facilitate both circular and temporary migration.

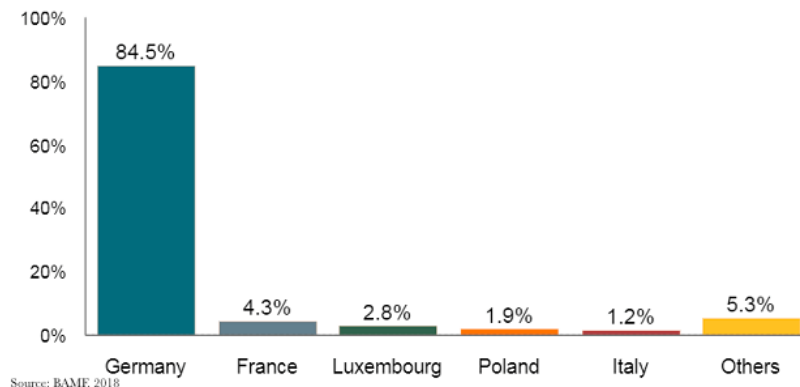
<sup>67</sup>A Member State can be revoked or refused to renew the Blue Card first of all, in the cases of fraudulent acquisition, falsified or unauthorized changes, then, when the holder has not respected the conditions for entry and residence laid down in the Directive (Articles 5 or 6) and the limitations set out in the Article 12 (1) and (2) and 13. In particular, Article 12 concerns the access to the labor market, while Article 13 regulates the temporary employment.

### 2.4.2.1 Impact of the Blue Card and the Proposal for a Revised Directive

Attracting highly skilled immigrants to Europe has been one of the EU's key priorities. However, the EU Blue Card Directive had been evaluated as not sufficiently successful. This limited application is due to a number of reasons including the high costs it imposes on both employers and migrants and in part to the coexistence and competition with national schemes for highly-qualified migrants. According to EUROSTAT data (2019), the number of Blue Cards issued remains low. In the majority of Member States, permits issued under national programs for highly qualified workers exceed the Blue Cards.

A considerable exception is Germany, which issued 84.5 percent of all the EU Blue Cards that were granted EU-wide in 2017. The others (Fig.2.4) were accounted for by France (4.3%), Luxembourg (2.8%), Poland (1.9%) and Italy (1.2%).

Figure 2.4: Top Countries issuing the EU Blue Card



This generally very low number of granted Blue Cards especially compared with national immigration schemes highlights that the Blue Card program has failed to facilitate high-skilled immigration into the EU.

Since the Blue Card Directive was negotiated and adopted before the Lisbon

Treaty entered into force<sup>68</sup>, the Directive provided Member States with wide discretion regarding its implementation in national law<sup>69</sup>. As a consequence, the implementation of the Blue Card Directive in Member States has been very heterogeneous. As mentioned before (Section 2.4.2), the Blue Card is a demand-driven system where both the principle of Community preference and the Member States' jurisdiction decide on the numbers of persons admitted (Barroso, 2007). However, since labor market needs differ in each Member State, the common system was flexible and no coordination was considered about the actual migration quotas (Brücker, Bertoli, Facchini, Mayda, and Peri, 2012). In addition, the Blue Card has been criticized for the presence of high eligibility standards, including the high salary threshold, lengthy bureaucracy, and limited harmonization concerning the intra-EU mobility. Not all Member States, for example, recognize the five years of professional experience or have set their salary thresholds at above or below 1.5 times the average gross annual salary. Other variations include the periods of validity of the card, which in some EU countries vary between one and five years, and the option to renew or withdraw the card if the holder does not have sufficient resources to maintain themselves or their family. Most countries require immigrants to make the application, while others the employer, or both of them. Most of the countries allow equal treatment in access to highly qualified employment after two years, while require the authorization of a competent authority if the card-holder changes employer in the first two years. Other differences are in respect to the application of provisions for residence in other Member States<sup>70</sup> and on the provisions on temporary unemployment<sup>71</sup> (EU

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<sup>68</sup>In this case, the adoption required unanimity in the Council, while the European Parliament was only consulted.

<sup>69</sup>European Parliament (2017), Revision of the Blue Card Directive, Briefing: EU Legislation in Progress.

<sup>70</sup>The directive stipulates that the Blue Card holder may move to a second Member State after 18 months of legal residence in the first Member State, and may apply for a second Blue Card in the first Member State or within a month of entering the second Member State

<sup>71</sup>The directive states that the beneficiary may be unemployed for less than three consecutive



Parliament, 2017). Therefore, high salary threshold, job offer prerequisite and labor market test have created additional barriers for high-skilled immigrants to work in the European Union. Furthermore, from the perspective of firms, national schemes look more beneficial (Giesing and Laurensyeva, 2016).

For all these reasons, in the framework of the European Agenda on Migration (2005), the European Commission has launched a review process of the EU Blue Card Directive. On 7th June 2016, the Commission proposed to replace the Blue Card Directive because it had showed an “intrinsic weakness”, restricting admission conditions and limiting the intra-EU mobility. The aim of the Commission is to make it easier and more attractive for highly skilled third-country nationals to come and work in the EU, thus supporting European businesses in attracting qualified and talented people. The proposal included improvements provisions to make less stringent admissions criteria, such as lower salary threshold and shorter required length of work contracts, better family reunification conditions, facilitated mobility, and the abolishment of parallel national schemes.

In particular, regarding the access to the territory of a Member State and its labor market, the Commission proposed several provisions in order to wide the definition of highly qualified/highly skilled employment, and to relax the requirements for admission<sup>72</sup>. By acting “*as a single player towards the outside world*” to “*create*

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months and not more than once.

<sup>72</sup>Proposal for a Directive of the European Parliament and of the Council on the conditions of entry and residence of third-country nationals for the purposes of highly skilled employment, COM(2016) 378, 6 June 2016,<sup>6</sup> The Commission has proposed (i) to lower the salary threshold for highly skilled workers (Draft Article 5); (ii) to abolish parallel national programs for issuing permits to highly skilled migrants (Draft Article 3); (iii) to permit changes in employer without prior authorization (Draft Article 13); and (iv) to relax the conditions for the intra-EU mobility (Draft Article 227). In addition, the access to the EU Blue Card is granted to the third-country national family members of EU citizens, beneficiaries of international protection and third-country nationals to be resettled under future EU schemes to engage in highly skilled employment (Draft Article 3). However, no substantive changes have been proposed to equal treatment of EU Blue Card holders with nationals (Friðriksdóttir, 2017).

*economies of scale and hence better compete with other major destinations for the limited supply of highly skilled workers*<sup>73</sup>, the proposal includes several goals that include: (i) attracting more high- skilled non-EU citizens through the Blue Card Scheme; (ii) reducing costs for EU employers; (iii) enhancing mobility; and (iv) competing with the National Schemes (Giesing and Laurentyeva, 2016). However, being based on measures proposed in order to facilitate the intra-European mobility and the harmonization between the Member States, the Council achieved no compromise on the inclusion of many provisions included skills and the recognition of professional experience equivalent to education qualifications, due to some resistance by several Member States (Friðriksdóttir, 2017).

A number of developments concerning the legal migration started in September 2017, involving inter-institutional negotiations for the revision of the EU Blue Card Directive, leading to an agreement on a number of technical points. The evaluation of the current EU framework on legal migration (REFIT Legal Migration Fitness Check) continued and will be completed in 2018. The European Commission also started developing pilot projects to enhance cooperation with third countries of origin on the comprehensive management of migration, aiming to create a legal pathway for economic migration to both address shortages in EU labor markets and to provide opportunities for migrant to acquire new skills. Furthermore, in 2017, the European Court of Justice provided judgments on three preliminary references: one related to the long-term residents Directive 2003/109/EC (judgment in case C 636/16 on protection of Long-Term Residence holders against expulsion); one related to the Single Permit Directive 2011/98/EU (judgment in Case C-449/16 interpreting the equal treatment Article of this Directive); and one related to the Students Directive

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<sup>73</sup>Proposal for a Directive of the European Parliament and of the Council on the conditions of entry and residence of third-country nationals for the purposes of highly skilled employment, COM(2016) 378, 6 June 2016,6.

2004/114/EC (judgment in case C-544/15 clarifying the interpretation of the public security clause in this Directive). In its communication on managing migration in all its aspects: progress under the European Agenda on Migration from 4 December 2018, the Commission reiterated the importance of the revision of the Blue Card Directive and called on the Council to swiftly agree on a position which brings real added value compared with the current Blue Card.

## **2.5 The Mobility of Turkish Workers into the EU**

The relationship between Turkey and the EU could be traced back to the early years of the establishment of the European Economic Community (EEC) with the application of Turkey's association membership in July 1959. The legislative framework on the right of Turkish nationals to free movement within the EU is mainly drawn by two legal sources. The first one included the EU legislation regulates the rights of free movement of workers across the Union. The second framework relies on the agreements concluded between Turkey and the European Community.

Ankara Agreement, also known as Association Agreement, was signed on 12 September 1963 and came into force on 1 December 1964. The Agreement is considered as the first piece of legal document in terms of Turkey-EU relations and the foremost legal source on the free movement of Turkish workers at Community level. On the one hand, in fact, the Agreement was considered as a legal document which aimed to secure Turkey's membership in the EEC through the establishment of a Customs Union. On the other hand, the framework represented a political and an economic agreement determining the basic principles of the association. It introduced rights and obligations based on the concept of the reciprocity. The Agreement was signed in a period (1960s) where the level of labor migration to the European countries was increasing. In fact, some founding Members were experiencing labor shortages

in the post-war period. The labor migration which had begun with individual initiatives in the early 1960s and turned out to be a flow in the mean time, led to the conclusion of bilateral labor and social security agreements between Turkey and the host countries, including some Community members (Halat, 2010)<sup>74</sup>. In this respect, Association Agreement introduced a broader and comprehensive framework to the issue of movement of Turkish workers. However, the Association Agreement itself does not contain many provisions that are of immediate relevance to the freedom of Turkish workers in the EU countries<sup>75</sup>. The solely reference to free movement of workers is made in Article 12 (Chapter Three of Other Economic Provisions), which states that *“The Contracting Parties agree to be guided by Articles 48, 49 and 50 of the Treaty establishing the Community for the purpose of progressively securing freedom of movement for workers between them”*. However, the Additional Protocol and Financial Protocol, signed 23 November 1970, annexed to the Agreement establishing the Association between EEC and Turkey, is more explicit on issues of migration. In fact, the Protocol includes more detailed provisions concerning the regulation of the free movement of Turkish workers. The provisions were listed in the Articles 36-40, which gradually established by progressive stages, the free movement of workers between EEC and Turkey according to the principles of the Association Agreement (Article 36)<sup>76</sup>. Other provisions included the non-discrimination principle on the ba-

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<sup>74</sup>The aim was to ensure that migration would be systematic and Turkish workers would be protected with regards to their working conditions and social security rights.

<sup>75</sup>Relevant Articles in the 1963 Association Agreement are the following: Article 7 (broadly similar to the Article 10 TEC), is a principle of the Community loyalty and obliges the contracting parties to take all appropriate measures, whether general or particular nature, to ensure fulfillment of the obligations arising out of the Agreement. In accordance with the provisions of this article, the competence to take relevant decisions upon which the parties would take necessary measures was given to the Council of Association (Article 22). Article 9 (broadly similar to the Article 12 TEC), prohibits discrimination on ground of nationality, within the scope of application of the Agreement and without prejudice of any special provisions contained therein.

<sup>76</sup>Article 36 gradually established the free movement of workers between EEC and Turkey within 12 and 23 years after the entry into force of the Protocol. In addition, the article states that the Association Council would be responsible for establishing relevant rules for the achievement of free

sis of nationality (Article 37); social security rights of the workers and their family members (Articles 39); and a program to facilitate the exchange of young workers across the EU (Article 40). In this respect, the Association Council was designed to be the responsible for Turkish workers in respect to work and residence permits (Article 38). In respect to self employment, Article 41(1) Additional Protocol: the contracting parties refrain from introducing between themselves any new restrictions on the freedom of establishment and the freedom to provide services<sup>77</sup>.

However, the historical context of Turkey-EU relations have suspended the process of enabling Turkish workers to freely move within the Community. Free movement of workers between Turkey and the EU has not at all been achieved and, for this reason, it is not possible to consider the current legal situation as an extension of the internal market with respect to free movement of workers<sup>78</sup>. The Association Council has to date adopted three important decisions on the rights of Turkish migrant workers, namely Decisions 2/76, 1/80 and 3/80<sup>79</sup>.

Decision No. 1/80 of the Association Council was signed on 18 September 1980 and establishes a legal position for Turkish nationals to work in a Member State once admitted under a national immigration law(Friðriksdóttir, 2017). It also gradually increases the right of access to the labor market of a Member State of Turkish workers

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movement of workers.

<sup>77</sup>In this respect, three interpretations by the ECJ are relevant: ECJ 11 September 2000, Savas, Case C-37/98; ECJ 20 September 2007, Tum and Dari, Case C-16/05; ECJ 2003, Abatay and Sahin, Joint Cases C-317/01 and C-369/01.

<sup>78</sup>Proposal for a Council Decision on the position to be taken on behalf of the European Union within the Association Council set up by the Agreement establishing an association between the European Economic Community and Turkey with regard to the provisions on the coordination of social security systems, COM/2012/0152.

<sup>79</sup>Decision 2/76 was adopted at the twenty-third meeting of the Association Council, on December 20,1976. Decision No. 1/80 of the Association Council of September 19, 1980 on the development of the Association. Decision No. 3/80 of the Association Council of September 19, 1980 on the application of the social security schemes of the Member States of the European Communities to Turkish workers and members of their families.

(Article 6) and their family members (Article 7)<sup>80</sup>. Although the Decision contains a clause according to which both Member States and Turkey may not introduce new restrictions on the conditions of access to employment for workers and family members who are legally resident in their respective territories (Article 13), limitations to this clause may be justified on grounds of public policy, public security or public health (Article 14). Decision 1/80 does not provide a right to family reunification. Member States decide under what conditions family members are eligible for joining a Turkish worker resident on their territories. The legal framework on free movement of Turkish workers has developed by the cases brought in front of the ECJ, which has considered the application of legal rights derived from the Ankara Agreement, and its Additional Protocol and the 1/80 Association Council Decisions<sup>81</sup>. To date, the position of Turkish workers regarding employment and free movement is stated on Article 6(1) of Association Council Decision 1/80<sup>82</sup>. The ECJ interpreted the right to access the labor market as provided for Article 6, as necessarily implying a right to legal residence. In particular, according to the ECJ, the word "worker" must be

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<sup>80</sup>Relevant provisions were listed in the Articles 6 to 16 (Chapter II, section 1). Article 6(1):gradually increase the right of access to the labor market of a Member State of Turkish workers. Article 7 extends the gradually increasing right of access to the labor market to family members of workers duly registered as belonging to the labor force of a Member State.

<sup>81</sup>The most important ECJ Interpretations of the Decision 1/80 on the access to labor market are represented by the following case law: ECJ 20 September 1990, Sevince, Case C-192/89, para.29; ECJ 6 June 1995, Bozkurt, Case C-434/93, paras 29-30; ECJ 30 September 1997, Günaydin, Case C-36/96, para. 49; ECJ 30 September 1997, Entanier, Case C-98/96, para.55; ECJ 26 November 1998, Birden, Case C-1/07, para 65; ECJ 16 March 2000, Ergat, Case C-329/97, paras, 41, 56, 58; ECJ 19 November 2002, Kurz, Case C-188/00; ECJ 21 October 2003, Abatay and Sahin, Joint Cases C-317/01 and C-369/01, paras. 84, 85.

<sup>82</sup>According to the Article 6(1), a Turkish worker duly registered as belonging to the labor force of a Member State: *(i) shall be entitled in that Member State, after one year's legal employment, to the renewal of his permit to work for the same employer, if a job is available; (ii) shall be entitled in that Member State, after three years of legal employment and subject to the priority to be given to workers of Member States of the Community, to respond to another offer of employment, with an employer of his choice, made under normal conditions and registered with the employment services of that State, for the same occupation; (iii) shall enjoy free access in that Member State to any paid employment of his choice, after four years of legal employment* (Association Council Decision 1/80).

interpreted according to the Community Law as "*being duly registered as belonging to the Labor Force*"<sup>83</sup>. ECJ interpreted the 1/80 Decision in respect to the termination of a residence right of a worker on 7 July 2005. In this case (Dogan, Case C-383/03), ECJ states that the right ceases to exist when Turkish worker definitively ceases to belong to the legitimate labor force of the host Member State<sup>84</sup>.

The Ankara Agreement and the Additional Protocol envisaged the necessary steps for the full achievement of the free movement of workers. However, certain political and economic developments hampered the establishment of full freedom of movement in the EU for Turkish workers (Halat, 2010). Today, Turks are the largest immigrant community in Europe. The total population of Turkish people living abroad exceeds 6 million people, around 5,5 million of which live in Western European countries (Ministry of Foreign Affairs, 2019). Since 2004 accession negotiations with Turkey, the question of Turkish immigrants in the EU countries become a major issue. This is seen as exacerbating anti-immigrant feelings in a number of EU countries and is fueling concerns about further immigration relations.

## 2.6 Skill-Selective Immigration Policies in the UK and in Germany

There are many debates about the interaction between EU and national policies. Although the competencies of the EU in the matter of immigration policies have

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<sup>83</sup>According to the Article 6, the provisions must be regarded as applying to all workers who have complied with the requirements laid down by legislation in the Member State concerned and are thus entitled to pursue an occupation in its territory; and "legal Employment" presupposes a stable and secure situation as a member of the labor force of a Member State and, by virtue of this, implies the existence of an undisputed right of residence (Friðriksdóttir, 2017)

<sup>84</sup>Article 6 (second sentence) states that: Annual holidays and absences for reasons of maternity or an accident at work or short periods of sickness shall be treated as periods of legal employment. Periods of involuntary unemployment duly certified by the relevant authorities and long absences on account of sickness shall not be treated as periods of legal employment, but shall not affect rights acquired as the result of the preceding period of employment.

increased over the years, the decisions on the actual selectivity of immigration continue to be a domain of national governments. During the last years, a policy shift has occurred both at EU level and at that of its Member States. At the EU level, several action plans are attempts to attract highly skilled immigrants and to facilitate the mobility of third-country nationals once they have been admitted to an EU member state. Nevertheless, the scope of these efforts is limited, because the immigration policies continue to remain by and large in the national domain. Member States at national level have restrictive and different rules on the admission of third country nationals. As mentioned before, EU Member States integrated the EU directive into their national legislation up to June 2011, and since 2012 most member states have started to issue Blue Cards. However, the criteria used to determine the admission for high-skilled immigrants - educational qualifications, work experience, salary thresholds and job offers - vary across Member States. The EU Blue Card program left parallel national admission schemes unaffected (OECD, 2016). Several European countries have introduced a point-based system (PBS) to select migrant workers. Since 2008, the United Kingdom, Denmark, the Netherlands and Austria have introduced PBS in their migration selection channels. In a climate of increased global competition for talent, most countries have adopted measures aimed at attracting highly skilled individuals. For instance, they have launched reforms aimed at encouraging international students to remain in the country after their graduation, mostly by issuing work permits to ease their transition into the labor market. This has been the case of France, Germany, Sweden, and the United Kingdom (de la Rica, Glitz, and Ortega, 2013). However, they fall far short of being radical policy shifts (Brücker, Bertoli, Facchini, Mayda, and Peri, 2012). Triggered by concerns that Europe may fall back in the contest for talent, the EU has harmonized study programs in order to encourage the intra-European flows of students. This in turn has led to



a higher intra-EU labor mobility, particularly among the highly educated. However, many countries have increased the education costs for students and the restriction for workers to enter their labor market.

The following paragraphs aim to present the admission policies in Germany and in the UK, which present a different approach in selecting immigrants. While Germany have full transposed the EU Blue Card Directive in its national legislation, the UK has adopted a points-based system.

### **2.6.1 Point-based system in the UK**

Point-based systems are a form of skill-based preference system proposed by countries in order to make them more attractive to potential immigrants<sup>85</sup>. A point system is essentially a selection tool that provide for the possibility of selecting immigrants on the basis of more than one characteristic including age, educational attainment, language ability, occupation, wage level, experience and wealth. Although different point systems are used around the world, in general, countries allocate points for certain characteristics, and if a potential immigrants earns enough points, this receive a permanent or a temporary visa, depending on the country (Bansak, Simpson, and Zavodny, 2015). When several selection criteria are involved, one has to weight each of them, that is, assign different points to each criterion and define an overall point threshold to determine whether an applicant will be accepted. Exactly how points are allocated and what the passing threshold is different across the countries. Traditionally, points systems have been implemented in countries, such as Australia, Canada and New Zealand, under whose migration system candidates were not required to have a job offer in order to be eligible for immigration. A number of countries, including Czech Republic, Denmark, Hong Kong, Japan, Singapore, Sweden and the

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<sup>85</sup>In this case, the term “skill” is used as a synonym for “ability” acquired through formal education and work experience (Tani, 2014)

United Kingdom, have introduced a point system in recent years. However, points systems have also been implemented more recently in regimes which select economically desirable immigrants depending on a job offer and skills shortages, such as in the United Kingdom Tier 2 system. They also provide more flexibility in identifying appropriate candidates, who can be highly skilled without necessarily having, for example, a university qualification. In this case, self-selection works to attract the most able and motivated workers because the distribution of income between countries remains unequal over time. According to the Roy model, income inequality and a selective immigration policy work together by screening in favor of observed (skills) and unobserved characteristics, such as innate abilities and motivation (Borjas, Kauppinen, and Poutvaara, 2018). A point system becomes relevant if the host country has a relatively high average income compared with the home country but a compressed income distribution and possibly a comprehensive welfare system for its low-income earners. Based only on observed individual characteristics to screen desirable immigrants, the host country keeps out low-skilled immigrants in favor of skilled immigrants in order to “protect” the host country’s welfare system and address its domestic employers’ needs. Such a measure may also offer an automatic mechanism to stabilize income inequality trends between skilled and unskilled native workers. This is because the earnings growth of skilled immigrants will be constrained (due to the additional supply of skilled immigrant labor), whereas unskilled (native) workers will be in shorter supply and therefore command higher wages (Tani, 2014). Canada, Australia, and New Zealand are high-income, high-tax, high-welfare countries with relatively compressed income distributions, and their point system is thus likely to filter out prospective low-skilled and low-ability immigrants. Points systems may succeed in selecting economically desirable immigrants because of their association with migration regimes, such as Canada’s, which are generally viewed as successful ones.

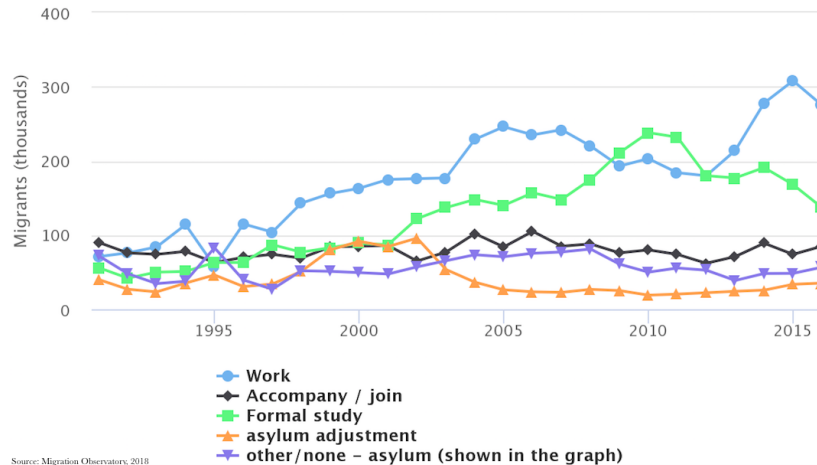
They can be a useful tool in screening potential migrants, but are complementary to job offers to employers. Indeed, Australia and Canada are according more and more importance to job offers in their points systems, because outcomes for immigrants selected under the points system without a job offer have not been as good in those countries as used to be case in the past (OECD, 2014). A point system is a tool for selecting would-be settlers who, because of increased international mobility and their transferable skills, can enhance their income or quality of life by moving to another country. Historically, the point system has been implemented to limit and regulate the inflow of migrants when they exceed the cap set by host countries. While effective in screening and altering an excess supply of immigrants, the system requires large data collections and regular policy evaluations. If this is not implemented, admitting unemployable immigrants becomes more likely, leading to substantial financial and social costs for the host country. Point systems do not guarantee immigrants' immediate economic integration, particularly in the early years after migration (Tani, 2014).

The UK manages its migration flows through its own national immigration law. Since 2008, in fact, the UK governments have published an immigration policy framework that has marked a shift in the priorities on immigration policy through the adoption of a points-based system. The points-based system replaced a large range of work and study visa categories which had evolved over time. These included the Highly Skilled Migrants' Programme, work permit schemes, and quota-based schemes for certain types of low-skilled work. These schemes granted non-EEA economic migrants temporary permits to work in the UK. Before the introduction of the PBS, skilled labor immigration was managed by permits granted to specified UK-based employers that sponsored named individuals to fill defined jobs at particular locations. Permits were administered by Work Permits (UK), part of the UK Border Agency (UKBA),

which was replaced by the “UK Visas and Immigration” in 2013. An additional route for highly skilled labor was the Highly Skilled Migrant Programme, which was implemented to encourage highly skilled people to come to the UK to work. While, since the UK became a member of the EU, there has been an unrestricted right of free circulation to any citizen of the EU member states (Aldin, James, Wadsworth, 2010). Before 1962, any Commonwealth or Irish citizen had right of entry to the UK. In 1962, the Commonwealth Immigrants Act was introduced through a voucher scheme, and the principle of right of entry to Commonwealth citizens was abolished in 1972 (Dobson, Koser, McLaughlan, Salt, et al., 2001). In that period, the existing work permit system was extended to all citizens outside of the EEC, Denmark, and Norway. Since the late 1990s, the British government has significantly increased the number of work permits issued to skilled and highly skilled non-EU migrants. The increase in labor immigration to the UK was further accelerated by the British government’s decision to allow so-called A8 nationals to enter and work without any restrictions in May 2004 (see MAC, 2009). In 2008, the UK adopted a Points Based System for managing the migration of non-European Economic Area (EEA) nationals into the country for work, training or study.

The UK’s new points-based system was organized along several tiers, which identified five categories of immigrants to be admitted under a point-based system. Each tier contains several different visa sub-categories (and some sub-sub-categories), with varying associated conditions and eligibility requirements. The first two categories included highly skilled immigrants, which are grouped in the Tier 1 programme and a Tier 2 scheme. Under the first programme, high skilled workers could apply for an entry permit, without needing an existing job offer. Tier 2 scheme should serve as main route for medium and high skilled workers who have already received a job offer. Tier 4 was devoted to the entry of the international students, who need to be

Figure 2.5: Migration to the UK by categories



sponsored by a licensed educational institution. While the last two tiers should serve as routes for temporary immigrants and for low skilled workers. Specifically:

- Tier 1: high-value immigrants (entrepreneurs, exceptional talent, post-study employment and investors;
- Tier 2: skilled workers with a job offer in an area where there is a labor shortage. Categories under this route include: 1) intra-company transferees (ICT); 2) elite sportspeople; 3) Ministers of Religion 4) general category that covers the admission of people coming to the UK with a job offer to fill a gap that cannot be filled from within the resident labor force;
- Tier 3: low skilled workers designed to fill temporary low-skilled shortage;
- Tier 4: foreign students;
- Tier 5: persons coming to the UK to satisfy primarily non-economic objectives, such as those entering on youth mobility schemes and temporary workers, or asylum seekers.

Since its introduction, the idea of the Labor Government was to attract “the brightest and best” immigrants. For several years the UK government policy has emphasized the need to prioritize skilled over unskilled migration. The UK system was, in fact, specifically designed to select individuals with skills regarded as beneficial to the national economy. Similar to the Australian and Canadian point systems, the UK first version system awarded points based on age, work experience and qualifications and there were no pre-specified numerical limits (de la Rica, Glitz, and Ortega, 2013). However, the application requirements become substantially stringent over time. Following the 2010 election, the Coalition Government reviewed the Points Based System for non-EEA migrants. The overall ambition aimed to reduce net-migration by the restriction of inflows of non-EEA net migration and to boost outflows of non-EEA nationals in order to affect the size and the composition of UK migrant workforce<sup>86</sup>. Controls on labor migration were introduced from April 2011, when the government announced a numerical immigration limit. Major reforms have included: (i) the closure of the Tier 1 general route due to a mismatch between education and occupations; (ii) the introduction of a permanent limit of 20,700 on skilled labor migration from outside the EU (Tier 2-General); (iii) strengthening the resident labor market test and successive updates to the Shortage Occupation List.; (iv) introducing financial requirements for those wishing to settle in the UK. Since 2011, furthermore, the UK Government has added a multiple checks for international students’ compliance with visa rules, stabbing restrictions on permission to work for international students and closing the Tier 1 Post-Study Work route, which allowed non-EEA university students to stay in UK and work two years after graduations. Since 2012, restrictions have affected also the family migration by increasing the minimum income threshold

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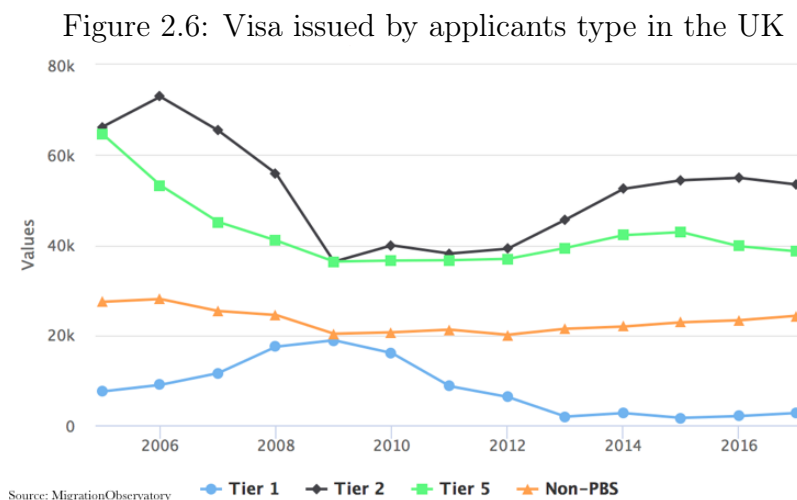
<sup>86</sup>One of the main promises by the former Prime Minister David Cameron during the 2010 General Election campaign was to decrease net migration to less than 100,000 migrants per year by 2015 General Election, and migration policy has since been focused on this goal (Rienzo and Vargas-Silva, 2015).

for British nationals to bring non-EEA partners and children to the UK and additional restrictions such as the need to demonstrate English proficiency (Rienzo and Vargas-Silva, 2015). In general, the tiers system is considered to be demand-driven since a valid job or, proof of investment capital or self-employment is a requirement. Although applicants are selected based on their overall score, the scores achieved in various sub-criteria also matter. This means that applicants cannot compensate for missing points in one criterion by scoring higher in another (Burmans, Perez, Hoffmann, Rhode, and Schworm, 2018). The requirements for the resident permit are stringent and allow only for a temporary admission into the country. Furthermore, most of the tiers require that the applicants must have a job offer and be sponsored by an employer licensed by the UK Home Office<sup>87</sup>. Another important feature of this system is its reliance upon previous earnings as a measure of expected labor market performance of the perspective migrants, emphasizing that the labor shortage determines the job offer in each occupation (Brücker, Bertoli, Facchini, Mayda, and Peri, 2012). As opposed to Australia, Canada and New Zealand, United Kingdom allows immigrants to grant a temporary visa in order to work in the UK for a few years but not to grant permanent resident status. The latest estimation provided by the Office for National Statistics (ONS), suggest that 627,000 people arrived in the UK (immigration) and 345,000 people left the UK (emigration) over the 2018. There are different patterns for EU and non-EU migration to the UK. According to the ONS estimates (2019), non-EU migration for both work and study follows a gradual increase in immigration of non-EU citizens from 2013 to an estimated 340,000 in the year ending September 2018. The UK has closed down or never opened a few of tiers. The largest category of work visas issued to non-EU citizens was Tier 2 route in 2018, which counted the 45% of all work visas. Details of the Tier 2 system can be found

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<sup>87</sup>Employer sponsorship means that employer is responsible for the foreign worker and must notify the UK Home Office if the employee stop working.

in the next chapter. The second largest category was Tier 5, which includes various temporary workers coming for cultural exchange and other work-related purposes and represented the 31% of work visas, while Tier 1 visas for main applicants remained below the 3% of work visas issued in 2018 (Sumption, 2019).



According to ONS (2019), the population of EU net migration has sharply decreased since 2016 referendum. In particular, ONS estimated 57,000 more EU citizens coming to the UK than leaving in the year ending September 2018. In 2017, EU population stood at almost 3.7 million, where approximately 2.4 million EU born were employed in the UK labor market. In 2016, inflows of EU nationals migrating to the UK stood at 250,000, down from 269,000 in 2015 (ONS, 2018). The post-Brexit seems to call for a system where future immigrants (i) are likely to be more skilled than their predecessors; (ii) they will probably stay in Britain for only a few years, rather than settle; and (iii) largely will come from outside the EU (Sumption, 2019). In December 2018, the UK government published a White Paper, which outlines proposals for the future border and immigration system<sup>88</sup>. The future system predicted

<sup>88</sup>In September 2018, the MAC published a comprehensive analysis of the economic and social impacts of EU migrants in the UK.



in the White Paper will apply in the same way to all nationalities, such as there will no longer differences between non-EU and EU citizens immigrants. Furthermore, the UK government will prioritize skilled migrants through a skilled-based migration policy. When the Government published its white paper on the UK's post-Brexit immigration system, one of the main questions that has received much attention was the salary thresholds that EU and non-EU citizens would both have to meet after Brexit if they want to come here for work. In the proposed system, migrants planning to live and work in the UK long term would have to be doing a skilled job and receive a minimum salary, as non-EU citizens currently have to do when they come to the UK on 'Tier 2' work visas. As mentioned above, currently, the general minimum salary for most experienced workers coming from non-EU countries is £30,000. The White Paper does not commit the Government to a specific level in the future system, but in an annex to the White Paper does take £30,000 as the baseline (Migration Observatory, 2019).

As the UK leaves the EU and the free movement will be to an end, different rules to the current ones to migration are proposed in the White Paper (UK Parliament, 2018). The future system will apply in the same way to all nationalities - EU and non-EU citizens (White Paper, 2018). The proposed new system should require all EU citizens coming to the UK for work or study to have authorization. Following the advice of the Migration Advisory Committee (MAC), the new system will prioritize skilled migration.

## 2.6.2 Policies for High-Skilled Immigrants in Germany

Since the end of the *Gastarbeiter* period in 1973<sup>89</sup>, German immigration policy limits immigration to skilled or highly skilled workers and admits low skilled workers only for short periods. Until recently, the most popular temporary worker programs there admitted seasonal workers and workers used by foreign contractors. These programs brought short-term labor to Germany from Eastern Europe but became obsolete as more countries ascended into the EU (Bansak, Simpson, and Zavodny, 2015). In order to prevent low skill levels in the immigration population and to increase the shortage of highly skilled labor, German government launched the New Immigration Act in 2005 where Germany declared itself as a country of immigration, putting integration as a legal duty<sup>90</sup>. Furthermore, in addition to the regulation measures aiming to improve integration, this Law was an important step in the regulation of labor market, identifying three types of legal residence permits: Permit of stay; Settlement permit; and Residence permit or *Aufenthaltserlaubnis* for the economic activities (Constant, Tien, et al., 2011). The new Immigration Act replaced the former German Green Card Initiative in order to encourage the access in labor market for highly skilled workers to move to Germany. The reform that explicitly targeted highly skilled workers focuses on two groups perceived as highly skilled. The first group includes scientists and teaching personnels with excellent qualifications like the University Professors, outstanding sportsmen, and artists. Instead, the second group includes managers and specialists. Although both groups are entitled to permanent

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<sup>89</sup>Starting from the early 1950s began the recruitment of foreign workers, the so-called *Gastarbeiter*, who were hired for a temporary period. The 1973 represented a turning point in the migration history of many countries due to economic recession triggered by the global oil crisis. In particular, Germany experienced an increase in unemployment as well as a contraction in mass production. For this reason, the government of GFR established the so-called *Anwerbestop*, that is the interruption of recruitment policies.

<sup>90</sup>Gesetz zur Steuerung und Begrenzung der Zuwanderung und zur Regelung des Aufenthalts und der Integration von Unionsbürgern und Ausländern, 2005.

stay, a resident permit is granted to individuals who are self-employed if they invest €500,000 and employ at least five persons. The new German Immigration Act allows highly qualified persons to be granted permanent residence and permission to work from the outset instead of five-year work permits as was previously. For instance, whereas according to the Green Card regulation initiated in 2000, foreign computer experts had to leave Germany after five years, the new law allows them to stay permanently (Grassler, 2005). This Law has marked an important development in Germany also regarding to the foreign students. While previously it was quite difficult for foreign students to remain in Germany upon the completion of their studies, since 2005 foreign graduates of German universities can have a year to look for a job if they wish to stay in the country. However, only since 2005, Germany has begun to gradually address its immigration policy toward labor immigration of high skilled foreign workers, by introducing other changes and reforms along the last years. The most important attempt in this respect was the introduction of the EU Blue Card in 2012, namely the EU-wide work permit that allows highly skilled immigrants with a job offer to work in European Union (Burkert and Haas, 2014).

The EU Blue Card is an important type of combined residence and work permit under the German immigration law, which was formally introduced in Germany on 1 August 2012 on the basis of the Act Transposing the Highly Qualified Employment Directive (Directive 2009/50/EC) on highly-qualified employment. It is a self-contained residence permit, which was introduced to facilitate the recruitment of highly-qualified applicants from the non-EU countries. Among other things, this Act has resulted in the introduction of a new residence title as outlined in section 19a of the German Residence Act (Aufenthaltsgesetz). Blue Card Initiative specifically targets third-country nationals who enter Germany directly from a non-EU state<sup>91</sup>,

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<sup>91</sup>Residence Act, section 19a subs. 1.

or who already have an EU Blue Card as a resident in another EU Member State<sup>92</sup> and who come to Germany for the purpose of taking up highly qualified employment<sup>93</sup>. The entry visas are mainly issued under the same requirements as final EU Blue Cards and have a validity of 90 days. Those requirements include: (i) work in Germany related to a local employment contract; (ii) have a German (or equivalent foreign) university degree; (iii) earn a salary that complies with the salary criteria. In terms of salary, German immigration law differentiates between shortage occupations and other occupations. The salary criteria stipulated by the EU Blue Card regulation are a mandatory requirement. In these cases of occupations in which there is a shortage of applicants, the EU Blue Card may only be issued with the consent of the Federal Employment Agency, unless they graduated in Germany<sup>94</sup>. If the laws change between filing the application and the decision to issue a permit, the latest laws have to be considered. Third-country nationals already living in Germany under a different type of residence permit may also apply for an EU Blue Card, under several conditions<sup>95</sup>. People living in non-European countries must first apply for a visa for the purpose of employment in their home country before they enter Germany in order to submit an application for an EU Blue Card. Third-country nationals who have been in possession of a EU Blue Card issued by another EU Member State for at least 18 months and who wish to migrate from that country to Germany may also apply for an EU Blue Card in Germany. The application must be submitted within one month of entry into German (Federal Office for Migration and Refugees, 2019). Holders of

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<sup>92</sup>German Residence Ordinance (Aufenthaltsverordnung – AufenthV), section 39 No. 7.

<sup>93</sup>All foreigners except nationals of Australia, Canada, Japan, Israel, New Zealand, South Korea, and the United States are entry- visa required for employment-related stays in Germany.

<sup>94</sup>Employment Ordinance, section 2 subs. 1 No. 2b and subs. 2.

<sup>95</sup>The conditions include: (i) the proof that they have graduated from university-level studies and the qualification must be comparable to a German higher education qualification<sup>96</sup> and (ii) the evidence of an employment contract or a binding job offer with a specified minimum salary (Federal Office for Migration and Refugees, 2019).

the EU Blue Card in Germany may be issued with a permanent national residence title (settlement permit) once they have been in highly qualified employment for 33 months during which they have paid into a retirement scheme. Holders of the EU Blue Card who can prove adequate German language skills at level B1 can apply for a settlement permit for Germany after only 21 months. This visa route enable the entry of family members<sup>97</sup>.

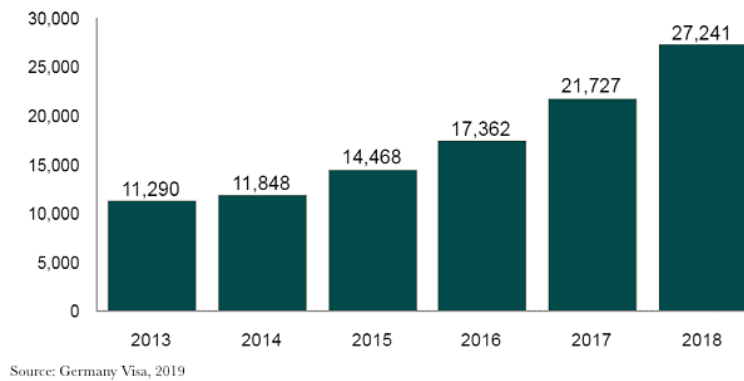


Figure 2.7: EU Blue Card issued in Germany by years

Nevertheless, the EU Blue Card is not the only type of combined residence and work permit for third-country nationals locally employed in Germany. Another type of permit for highly-skilled specialists exists and, additionally, nationals of the seven countries listed above can apply for a combined residence and work permit. For these types of permits, definite salary criteria do not exist. Amongst other requirements, the salary must be equal to the salary of local workers with a comparable professional background and working in a comparable position <sup>98</sup>. Since 2013, the Federal Min-

<sup>97</sup>Residence Ordinance, section 39 No. 7. The EU Blue Card has several advantages for family members. In particular, spouses are entitled to be granted a residence permit even if they do not possess any knowledge of German prior to entering the country (Residence Act, section 30 subs. 1 sentence 1 No.3g and sentence 3 No. 5). In addition, spouses are immediately entitled to take up dependent and independent employment without any restrictions (section 27 subs. 5).

<sup>98</sup>The salary criteria for EU Blue Cards in 2017 calendar year issued by German authorities have

istry of Labor and Social Affairs (FMLS) has promoted a campaign in order to attract high skilled workers especially young individuals from EU countries suffering from the economic and financial crisis. It is organized into two steps: the first one concerns the country of origin through an introductory course of German language supported by FMLS itself; the second one is linked to the support in the search of employment or apprenticeship position in Germany and to take part in language classes in Germany in order to prevent communication barriers. Both prospectives involve immigrants, who are between 18 and 35 years old as well as interested employers, who can apply for support under this campaign. Furthermore, the Federal Ministry of Labor and Social Affairs (FMET) together with the Federal Employment Services (FEA) launched the website “Make in Germany” in order to make easier foreign workers to take up employment in Germany (Constant, Rinne, et al., 2013). One of the main obstacles to job mobility in Germany resulted to be the insufficient language skills and the recognition of qualification. For this reason, both federal state and local governments, as well as the employers have tried to introduce some services for immigrants. At the first level, the institutions have spread solutions in order to improve the labor integration of immigrants through counselling, vocational training and language courses. In this way, federal governments are shaping their integration policies towards the coordination of training and employment services at regional level to improve employment advisors’ intercultural competence. Altogether, the reforms of the immigration legislation in Germany did not fundamentally change the conditions for selection of high-skilled immigrants (Brücker, Bertoli, Facchini, Mayda, and Peri, 2012).

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increased. For shortage occupations, the new criterion is EUR 39,624, while in 2016, was EUR 38,688 and for all other occupations it is EUR 50,800 (in 2016: 49,600). In addition, the general minimum wage requirement arising for all work performed in Germany increased from EUR 8.50 to EUR 8.84 gross/hour (Klaus and Wolf, 2017).

## 2.7 Conclusion

The EU labor market is expected to experience important future challenges. While the ageing population is expected to affect the quantity of the labor supply, the increasing demand for certain skills and for technological innovations will change the way how work is conceived and organized, affecting professions and occupations required in the labor market. Therefore, attracting highly qualified labor has become a key priority of most Member States, which view migration as part of a wider strategy to address labor shortages in the domestic workforce. Generally, two systems have been identified to linking economic migration to labor market needs: demand-driven systems, where an employment offer influences the decision to admit a migrant seeking employment in previously identified shortage occupations; or supply-driven systems, where admission frameworks are adjusted in order to attract migrants with characteristics like education, abilities and potential to successfully integrate. Often countries also implement a hybrid structure merging both supply-driven and demand-driven approaches in their migration policies. To date, efforts at Union-level to attract high-qualified workers from third countries have had a limited impact due mostly because of the limited application of the EU's Blue Card Directive. Statistics show that labor migration into the EU is relatively low in comparison to other OECD countries. These flows from third countries differ greatly across European host countries, both in terms of size and composition (de la Rica, Glitz, and Ortega, 2013).

While today's intra-European migration is largely unrestricted, the regulation of immigration flows from outside the EU remains primarily the responsibility of the individual national governments. Migration policy includes both laws and regulations, as well as specific programs.

Currently, the EU's approach to labor migration has so far been implemented

through individual Directives focusing on the conditions of residence and entry of specific categories of third country workers, including highly- skilled workers, seasonal workers, intra-corporate transferees (ICTs) and students and researchers. In addition, a number of instruments have been developed at the EU level to monitor and forecast labor migration across Member States, for instance the European Employment Observatory, the European Vacancy Monitor, EU Skills Panorama, and the EU Labor Force Survey. However, the impact of both directives and instruments are considered to be limited due to problems in relation to their implementation.

In May 2009, the Council Directive "on the conditions of entry and residence of third-country nationals for the purposes of highly qualified employment" was approved with the aim to increase internal labor mobility to improve the match between labor market supply and demand, but also foresees a growing need for more migrants from outside the EU (Goldin, Cameron, and Balarajan, 2012). The so-called Blue Card Directive put in place a specific demand-driven migration scheme for highly qualified non-EU workers by introducing a new procedure and common admission criteria for issuing a special residence and work permit. The EU Commission presented three main arguments in favor of the Blue Card: (1) EU enterprises have growing difficulties in filling their labor market shortages; (2) the EU was no longer producing sufficient numbers of workers to meet its labor market needs; and (3) the high-skilled regime was failing in international competition for the "best and brightest" (Commission, 2007). This Initiative sought to make the EU internationally more competitive by facilitating the access to the labor market and providing the holders some socio-economic rights, like favorable conditions for family reunification and facilitated movement around the EU. However, Member States were reluctant to cede responsibility for labor market access regulation. For this reason, the EU Blue Card Directive has had a limited application due to a number of reasons, including the high



costs it imposes on both employers and migrants and the coexistence and competition with national schemes for highly-qualified migrants. In addition, the Directive was criticized for the presence of high eligibility standards, including the high salary threshold, lengthy bureaucracy, and limited harmonization concerning the intra-EU migration. For these reasons, the Commission made a review of the EU Blue Card one of its top priorities, with the goal of making the EU Blue Card a more attractive and relevant scheme across Member States. In June 2016, the Commission put forward a proposal for a new EU Blue Card Directive that offers a more harmonized, simplified and streamlined approach to attract highly skilled workers through a EU-wide scheme, which intends to introduce more inclusive and flexible admission conditions, faster and more flexible procedures, improved rights and enhanced facilitation of intra-EU mobility. At the same time a new dedicated EU Blue Card section was launched on the EU Immigration Portal in order to provide practical information for potential EU Blue Card applicants. Some researches have shown that the Blue Card in the EU would only be effective in case of an increase in the share of employment-based immigrants in the population (Hatton, 2008; Speciale, 2010).

While the majority of policies is employment-based, the implementation of potential oriented schemes is increasing. Another potential-oriented policy is the EU-wide directive aimed at increasing of foreign graduates and researchers. With a view to retaining a higher number of third-country national students after graduation, the Students and Researchers Directive was adopted in 2016. This was the result of the recast of the 2004 Directive on the conditions of admission of third-country nationals for the purposes of studies, pupil exchange, remunerated training or voluntary service and the 2005 Directive on researchers. An endorsement for a high-skilled mobility within the EU has been provided also for EU citizens under different regulations in order to harmonize the study programs and to recognize the university degrees among

the Member States.

The review of the main developments for mobility of high-skilled immigrants across the EU has showed a fragmented framework. The EU presents several directives covering different types of migrants. The reasons for such fragmentation has been due to Member States' reluctance to cede sovereignty to the EU level in this policy field. Member states at the EU-level appear to be reluctant to adopt EU rules on admission of third country nationals and in this respect the decisions on the actual selectivity of immigration continue to be a domain of national governments.

During the last years, a policy shift has occurred both at EU level and at that among its Member States. In a different way to the EU member countries, the immigration system of the United Kingdom does not include the EU Blue Card. Instead, the UK manages its migration flows through a national immigration law. Since 2008, UK governments have published the immigration policy framework that marked a shift in the priorities on immigration policy through the adoption of a points-based system. Work and study result to be the main determinants of migration to the UK, partly explained by (i) the introduction of a relatively open work permit system for third-country workers in the early 2000s, (ii) by the government's decision to open the UK labor market to East European workers in May 2004, and (iii) by policies to increase the number of foreign students coming to UK (Czaika and De Haas, 2018). However, since 2010, the main goal of the UK's immigration policy has been to decrease net migration, making migration more restrictive, including the routes for high-skilled migrants. Germany has reported a shortage of skilled workers and highly qualified people. To encourage such people for Germany immigration, foreign immigration authorities have relaxed the stringent requirements to go to Germany and work. Attempting to go beyond these limits, Germany introduced the Blue Card in 2012 , such as the EU-wide work permit that allows highly skilled immigrants with

a job offer to work in European Union (Burkert and Haas, 2014). The EU Blue Card is given to foreign third-country national workers who have high qualifications and want to work in Germany and apply those skills. To qualify for the EU Blue Card, the applicants need to have already found a job in Germany, and the minimum annual salary must be EUR 50,800. The EU Blue Card grants its holders the right to stay in Germany for four years, with a possibility of changing their residence permit into a permanent settlement. To qualify for permanent settlement the holder must show enough German proficiency, meet certain financial requirements, as well as must have worked in Germany for more than 33 months in their place of employment which requires the skills gained with the highest qualifications.

## Chapter 3

# IMPACT OF IMMIGRATION IN THE UNITED KINGDOM

## Abstract

Since 2011, the UK migration policy has focused on the reduction of net-migration by the restriction of inflows of non-EEA net migration. Tier 2 visa route restricts such numbers to a cap of 20.700. The UK has shifted much of its emphasis on having a job offer in an occupation determined to be experiencing a labor shortage. This chapter focuses on this issue, relying on a new source of data created by merging administrative labor force data with a Certificate of Sponsorship (CoS) and Minimum Salary data. The identification strategy is based on a difference-in-differences approach. It allows exploiting how an exogenous shock made by the Government in the selection of people in the labor market has influenced the access to some professional categories. Such categories are observed according to market priority and divide them into treated and control groups before and after the event of interest. Then, a triple-difference estimation exploits variation across occupations in some different groups, namely EU and non-EU immigrants, compared to the UK-born workers. Finally, the announcement of Brexit is exploited observing whether this event may indirectly influence the labor market conditions as it changes the status of EU citizens. Results for the period 2009-2013 show that immigrants selected based on skill priority on shortage are not the top-level of skill distributions. The results for 2014-2018 show that the Brexit referendum has already had an impact on the high-skilled labor market and show an increase in the average salary of shortage occupations over time<sup>1</sup>.

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<sup>1</sup>This analysis is conducted with G. Pignataro (giuseppe.pignataro@unibo.it) and S. Fiore (s.fiore@unibo.it), Department of Economics, University of Bologna. The results in this chapter are very preliminary. Before to cite and for further information, please contact the author: mariele.macaluso2@unibo.it.

### 3.1 Introduction

United Kingdom's immigration system is undergoing its most radical reform in half a century. As the UK leaves the European Union (EU) and they bring free movement to an end, Brexit is going to mark a big shift which will lead to a new system. However, since 2011, the UK policy has aimed to reduce net-migration by restricting inflows of non-European Area (EEA) net migration and encouraging the outflows of non-EEA nationals to affecting the size and the composition of UK migrant workforce. Immigration to the UK depends on a tiered system substantially revised after its first approval in 2008. It is a hybrid immigration system, consisting of both points-based and demand-led elements. For several years, the UK government policy has emphasized the need to prioritize skilled over unskilled migration. Government policy to increase selection based on skills was evident in the introduction of the Points Based System (PBS, hereafter) in 2008. Labor government's choice was to control the quality rather than the number of migrants to attract 'the brightest and best' immigrants. Nevertheless, since 2010, the Coalition government has aimed to reduce net migration from the 'hundreds of thousands to the tens of thousand'. The reform was implemented in April 2011, when the Government announced a numerical immigration limit. The target of these measures has included migration restrictions of the three main migration inflow routes for non-EEA nationals, namely work, study and family, and efforts to boost outflows of non-EEA citizens. Such a policy has influenced the size and composition of the migrant workforce. In particular, it induces a selection process for the highly skilled migrants, since there is no route open to low-skilled labor migration to the UK from outside of the EEA (Rienzo and Vargas-Silva, 2015). This category was limited to the job in graduate level occupations based on the Standard Occupational Classification (SOC), which has a more significant effect

on numbers. Shortly after the May 2015 general election, the Government asked to restrict the quantities of Tier 2 migrants further. This followed from a commitment in the 2015 Conservative party manifesto to *"Maintain our cap at 20,700 during the next Parliament. This will ensure that we only grant visas to those who have the skills we need in our economy"* (Conservative Party Manifesto, 2015). In this way, net migration has become the way to measure the success or the failure of policies that intend to control immigration (Vargas-Silva, 2017). Since 2012 there has been a significant increase in the numbers of both entry clearance and extension visas issued. However, until recent years, the route has been under-subscribed, and therefore the limit not reached. The cap was reached for the first time in June 2015. In December 2017, probably due to the 'announcement' impact of the Brexit referendum, the cap had started to bite again. The demand for Certificates of Sponsorship (CoS) made by employers was higher than the supply threshold made by the Home Office. According to the Office for National Statistics (2018), migrants from non-EU countries were the largest since 2004. Higher demand means that fewer visas are allocated, with an increase in the minimum salary required to apply. Thus, the cap started to prevent some non-EU skilled workers from taking positions in the UK labor market. Tier 2 has become much more selective since its introduction. Skill requirements have been ratcheted up, and minimum pay thresholds raised. The Migration Advisory Committee in the UK is the responsible to produce independent advice and recommendations on the shortage in the labor market. The National Employer Skills Survey (NESS) defines skills shortage as "hard to fill vacancies". It depends on either a low number of applicants with the required skills, or a lack of candidates with the necessary work experience, or a lack of candidates with the required qualifications. Different approaches in the literature study how to define and measure skills and their selection in the labor market. Although the term "skill shortage" is frequently used by gov-

ernments and employers, there is no universally accepted definition for it. Typically, shortages occur when demand exceeds supply at a given wage, and there is a lack of equilibrium in the labor market. However, there does not exist direct evidence about the relationship between labor shortages and inflows of high-skilled foreign workers in the literature. It represents a significant gap. While the existence of labor shortages can theoretically reconcile different results of the research, empirical evidences do not have a clear vision of this phenomenon. The explanation of this gap seems to be due to the scarcity of the data and the difficulty of measuring the impact of shortage in the labor market. To the best of my knowledge, this analysis represents the first exercise filling this gap in a EU context. It exploits an exogenous reform in 2011 intending to understand the impact of an institutional change at national level. In this setting, this implies to quantify how a policy change in the VISA selection affects the group of shortage occupations compared with the differences in the other Tier 2 occupations before and after the 2011 Reform. Moreover, this analysis exploits the Brexit referendum to observe if it has caused an impact and to which extent, on the same professional categories. This analysis builds on the Labour Force Survey (LFS) quarterly data released by the Office for National Statistics (ONS). It is the official source of information on labor market outcomes in the UK. This analysis pays attention to tier 2 occupations by focusing mainly on shortage and no shortage information. The second source concerns confidential data on the Certificate of Sponsorship (CoS) collected through a Freedom of Information (FOI) Requests process from the UK Home Office. These specifically concern the occupation breakdown of restricted CoS granted from years from 2009 to 2018 to identify the CoS demand at the professional level. We have also created a dataset on minimum salary thresholds at the professional level by looking at the Codes of practice for Tier 2 Sponsors. It sets out the skill level and the appropriate salary rate for jobs. The contribution of



this analysis mostly relies on a merged dataset that exploits variations in high-skilled and especially in labor shortages at the occupation level conditioned on information on CoS granted as well as on minimum salary thresholds. The question of how to regulate migration flows to favor the destination economy is not new in the policy debate within the European Union. Previous studies have investigated the role of immigration policy on the selection process of migrants and their socio-economic performance in the destination countries. However, rare studies look at the impact of selective-policies on skilled migration (see Docquier and Rapoport, 2007; Constant and Zimmermann, 2005; Czaika and Parsons, 2017; Ruhs and Anderson, 2010). How immigration affects the labor market in the destination country is a question that has been extensively explored by the literature without reaching a definitive consensus. As shown in the first chapter, there is a vigorous debate among academics. Some research finds that immigration flows harm at least some workers, as economic theory predicts when immigration changes the balance of skills in an economy. Nevertheless, there is little direct evidence about the relationship between labor shortages and the inflow of high-skilled foreign workers in the economic literature. This chapter takes advantage of a 'natural' experiment in the UK by investigating how tightness in a selective policy affects the selectivity and the quality of immigrants and the effects on real shortages in the labor market. This chapter expands the existing literature by examining whether the implementation of the Tier 2 policy had a substantial impact on labor shortages for the demand of foreign workers. The last part of the thesis is organized under two parts to understand the sophisticated setting of the UK policy. The first part explores in detail the institutional environment and presents the data sources. The second part will focus on theoretical and empirical findings. The rest of the chapter is organized as follows. Section 2 explains the institutional setting by discussing (i) the reform and how it has evolved over time, (ii) the central element

of the Tier 2 system, and (iii) how migration flows to the UK changed after its introduction; Section 3 focuses on the debate in the literature and the contribution of this analysis; Section 4 describes the data and the descriptive statistics essential to understand both the setting and the empirical results. The second part of the chapter is organized as follows. Section 5 begins from a theoretical framework that relies on two hypotheses on the selection and the quality of immigrants; Section 6 presents the identification strategy; Section 7 shows the empirical results and the robustness checks. The last section includes a conclusion and a discussion of the observed effects.

## 3.2 Institutional Setting

### 3.2.1 The Legal Context

Tier 2 (General) system was announced on November 2008. It regulates the selection mechanism of job offerings towards the high-skilled profiles from the non-European Economic Area (EEA, hereafter). A Points Based System (PBS) characterized the system giving priority in the VISA selection to some job categories particularly appreciated in the labor market<sup>2</sup>. It replaced the previous Work Permit scheme which was an immigration category used to encourage skilled workers to enter the UK, while still protecting the interests of resident workers. Under the 1971 Immigration Act, a work permit would be granted to a specific employer for a named person from outside the EEA for a specific job. Work permits allowed skilled workers to apply for a work permit as long as they held a valid job offer from an employer in the UK. Under this system, employers had to advertise skilled occupations and carried out a labor market test to hire migrants from non-EEA. Note that there were no limits on the numbers allowed into the country. The position for a work permit required a National

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<sup>2</sup>Tier 2 is divided into 4 subcategories: (i) Tier 2 (General), (ii) Tier 2 (Intra-company transfer), (iii) Tier 2 (Minister of religion), (iv) Tier 2 (Sportsperson).

Qualification Framework (NQF, hereafter) level 3 (equivalent to A-level) and above, while for certain professions, the registration with the governing body of that profession was required. The duration of the work permit was dependent on the length of time requested by the sponsoring company, and then work permit holders were able to work in the UK without restrictions (Glennie, 2012). However, the Government's idea to link migration policies more explicitly to the UK's skills needs to prompt it to carry out a fundamental rethink of the rules around the selection of immigrants. In 2008, this idea led the UK to adopt a Points Based System for managing migration, with Tier 2 as the main route for selecting skilled non-EEA nationals into the country for work. The objective of the Labour government was to prioritize the selection of the most highly skilled and best-paid migrants through the PBS. Instead, the New coalition government came in power in 2010, based its immigration policies around the reduction of the net immigration "from the hundreds of thousands to the tens of thousands" (Conservative Party, 2010). On 23 November 2010, the Home Secretary announced the Government's criteria of applications for Tiers 2 program<sup>3</sup>. Statement of changes HC 863 to the Immigration Rules was published by the Government on 16 March 2011 and applied on 6 April 2011<sup>4</sup>. It is a substantial document that makes various amendments, including changes to the Tier 2 (General) category. The major reform introduced a permanent limit of 20,700 on the number of overseas applicants who may be sponsored. It also revised some characteristics of the vacancies according to minimum skill, appropriate salary rates, and English language thresholds. The new system identified those migrants which the UK needs, ensuring they have the neces-

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<sup>3</sup>The House of Commons ordered the Statement of Changes in Immigration Rules and presented the results on Parliament on 18 March 2010 under section 3(2) of the Immigration Act 1971. An Explanatory Memorandum accompanied this document, and it included the changes of Tier 2 (General), following recommendations by the Migration Advisory Committee.

<sup>4</sup>A statement of practice characterizes the Immigration Rules according to the Immigration Act 1971. The Statement of Changes in Immigration Rules is incorporated into a consolidated version of the Immigration Rules, found under the "Policy and Law".

sary English-language ability and can support themselves when they first arrived. In this way, the UK government gave more emphasis on the concepts of "skill needs" and "skill shortages". The 'Shortage Occupation' (SOL) is a list of job categories in a shortage condition of natives filling their positions. It implies that the vacancies in this list should fill with immigrants giving them priority in the VISA selection. The system has quickly become a criteria-based system via minimum skill and pay thresholds (MAC, 2015). Shortly after the May 2015 general election, the Government announced a series of policy changes to the Tier 2 (General) migration route. In particular, the Conservative party stressed on maintaining the cap at 20,700 to grant visas to those who have the skills needed for the UK economy (Conservative Party Manifesto, 2015).

For this reason, the Government asked the Migration Advisory Committee (MAC) to advise on further changes to restrict the numbers of Tier 2 migrants. The MAC was asked to report on two issues: the possibility of increasing the minimum salary levels for Tier 2 (General) and a more comprehensive review of the mechanism of Tier 2 visas. The review of Tier 2 included a revision of the Shortage Occupation List to restrict Tier 2 (General) recruitment, and whether there should be a time limit on how long occupations are on the SOL. While, on minimum salary thresholds, MAC recommended that the Government should be cautious over raising the minimum salary requirement. On 6 April 2017, significant changes to the UK Immigration Rules for Tier 2 employer-sponsored migrants came into force. These changes have affected all Tier 2 applications by increases in minimum salary thresholds and the introduction of additional and increased charges. Other significant changes have come into force since 2018. In particular, doctors and nurses were made exempt from the cap in June 2018, meaning there is no restriction on the number of doctors and nurses recruited from overseas. Home Office, nevertheless, has presented this measure as temporary

after the Tier 2 monthly limit had been exceeded for a record eight consecutive months stretching back to December 2017. Besides, the Government has also asked the MAC to review the Shortage Occupation List. The UK has implemented all changes to the SOL recommended by the MAC from October 2019, alongside several other changes to its points-based immigration system, including the amendment to the tier 2 salary rates. The Tier 2 salary rates listed in Appendix J of the Immigration Rules and amended through Immigration Rules change in March 2019. It reflects the latest available occupational salary data for each occupation.

### **3.2.2 The Reform**

Since 2011, the UK government has restricted the Tier 2 (General) visa, thus limiting the access of immigrants outside the EEA (and Switzerland) interested in a job in the UK. As mentioned above, the annual limit of 20,700 on the number of Certificates of Sponsorship available for out of country immigrants in Tier 2 General. The limit size has been established following advice from the Migration Advisory Committee and divided into monthly allocations to prevent the limit from being exhausted early in the year. The UK Border Agency (UKBA) is responsible for assessing applications for restricted CoS.<sup>5</sup> The system requires that migrants must be sponsored through a Certificate of Sponsorship (CoS, hereafter) from a licensed sponsor. Then, immigrants must be at least 16 years of age and advance English comprehension.<sup>6</sup> The Home Office makes a monthly evaluation of the different requests for sponsorship. The criteria

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<sup>5</sup>The UK Border Agency (UKBA) was the border control agency of the Government of the United Kingdom and part of the Home Office that was superseded by UK Visas and Immigration in April 2013. On 26 March 2013, it was announced by Home Secretary Theresa May that the UK Border Agency would have been abolished and its work returned to the Home Office.

<sup>6</sup>If the applicant is under 18 years, the applicant's parents or the legal guardian must support the application. Applicants that have been included as a Tier 4 (General) student as in the case of doctorate extension scheme must provide written consent from the sponsoring Government, (Home Office, 2019).

to be selected are based on the priority given to specific job categories, particularly tricky to be filled in the labor market. In particular, this mechanism provides priority to the occupations belonging to the shortage occupation list (SOL) identified by the Home Office. If the limit is under-subscribed in any particular month, the unused surplus is rolled-over and added to the following month. While, if the limit is oversubscribed in a specific month, unsuccessful requests are not carried forward, although those employers can submit requests again in the following month. Usually, the Home Office rejects the requests in case the information cannot be verified or confirmed as false or if there is a delay in completing the verification checks.<sup>7</sup> Furthermore, the limit excludes in-country applications for leave to remain, and any requests where the job sponsored has a salary of £150,000 or above. Additional requirements were included to ensure that applicants enter a graduate-level occupation, speak an intermediate level of English, and meet specific salary and employment criteria. Tier 2 (General) holders can work in a particular sponsor in the job described in the COS and can start their stay up to 14 days before the start date on the CoS. It is a temporary permit that allows Tier 2 visa holders to stay for a maximum of 5 years and 14 days (UK Government, 2019).<sup>8</sup> This system is designed to incorporate various protections for resident workers by requiring the employer first to try to recruit from within the resident workforce. Currently, Tier 2 (General) consists of the Shortage Occupation List (SOL) route and the Resident Labor Market Test (RLMT) route. Next sessions present the main changes in Tier 2 policy that are relevant for this analysis.

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<sup>7</sup>However, a certain degree of flexibility exists. Home Office could consider urgent requests in exceptional circumstances. Or, if all requests scoring a particular number of points would cause a monthly limit to be exceeded by 100 or less, the claims are granted and the excess deducted from the following month.

<sup>8</sup>After six years, an applicant can apply to extend their Tier 2 (General) visa for up to another five years. In fact, beyond the six years, Tier 2 visa holders will generally look at applying to settle in the UK under "indefinite leave to remain".

### 3.2.2.1 Tier 2 CAP

Since 2010, the policy objectives of the UK government aimed to reduce net migration and to increase the selectivity of the migration system. The main reform of the Tier 2 system was to introduce a permanent limit to skilled migration from outside the EEA. Thus, the Tier 2 (General) category became to be subject to a limit on numbers of 20,700 in the year starting from 6 April 2011. Tier 2 cap operates by restricting the number of CoS allocated to sponsoring employers looking to hire non-EU skilled workers. CoS issued under the limit are called "restricted". The employers must obtain the permissions for the restricted certificates by the Home Office through a monthly allocation process.<sup>9</sup> Restricted CoS is not necessary whether the gross annual salary on the CoS is at least £159,600 or the job relates to an inward investment project. The exclusion is also possible when the applicants is a Tier 4 visa switchers. Since June 2018, the exclusion from the cap is valid also if the application is for a doctor (SOC code 2211), and a nurse (SOC code 2231). The limit of 20,700 places runs from 6 April one year to 5 April the following year. It is divided into 12 monthly allocations to avoid it being exhausted in the early part of the year. Places are allocated monthly according to the criteria set out in the Immigration Rules. The Home Office designs the limit such that, if there is pressure on places, there is still capacity for those whose skills are most in-demand.

Places are monthly allocated to avoid it being exhausted in the early part of the year. The limit is designed so that, if there is pressure on places, there is still capacity for those whose skills are most in-demand. Currently, the limit varies from around 2,200(April) to 1,000 per month. The monthly allocations of restricted certificates of

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<sup>9</sup>Restricted CoS means that employers must obtain permission from the restricted certificates of sponsorship team before they can issue restricted CoS by using the monthly allocation. Instead, an unrestricted CoS is for individuals who are already working for the same sponsor and needed to extend their stay or want to switch to the Tier 2 program.

sponsorship have changed over time, as reported in table 3.1.

Table 3.1: Monthly Allocation of CoS across the years

Application Period	Monthly Allocation			
	2011	2012-2014	2015	2016-
6 March - 5 April	4,200	1,725	2550	2,200
6 April - 5 May	1,500	1,725	1,650	2,000
6 May - 5 June	1,500	1,725	1,650	2,000
6 June - 5 July	1,500	1,725	1,650	2,000
6 July - 5 August	1,500	1,725	1,650	2,000
6 August - 5 September	1,500	1,725	1,650	2,000
6 September - 5 October	1,500	1,725	1,650	1,500
6 October - 5 November	1,500	1,725	1,650	1,500
6 November - 5 December	1,500	1,725	1,650	1,500
6 December - 5 January	1,500	1,725	1,650	1,500
6 January - 5 February	1,500	1,725	1,650	1,500
6 February - 5 March	1,500	1,725	1,650	1,000

During the application process, the employers must confirm that: (i) the job is skilled on NQF level required by the government, or it has a specific exception listed in Appendix J of the Immigration Rules; or (ii) it is on the shortage occupation list; and (iii) the applicant will be paid the relevant minimum salary. An employer wishing to sponsor a non-EEA national under the Tier 2 route must ensure they have advertised the role under the Sponsor Guidance before issuing a certificate of sponsorship. After having advertised the vacancy, the employer must be unable to find a suitable resident worker by a Resident Labour Market Test (RLMT, thereafter), which requires the employer to show to UK Visas and Immigration that no resident worker is available for the role they wish to fill with a Tier 2 visa worker. In this respect, an employer must first advertise the job to enable settled workers (UK nationals, EEA nationals, those with Indefinite Leave to Remain and permanent residency rights in the UK) a chance to apply. In particular, employers are required to advertise the relevant vacancy through "Find a Job", which is a Government-owned website, or in a private-



sector job site for at least four weeks (UK Government, 2019).<sup>10</sup>. The employer must usually assign applicants under the RLMT a Certificate of Sponsorship within six months of the recruitment advertisement. Suppose that an employer has more than one candidate with all the necessary skills and experience, e.g., a settled worker, and a migrant. In this case, the Home Office requires that employers must offer the role to the determined worker even if the migrant is more skilled or experienced<sup>11</sup>. For the occupation considered in the Government’s Shortage Occupation List (SOL), an employer does not need to conduct the RLMT, as explained in the next paragraph.

### **3.2.2.2 Shortage Occupation List (SOL)**

The UK government has established a selection system where shortage occupations receive priority over non-shortage jobs. The main aim is to encourage the skills system and employers to give priority to the recruitment of resident workers to meet skill needs. The Shortage Occupation List (SOL) indicates the skilled occupations in a shortage as there are not enough settled workers to fill available jobs in particular sectors. The MAC is responsible for drawing up the SOL<sup>12</sup>. The MAC advises Government on migration issues, in particular on skill shortages within occupations. There are two shortage occupation lists: one for the whole of the UK (including Scotland) and an additional list of shortage occupations relating solely to Scotland. MAC

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<sup>10</sup>More specifically, employers under RLMT route must ensure that: (i) the job advert has all the mandatory requirements listed in the Home Office guidance; (ii) they are advertising the job using the methods permitted in the Home Office guidance, one of which must be to use any website of the government or a prominent or professional recruitment organization; and (iii) each advert appears for not less than 28 days. Where this advertising does not produce a suitable resident candidate for the job, the employer can sponsor a migrant to fill the position (UK Government, 2019).

<sup>11</sup>The only exception could be if the job falls within one of the Ph.D. level standard occupation classification SOC codes listed by the Home Office list.

<sup>12</sup>The Committee consists of a chair and five other independent economists who have been appointed by the Office of the Commissioner for Public Appointments (OCPA). To date, the MAC is composed by: Professor Alan Manning (chairman), Madeleine Sumption, Dr. Jennifer C. Smith, Professor Jackline Wahba, Paul Regan (ex-officio member, Home Office), Dr. Brian Bell, Professor Jo Swaffield are currently the members of MAC.

uses three criteria to decide which categories are in the SOL. It asks whether (i) the job is skilled to the required level set by the Government, (ii) the job is in shortage, and (iii) it is sensible to try to fill this shortage through migration. Tasks have to be skilled to NQF 6 and above to be eligible for Tier 2 (General) included the SOL<sup>13</sup>. The MAC uses a combination of quantitative indicators and qualitative evidence received from stakeholders with a combination of national datasets in assessing whether there is a shortage in some occupations but not in others. First of all, five skill indicators are used, of which three top-down and two bottom-up. The former signs include (i) median occupation pay, (ii) qualifications, and (iii) the classification provided by the Office of National Statistics (ONS). The latter indicators are (iv) innate ability, and (v) amount of on-the-job training required. Nationally, the datasets relevant for assessing the SOL include: (i) the Labour Force Survey (LFS), (ii) the Annual Survey of Hours and Earnings, (iii) the ONS Vacancy Survey, (iv) the Job Centre Plus NOMIS database, and (v) the National Employer Skills Surveys. The MAC also considers nine indicators that look at wages, vacancies, and employment to identify shortages. In particular, they consider: (i) rapidly rising earnings within a specific occupation or high rates of return to qualifications in certain professions; (ii) vacancy level, rates, durations and changes over time; and (iii) a variety of employment indicators (MAC, 2017)<sup>14</sup>.

The shortage indicators have been reviewed several times, most recently in 2017 and 2019. The update of SOL uses the 4-digit SOC codes hierarchy provided by the

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<sup>13</sup>RQF6+ are "graduate-level" occupations, though also include higher-level vocational qualifications deemed equivalent to a degree. The Home Office lists the rules at RQF6+ in Appendix J of the Immigration Rules.

<sup>14</sup>The employment indicators include: (i) the increasing levels of overtime or an increase in its prevalence; (ii) the increased recruitment efforts; (iii) the reduced working standards; (iv) the altering production methods to minimize the need for skills in short supply; (v) more contracting out of work or outsourcing to other countries; (vi) the increased levels of training or training expenditure (MAC, 2017).

ONS. For employers looking to sponsor skilled non-EEA workers, roles that feature on the SOL benefit from several exemptions to the requirements valid for the other occupations in Tier 2 (General). The advantages for employers to hire shortage occupation workers include: (i) not having to conduct an RLMT; (ii) exemption from the minimum income threshold for settlement; (iii) lower visa fees; (iv) priority allocation in the event the cap limit is reached. In particular, if an employer wants to employ a non-EEA Tier 2 worker in one of these shortage occupations, the role must be for at least 30 hours per week and pay the appropriate minimum salary found in the list. Some problems emerge on the methods of identifying the shortages. Even semi-annual reports of the shortage lists might not be able to adequately capture and respond to rapid changes in the labor market (Glennie, 2012).

### **3.2.2.3 Skills and Salary Thresholds**

As the UK Government tightened the entry criteria, the system included greater selectivity, including various measures to select the "brightest and the best," and those are "economic desirable" (Home Office, 2011). For this reason, the minimum skill requirement for Tier 2 occupations was raised to NQF level 6 (Degree level) and above in 2012. The skill threshold of occupations under this category was previously set at NQF level 4, graduate-level (Foundation degree), and above in 2011, and before that NQF level 3 and above. The Government determines skill thresholds. However, the MAC advises on which occupations and jobs that pass the threshold. Besides, the English language requirement increases from basic user standards to an intermediate level (B1 on the Council of Europe's Common European Framework for Language Learning). On the other hand, income criteria became central in the selection process. All Tier 2 (General) migrants must be employed in a job with a minimum annual salary fixed by the Home Office. This minimum annual salary has changed over time.

When introduced in 2008, the minimum payment threshold is at £20,000. The MAC recommended this figure, which was the 30th percentile of the pay distribution for skilled workers to prevent undercutting (MAC, 2015; Metcalf, 2018). The threshold was at £20,800 in 2015. The Government has asked to increase the minimum salary threshold as the required skill level had become more stringent. In 2016 the MAC recommended a new threshold of £30,000, which corresponded to the 25th percentile of the pay distribution among individuals skilled to NQF6+<sup>15</sup>. More specifically, each of the 4-digit SOL occupations skilled to NQF6+ has its minimum payment threshold, which is normally the 25th percentile of the pay distribution of workers in the given occupation. The pay thresholds in the health and education sectors are based on national pay scales. When the occupation threshold exceeds the overall minimum threshold (now £30,000), the occupation threshold prevails. Appropriate salary rates are listed in Appendix J of the Immigration Rules. They are based on the salary for full-time hours, and they have minimum salary requirements for both "new entrants," and "experienced" hires. A lower salary threshold will apply to "new entrants" on initial application, and it is applied if one or more of the following conditions are satisfied: (i) the applicant is exempt from the resident labor market test (RLMT) because they qualify under the post-study work provisions; (ii) the RLMT was met via the provisions for "new graduate jobs or internships", or (iii) the applicant was under 26 on the date the application was made. The thresholds for new entrant employees are set at the 10th percentile of the pay distribution for full-time employees in that occupation. While, where a CoS is assigned, the salary shown on the CoS must be at least the "experienced" rate of pay. The salary thresholds for experienced workers are set at the 25th percentile for full-time employees in each occupation, mostly calcu-

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<sup>15</sup>The increase in the threshold, from £20,800 to £30,000, was substantial, so the MAC recommended phasing and some temporary exemptions (MAC, 2016). The Home Office accepted all these recommendations.

lated using the Annual Survey of Hours and Earnings (ASHE), a survey of employers conducted by the Office for National Statistics. The number of hours considered to be "full time" varies depending on the source used to determine the appropriate rate for the specific occupation. The rates used to determine salary thresholds are usually based on a 39-hour working week for full-time roles as per the Annual Survey of Hours and Earnings (ASHE). However, where the source differs to ASHE, weekly hours for salary threshold purposes are different<sup>16</sup>. Currently, the minimum salary for the applicants under this category is normally £20,800 for new entrants or £30,000 for experienced migrants. There are numerous exceptions including (i) new Entrants that are subject to a salary threshold of £20,800 or the 10th percentile of the occupation whichever is higher; (ii) the appropriate rate set for some public sector occupations, including secondary school teachers in specific subjects, nurses, paramedics and medical radiographers, are taken from national pay rates; (iii) pre-registration nurses and midwives are paid on the NHS Agenda for Change Band 3 rates subject to certain conditions. In addition, there are some occupations that have different appropriate rates applied depending on certain characteristics.

### **3.2.3 The mechanism of Tier 2**

This section briefly illustrates how the Tier 2 mechanism works. As part of the application, the prospective employer-sponsor will need to request a CoS from the Home Office. As mentioned before, the number of certificates that can be issued restrict to 20,700 per year. Such amount is divided into different monthly CoS allocations,

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<sup>16</sup>Where the source differs to ASHE, weekly hours for salary threshold purposes are considered as follow: (i) 37.5 hour week where the source is the NHS Agenda for Change, or the Royal Institute of British Architects; (ii) 37.5 hour week where the source is the National Grid submission to the MAC; (iii) where the source is teachers national pay scale, the definition of full-time teachers is used when determining those pay scales; (iv) in all other cases, a 40 hour week (MAC, 2015, 2019; Home Office, 2018).

which currently vary from around 2,200 to 1,000 per month to provide higher quotas during the busier months of April through to September. An employer can only recruit a non-EEA national. The conditions are the following: (i) a job cannot be filled from the domestic UK market and has therefore passed the RLMT; (ii) a position is exempt from the RLMT because a migrant worker is switching from Tier 4 student visa, or the salary offered is £159,600 or above, or a job role is on the SOL. If the post is not on the SOL list, then the employer must advertise the job domestically and be able to show that no suitable settled UK worker could fill the position. For the next six months, the employer can fill the post with someone from outside the EEA. If the vacancy is unfilled after six months, the employer has to re-advertise in the UK. Employers must request the COS by the 5th of each month. During each month, a sponsor needs to confirm that: (i) the job is on the published Graduate Occupations List of posts eligible for Tier 2; (ii) the occupation is on the SOL or (iii) an RLMT has carried out, (iv) the job meets the minimum applicable salary requirements. If sponsors apply for more CoS than Home Office have available in any given month, the "UK Visas and Immigration" is responsible for allocating CoS according to a ranking system. In particular, if the number of applications granted is less than the monthly allocation, the next monthly allocation is increased by the number of restricted CoS remaining unallocated (Home Office, 2015). The assignment of the Tier 2 (General) visa depends on a points system. There are points available for the job, salary, English language ability, and the maintenance funds. When the number of CoS requests exceeds monthly allocations, the points system is used to give priority to specific applications, notably: the roles officially recognized as being in the SOL being awarded the most points, followed by some occupations at Ph.D. level and finally points are awarded based on the applicant's salary for those occupations which meet the requirements of the RLMT. The application must score at least 70

points. When eligible applications oversubscribe the monthly allocation of restricted CoS, Home Office prioritizes application using the marks scored in the table below.

Home Office awards one point for each £1,000 of gross annual salary, up to a maximum of £160,000<sup>17</sup>. If the wage does not meet the rate stated in the code of practice, the Home Office assigns 0 points for an appropriate salary and refuses the application, even if the applicant meets the other requirements. Concerning the salary spectrum, points will be awarded for salary bands ranging from £20,800 to £159,599,999 (Home Office, 2019). When the number of requests is much higher than the monthly allocation of certificates, the Home Office will grant applications with the most top salary and move down until they run out of licenses available. This means that requests for occupations with a higher starting salary will stand a better chance of being successful<sup>18</sup>. All applications for restricted CoS had to score a minimum of 21 points (minimum points required are varied over time) until December 2017. Then, the minimum marks required increased to 55 with a minimum salary of £55,000. The salary requirements dropped £50,000 in January and February 2018, and in March 2019, it rose £60,000 (Migration Observatory, 2018).

### **3.2.4 The impact of Brexit referendum on Tier 2 occupations**

Although Brexit has still happened, some consequences of the Brexit referendum have already had some important ramifications for migration to and from the UK. Since December 2017, application for Certificate of Sponsorship for non-EU immigrants has consistently been in excess of the monthly limit. For this reason, the Tier 2 cap has become one of the main political issues in the UK. As mentioned above, certificates are allocated based on priority criteria determined by the UK Home Office.

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<sup>17</sup>These rules are set in paragraphs 79 to 79C of Appendix A to the Immigration Rules

<sup>18</sup>In June 2015, an applicant needed to score 50 points to be successful, which means a non-PhD occupation that is not on the Shortage Occupation List would need to have had a minimum salary of £46,000.

Table 3.2: Points allocated to CoS applications

<b>Job and recruitment</b>	<b>Points</b>
Shortage occupation	320
PhD-level occupation code	175
Graduate recruitment via "milkround" or post-study work requirements	30
Job in one of the following public service occupations: - Medical radiographers (2217) - Secondary education teaching professionals (2314): subject teachers in maths, physics, chemistry, computer science and Mandarin only - Paramedics (3213)	30
Others (RLMT)	20

Applicants whose occupations are considered to be in notable shortage are issued the most points. Those who need PhDs to do their jobs also receive extra points, likely to be enough to qualify in any given month. Remaining certificates are allocated based on the proposed income of applicants coming to the UK. In this case, higher demand throughout the fiscal year means that fewer visas are rolled over the following month, and the number of CoS has declined. At this point, the cap has started to prevent some non-EU skilled workers from taking positions in the UK. Since December 2017, the minimum number of points required for a Tier 2 Visa increased to 55 (until November 2017 was 21), which means that the minimum salary required for most workers was £55,000. In January and February 2018, slightly lower demand meant that this salary requirement dropped to £50,000, and in March 2018, it rose to £60,000. Since the rest of the applications are prioritized on the basis of the proposed salary, this meant that the effective salary required for most applicants has increased from a minimum of £30,000 to an amount that fluctuated month-to-month, to £60,000. Jobs on the SOL are not affected by higher salary requirements because when the cap is binding, all applications are ranked using a points system, and the number of points allocated for being on the SOL is so high that it automatically



outstrips points earned by other applications for salary. This means that for that positions that not belong to the SOL or are qualified Ph.D. level jobs, the effect of the cap is that those with the lowest salaries will be rejected, pushing up the effective minimum salary threshold. From an economic point of view, the use of salary when the work-permit applications need to be capped is related to the productivity and skill level of the worker, and *ceteris paribus* is, higher-paying, higher-productivity jobs are expected to be more economically beneficial. However, the prioritization mechanism means that the salary requirements that employers must meet to sponsor non-EU workers are not known in advance. For this reason, an economic drawback of the cap is unpredictable, causing economic costs (Migration Observatory, 2018).

### 3.2.5 Net migration in the UK

Immigration to the United Kingdom (UK) has risen significantly over the past 20 years<sup>19</sup>. The Office for National Statistics (ONS, 2019)<sup>20</sup>, estimates that net migration was down in 2018 from a peak of 336,000 in the year ending June 2016. Fig.3.1 shows the total immigration trends of EU and non-EU immigrants to the UK. The latest reports provided by the Office for National Statistics (2019) show that non-EU immigration has followed a gradual increase over the past five years for both work and study, and it is now the highest since 2004. Instead, migration from the EU countries has firstly increased due to the EU enlargement from 2004 to 2017. Since the Brexit vote, EU immigration has decreased, and the net migration has fallen to a level recently reached only in 2009.

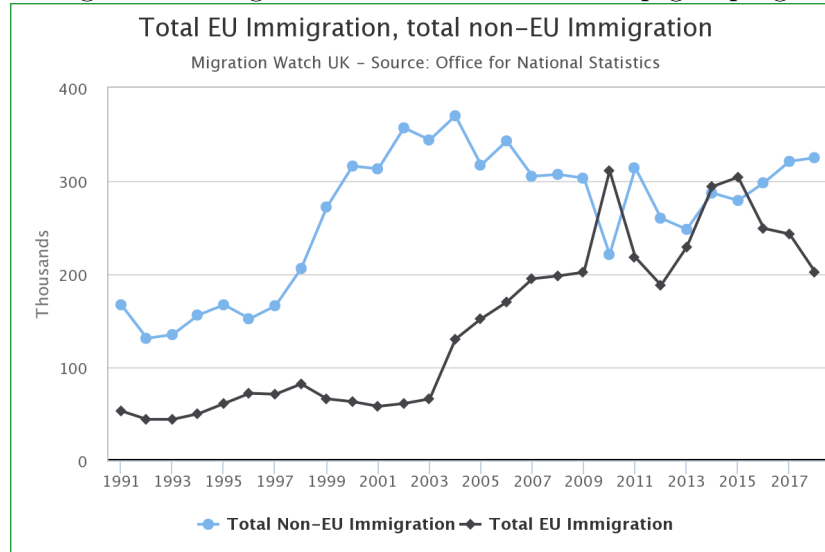
The decline in net migration between 2010 and 2012, from 256,000 to 177,000, coincided with several restrictions in the migration policy measures designed to re-

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<sup>19</sup>As mentioned in chapter III, there are different patterns for EU and non-EU migration.

<sup>20</sup>ONS provides quarterly reports on net migration in the UK, which is defined as the difference between immigration and emigration of people moving for at least a year.

Figure 3.1: Migration of different citizenship groupings



duce net migration for work, study, and family migration. The lowest estimation of net migration during this period was 154,000 in the year ending September 2012 (Sumption and Vargas-Silva, 2019). From 2013 onwards, the levels started to increase and reached a record of 336,000 in mid-2015 and again in the year ending June 2016, just before the EU referendum. Since June 2017, net migration recorded its largest-ever single-year fall, although a statistical anomaly drove part of this decrease in the measurement (Office for National Statistics, 2018). However, non-EU net migration has gradually increased since 2013, due to an increase in immigration, while the emigration remained broadly stable for this group.

### 3.3 Literature Review

This chapter is mainly related to the branch of the economic literature that focuses on the role, the effectiveness, and the "costs" of selective immigration policies. Previous studies have investigated the role of immigration policy on selection process of

migrants and their socio-economic performance in the destination countries<sup>21</sup>. Potential change in migration policy favoring high-skilled immigrants relative to less educated ones is considered one of the most critical factors. Indeed it influences the positive selection of immigrants, see (Brücker, Bertoli, Facchini, Mayda, and Peri, 2012). Belot and Hatton (2012) show that selective immigration policies operate as a screening mechanism that imposes differential costs on potential immigrants by skill and education. Bertoli and Rapoport (2015) predicts that the quality of migrants can be positively associated when destination countries adopt sufficiently selective immigration policies. However, unobservable characteristics may reduce migrants' quality when migrants are positively self-selected (Bertoli, Dequiedt, and Zenou, 2016). Rare studies look at the impact of selective-policies on skilled migration. According to Docquier and Rapoport (2007), a selective process could help to mitigate some demographic and economic trends, like skill shortages. Still, the effects of selective immigration may be limited within the European Union. Some studies showed that the EU could benefit from a migration policy in line with economic needs (see Constant and Zimmermann, 2005). However, Czaika and Parsons (2017) show that points-based systems are much more effective in attracting and selecting high-skilled migrants in comparison to demand-driven policies. Naturally, this should require a job offer through a labor market test or working in a shortage listed occupation. Ruhs and Anderson (2010) investigate whether the demand for migrants depends on a wide range of government policies. They propose a conceptual framework to assess whether migrants should be imported to fill labor shortages.

Nevertheless, there is little direct evidence about the relationship between labor

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<sup>21</sup>The influence of immigration policies on selection on education has been analyzed both from a theoretical (see Bertoli and Brücker, 2011; Brücker, Bertoli, Facchini, Mayda, and Peri, 2012; Bertoli and Rapoport, 2015; Bianchi, 2013; Beine, Docquier, and Rapoport, 2008) and from an empirical perspective (see Antecol, Cobb-Clark, and Trejo, 2003; Aydemir, 2011; Belot and Hatton, 2012; Jasso and Rosenzweig, 2008; Bertoli, Dequiedt, and Zenou, 2016)

shortages and the inflow of high-skilled foreign workers in the economic literature. Sparber et al. (2015) reports indirect evidence in trying to understand the consequences of shortages implied by high H-1B demand in the US. Two recent working papers by Raux (2018) and Signorelli (2019) show some evidence on labor shortages and the need for high-skilled foreign workers at firm-level, respectively, for the US and France. This chapter aims to fill this gap by investigating how tightness in a selective policy affects the selectivity and the quality of immigrants and the effects on real shortages in the labor market. The closest study is Mayda, Ortega, Peri, Shih, and Sparber (2018), testing how the changes in H-1B policy affect the quantity and the characteristics of H-1B workers<sup>22</sup>. Using a triple difference approach, the authors find that the policy has caused a change in the composition of H-1B workers. There was a high concentration among workers with middle-levels of skill associated with a reduction in H-1B workers. Their results highlight how the binding H-1B cap has reduced the number of workers most likely to be highly productive and innovative.

The second question addressed in this chapter is how immigration affects the labor market in the destination country. This is a question that has been extensively explored by the literature without reaching a definitive consensus. There is, in fact, a vigorous debate among academics about the impact of immigration on wages, especially concerned the low-skilled migration in the United States (see Card, 1990; Borjas,

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<sup>22</sup>The H-1B is a temporary work visa that allows high-skilled foreign-born individuals to work in the United States. It is an "employer-driven" skilled system where the employers must sponsor the application for the admission of foreign workers. Current policy restricts the number of new H-1B visas at 65,000 per fiscal year, more an additional 20,000 visas available for masters or Ph.D. recipients from US Universities. Because H-1B visas represent the main channel through which high-skilled foreign workers enter the United States, it is perhaps the most controversial temporary worker visa. Research on the economic impacts of the H-1B program has exploited the policy-driven variation in the H-1B quota to understand better how inflows of highly-skilled foreign-born labor affect American native-born workers and productivity. While some papers show adverse effects on native-born workers in the US (see Lofstrom and Hayes, 2011; Doran, Gelber, and Isen, 2014), several articles argue that H-1B workers improve innovation, productivity, and labor markets (see Kerr and Lincoln, 2010; Peri, Shih, and Sparber, 2015; Mayda, Ortega, Peri, Shih, and Sparber, 2018).

2015, 2017; Ottaviano and Peri, 2012; Peri and Yasenov, 2015, for a reassessment of Card's (1990) "Mariel boatlift" article). Some research finds that immigration flows harm at least some workers, as economic theory predicts when immigration changes the balance of skills in an economy (Staff, 2016). This wide range of findings depends mainly on two factors. The first one concerns the definition of "skilled" and "unskilled" workers (see Card, 1990; Borjas, 2015). The second factor involves the presence of migrants in the labor market. In particular, the open question is whether native-born workers depends on how migrants and natives workers are substitutes (see Borjas, 1995; Kerr and Lincoln, 2010; Peri and Sparber, 2009; Ottaviano and Peri, 2012; Peri, Shih, and Sparber, 2015). For these reasons, models on the impact of immigration on the income distribution in the country of destination often predict ambiguous outcomes under different assumptions about (i) the socio-economic characteristics of immigrants, (ii) the structure of the production system and (iii) the public policies adopted in the field of immigration. Therefore, migration can have a very little or zero effect on average wages among natives in the United States and within the European Union (see Friedberg and Hunt, 1995; Dustmann, Frattini, and Preston, 2008; Card, 2009; Kerr and Kerr, 2011; Kahanec and Zimmermann, 2011; Peri, 2014) or it has at most modest adverse effects on employment and wages (see Borjas, Freeman, Katz, DiNardo, and Abowd, 1997; Borjas, 1999, 2003; Aydemir and Borjas, 2007; Orrenius and Zavodny, 2007). A study by Docquier, Ozden, and Peri (2010) shows that immigration in Europe from 1990 to 2000 had a positive effect on the average wage of native workers, while the extent of wage losses due to emigration was close to or higher than the gains generated by immigration (Villani, Ferrara, and Liotti, 2016). Edo and Rapoport (2019) study how the prevalence of minimum wage affects the labor market impact of immigration in the US. They show that immigration has relatively small detrimental effects on the wages and employment outcomes

of competing native workers.

Specifically, the studies on the impact of immigration on the labor market in the UK have not found a significant effect on the wages of native-born workers (see Dustmann, Frattini, and Glitz, 2007; Ruhs and Vargas-Silva, 2019). By using variation in immigration to different spatial areas as an instrument, Dustmann, Fabbri, and Preston (2005) show no evidence that immigration has overall effects on native wages at the aggregate level. A similar conclusion is reached by (Dustmann and Preston, 2012) that suggest an overall slightly positive effect on native wages, which, however, could involve deviations of immigrant remuneration from contribution to production either because of initial mismatch or immigrant downgrading. By expanding the multi-level CES production function approach used by Card and Lemieux (2001); Manacorda, Manning, and Wadsworth (2010) find that natives and immigrant workers are imperfect substitutes in the UK; namely, the wage differential is sensitive to the share of immigrants in the working-age population. Wadsworth et al. (2017) show that the areas of the UK with significant increases in EU immigration did not suffer higher falls in the jobs and pay of UK-born workers and the big falls in wages after 2008 are due to the global financial crisis and a weak economic recovery, not to immigration. More recently, the Migration Advisory Committee (2018) shows that immigration has little impact on average wages. Other studies have found a small negative effect on average wages (see Nickell and Saleheen, 2015), while others found positive average results for most workers (e.g. Dustmann, Frattini, and Preston, 2012).

This chapter expands the existing literature by examining whether the implementation of the Tier 2 policy had a strong impact on labor shortages for the demand of foreign workers. It looks at the inflow of high-skill migrants due to an exogenous shock by a policy rule and study whether exists a causal impact in the labor market due to the presence of migrants primarily in some categories of workers. It is going

to show the impact on wage differentials of natives working in the same categories.

### 3.4 Data

This section presents the data on which the analysis focuses. This analysis builds on the Labour Force Survey (LFS) quarterly data released by the Office for National Statistics (ONS) on the labor market in the UK. The section starts by presenting this first administrative source of information on workers and labor markets. In particular, tier 2 occupations are taken into account by focusing mainly on shortage and no shortage information. The second source concerns confidential data on the Certificate of Sponsorship (CoS) collected through a Freedom of Information (FOI) Requests process from the UK Home Office. These were monthly data, which we pool together in a quarterly dataset from years 2009 to 2018 to identify the CoS demand at the professional level. In addition, a dataset on minimum salary thresholds at the occupational level has been created by looking at the Codes of practice for Tier 2 Sponsors, which sets out the skill level and appropriate salary rate for jobs. Eventually, this section concludes on the description of the merging procedure delivering the final data used in the analysis. The contribution of this analysis mostly relies on this merged dataset that allows to exploit variations in high-skilled and especially in labor shortages at the occupation level conditioned on information on CoS granted as well as on minimum salary thresholds. By construction, this study takes occupation as unit of analysis, where professions are identified by their Standard Occupation Classification (SOC) provided by the Office for National Statistics (ONS). This classification is based on the revision of SOC2010, while the first two years (2009-2010) look at the SOC2000. The essential element in this classification is the concept of "job" which allows for a rating into groups and sub-groups according to the ideas of "skill level" and "skill spe-

cialization" <sup>23</sup>. Specifically, it distinguishes between low-skilled, medium-low skilled, medium-high skilled and high-skilled occupation, defined in terms of general nature of the qualifications, training, skills, and experience associated with the competent performance of work tasks. Table 3.3 lists the sub-major group of SOC2010.

Table 3.3: Sub major groups in SOC2010

Skill Level	SOC 2010	Sub-Major groups
Level 4	11	Corporate managers and directors
	21	Science, research, engineering and technological professionals
	22	Health professionals
	22	Teaching and educational professionals
	24	Business, media and public professionals
Level 3	12	Other managers and proprietors
	31	Science, engineering and technology associate professionals
	32	Health and social care associate professionals
	33	Protective service occupations
	34	Culture, media and sports occupations
	35	Business and public service associate professionals
	51	Skilled agricultural and related trades
	42	Skilled mental, electrical and electronic trades
	53	Skilled construction and building trades
54	Textiles, printing and other skilled trades	
Level 2	41	Administrative occupations
	42	Secretarial and related occupations
	61	Caring personal service occupation
	62	Leisure, travel and related personal service occupations
	71	Sales occupations
	72	Customer service occupations
	81	Process, plant and machine operatives
	82	Transport and mobile machine drivers and operatives
Level 1	91	Elementary trades and related occupations
	92	Elementary administration and service occupations

As in SOC2000, SOC2010 retains nine major groups and 25 sub-major groups, but now it has 90 minor groups and 369 unit groups, while SOC2000 presented 81 small groups and 353 unit groups (Office for National Statistics, 2019). For a piece of

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<sup>23</sup>Skill level is defined both in SOC2000 and in SOC2010 with respect to the duration of training and/or work experience recognized in the field of employment concerned as is generally required in order to perform the activities related to a job in a competent and efficient manner. While skill specialization is defined as the field of knowledge necessary in the performance of the tasks associated with an occupation (Office for National Statistics, 2019).



detailed information on the structure and the definition of unit groups in SOC2010 and the main changes to SOC2000, see Appendix A.3.

### **3.4.1 Labour Force Survey (LFS)**

This analysis relies on the UK Labour Force Survey (LFS) quarterly data over the period from 2009 until 2018. The LFS is the most extensive household study in the UK and provides a comprehensive source of data on workers and labor markets. The LFS is intended to be representative of the whole population of the UK. The sample design is about 60,000 households based on a quarterly survey, and it is conducted by the ONS' Social Survey Division. The population covered is all people resident in private houses, all residents in National Health Service accommodation and young people living away from the parental home in a student hall of residence or similar institution during term time. Since 1992, the LFS has been a rotating quarterly panel. Each sampled address is interviewed five consecutive times at three-monthly intervals. However, the LFS was not primarily designed for the study of immigration. The number of sampled immigrants reflects the proportion of immigrants in the total population. The LFS allows a detailed disaggregation of employment patterns by occupation and by industry, according to official classifications. In this analysis, three different datasets have pooled together all quarters within each year: the first dataset concerns the years from 2009 until 2013; the second dataset includes the years from 2014 until 2018; the third dataset is the final one and consists of all years (2009-2018). We first gather all LFS quarters together, and then, append all years together. A consistent time series for some variables have been created along with the variables "year" and "quarter" and the variable "soc\_common," which identify the four-digit SOC code used later for merging LFS with data on Certificate of Sponsorship. The two different standard occupational classifications have required

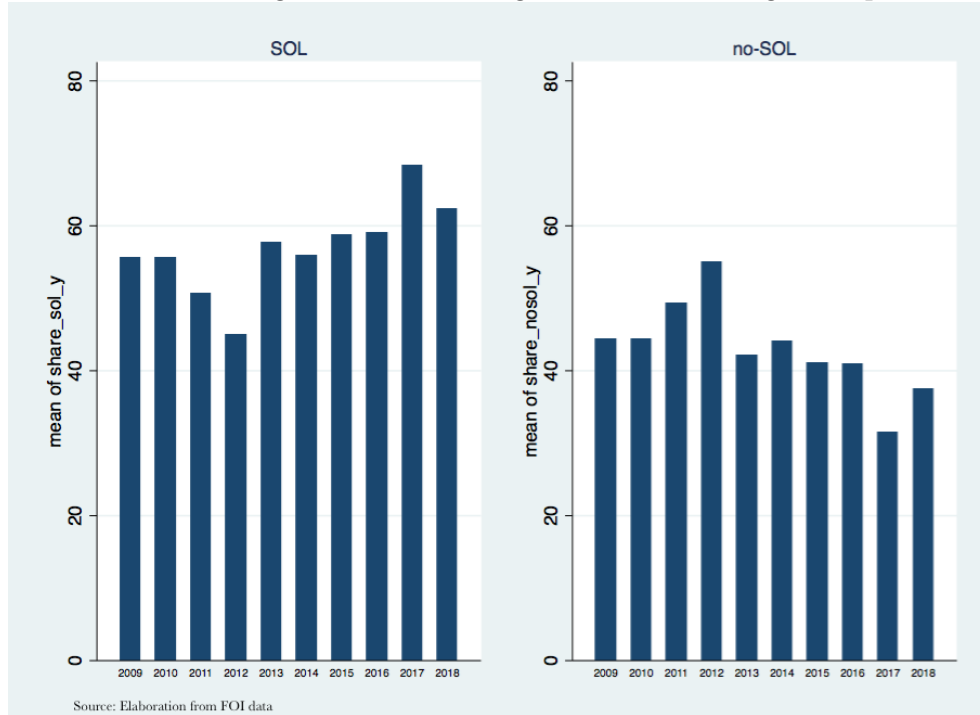
adjustments on laws based on an index for the conversion of a formerly used SOC2000 code to the corresponding SOC2010 one provided by the UK Visas and Immigration (2015). The sample size resulted from the LFS quarterly datasets from 2009 to 2018 has initially been 3,912,853 observations. The percentage of working-age (sixteen to sixty-four) among the native population between 2009 and 2013 represents the %92, while the EU working-age population counts for 3% and non-EU communities are the 5% of the total population. While, the native population counts 87% of the full sample between 2014 and 2018, the EU represents 5% and non-EU is about 8%.

### **3.4.2 Dataset on Certificates of Sponsorship**

The second dataset includes information on the Certificates of Sponsorship (CoS) granted between years 2009 and 2018, obtained under the provisions of the Freedom of Information (FOI) Act by the UK Home Office. The data consist in the occupational breakdown by 4-digit SOC code of restricted CoS granted collected separately for each month from January 2009 to December 2018, which then have been aggregated on quarterly-basis. As for the LFS dataset, annual datasets have been created based on the quarterly aggregation, which then has been aggregated into three different datasets: 2009-2013; 2014- 2018, and the total dataset from 2009 until 2018. Similarly to the LFS data, the two standard occupational classifications have required some adjustment on the SOC codes. The variable "soc\_common" and the variables for year and quarter are included in the dataset. Another variable identifies the CoS year, which considers the Home Office monthly allocation that runs from 6 April one year to 5 March the following year. This dataset allows identifying visa demands at the professional level. In particular, I have divided the Tier2 (general) occupation into two different groups, by generating a dummy variable equal to one for those occupations that are part of the Shortage Occupation List. Figure 3.2 represents the

share of the CoS granted for shortage and no-shortage occupations by CoS year.

Figure 3.2: Share of CoS granted in Shortage and non-Shortage occupations by year



The graph shows the evolution of the demand for high-skilled jobs in the UK and how it translates into a specific request for shortage and non-shortage foreign workers. The figure shows that the share of CoS in Shortage occupations has increased over the years. This is, therefore, consistent with the focus of the policy on Tier2, which is based on a priority system determined to be in notable shortage. This is confirmed by the t-test reported in the following Table 3.3, which confirms that the mean for SOL occupation is increased after the policy change than that of non-SOL professions.

### 3.4.3 Dataset on Minimum Salary Thresholds

Since the remaining CoS are allocated based on the proposed income, this dataset includes information on the minimum appropriate salary rates associated with each

Figure 3.3: Two-sample t test with equal variances

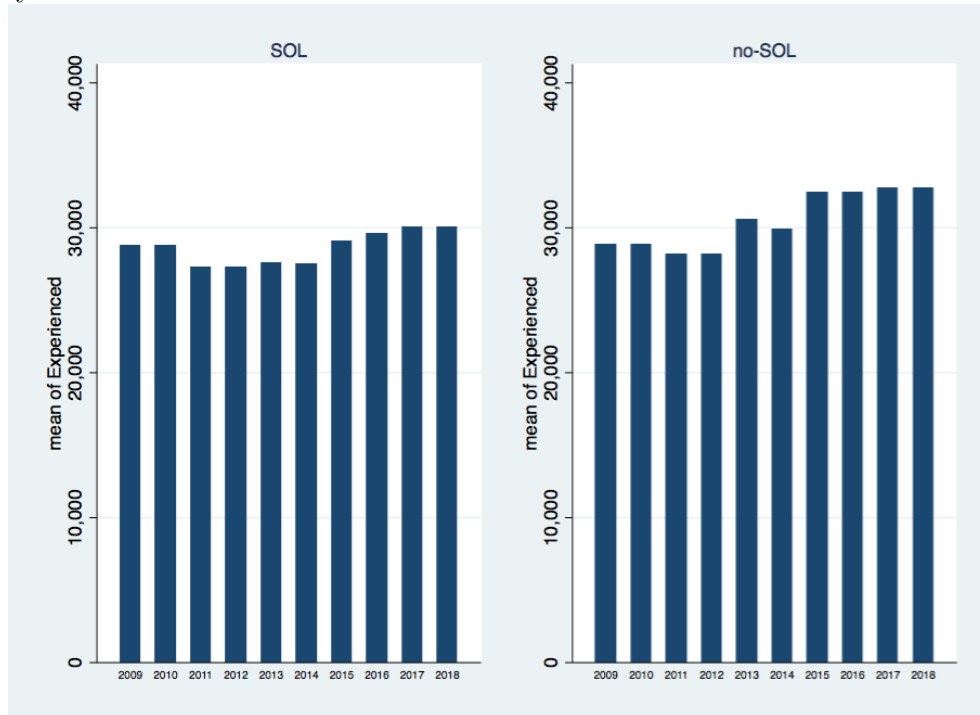
Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	1,784	56.87635	.0417433	1.763129	56.79448	56.95822
1	3,476	57.18754	.1130194	6.663355	56.96595	57.40913
combined	5,260	57.08199	.0760405	5.5149	56.93292	57.23106
diff		-.3111908	.1605756		-.6259856	.003604
diff = mean(0) - mean(1)					t =	-1.9380
Ho: diff = 0					degrees of freedom =	5258
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr(T < t) = 0.0263		Pr( T  >  t ) = 0.0527		Pr(T > t) = 0.9737		

Tier 2 occupation. As mentioned in the Institutional Setting, minimum salaries for each profession are based on the payroll for full-time hours, and they have minimum salary requirements for both "new entrants" and "experienced" hires. The lower pay threshold for new entrants workers is set at the 10th percentile of the pay distribution full-time employees in that occupations. The pay threshold for experienced workers is set at the 25th percentile of the full-time earning distribution measured using the Annual Survey of Hours and Earnings (ASHE). This dataset includes both new entrants and experienced salary thresholds for the years 2009-2018 based on appropriate salary rates listed in Appendix J of the Immigration Rules. Until 2013, the Home Office used the SOC 2000 classification and provided minimum salary on the basis of hourly wages. To estimate yearly minimum wage, we have calculated hourly pay by 37,5 hours by 52 weeks<sup>24</sup>. For the rest of the years, we have used the skill level and appropriate salary rates as in the codes for practice provided by the Home Office. In this dataset, the unit of analysis is represented by the 4-digit SOC occupations skilled to NQF level 6 and professions listed in the Shortage Occupation List, namely only the occupations that are in common before and after the Reform of 2011. Figure

<sup>24</sup>As stated in the Codes for practice for Tier 2 Sponsors until 2012, the salary rates were based on a 37,5-hour working week, unless otherwise indicated.

3.4 presents the yearly minimum wage differentials between shortage and no-shortage categories.

Figure 3.4: Differences in Salary Threshold between SOL and no-SOL occupations across years



Graph 3.4 highlights that the difference between the minimum salary thresholds for "experienced" workers in shortage and no-shortage occupations are increasing between the two categories. This latter observation supports the idea that the UK government is looking for jobs that are considered in shortage but that are not top skills in the foreign labor force. However, the empirical analysis later in the chapter will give more detailed information about the effect of the policy change on wages and on level of skills distribution.

### 3.4.4 Merged Dataset and Variables

Finally, this section presents the final sample obtained from the merge of both LFS data and data on the Certificate of Sponsorship. By focusing on the occupation level, the four-category classification based on the SOC allows identifying the Tier2 occupations, which represents the final sample size in the dataset. In the following analysis, we explore the determinants explaining the presence of shortage and non-shortage jobs among the Tier2 occupations. This analysis examines the labor market situation of UK-born and foreign-born people. The term "migrant" or "immigrant" refers to the people who were born and have migrated to the UK, based on the variable *Country of birth*. In particular, UK-natives and foreign-born population are presented as a whole with a "foreign" dummy variable, or for the different country of birth grouping. The country-categories are aggregated under the variable "group" as follow:

- UK-born population (England, Wales, Scotland, Northern Ireland, the United Kingdom not otherwise specified);
- European Union citizens (EU-14, EU-8, EU-2, EU others);
- EFTA citizens (Iceland, Liechtenstein, Norway, Switzerland);
- non-EU immigrants (Europe other, Americas and Caribbean, Africa, Middle East, and Asia, Antarctica and Oceania, Other countries).

The analysis focuses on the working-age population, which includes all individuals aged 16-64. Age is identified with the variables *age* (age of respondent) and *AGES* (age bands), while the variable *WorkingAge* includes males 16-64 and females 16-59. The employed population refers to all individuals who are employees, self-employed, or under a government employment or training scheme, while full-time and part-time

workers are both considered. The microdata also cover a wide range of individual characteristics including variables on: gender (*sex*); marital status (*maritalstatust*) and sex and marital status (*marsex*); *nationality* which is aggregated as in country of birth; *ethnicity*, which include "white", "black - African and Caribbean, Indian, Pakistani, Bangladeshi, Chinese, "mixed-multiple ethnic groups and "other - mixed". Geographical information is considered at the country-level within the UK (England, Wales, Scotland, Northern Ireland ) and at the regional level, where the region is determined according to the usual residence. The LFS originally identifies 20 regions, while are aggregated into 17 regions to create territorially homogeneous regions, by unifying Inner and Outer London into Greater London, and Strathclyde and the Rest of Scotland into Scotland. Merging both data relies on the main dimensions of skills identifying an occupation. The analysis uses a four-category digit classification of SOC, which is detailed reported in the Appendix, while employment status is organized as in the National Statistics Socio-economic Classification (NS-SEC) major group based on SOC, which identifies positions within labor markets and production units in terms of their typical employment relations. The variable *economicactivity* is used for consistency with current ONS practice as it gives the International Labor Organization (ILO) standard definitions of employment, unemployment, and economic activity and inactivity. This analysis uses two variables of education to better describe the immigrants' qualification. The first one is based on the highest qualification (specific grouping), which is aggregated under four levels, such as: "No qualification", "Low", "Medium", and "High". While, the second variable is *education* and is based on years of education and, specifically, includes three levels, namely: "low education", "intermediate education", and "high education". Consistent with the literature, the variable *experience* is created by considering years of potential experience in the workforce. Salary information in the LFS is the

self-reported gross weekly pay for the "reference week" that interviews are asked information about. From 1997 onwards, questions on both gross weekly wages and hours worked were asked during the first and the fifth interview in order to reduce the sampling errors. The LFS includes a variable for gross weekly pay in the main job (*grosswpay*), a variable for average gross hourly pay (*hourpay*), and a variable for net weekly pay in main job (*netpay*). Furthermore, a variable *hourlywage* is calculated based on gross hourly pay by usual total hours worked in main job and usual hours of paid overtime. Moreover, we compute the real wage based on hourly wages in 2015 prices as used by the OECD in two different ways. The first one is:  $realpay = hourpay * (CPI2015/CPIyear)$ . The second one is based on Dustmann, Glitz, and Frattini (2008) and is:  $realwage = hourpay/(CPI2015/100)$ . The 2009-2018 dataset also includes a "recent immigrant" dummy for immigrants who arrived in the last two years and a categorical variable to identify natives and earlier and recent immigrants. Moreover, matching both sources of data need to take into account the specific characteristics of the tier 2 policy. A specific dummy variable, in fact, identifies the occupations that are included in the Shortage Occupation List, which is equal to one if the specific occupations are considered in *Shortage*, while it equals zero otherwise. To strengthen the analysis, a variable named *Tier2\_bis* identifies the same occupations in tier 2 from 2009 to 2018, such as only the occupations based on skill restrictions resulted from the policy change. In the final dataset, I drop some variables and observations I do not need for the analysis, and I filter on  $hourpay > 0$ .

### 3.5 Descriptive Statistics

The 2009-2018 final estimation sample includes 173,740 observations, with a sample size of 103,982 observations for the period 2009-2013 and of 69,758 observations for the period 2014-2018. This analysis is focused on immigrants to the UK and compares



them to natives, where among the foreign-born, this analysis distinguishes between EU citizens (or eventually EEA citizens) and non-EU immigrants. The sample of individuals between 2009 and 2018 is mostly composed of UK-born workers (86.8%). The foreign-born population represents 13.21% of the total working-age population working age (eighteen to sixty-four). Figure 3.5 shows working-age natives and immigrants across years, where immigrants count for 4,41 % from EEA countries and for about 9% from non-EEA countries.

Figure 3.5: Working age natives and immigrants, 2009-2018

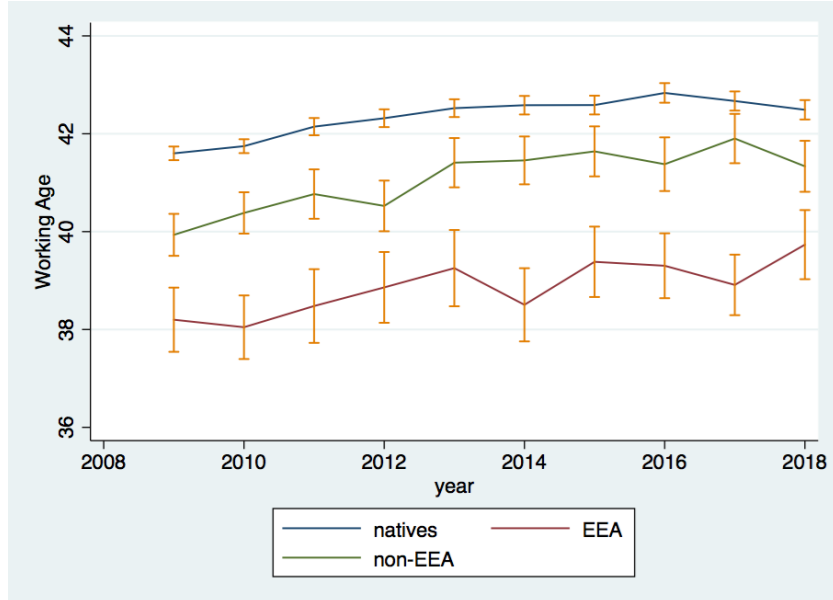


Table 3.4 shows the summary characteristics for the variables that are relevant for the empirical analysis. In particular, the outcome of interest is the real wage. The variable that will represent the treatment in the following report is *Shortage*, which is a dummy variable, as explained above.

Immigrants are younger than natives: EEA is especially likely to be young compared to the average wage of non-EU immigrants and natives. The gender composition of the working-age population is quite balanced, with 52.3% of males and

Table 3.4: Summary statistics

Variable	Mean	Std. Dev.	N
ln_wage	2.766	0.575	173740
Shortage	0.321	0.467	173740
group	0.221	0.591	173716
age	42.6	11.32	173740
sex	1.479	0.5	173740
maritalstatus	1.954	0.877	173740
education	2.205	0.814	172106
experience	23.152	12.201	172106
employmentstatus	2.019	1.409	173740
region	10.43	4.634	173740

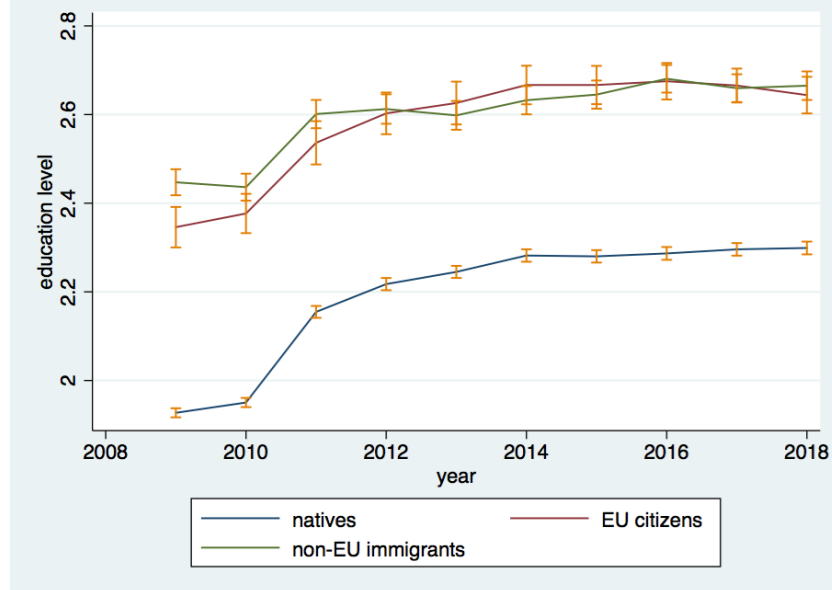
47.7 % of females. However, among EU citizens, the percentage of females (51%) is slightly higher than that of the males (48.9%). The non-EEA immigrants have a more differentiated ethnic origin from EU citizens and UK natives. Both natives and immigrants are mostly used to live in England (about the 85% of the total sample), which about 12% live in the region of Greater London and approximately 22% in the South East. UK natives, as well as immigrants both from the EU and from non-EU countries, are more concentrated in higher managerial and professional occupations and in lower managerial and professional occupations based on the NS-SEC classification, as shown in table 3.5.

Table 3.5: Occupational distribution of immigrants and natives

NS-SEC	natives	EU citizens	non-EU imm	Total
Higher managerial and professional	57,854	3,266	6,605	67,725
Lower managerial and professional	72,663	3,000	6,530	82,193
Intermediate occupations	6,743	269	476	7,488
Small employers	10	0	0	10
Lower supervisory and technical	6,777	501	920	8,198
Semi-routine occupations	3,077	170	369	3,616
Routine occupations	1,533	189	101	1,823
n.e.c.	2,022	187	358	2,567
Total	150,679	7,582	15,359	173,620

The next figure (3.6) shows the level of education among groups in Tier 2 occupations. As mentioned above, the variable *education*, in this case, defines individuals when left full-time education. Although this variable could be imperfect in measuring knowledge (for instance, do not allow for country differences in school starting age or in the number of years of high school), it is considered the best available measure of immigrants' education in the UK LFS. The other variable, *school*, confirms the picture below, but it also includes the no-answers and "other" qualifications, which makes it more problematic to compare immigrants' and natives' educational levels.

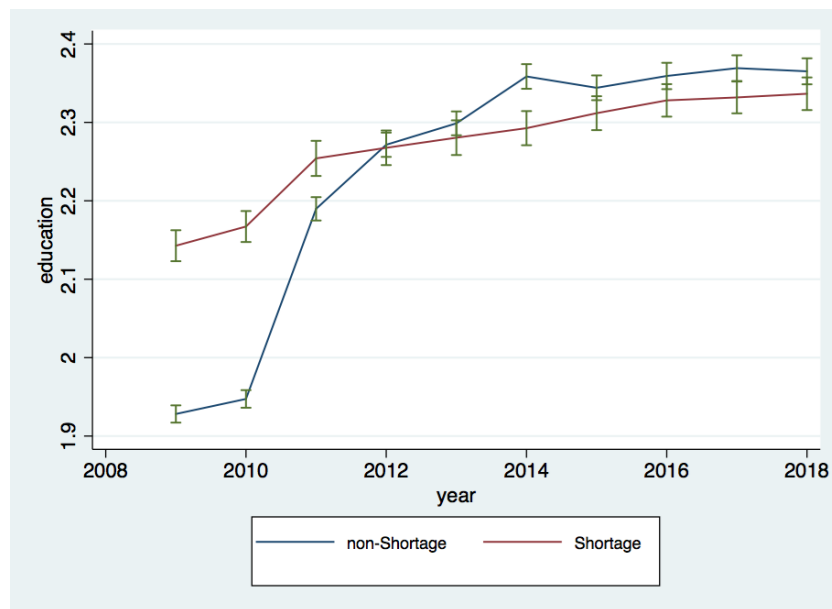
Figure 3.6: Education level among groups in Tier 2 occupations



The level of educated individuals for both EEA and non-EEA immigrants is higher than for the UK natives. The educational advantage of immigrants is probably due to the occupations included in the sample and to the different age composition of the native and immigrant populations as well. However, this picture confirms the high-selectivity of the UK policy in selecting immigrants on the basis of skills and shortages. By looking at the level of education in both shortage and no shortage

occupations, it has been possible to observe an increase in the level of knowledge in both categories since 2012 (see fig. 3.7). This confirms the increase in the skills threshold for Tier 2 at NQF level 6. As mentioned in the Institutional Setting, the lists of occupations skilled to NQF level 4 and NQF level 3 apply to skilled workers who entered Tier 2 before the threshold was raised to NQF level 6 in June 2012.

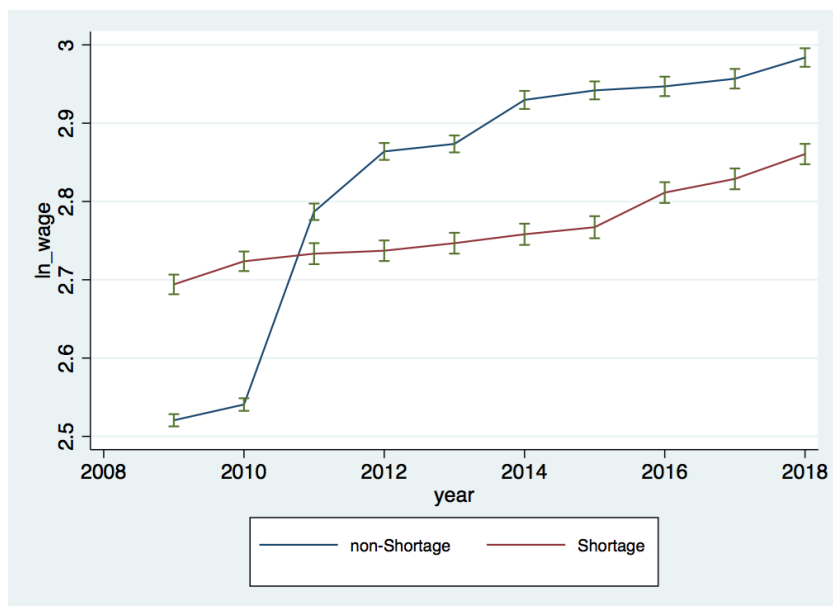
Figure 3.7: Education Differential between Shortage and non-Shortage Occupation by year



Since the beginning of the policy change in 2011, the average wage for both occupations in shortage and no shortage has increased due probably to the more restrictive criteria both in skill levels and in the minimum salary thresholds. However, the average wage for occupations in non-shortage occupations is increasing more than the average salary in shortage occupations, as shown in Fig. 3.7. In this case, the average wage refers to the logarithm of the real wage computed as  $realwage = hourpay / (CPI_{2015} / 100)^{25}$ .

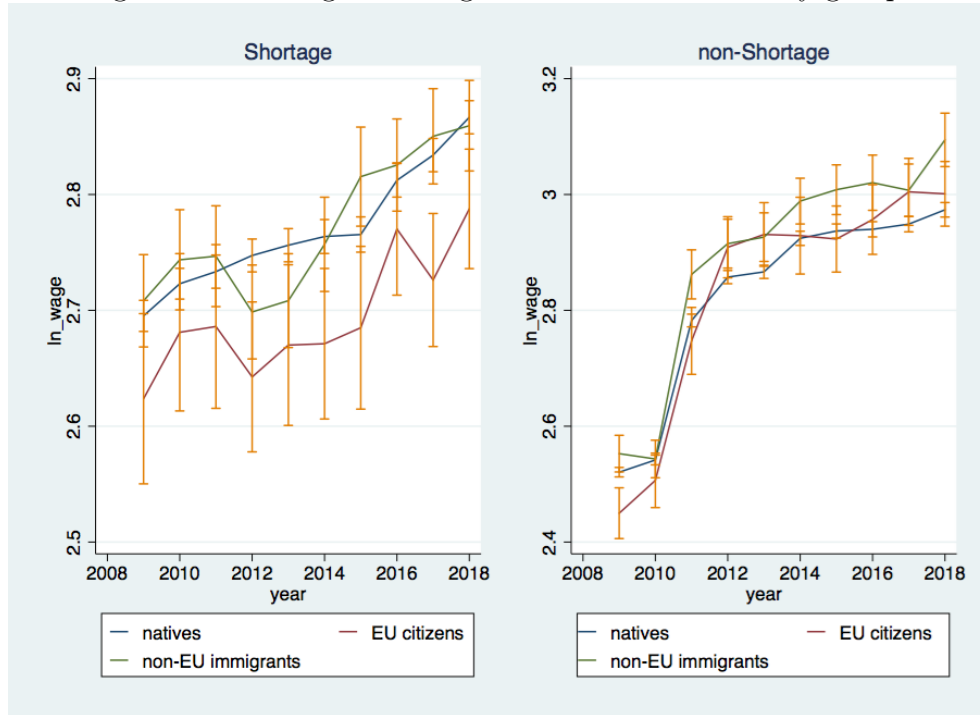
<sup>25</sup>This analysis has included the same exercise by taking into account the other "wage" variables to confirm the results of these pictures.

Figure 3.8: Wage Differentials between Shortage and non-Shortage Occupations by year



The educational level showed in figure 3.6, as well as the wage pictures can explain the wage differentials among groups measured both in shortage and in non-shortage occupations. Again, the jump in the average wages before the policy is defined by the reduction of the occupation categories due to restriction of skills threshold to NQF level 6. The same exercise has been carried out by using the same occupational groups, also in the years before the Reform. In this case, the jump is decreased, but the result is the same, namely after the policy change in 2011, the average wage both for shortage and no shortage occupations has increased. However, the average wage differentials are higher in non-shortage professions than in shortage ones. For this reason, the next session highlights two possible hypotheses relevant for testing the empirical analysis.

Figure 3.9: Average real wage in SOL and no-SOL by groups



### 3.6 Hypothesis and Theoretical Framework

The theoretical framework in this chapter starts from the simple theoretical models elaborated by Chiquiar and Hanson (2005) and McKenzie and Rapoport (2010)<sup>26</sup> to allow for the impact of a selective-immigration policy on selection in the United Kingdom, and how a change in selection caused by a tightness in the policy affects the selectivity and the quality of the immigrants. In this model, two origin countries

<sup>26</sup>Both these theoretical models are based on the study of migration from Mexico to the US. Consistent literature has produced conflicting results as to whether Mexican migrants are positively or negatively selected in terms of educational skills. By developing a simple model of selection, Chiquiar and Hanson (2005) claim that migrant selection in a country such as Mexico may be negative, intermediate, or positive, depending on the size of migration costs and how they vary with skill. McKenzie and Rapoport (2010) examine the role of migration networks in determining self-selection patterns of Mexico-U.S. migration. They present a theoretical framework that includes the impact of networks on migration incentives at different education levels and how this affects the composition of migrant skills.

are considered. In particular, residents of the non-EU source countries (subscript 0) and residents of the EU-countries (subscript 1) can choose to migrate to a destination country (subscript 2), such as the United Kingdom. The migration decision is assumed to be irreversible. Using the notation of Chiquiar and Hanson (2005) and McKenzie and Rapoport (2010) the wage equation for immigrants that come from non-EU countries (0) and EU (1) countries may be written as:

$$\ln w_0 = \mu_0 + \delta_0 s \quad (3.1)$$

$$\ln w_1 = \mu_1 + \delta_1 s \quad (3.2)$$

where  $w$  is the wage,  $\mu$  is the base wage,  $\delta$  is the return to skills, and  $s$  is the level of skills in countries of origin. In this case, the focus is on observable characteristics. Similarly, the wage equation in the destination (subscript 2) may be written as follows:

$$\ln w_2 = \mu_2 + \delta_2 s \quad (3.3)$$

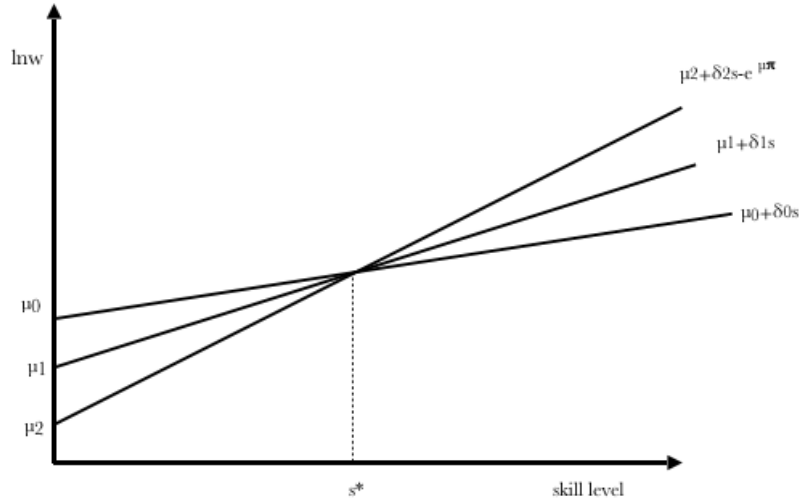
Suppose that the wages are higher in the destination country than in the origin countries. It is possible to assume that  $\mu_2 > \mu_1 > \mu_0$ , as showed in Fig.3.10. Furthermore, since the relative returns to observable skills are higher in origin countries than in the UK, it is possible to assume that  $\delta_0 > \delta_1 > \delta_2$

Thus, assuming that the migration decision is determined by a comparison of wages across countries net of migration costs  $C$ , the decision to migrate is given by:

$$I_i = \ln(w_2|w_0 + C) \approx (\mu_2 - \mu_0 - \pi) > 0 \quad (3.4)$$

$$I_i = \ln(w_2|w_1 + C) \approx (\mu_2 - \mu_1 - \pi) > 0 \quad (3.5)$$

Figure 3.10: Destination and origin wages by-skill level



where  $\pi$  is a time-equivalent migration costs and it is given by the ratio between migration costs ( $C$ ) and the individual-specific wage at origin, ( $\pi = C/w_{i0}$ ;  $\pi = C/w_{i1}$ ). Following Bertoli, Dequiedt, and Zenou (2016), the time-equivalent migration cost is assuming do not vary across individuals with the same level of education<sup>27</sup>.

This analysis exploits an exogenous reform which impacts on selectivity and wages at the destination. Migration policy in the UK is based on priority criteria that address the "skill needs". As mentioned in the institutional setting, in fact, the UK has developed a system of immigration control that reacts to the demands of the national needs. This system is designed to incorporate various protections for resident workers, which have a priority in the labor market. For this reason, the UK has developed an educational selectivity system, which looks at the labor-market quality of immigrants. In this respect, the government uses immigration as a tool to address "labor shortages", through the shortage occupation list, which identifies occupations

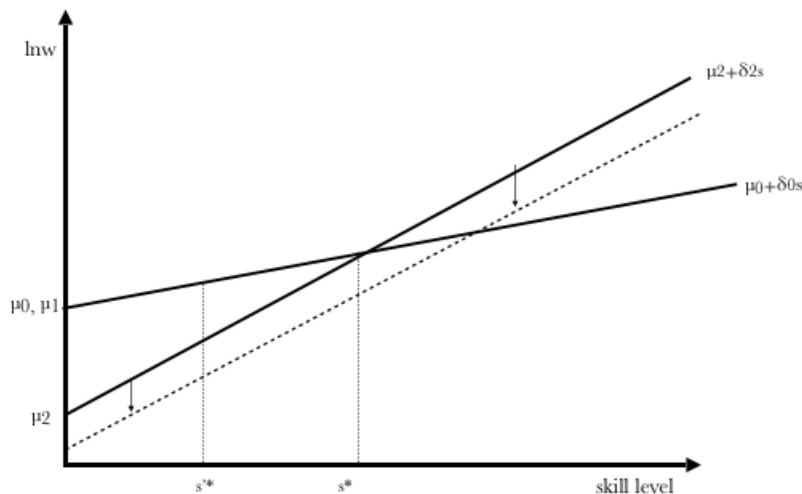
<sup>27</sup>In his previous paper (1987), Borjas considered  $\pi$  as constant, so that  $C$  was directly proportional to  $w_{i0}$ . Then, according to his framework, migration costs vary among individuals, but the sign of the correlation between costs and skills is ambiguous (Poutvaara, Borjas, and Kauppinen, 2015).



where there is an understanding both that a shortage exists and that this shortage should be addressed through labor immigration. As shown in the previous section, the data seems to confirm this priority restriction, because the visa for shortage occupations has increased over time compared to non-shortage professions, as well as the differences between minimum salary thresholds between the two categories has raised. According to the literature, more quality-selective immigration policy is expected to lower the number of immigrants and, at the same time, increase the average quality of immigrants. However, observing the data, this prediction can imply two different hypotheses:

$H_0$ : Within high-skilled occupations, UK-born workers do not react to labor market needs, and consequently, the policy is "forced" to recruit immigrants willing to work in those occupations from abroad. In this case, it is expected to find lower wages and less quality of immigrants.

Figure 3.11: Predictions on wages based on skill level and low-quality of immigrants



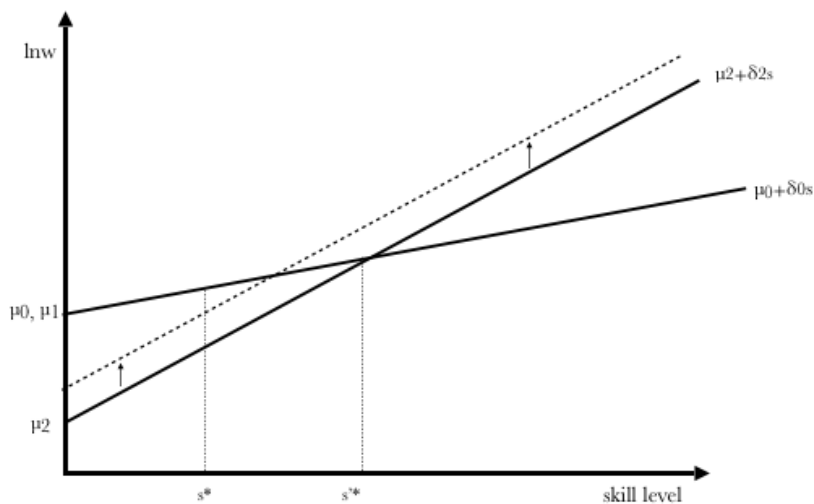
where  $s^*$  refers to the level of skills that are assumed to be perfectly transferable

across countries. In this case, a decrease in the average wage in the destination causes the dashed skill-wage line to shift down. The skill threshold  $s^*$  decreases, and the quality is going down in  $s'^*$ .

The alternative hypothesis states as follow:

$H_1$ : Within high-skilled occupations, the quality of the UK-natives in those occupations is too low and hence the policy acts to recruit more skilled workers from abroad. In this case, it is expected to find higher wages and more quality of immigrants.

Figure 3.12: Predictions on wages based on high-skilled level and high-quality of immigrants



Therefore, an increase in the average wage in the destination country lead the dashed skill-wage line to shift up. The skill threshold increases from  $s^*$  to  $s'^*$ , and the quality of immigrants is going up.

The following empirical analysis aims to test these hypotheses on average wages between a treatment group and a control group. Specifically, in the presence of an exogenous shock, this research design intends to estimate a causal effect, such as

the effects of a policy change that do not affect everybody at the same time and in the same way. In addition, the impact of this policy change will be further tested considering a comparison between natives with EU citizens and non-EU immigrants.

### 3.7 Identification Strategy

This section is devoted to different empirical investigations. The primary objective is to comprehend the impact of an institutional change in policy at a national level. In our setting, this implies to quantify how a policy change in the VISA selection affects the group of shortage occupations compared with the differences in the other Tier 2 occupations before and after the 2011 Reform.

This empirical investigation is possible under a difference-in-difference (DID) analysis. It estimates the impact of a policy interpreted as an exogenous shock made by the Government in the selection of people in the labor market. Such institutional changes have influenced access to some categories of works (treated) and not others (control) by observing both groups before and after the event of interest. This methodology is used in the setting of a natural experiment or a quasi-experiment in which a treatment variable undergoes a change that can be viewed as an exogenous variation in a treatment variable, (see e.g. Cameron and Trivedi, 2005).<sup>28</sup> The intuition behind the DID is to measure the effect of the policy on the outcome in the treated group relative to changes in the outcome in the control group. A natural experiment always, in fact, includes a control group, which is not affected by the policy change, and a treatment group, which is thought to be affected by the policy change<sup>29</sup>. DID requires data measured from a treatment group and a control group at

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<sup>28</sup>One of the first contributions to the DID strategy is made by Card and Krueger (1993) paper on minimum wages. In migration studies, the seminal paper using this approach is Card (1990) study on Mariel Boatlift to Miami.

<sup>29</sup>The control and treatment groups in natural experiments arise from the particular policy change

two or more different time periods, specifically at least one time period before "treatment" and at least one time period after "treatment." For the  $i$ th treated group, the change in the outcome is measured by  $[y_{i0} - y_{i1}|D_{i0} = 1]$  and that for the control group is measured by  $[y_{i0} - y_{i1}|D_{i0} = 0]$ . Then, the differences-in-differences measures  $[y_{i0} - y_{i1}|D_{i0} = 1] - [y_{i0} - y_{i1}|D_{i0} = 0]$ , where 0 and 1 denote respectively "after" and "before" the experiment occurs. The idea is to difference out the confounding time trends:  $[y_{i0}^0 - y_{i1}^0|D_{i1} = 1] - [y_{i0}^0 - y_{i1}^0|D_{i0} = 0]$ . This is called the *parallel trend assumption*; namely, it is assumed that in the absence of treatment, the difference between the 'treatment' and 'control' group is constant over time. This means that the group of occupations concerned by the policy change would have evolved with the same trend as the group used as control if the policy change would not have happened, therefore ensuring that the evolution observed in controls is a valid counterfactual. This rules out: (i) group-specific time trends, such as:  $E[m_t|d_{i1} = 1] \neq E[m_t|d_{i1} = 0]$ , and (ii) composition effects if the treatment under consideration affects the composition of treatment and control groups<sup>30</sup>. Difference-in-differences (DiD) estimators provide unbiased treatment effect estimates when, in the absence of treatment, the average outcomes for the treated and control groups would have followed parallel trends over time. For this reason, the validity of DID estimator (and the distinction with Fixed Effects (FE) estimator) lies in the choice of the appropriate comparison group where the common trend assumption above holds. This approach aims to avoid endogeneity by exploiting exogenous sources of variation, but finding a true natural experiment is quite difficult (Bansak, Simpson, and Zavodny, 2015).

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unlike a true experiment, in which treatment and control groups are randomly and explicitly chosen (Wooldridge, 2016).

<sup>30</sup>Potential solutions for composition effects, in fact, include (i) re-define the control group or (ii) estimate the intention to treat.

### 3.7.1 Estimating the Effect of Tier 2 Policy on Wages

The empirical strategy in this analysis takes advantage of the variation in the Tier 2 policy during April 2011. The estimation sample consists of all occupations within each establishment, which are assigned to the treatment group if they appear in the Shortage Occupation List. The outcome of interest is the average salary within occupations. The first sample includes periods from January 2009 until December 2013. The reform coincides with the second quarter of the year 2011. Moreover, the second part of the analysis presents a preliminary study on the effect of Brexit referendum on the same categories by exploiting variations at extensive margins. In this case, the sample includes periods from January 2014 to December 2018. Formally:

$$y_{iot} = \alpha + \beta_1 T_o + \beta_2 post_t + \beta_3 T_o * post_t + \epsilon_{it}^{31} \quad (3.6)$$

In this setting, eq. (3.6) can be rewritten as follows:

$$lnwage_{iot} = \alpha + \beta_1 Shortage_o + \beta_2 post_t + \beta_3 Shortage_o * post_t + \beta_4 X_{iot} + \epsilon_{it} \quad (3.7)$$

The dependent variable  $lnwage_{iot}$  represents the natural log of real wage within occupation  $o$ , individual  $i$  at time  $t$ . The variable  $Shortage_o$  represents the treatment  $T_o$  in equation (1) and it is a dummy varying at occupational level. In particular,  $Shortage_o$  identifies those occupations that are in the Shortage Occupation List and it is equal to one for observations in the treatment, while it equals zero for those in the control group. The variable  $post$  is a time period dummy for the second time period. The treatment started in 2011, second quarter. In this case, years before 2011 have a value of 0 and 2011+ have a value of 1. The coefficient ( $\beta_3$ ) directly measures

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<sup>31</sup>This model is called "log-level model" and implies the  $\log(y)$  as the dependent variable and  $x$  as the independent variable (Wooldridge, 6E).

the impact of the policy change by estimating the differential trend observed in the treatment group after the policy change, i.e.,  $Shortage_o * post_t$ . The remaining term ( $\epsilon_{it}$ ) is at the individual level (i) and the time period (t). The analysis controls, then, for these variations through a matrix of controls ( $X_{oit}$ ), which includes measures of individual and demographic characteristics, schooling, employment, and ability that allows for correcting for any pre-trend differences.

In particular, controls include different aspects of the individual or market behaviors: (i) some variables for individual covariates, namely age, sex and marital status; (ii) a variable for education based on age at which left full time education; (iii) a variable of potential experience in workforce; (iv) a variable for employment status; and (v) a variable for region of usual residence. Because the variable  $post$  captures the aggregate factors that would cause changes in the dependent variable even in the absence of a policy change, the second step aims to test the *parallel trend* assumption. As explained above, in this case we can observe whether the difference between shortage and no shortage groups (our treated and control references) the ‘treatment’ and ‘control’ group is constant before the reform. For this reason, equations 3.8 test the effect through the interaction between  $Shortage$  for different *years*, as formally specified in the following equation:

$$lnwage_{iot} = \alpha + \beta_1 Shortage_o + \sum_{j=t+1}^T \beta_2 I_t + \beta_3 X_{iot} + \epsilon_{it} \quad (3.8)$$

where  $j$  denote the years of analysis and  $I_t$  is the interaction between treated and years after the policy change and is now an indicator for whether the treatment is switched on a certain period.

Equation 3.9 is more detailed and looks at the effects in the outcome by the interaction between treated and quarters. The treatment starts, in fact, in 2011, the second quarter. For this reason, I have created the variable *period*, which indicates a

detailed time period.

$$\ln wage_{iot} = \alpha + \beta_1 Shortage_o + \sum_{j=q+1}^T \beta_2 I_t + \beta_3 X_{iot} + \epsilon_{it} \quad (3.9)$$

where  $q$  denotes all quarters, which are indicated as periods from 1 (quarter 1, 2009) to 20 (quarter 4, 2013) or in the second case from 1 (quarter 1, 2014) to 20 (quarter 4, 2018). Thus,  $j=q+1, \dots, Q$ . The variable  $I$ , in this case, refers to the effect of the interaction between treated and quarters. The policy change in both cases occurs at period 10th.

### 3.7.2 The Effect of Tier 2 Policy in Shortages and Groups

A triple-difference (DDD) estimation strategy is implemented by adding an additional comparison group. The idea is to explore not only the differences in wages across shortage and non-shortage occupations, but across the three groups of workers: natives, EU citizens, and non-EU immigrants. In fact, the shock could affect the wages of these three groups within both shortages and no shortage occupations in different ways. Triple differences estimator is an extension to the basic DID analysis and covered above to multiple groups and for multiple time periods. DDD follows the logic of difference-in-differences and presents the same assumption as the first estimator. However, the DDD estimation model allows exploiting differentials that a standard DD cannot. In this respect, it allows estimating the diff-in-diff model for two groups: one which is affected by the reform and one which is not. If the group which is not affected by the reform has any change over time, this is then subtracted from the main diff-in-diff estimate to give a triple difference estimate. In this way, when the outcome variable is determined by policy, time, place, or another variable, a triple difference strategy may remove the bias from the confounder and isolate the treatment effect (Wing, Simon, and Bello-Gomez, 2018). The identifying assumption

of this DDD estimator is that there be no contemporaneous shock that affects the relative outcomes of the treatment group in the same groups or years as the reform (Gruber, 1994). In a DDD analysis, a full set of dummies is included for each of the two kinds of groups and all time periods, as well as all pairwise interactions. Then, a policy dummy (or sometimes a continuous policy variable) measures the effect of the policy. Besides, this method can potentially account for unobserved trends.

Triple differences as identification strategy exploits variation across occupations and different groups of workers, as formally follows:

$$\begin{aligned} \ln wage_{iot} = & \alpha + \beta_1 Shortage_o + \beta_2 post_t + \beta_3 Shortage_o * post_t + \beta_4 group \\ & + \beta_5 group * post + \beta_6 group * Shortage_o + \beta_7 group * Shortage_o * post + \beta_8 X_{iot} + \epsilon_{it} \end{aligned} \quad (3.10)$$

where  $i$  indexes individuals,  $o$  refers to the occupation and  $t$  at years equal to 1 if it is after the policy change, while it equals 0 if before. The outcome is the log real hourly wage,  $X$  is a vector of observable characteristics as explained above, and  $Shortage$  is a dummy for treatment group (1 if treatment, 0 if control), while  $group$  refers to the EU and non-EU immigrants relative to the UK-born workers. In this model, the effect of the policy is captured by  $\beta_3$ , such as the triple-difference estimator. The coefficient of interest is now  $\beta_7$ , such as the coefficient on the triple interaction term, namely  $Shortage * group * post$ . Therefore, the treatment effect will measure the effect of the policy change on the average real wages of Shortage and no shortage occupations of UK native-workers relative to the EU and non-EU immigrants. This exercise would test the parallel trends between groups in order to exclude the possibility that wages are subject to systematically different changes that have nothing to do with the policy.



## 3.8 Empirical Results

This section presents estimations for the equations described in the empirical strategy. The causal identification regards the effect of a policy change on the average wages for the period between 2009 and 2013. By using a difference-in-differences method, the treatment effect tests whether the policy implemented in 2011 can affect the wage outcome of shortage occupations compared with individuals in non-shortage occupations, as shown in table 3.6. Moreover, table 3.7 shows this effect by exploiting a triple-difference estimation, which allows differentiating by groups, namely EU citizens and non-EU immigrants, for UK-born workers. Results are consistent across all specifications and show, on average, a negative impact of the reform to the wage of shortage occupations compared to the control occupations. This effect is more negative for immigrants compared to the UK-natives. The second part of the analysis shows the results for the period between 2014 and 2018. In this case, an "identifying" effect involves an extensive margins view by exploiting a policy announcement, namely the Brexit referendum, on the same treatment and control groups. Table 3.8 shows the DID estimation highlighting a positive effect on the shortage occupation after the treatment, while table 3.9 finds a slightly positive effect on the treatment on immigrants compared to the natives.

### 3.8.1 Institutional Changes in the period 2009-2013

To investigate the causal role of the policy change implemented in the UK in 2011, the first estimation (equations (1)-(4) in the previous section) considers the effects of the policy on wages of shortage occupations relative to the ones of non-shortage occupations. The first estimations are based on data for the years between 2009 and 2013. Specifically, table 3.6 explores the effects at intensive margins, such as

the effects of a change in a policy on labor market *within* occupational and salary categories. Therefore, estimations rely on variations across occupations competing within the same labor market. Columns (1) and (2) look at the effects of the treatment ( $\beta_1$ ) and time ( $\beta_2$ ) and at the interaction between treatment and the time ( $\beta_3$ ) after the policy change. This is a log-level model, where the  $\log(y)$  is the dependent variable, and  $x$  identifies the regressors. In this case the coefficient ( $\beta_1$ ) is interpreted as  $\% \Delta y = (100\beta_1)\Delta x$  (Wooldridge, 2016)<sup>32</sup>. Specifically, the treatment ( $\beta_1$ ) shows a positive and statistically significant sign, which means that the individuals in shortage occupations present average wages higher than that of individuals in non-shortage occupations. Variable *post* confirms that average wages are higher in the year when the policy change happened in 2011. Looking at the estimate of the interaction variable ( $\beta_3$ ) suggests that 25,5 % units reduce the average wages in treated occupations because of the policy change that happened. When the controls are added, these results can be interpreted as a reduction of 9,4% units in the average wages of the shortage occupation after the reform. A test for the validity of the “parallel trends” assumption has been conducted to exclude changes in outcomes for the treatment and control groups before the program was implemented<sup>33</sup>. By using the interaction between the treatment and the variable *year*, the evaluation takes into consideration two pre-intervention observations to assess the pre-policy and the post-intervention trends. Columns 3 and 4 show the equality of pre-intervention trends with coefficients that are not statistically significant before the policy change. The interaction between

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<sup>32</sup>In the log-level model,  $100\beta_1$  is sometimes called the *semi-elasticity* of  $y$  with respect to  $x$  (Wooldridge, 2016)

<sup>33</sup>As said, the difference-in-differences strategy allows testing the effects between a treatment and a comparison group that are constant over time. Therefore providing a valid estimate of the counterfactual, the assumption that no such time-varying differences exist between the treatment and control group should be confirmed. If the outcome trends are different for the treatment and comparison groups, then the estimated treatment effect obtained by the DID method would be biased.

*Shortage* and *year* indicates that policy restrictions introduced in 2011 reduced the average wages of shortage occupations by 7,6% in 2011, by 11,6% in 2012 and by 11,3% in 2013. To further confirm that there are no differences between the treatment and comparison groups that change over time, this analysis has been conducted at a quarterly level. In this case, the interaction between treatment and periods further confirms that no time-varying differences exist between the treatment and control group, which present no statistically significant coefficients before the policy change. Since period 9, and more specifically since period 10 (2011, second quarter), the interaction coefficients show a decrease in the average wages for individuals in shortage occupations. These empirical results support hereby the causal effect of the policy change on the treatment. In addition, this confirms what discussed in the descriptives. As restrictions in the policy were implemented since 2011, the average wage for both occupations in shortage and no shortage occupations has increased due probably to more restrictive criteria both in skill levels and in the minimum salary thresholds required to enter the country. However, the average wage in shortage occupations has decreased compared to non-shortage professions, as shown in Fig. 3.8. By using a priority system based on a "skill need" approach, the reform may thus have contributed to lower the wages required to fill these positions. In this case, the presence of such an essential difference in the effect on salaries between shortage and shortage occupations could confirm the first hypothesis. The lower level of wages in shortage occupations could confirm that immigrants selected based on skill priority on Shortage are not the top-level of skill distributions. This finding is also consistent with the picture of the minimum salary threshold, as shown in Figure 3.5. It shows that the difference between minimum salary thresholds for "experienced" workers in shortage and no-shortage occupations are increasing.

Table 3.6: Results from Diff-in-Diff 2009-2013

VARIABLES	(1) ln_wage	(2) ln_wage	(3) ln_wage	(4) ln_wage
1.Shortage	0.153*** (0.005)	0.053*** (0.004)	0.059*** (0.006)	0.058*** (0.013)
1.post	0.288*** (0.004)	0.111*** (0.004)		
1.Shortage#1.post	-0.255*** (0.007)	-0.094*** (0.006)		
1.Shortage#2010.year			0.002 (0.009)	
1.Shortage#2011.year			-0.076*** (0.010)	
1.Shortage#2012.year			-0.116*** (0.010)	
1.Shortage#2013.year			-0.113*** (0.010)	
1.Shortage#2.period				0.004 (0.019)
1.Shortage#3.period				0.004 (0.018)
1.Shortage#4.period				-0.004 (0.018)
1.Shortage#5.period				-0.009 (0.018)
1.Shortage#6.period				0.012 (0.018)
1.Shortage#7.period				0.015 (0.018)
1.Shortage#8.period				-0.005 (0.018)
1.Shortage#9.period				-0.095*** (0.020)
1.Shortage#10.period				-0.067*** (0.020)
1.Shortage#11.period				-0.079*** (0.020)
1.Shortage#12.period				-0.056*** (0.020)
1.Shortage#13.period				-0.108*** (0.020)
1.Shortage#14.period				-0.103*** (0.020)
1.Shortage#15.period				-0.120*** (0.021)
1.Shortage#16.period				-0.129*** (0.020)
1.Shortage#17.period				-0.115*** (0.020)
1.Shortage#18.period				-0.122*** (0.021)
1.Shortage#19.period				-0.108*** (0.020)
1.Shortage#20.period				-0.104*** (0.020)
Constant	2.558*** (0.003)	2.203*** (0.018)	2.189*** (0.018)	2.184*** (0.019)
Individual controls	NO	YES	YES	YES
Skill controls	NO	YES	YES	YES
Occupation control	NO	YES	YES	YES
Demographic control	NO	YES	YES	YES
Observations	102,777	102,777	102,777	102,777
R-squared	0.046	0.278	0.279	0.279

Robust standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

These findings are also consistent with the literature on the impact of skill-selective immigration policies on immigrants' and natives' outcomes. In particular, it is compatible with the analysis carried out by Czaika and Parsons (2017), which uses a micro-founded gravity model and finds that demand-driven systems, which are usually based on the principle of job contingency and which are often supplemented by labor markets tests or shortage list assessments of labor market needs, have little, and potentially even a negative, effect. These findings are also consistent with the literature on the quality of immigrants based on observable characteristics (see McKenzie and Rapoport, 2010; Bertoli and Rapoport, 2015).

### 3.8.2 Wages and inequality of immigrants and natives

The results in Table 3.6 highlight a causal effect where a restriction in the policy has caused a reduction in the average wages of the treated group after the change in respect to the control group. Second, they show that no differences in trends are observed between the comparison and treatment groups before the policy change began. Triple-difference estimation would exploit variation across occupations and different groups of workers, and it is a robust way to test the assumption of parallel trends since it uses different comparison groups. The main issue of interest estimated in equations 3.10 is whether the effects on the average wages caused by a restriction in the policy on shortage and no shortage occupations are passed over to immigrants with respect to the UK natives. The results are shown in table 3.7. In this respect, the interaction between treatment and time provided the double difference, while further interaction between the groups is the triple difference. The results confirm that individuals in shortage occupations present average wages higher than that of individuals in non-shortage professions. In fact, the treatment ( $\beta_1$ ) shows a positive and statistically significant sign. Variable *post* confirms that average wages are higher

in the year when the policy change happened in 2011. And the interaction between treatment and time suggests that the average salaries in treated occupations are reduced by 8,6 % units because of the policy change that happened. Looking at the estimate of the interaction variable ( $\beta_6$ ) suggests that EU immigrants (1.group) present lower average wages in shortage occupations with respect to the UK-born workers of 1,9%, while the average salary for non-EU immigrants (2.group) increases by 0,3 in a shortage occupation. The interaction between group and time shows an increase in the average wage both for EU citizens (*by*6,4%) and non-immigrants by 5,1%. However, the triple-difference coefficient ( $\beta_7$ ) highlights the negative effect of the policy on shortage occupations for EU immigrants by 7,6%. This effect is even more negative for non-EU immigrants in shortage occupations with respect to the UK-born workers. The impact on wages between EU and non-EU immigrants is negative, but it is not so different between these two groups. This latter observation supports the idea of the UK government's demand for high-skilled foreign workers, but that are not top-skills in the foreign labor force. This is consistent with the results finding by Mayda, Ortega, Peri, Shih, and Sparber (2018) on the effect of the binding H-1B cap in the US. They find that the policy has reduced the number of workers who were likely to have been among the most talented and productive foreign individuals seeking US employment and has caused the composition of H-1B workers to become more concentrated among workers with middle-levels of skill or ability.

Table 3.7: Results from Triple Difference Estimation 2009-2013

VARIABLES	(1) ln_wage	(2) ln_wage
1.Shortage	0.153*** (0.005)	0.057*** (0.005)
1.post	0.282*** (0.005)	0.108*** (0.004)
1.Shortage#1.post	-0.242*** (0.008)	-0.086*** (0.007)
1.group	-0.041** (0.016)	-0.038*** (0.013)
2.group	0.018 (0.012)	-0.040*** (0.010)
1.Shortage#1.group	-0.019 (0.030)	-0.019 (0.025)
1.Shortage#2.group	0.003 (0.019)	-0.018 (0.016)
1.post#1.group	0.064*** (0.024)	0.021 (0.021)
1.post#2.group	0.051*** (0.018)	0.035** (0.016)
1.Shortage#1.post#1.group	-0.076* (0.040)	-0.032 (0.034)
1.Shortage#1.post#2.group	-0.098*** (0.027)	-0.063*** (0.023)
Constant	2.558*** (0.003)	2.183*** (0.018)
Individual controls	NO	YES
Skill controls	NO	YES
Occupation control	NO	YES
Demographic control	NO	YES
Observations	102,718	102,718
R-squared	0.047	0.279

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

### 3.8.3 The impact of Brexit Referendum

This section would explore the effects of policy intervention at the extensive margin by exploiting variations in the labor market by taking into account the effect *between* the same occupational and salary categories. Although Brexit has not still happened, the referendum can be already considered as a natural experiment. However, this analysis would find an "identifying" effect to test if the result of the referendum has already had an impact on the UK labor market. Although the Brexit poll directly changes the labor market by affecting individuals, this analysis would test the "indirect" effect caused by an announcement on average wages in shortage and non-shortage occupations. The results are shown in table 3.8. Columns (1) to (2), which look at the effects of the treatment ( $\beta_1$ ) and time ( $\beta_2$ ), show that the policy intervention has a negative but statistically significant effect on the treatment ( $\beta_1$ ), which means that the individuals in shortage occupations present average wages lower than that of individuals in non-shortage occupations. However, average wages become higher in the year when the referendum happened in 2016. Looking at the estimate of the DID interaction variable ( $\beta_3$ ) suggests that the average wages in treated occupations are increased by 3,7 % units because of the referendum. When the controls are added, these results can be interpreted as an increase of 1,7% units in the average wages of the shortage occupation after the referendum. Also, in this case, it is possible to assume that no time-varying differences exist between the treatment and control groups before the policy intervention. Because coefficients are negative or not statistically significant before the referendum, it is possible to assume that the change in the average wages of individuals in non-shortage occupations reflects what would have happened to the average wages of individuals in shortage occupations in the absence of the treatment. Columns (3) and (4) can confirm the parallel trend assumption. Specifically, the interaction between Shortage and year results to be statistically significant and indi-



cates that policy intervention in 2016 slightly increases the average wages of shortage occupations. This is also confirmed by the interaction between treatment and periods, which present no statistically significant coefficients before the announcement, while an increase in the average wages for shortage occupations since period 9. In this case, the effect is less pronounced than in the first specification, probably due to the "announcement" effect. However, the results show that the Brexit referendum has already had an impact on the high-skilled labor market. These findings are consistent with the figures on wages shown in the Descriptive Statistics, which show an increase in the average salary of shortage occupations over time. These results are also consistent with the literature on the effects of immigration on native wages that exploits a natural experiment (see for instance, Card, 1990; Friedberg, 2001; Angrist and Krueger, 1991), which find limited evidence on an adverse effect of immigration on natives' labor market outcomes.

Table 3.8: Results from Diff-in-Diff 2014-2018

VARIABLES	(1) ln_wage	(2) ln_wage	(3) ln_wage	(4) ln_wage	(5) ln_wage	(6) ln_wage
1.Shortage	-0.164*** (0.006)	-0.076*** (0.006)	-0.170*** (0.009)	-0.078*** (0.008)	-0.181*** (0.019)	-0.086*** (0.017)
1.post	0.027*** (0.005)	0.028*** (0.005)				
1.Shortage#1.post	0.039*** (0.008)	0.017** (0.007)				
1.Shortage#2015.year			-0.001 (0.013)	-0.005 (0.012)		
1.Shortage#2016.year			0.040*** (0.013)	0.018 (0.012)		
1.Shortage#2017.year			0.044*** (0.013)	0.024** (0.012)		
1.Shortage#2018.year			0.053*** (0.013)	0.018 (0.012)		
1.Shortage#2.period					0.017 (0.026)	0.016 (0.024)
1.Shortage#3.period					-0.003 (0.026)	-0.001 (0.023)
1.Shortage#4.period					0.028 (0.026)	0.018 (0.023)
1.Shortage#5.period					0.008 (0.026)	0.002 (0.024)
1.Shortage#6.period					-0.003 (0.027)	-0.005 (0.024)
1.Shortage#7.period					0.015 (0.027)	0.012 (0.024)
1.Shortage#8.period					0.019 (0.027)	0.007 (0.024)
1.Shortage#9.period					0.068** (0.027)	0.041* (0.024)
1.Shortage#10.period					0.039 (0.027)	0.024 (0.024)
1.Shortage#11.period					0.027 (0.026)	0.006 (0.024)
1.Shortage#12.period					0.068** (0.027)	0.034 (0.024)
1.Shortage#13.period					0.040 (0.027)	0.017 (0.024)
1.Shortage#14.period					0.044* (0.027)	0.024 (0.024)
1.Shortage#15.period					0.055** (0.027)	0.034 (0.024)
1.Shortage#16.period					0.081*** (0.027)	0.055** (0.024)
1.Shortage#17.period					0.085*** (0.026)	0.048** (0.024)
1.Shortage#18.period					0.047* (0.026)	0.003 (0.024)
1.Shortage#19.period					0.077*** (0.027)	0.043* (0.024)
1.Shortage#20.period					0.047* (0.026)	0.012 (0.024)
Constant	2.938*** (0.004)	2.467*** (0.020)	2.931*** (0.006)	2.460*** (0.020)	2.930*** (0.012)	2.457*** (0.022)
Individual controls	NO	YES	NO	YES	NO	YES
Skill controls	NO	YES	NO	YES	NO	YES
Occupation control	NO	YES	NO	YES	NO	YES
Demographic control	NO	YES	NO	YES	NO	YES
Observations	69,329	69,329	69,329	69,329	69,329	69,329
R-squared	0.018	0.169	0.018	0.170	0.019	0.170

Robust standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 3.8.4 Effect of Brexit vote on wages and worker quality

The years between 2014 and 2018 are particularly relevant to the study of the labor market in the UK. Since the Brexit referendum in 2016, the priority system in the UK labor market is changing, especially with respect to labor migration. Since the immediate aftermath of the Brexit vote hit the EU immigrants, one could expect a more evident effect on the labor market outcomes of this group. However, the Brexit referendum has caused an "indirect" impact on non-EU labor immigration, which is substantially increased since 2016. In fact, as explained in the Institutional Setting, the Tier 2 Visa restricted COS monthly allocation limit was reached for a record of different consecutive months in a row. As a result, prioritized applications such as those on the shortage occupation list have been granted ahead of many other applicants. At the same time, significant restriction to the UK Immigration Rules for Tier 2 employer-sponsored migrants has come into force since 6 April 2017 by the increase in minimum salary thresholds and the introduction of additional and increased charges. This analysis would offer an understanding that could explain how the Brexit vote has had an effect, either positive or negative, on the wage outcome of EU and non-EU immigrants in respect of the UK-born residents. Equations 7 and 8 would test whether the effects on the average wages caused by this announcement on shortage and no shortage occupations between these three different groups. Results in table 3.9 confirm that the referendum has a negative effect more on average wages of the EU citizens than of the non-EU immigrants with respect to the UK natives. The triple-difference coefficient ( $\beta_7$ ), in fact, highlights an adverse effect of the policy intervention on shortage occupations for EU immigrants by 2,2% with respect to natives. This effect is also harmful to non-EU immigrants in shortage occupations with respect to the UK-born workers but is lower than for EU immigrants. By decomposing this effect, the treatment ( $\beta_1$ ) shows a negative and statistically significant

sign, which means that the impact on the policy intervention on average wages of the individuals in shortage occupations is decreasing by 1,58% units in respect to the control group. Variable *post* confirms that average salaries are higher in the year when the referendum happened in 2016. And the interaction between treatment and time suggests that the average wages in treated occupations have increased by 4,7 % units because of the policy intervention that happened. The interaction between group and time shows a slight increase in the average wage both for EU citizens by (2,1%) and non-EU immigrants by 0,9%. However, the average salary of the EU individuals in shortage occupations has decreased after 2016 with respect to both natives and non-EU immigrants, as in Fig. 3.9. This estimation result again is in line with the UK government policy currently based around the notion that bringing in migrants alleviates skill shortages. However, the wage gap effect between groups is decreasing with respect to the previous analysis conducted for 2009-2013. In this case, the impact of tightness in the policy on the quality of immigrants is more ambiguous.

Table 3.9: Main results from Triple Difference Estimation 2014-2018

VARIABLES	(1) ln_wage	(2) ln_wage
1.Shortage	-0.158*** (0.007)	-0.066*** (0.006)
1.post	0.024*** (0.006)	0.026*** (0.005)
1.Shortage#1.post	0.047*** (0.009)	0.020** (0.008)
1.group	0.004 (0.021)	-0.014 (0.020)
2.group	0.068*** (0.015)	0.020 (0.014)
1.Shortage#1.group	-0.075** (0.032)	-0.059** (0.028)
1.Shortage#2.group	-0.040* (0.021)	-0.060*** (0.019)
1.post#1.group	0.026 (0.027)	0.021 (0.026)
1.post#2.group	0.018 (0.021)	0.009 (0.020)
1.Shortage#1.post#1.group	-0.048 (0.041)	-0.022 (0.036)
1.Shortage#1.post#2.group	-0.043 (0.029)	-0.015 (0.026)
Constant	2.932*** (0.004)	2.455*** (0.020)
Individual controls	NO	YES
Skill controls	NO	YES
Occupation control	NO	YES
Demographic control	NO	YES
Observations	69,270	69,270
R-squared	0.019	0.170

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

### 3.9 Discussion and Conclusion

In recent years skill-selective immigration policies have been implemented in several developed countries. Despite their growing popularity, little evidence exists to date documenting their impact on the local labor markets. This chapter aimed to address this gap first by focusing on a reform that was introduced in the UK in 2011 to re-orient economic migration towards skills that are the most in need of the economy. Tier 2 system has been implemented for selecting economically desirable immigrants depending on a job offer and skills shortages. This admission system also provides more flexibility in identifying appropriate candidates, who can be highly skilled. In this case, self-selection should work to attract the ablest and motivated workers because the distribution of income between countries remains unequal over time (see Borjas, Kauppinen, and Poutvaara, 2018). When the pool of high-skilled individuals in the country is insufficient, the ability to attract high-skilled immigrants is crucial for improving the quality of a country's workforce and its innovative capacity (Parey, Ruhose, Waldinger, and Netz, 2017). The UK has developed a system of immigration control that reacts to the demands of the national need through priority criteria. For this reason, the UK has developed an educational selectivity system, which looks at the labor-market quality of immigrants. In this respect, the Government uses immigration as a tool to address labor shortages. The shortage occupation list identifies all occupations in a shortage within the UK market, and that can be of interest in labor immigration. This analysis investigates whether the policy was successful in selecting individuals for the priority list. The data have confirmed this priority restriction. Indeed the visa for shortage occupations has increased over time compared to non-shortage professions. Further, the differences between the minimum salary thresholds between the two categories have raised. According to the literature, more

quality-selective immigration policy is expected to lower the number of immigrants and, at the same time, increase the average quality of immigrants. However, observing the data, this analysis has tested two different hypotheses on the variety of immigrants. The first hypothesis would test whether a lower quality of immigrants corresponds on average to lower wages. The idea is that native workers do not react to the requests of the internal market. In turn, the Government is forced to recruit immigrants from abroad. The second hypothesis would take into account the possibility that the natives' quality is relatively low for the market needs. In this alternative case, the Government should select more qualified people from abroad. I test these hypotheses for two different periods. This challenge is possible under a difference-in-difference (DID) analysis, which in this case estimates the impact of a policy interpreted as an exogenous shock made by the Government in the selection of people in the labor market. Such institutional changes have influenced access to some categories of works (treated) and not others (control) by observing both groups before and after the event of interest. The first causal identification regards the effect of a policy change on the average wages for the period between 2009 and 2013. By using a difference-in-differences method, the treatment effect tests whether the policy implemented in 2011 can affect the wage outcome of shortage occupations compared with individuals in non-shortage professions. Moreover, we test this effect by exploiting a triple-difference estimation, which allows differentiating by groups, namely EU citizens and non-EU immigrants, for UK-born workers. A first descriptive examination of the CoS and salary thresholds shows that the visas issued for shortage occupations have increased over time. The result is confirmed by looking at the differences in the minimum salary thresholds among groups. Results from estimation show, on average, a negative impact of the reform to the wage of shortage occupations compared to the control group. This effect is more harmful to immigrants compared to the UK-

natives. Thus these results from our empirical analysis confirm that hiring workers in shortage occupation has increased, but this has not caused adverse effects on native wages. The reform was thus able to increase the migration levels in target occupations, revealing that this policy may be effective in addressing skill needs in the short run. However, the lower level of wages in shortage occupations seems to confirm that the selection of immigrants based on shortage is not the top-level of skill distributions. The second part of the analysis shows the results for the period between 2014 and 2018. In this case, an "identifying" effect involves an extensive margins view by exploiting a policy announcement, namely the Brexit referendum, on the same treatment and control groups. In this case, the DID estimation highlights a positive effect on the shortage of occupation after the treatment, while a slightly positive impact on the treatment of immigrants compared to the natives. The analysis shows a slight increase in the average wage both for EU citizens (by 2,1%) and non-EU immigrants by 0,9%. However, the average salary of the EU individuals in shortage occupations has decreased after 2016. This is true even in relative terms in comparison with the salaries of both natives and non-EU immigrants. This estimation result again is in line with the UK government policy currently based around the notion that bringing in migrants alleviates skill shortages. However, the wage gap effect between groups is decreasing compared to the previous analysis conducted for 2009-2013. In this case, the impact of tightness in the policy on the quality of immigrants is more ambiguous. These results reveal that natives are, in part, affected by immigration in shortage categories. However, these small adverse effects on wages explain the reduction of the occupational groups in the Labor Force Survey for the period between 2014 and 2018. These results are consistent with the literature on the effects of immigration on native wages that exploits a natural experiment (see for instance, Card, 1990; Friedberg, 2001; Angrist and Krueger, 1991), which find limited evidence on an adverse effect of



immigration on natives' labor market outcomes. Some criticisms of this policy reside in the definition of skill shortages. While the reform has been effective in reaching its goals in the first period, the effect on the second period is more ambiguous. For this reason, this analysis raises some further research questions on the effectiveness of a selection policy based on skill-needs.

# GENERAL CONCLUSION

Although countries focus on selective migration, a further reduction of family migration and an ever more systematic re-addressing of asylum flow, the economic importance of migration continues to grow for both sending and receiving countries. Many states in Europe and North America have experienced rapid increases in labor immigration over the past 20 years. In 2017 the number of immigrants in the European Union (EU) was 53.1 million, roughly 10% of the total population. Most of them (48.2 million) live in an EU15 country. More than half of the immigrants in EU countries are European (38% of the foreign-born population in the EU). An additional 16% was born in a European country outside of the EU. Africa and the Middle East account for 19 % of all immigrants, with around 16 % coming from Asia and 11% from the Americas or Oceania (EU LFS, 2019). Labor migration in the EU has changed in recent years, in particular, as far as the time length that labor migrants spend abroad. In addition, the nature, scale, and direction of the migration flows have also changed dramatically. The EU successive enlargements towards the former Eastern European countries in 2004 and 2007 were influential in this respect. Another important element we need to consider is related to some EU demographic trends: populations aging and declining birth rates both imply shrinking labor force. Moreover, the presumably most important reason concerns the changes in employment relations with the transition to flexible employment practices which is causing a

worldwide redistribution of labor. Several other elements add up. In fact, European migration patterns have heavily influenced by the transitional measures that have been applied, their duration, and by the economic crisis. In addition, technological innovation and global competitiveness are addressing many of the labor market trends. In combination with increasing demand for skilled workers due to demographic challenges and growing innovation pressures, key sectors of the EU's economy suffer from specific labor and skill shortages (European Commission, 2019). Across the EU, the top five skill shortage occupations are: (1) ICT professionals; (2) medical doctors; (3) science, technology, engineering and mathematics (STEM) professionals; (4) nurses and midwives; and (5) teachers. However, the specific occupations experiencing shortages differ among member states (CEDEFOP, 2016). In countries facing pronounced demand for skilled workers, labor migration can help to mitigate skill shortages in the domestic workforce. For this reason, attracting highly qualified labor has become a priority of many member states. Both supra-national and national policies are being introduced and implemented to increase the attractiveness of the EU countries as a migration destination (Zincone, Penninx, and Borkert, 2011; Chaloff and Lemaitre, 2009). The European Commission (EC) has tried to harmonize the selection policies for purposes of labor, research and study. The underlying idea is to enable the EU to respond quickly and efficiently to labor market requirements at the national, regional, and local level in the face of a growing global competition. As part of the EU strategy to respond to fluctuating demand for high-qualified workers, the "EU Blue Card" was introduced in 2009, with the aim to to offset skill shortages and to address the problem of demographic aging. The EU Blue Card is an EU-wide work permit for highly qualified employment, aimed at making EU a desirable destination for skilled workers from third countries. The EU Blue Card was implemented by 25 EU member states, apart from Denmark, Ireland and the United Kingdom. It

is designed to be demand-oriented, such that immigration follows the needs of the labor market. Restrictive admission conditions and the existence of parallel rules, conditions and procedures at national level have limited the use of the EU Blue Card scheme. In 2017, Germany issued almost 21.000 Blue Cards (85% of the EU total), followed by France (4.3 %), Luxembourg (2.8 %) and Poland (1.9 %) (see Hatton, 2008; OECD, 2008; Speciale, 2010; Commission, 2016; Eurostat, 2019a,b, for analyses of the impact of the EU Blue Card). Mobility within the EU can in principle help to fill labor market shortages, but the cost of moving for individuals is increased by policy-induced barriers to mobility such as the loss of pension entitlements, lack of recognition of qualifications, inaccessibility of some public sector jobs and housing market frictions (OECD, 2012).

Since assessing the overall net gains or losses to the economy from immigration is one of the most debated issue, the first chapter of the Thesis has provided an overview of the main theoretical and empirical contributions for explaining the socio-economic impact of immigration from the receiving country perspective. Starting from the basic model of immigration, Chapter 1 has provided a survey of the economic literature on the characteristics and socio-economic impact of migration. The first part has analyzed why people become immigrants and whether immigrants are positively or negatively selected relative to the receiving country population. In particular, it has focused on the literature that has tried to answer to “why people migrate” and “who immigrates”. It takes into consideration the theoretical literature on the economic determinants of international migration which stemmed from the much older theory of internal migration. The standard models imply that immigration rate depends on the international differences in the returns to factor supply, net of migration costs, skill levels, income inequality, and immigration policies. In particular, considering the cross-country differences in economic conditions, utility-or- income maximization

model at micro level and the gravity model at macro level predict that changes in relative economic conditions lead to changes in migration flows determining whether people move. While the economic models of migration decision look at the cross-country differences in the economic conditions to determine the migration flows, the “Selection Models” focus on the immigrants’ skill levels and returns to skill in order to look at the immigrants’ characteristics. The most influential model on skill selection in immigration was elaborated by Borjas (1987) based on a canonical model by Andrew Roy (1951). His application (Borjas, 1987, 1991), shows that international migration is not only influenced by net earnings differences between countries, but also by factors such as international differences in income inequality and the degree of skills transferability. The second part of the chapter has focused on the literature on labor market effects of immigration. By exploring the basic neoclassical model of immigration, the chapter has explored the main theoretical predictions concerning the labor market impact of immigration on demand and supply of labor taking into account the difference between substitutability and complementarity in the production process, as well as between skilled and unskilled labor. Although basic economic theory suggests that immigration increases the labor supply, leading to an adjustment of employment and wages, the empirical literature shows more complex evidences. The last part of the chapter focuses on the empirical strategies and the main findings on the labor market impact of immigration in the destination countries. The main conclusion of this stream of literature tend to find small effects of immigration on wages in destination countries. Although many studies find that immigration does not appear to have had negative labor market effects on natives the destination, some studies do find evidence that certain groups have seen their wages fall because of immigration. In particular, studies that use the spatial correlation and natural experiments approaches tend to find smaller, if any, negative effects on wages

and employment of native-born workers. Studies that use the skill cells approach or factor proportions models tend to find more evidence of detrimental effects, although there are exceptions. The labor market effects of immigration thus remain open to debate.

In recent years skill-selective immigration policies have been implemented in several developed countries. In particular, a growing number of OECD countries are likely to adopt more restrictive and increasingly quality-selective immigration policies, with the aim to confer better chances of admission at destination to those applicants with a higher level of education. This policy become to be clear from the gradual introduction of points-based immigration systems, first in Canada in 1967, recently in the UK in 2008. Elsewhere, immigration policies have also evolved towards becoming more restrictive quantitatively and more selective qualitatively, through the introduction of specific visa categories for highly skilled professionals (e.g., the H1-B visa category in the US, or the European “Blue Card”) or through the introduction of biased selection criteria, making low-skill immigration more difficult while at the same time encouraging permanent high-skill immigration. Labor markets across the European Union are characterized by varied regulatory frameworks, but each Member State faces the challenges of shortages of workers with relevant qualifications or interested to take up certain occupations. Chapter 2 has focused on the review of the admission policies within the European Union (EU) that affect the size and the characteristics of the highly skilled immigrant inflows. Within EU, countries currently allow citizens of other EU countries to enter freely to work. Although the mobility of EU-born workers within the EU is free and not skill-selective, an endorsement for a high skill mobility within the common market has been provided under several regulations. Generally, the rules about the selection admission policies in EU are based on Treaty provisions interpreted by Court decisions. Concerning the movement of the

third countries nationals, European Commission has dealt with several proposals for directives on labor migration, although the Member States have relatively strict policies for immigrants from non-EU countries. The attempts by European Commission (EC) to harmonize the selection policies for purposes of labor, research and study has been analyzed. The EC, in fact, has been promoting the immigration of highly skilled people in order to compensate the labor shortages in the face of a growing global competition. The last part has aimed to discuss the different approaches to selecting and admitting highly-skilled immigrants in UK and Germany.

The immigration system of the United Kingdom does not include the EU Blue Card as in the main EU countries. Instead, the UK manages its migration flows through a national immigration law. Since 2008, UK governments have published the immigration policy framework that marked a shift in the priorities on immigration policy through the adoption of a points-based system. This new system is specifically designed to select individuals with skills regarded as beneficial to the national economy. However, since 2011, the UK policy has aimed to reduce net-migration by restricting inflows of non-European Area (EEA) net migration and encouraging the outflows of non-EEA nationals to affecting the size and the composition of UK migrant workforce. An annual cap of 20,700 was introduced to the number of non-EEA nationals who apply under Tier 2 visa. The cap created an upper limit on the number of workers that employers could sponsor to come from overseas. It also revised some characteristics of the vacancies according to minimum skill, appropriate salary rates, and English language thresholds. In this way, the UK government gave more emphasis on the concepts of "skill needs" and "skill shortages." The 'Shortage Occupation' (SOL) in this respect was introduced to list job categories in a shortage condition of natives filling their positions. It implies that the vacancies in this list should fill with immigrants giving them priority in the VISA selection. The system has quickly

become a criteria-based system via minimum skill and pay thresholds, which reacts to the demands of the national need through a priority criteria that incorporate various protections for resident workers, which have a priority in the labor market. This analysis has exploited an exogenous reform in 2011 intending to understand the impact of an institutional change in policy at a national level. In this setting, this implies to quantify how a policy change in the VISA selection affects the group of shortage occupations compared with the differences in the other Tier 2 occupations before and after the 2011 Reform. Moreover, this analysis has exploited the Brexit referendum to observe if it has caused an impact and to which extent, on the same professional categories. The main dataset used is the Labour Force Survey (LFS) quarterly data released by the Office for National Statistics (ONS), which it is the official source of information on labor market outcomes in the UK. By paying attention to tier 2, the focus has been on shortage and no shortage occupations. The second source concerns confidential data on the Certificate of Sponsorship (CoS) collected through a Freedom of Information (FOI) Requests process from the UK Home Office. These specifically concerns the occupation breakdown of restricted CoS granted from years from 2009 to 2018 to identify the CoS demand at the professional level. The third source is a dataset on minimum salary thresholds at the professional level by looking at the Codes of practice for Tier 2 Sponsors. It sets out the skill level and the appropriate salary rate for jobs. The contribution of this analysis mostly relies on a merged dataset that exploits variations in high-skilled and especially in labor shortages at the occupation level conditioned on information on CoS granted as well as on minimum salary thresholds. The third chapter has taken advantage of a 'natural' experiment in the UK by investigating how tightness in a selective policy affects the selectivity and the quality of immigrants and the effects on real shortages in the labor market. To the best of my knowledge, this analysis represents the first exercise in this respect. This



challenge has been possible under a difference-in-difference (DID) analysis, which in this case estimates the impact of a policy interpreted as an exogenous shock made by the Government in the selection of people in the labor market. Such institutional changes have influenced access to some categories of works (treated) and not others (control) by observing both groups before and after the event of interest. The first causal identification regards the effect of a policy change on the average wages for the period between 2009 and 2013. By using a difference-in-differences method, the treatment effect tests whether the policy implemented in 2011 can affect the wage outcome of shortage occupations compared with individuals in non-shortage professions. Moreover, we test this effect by exploiting a triple-difference estimation, which allows differentiating by groups, namely EU citizens and non-EU immigrants, and UK-born workers. A first descriptive examination of the CoS and salary thresholds shows that the visas issued for shortage occupations have increased over time. The result is confirmed by looking at the differences in the minimum salary thresholds among groups. Results from estimation show, on average, a negative impact of the reform to the wage of shortage occupations compared to the control group. This effect is more harmful to immigrants compared to the UK-natives. Thus, these results from the empirical analysis confirm that hiring workers in shortage occupation has increased, but this has not caused adverse effects on native wages. The reform was thus able to increase the migration levels in target occupations, revealing that this policy may be effective in addressing skill needs in the short run. However, the lower level of wages in shortage occupations seems to confirm that the selection of immigrants based on shortage is not the top-level of skill distributions. The second part of the analysis shows the results for the period between 2014 and 2018. In this case, an "identifying" effect involves an extensive margins view by exploiting a policy announcement, namely the Brexit referendum, on the same treatment and control

groups. In this case, the DID estimation highlights a positive effect on the shortage of occupation after the treatment, while a slightly positive impact on the treatment of immigrants compared to the natives. The analysis shows a slight increase in the average wage both for EU citizens (by 2,1%) and non-EU immigrants by 0,9%. However, the average salary of the EU individuals in shortage occupations has decreased after 2016. This is true even in relative terms in comparison with the salaries of both natives and non-EU immigrants. This estimation result is in line with the UK government policy currently based around the notion that bringing in migrants alleviates skill shortages. However, the wage gap effect between groups is decreasing compared to the previous analysis conducted for 2009-2013. In this case, the impact of tightness in the policy on the quality of immigrants is more ambiguous. These results reveal that natives are, in part, affected by immigration in shortage categories. However, these small adverse effects on wages explain the reduction of the occupational groups in the Labor Force Survey for the period between 2014 and 2018. These results are consistent with the literature on the effects of immigration on native wages that exploits a natural experiment (see, for instance, Card, 1990; Friedberg, 2001), which find limited evidence on an adverse effect of immigration on natives' labor market outcomes. Some criticisms of this policy reside in the definition of skill shortages. While the reform has been effective in reaching its goals in the first period, the effect on the second period is more ambiguous. For this reason, this analysis represents a preliminary study and raises some further research questions on the effectiveness of a selection policy based on skill-needs.

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Appendix A

Appendix

## A.1 Basic Model of Immigration

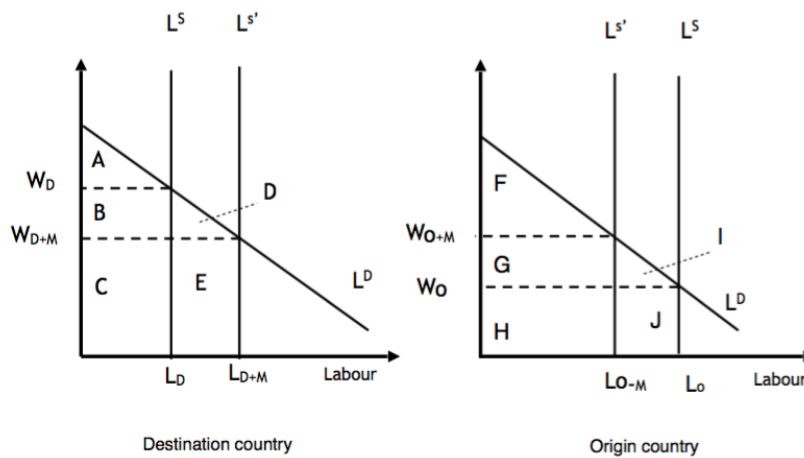
Before Immigration:

- Under the pre-immigration labour market equilibrium,  $L_D$  workers are employed at  $W_D$  in the destination that represents the country with the higher wages.
- On the contrary, in the origin, such as the country with lower wages,  $L_O$  workers are employed at wage  $W_O$ .

After immigration:

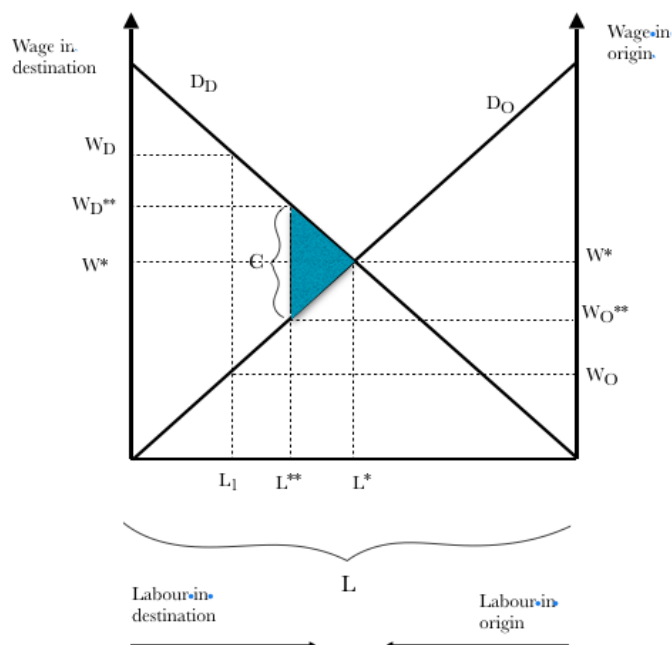
- $L_D + M$  workers result to be employed at wage  $W_{D+M}$  in the destination
- $L_O - M$  workers are employed at wage  $W_{O-M}$  in the origin, generating a new equilibrium

Figure A.1: Basic Model of Immigration



## Basic Model of Immigration with Costs

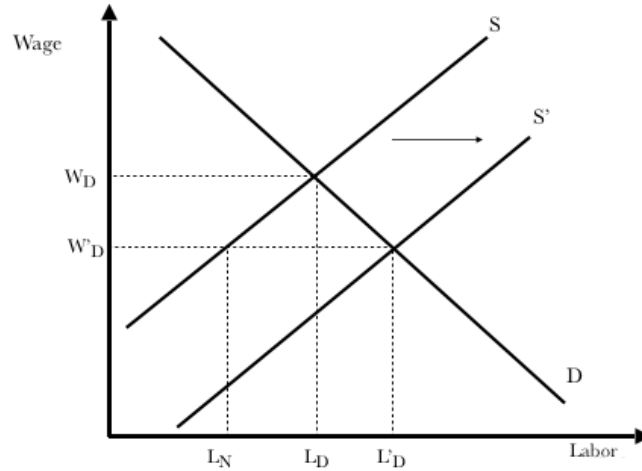
Figure A.2: Basic Model of Immigration with costs



- Each immigrant incurs a fixed cost equal to  $C$ .
- In equilibrium, workers migrate until  $W_D^{**} - C = W_O^{**}$ , which occurs at  $L^{**}$ .
- The shaded area is the loss in social welfare due to migration costs compared with costless migration.

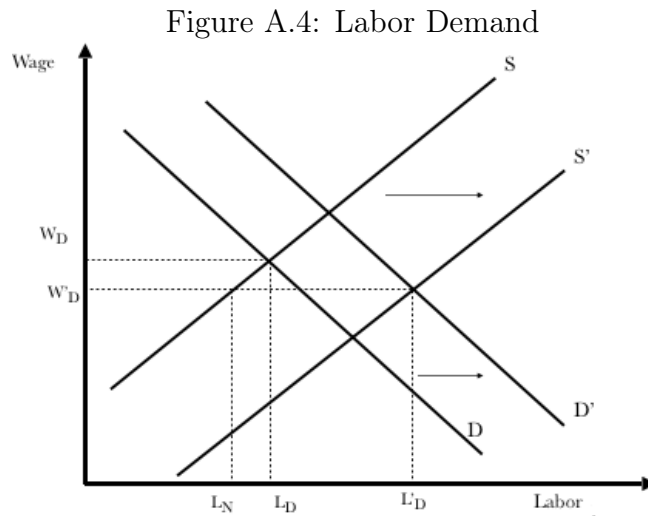
Effects of immigration in the destination with upward-sloping labor supply

Figure A.3: Basic model with upward-sloping labor supply



- Immigration causes the supply of labour to shift to the right.
- The wage falls from  $W_D$  to  $W'_D$ .
- The number of natives employed falls from  $L_D$  to  $L_N$ .
- The number of immigrants employed is  $L'_D - L_N$

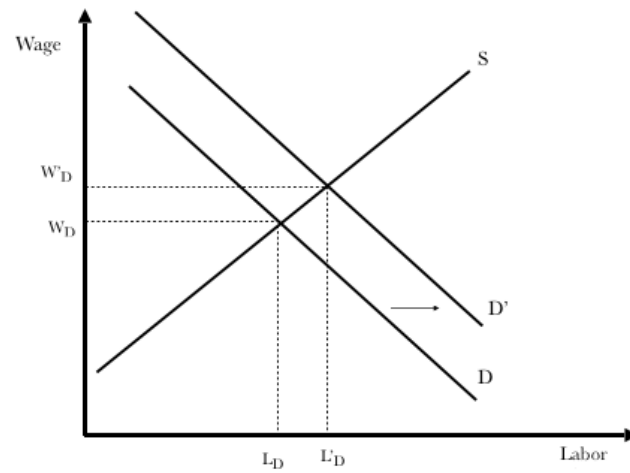
## The effects of Immigration on Labor Demand



- Immigration increases both labor supply and labor demand.
- However, the increase of labor demand is assumed to be smaller than the increase in labor supply
- The wage falls from  $W_D$  to  $W'_D$ .
- The number of employed natives falls from  $L_D$  to  $L_N$

## Effects of immigration when immigrants and natives are complements

Figure A.5: Basic model when immigrants and natives are complements



- Immigration increases demand for workers who are complements to immigrants in production.
- The increase in labor demand causes the wage to rise from  $W_D$  to  $W'_D$  and the number of employed natives to rise from  $L_D$  to  $L'_D$

## Effects of immigration with skilled and unskilled workers

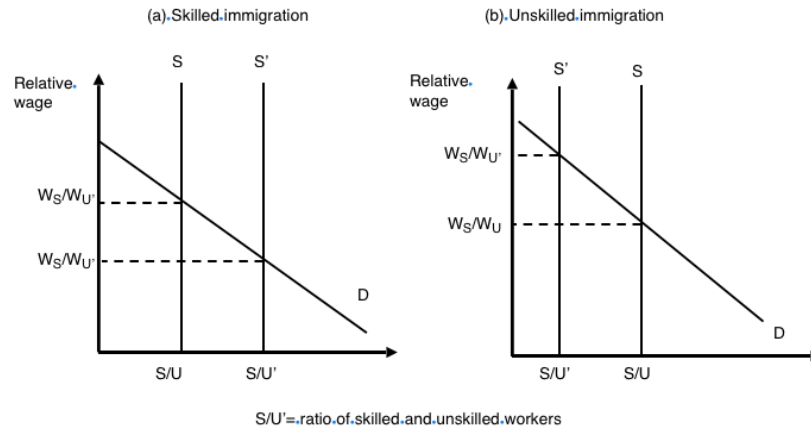


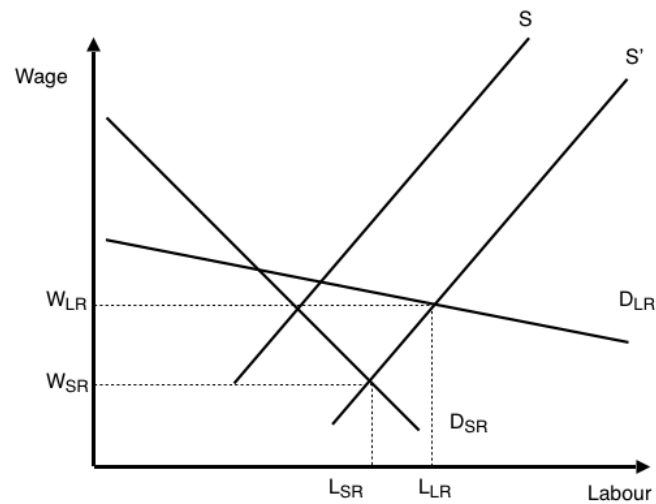
Figure A.6: Effects of immigration with skilled and unskilled workers

- In (a), an increase in the ratio of skilled to unskilled workers due to skilled immigration reduces the relative wage of skilled to unskilled workers.
- In (b), a decrease in the ratio of skilled to unskilled workers due to unskilled immigration raises the relative wage of skilled to unskilled workers.



## The role of Physical Capital

Figure A.7: Basic Model with Physical Capital



In the short run, physical capital is fixed.

- Over time, physical capital adjusts.
- This causes labor demand to become more elastic and the labour demand curve to become flatter.
- The decrease in wages as a result of immigration is therefore smaller in the long run ( $W_{LR} > W_{SR}$ )

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## A.3 Appendix Chapter 3

### A.3.1 Standard Occupation Classification

The basic element in SOC2000 and SOC2010 classification is the concept of “job” which allows a classification into groups and sub-groups according to the concepts of “skill level” and “skill specialization”. Skill level is defined with respect to the duration of training and/or work experience recognized in the field of employment concerned as being normally required in order to perform the activities related to a job in a competent and efficient manner. Furthermore, skill levels are approximated by the length of time deemed necessary for a person to become fully competent in the performance of the tasks associated with a job. In this respect, the broad structure of the classification is composed by four skill levels: the first skill level is related to the competence associated with a general education; the second skill level covers all of which require the knowledge provided by a good general education but which typically have a longer period of work-related training or work experience; the third skill level applies to occupations that normally require a body of knowledge associated with a period of post-compulsory education but not normally to degree level; the fourth skill level relates to what are termed “professional” occupation and high level managerial positions in corporate enterprises or national/local government.

Skill specialization is defined as the field of knowledge required for competent, through and efficient conduct of the tasks. This last criterion has been used to distinguish groups of occupations within each skill level. Furthermore, the revised structure identifies a number of supervisory occupations as unit groups within International Standard Classification of Occupations (ISCO08). ISCO-08 is a four-level hierarchically structured classification that aggregates all jobs into 130 minor groups, 43 sub-major groups and 10 major groups, based on their similarity in terms of the skill level and skill specialization. In this respect, SOC2010 consists in nine major groups, 25 sub-major groups, 90 minor groups and 369 unit groups, defined in terms of general nature of the qualifications, training and experience associated with competent performance of tasks in the occupation classified within each major group Under Tier 2 Visa, the data required the analysis of the major groups 1, 2, 3 and 5 and the sub-major groups and the minor groups. They are reported in the following tables.

Table A.1: Sub major groups in SOC2010

Skill Level	SOC 2010	Sub-Major groups
Level 4	11	Corporate managers and directors
	21	Science, research, engineering and technological professionals
	22	Health professionals
	22	Teaching and educational professionals
	24	Business, media and public professionals
Level 3	12	Other managers and proprietors
	31	Science, engineering and technology associate professionals
	32	Health and social care associate professionals
	33	Protective service occupations
	34	Culture, media and sports occupations
	35	Business and public service associate professionals
	51	Skilled agricultural and related trades
	42	Skilled mental, electrical and electronic trades
	53	Skilled construction and building trades
54	Textiles, printing and other skilled trades	
Level 2	41	Administrative occupations
	42	Secretarial and related occupations
	61	Caring personal service occupation
	62	Leisure, travel and related personal service occupations
	71	Sales occupations
	72	Customer service occupations
	81	Process, plant and machine operatives
	82	Transport and mobile machine drivers and operatives
Level 1	91	Elementary trades and related occupations
	92	Elementary administration and service occupations

Table A.2: Major Group 1: Managers, Directors and Senior Officials

Major Group 1	11	Corporate managers and directors
Minor Group	111	Chief Executives and Senior Officials
Minor Group	122	Production Managers and Directors
Minor Group	123	Functional Managers and Directors
Minor Group	125	Financial Institution Managers and Directors
Minor Group	116	Managers and Directors in Transport and Logistics
Minor Group	118	Health and Social Services Managers and Directors



Table A.3: Major Group 2: Professional Occupations

Sub-Major Group	21	SCIENCE, RESEARCH, ENGIN. & TECHNOLOGY PROFESSIONALS
Minor Group	221	Natural and Social Science Professionals
Minor Group	222	Engineering Professionals
Minor Group	223	Conservation and Environment Professionals
Sub-Major Group	22	HEALTH PROFESSIONALS
Minor Group	211	Health Professionals
Minor Group	222	Therapy Professionals
Minor Group	223	Teaching and Educational Professionals
Minor Group	224	Research and Development Managers
Minor Group	225	Teaching and Educational Professionals
Sub-Major Group	24	BUSINESS, MEDIA AND PUBLIC SERVICE PROFESSIONALS
Minor Group	241	Legal Professionals
Minor Group	242	Business, Research and Administrative Professionals
Minor Group	243	Architects, Town Planners and Surveyors
Minor Group	244	Welfare Professionals
Minor Group	245	Librarians and Related Professionals
Minor Group	246	Quality and Regulatory Professionals
Minor Group	247	Media Professionals

Table A.4: Major Group 3: Associate Professional and Technical Occupations

Sub-Major Group	31	SCIENCE, ENGIN. AND TECH. ASSOCIATE PROFESSIONALS
Minor Group	311	Science, Engineering and Production Technicians
Sub-Major Group	32	HEALTH AND SOCIAL CARE ASSOCIATE PROFESSIONALS
Minor Group	321	Health Associate Professionals
Sub-Major Group	34	CULTURE, MEDIA AND SPORTS OCCUPATIONS
Minor Group	341	Artistic, Literary and Media Occupations
Minor Group	342	Design Occupations
Minor Group	243	Architects, Town Planners and Surveyors
Sub-Major Group	35	BUSINESS AND PUBLIC SERVICE ASS. PROFESSIONALS
Minor Group	323	Business, Finance and Related Associate Professionals
Minor Group	324	Sales, Marketing and Related Associate Professionals

Table A.5: Major Group 5: Skilled Trades Occupations

Sub-Major Group	52	Metal Forming, Welding and Related Trades
Minor Group	521	Science, Engineering and Production Technicians
Minor Group	523	Vehicle Trades
Sub-Major Group	54	TEXTILES, PRINTING AND OTHER SKILLED TRADES
Minor Group	343	Food Preparation and Hospitality Trades

Table A.6: Tier 2 Occupation SOC2010

SOC Code	Job Title		
1115	Chief executives & senior officials	2312	Further education teaching professionals
1121	Production managers & directors in manufacturing	2314	Secondary education teaching professionals
		2315	Primary & nursery education teaching professionals
1122	Production managers & directors in construction	2316	Special needs education teaching professionals
1123	Production managers & directors in mining and energy	2317	Senior professionals of educational establishments
1131	Financial managers and directors	2319	Teaching and other educational professionals n.e.c.
1132	Marketing and sales directors	2412	Barristers and judges
1133	Purchasing managers and directors	2413	Solicitors
1134	Advertising and public relations directors	2419	Legal professionals n.e.c.
1135	Human resource managers & directors	2421	Chartered & certified accountants
1136	Information tech. & telecommunications directors	2423	Management consultants and business analysts
1139	Functional managers & directors n.e.c.	2424	Business and financial project management professionals
1150	Financial institution managers & directors	2425	Actuaries, economists & statisticians
1161	Managers & directors in transport and distribution	2426	Business & related research professionals
1181	Health services and public health managers and directors	2429	Business, research and administrative professionals n.e.c.
2111	Chemical scientists	2431	Architects
2112	Biological scientists and biochemists	2432	Town planning officers
2113	Physical scientists	2433	Quantity surveyors
2114	Social & humanities scientists		
2119	Natural & social science professionals n.e.c.	2434	Chartered surveyors
2121	Civil engineers	2436	Construction project managers and related professionals
2122	Mechanical engineers	2442	Social workers
2123	Electrical engineers	2443	Probation officers
2124	Electronics engineers	2449	Welfare professionals n.e.c.
2451	Librarians		
2126	Design & development engineers	2452	Archivists & curators
2127	Production & process engineers	2461	Quality control & planning engineers
2129	Engineering professionals n.e.c.	2462	Quality assurance & regulatory professionals
2133	IT specialist managers	2463	Environmental health professionals
2134	IT project & programme managers	2471	Journalists, newspaper & periodical editors
2135	IT business analysts, architects and systems designers	2472	Public relations professionals
2136	Program & software development professionals	2473	Advertising accounts managers & creative directors
2137	Web design & development professionals	3113	Engineering technicians
2139	Information tech & telecommunications professionals n.e.c.		
3213	Paramedics		
2141	Conservation professionals	3411	Artists
2142	Environment professionals	3412	Authors, writers & translators
2150	Research and development managers	3413	Actors, entertainers and presenters
2211	Medical practitioners	3414	Dancers and choreographers
2212	Psychologists	3415	Musicians
2213	Pharmacists	3416	Arts officers, producers and directors
2214	Ophthalmic opticians	3421	Graphic designers
2215	Dental practitioners	3422	Product, clothing and related designers
2216	Veterinarians	3532	Brokers
2217	Medical radiographers	3534	Finance and investment analysts and advisers
2218	Podiatrists	3535	Taxation experts
2219	Health professionals	3538	Financial accounts managers
2221	Physiotherapists	3541	Buyers and procurement officers
2222	Occupational therapists	3545	Sales accounts & business development managers
2223	Speech & language therapists	5215	Welding trades
2229	Therapy professionals	5235	Aircraft maintenance and related trades
2231	Nurses	5249	Electrical and electronic trades n.e.c.
2311	Higher education teaching professionals	5434	Chefs

Table A.7: Shortage Occupation List SOC2010

1123	Production managers& directors in mining and energy
2112	Biological scientists and biochemists
2113	Physical scientists
2119	Natural and social science professionals n.e.c.
2121	Civil engineers
2122	Mechanical engineers
2124	Electronics engineers
2126	Design & development engineers
2127	Production & process engineers
2129	Engineering professionals n.e.c
2133	IT specialist managers
2135	IT business analysts, architects and systems designers
2136	Program & software development professionals
2139	Information tech & a telecommunications professionals n.e.c
2142	Environment professionals
2211	Medical practitioners
2217	Medical radiographers
2219	Health professionals
2231	Nurses
2314	Ophthalmic opticians
2425	Actuaries, economists& statisticians
2442	Social workers
2461	Quality control & planning engineers
3113	Engineering technicians
3213	Paramedics
3411	Artists
3414	Dancers and choreographers
3415	Musicians
3416	Arts officers, producers and directors
3421	Graphic designers
3541	Buyers and procurement officers
5215	Welding trades
5235	Aircraft maintenance and related trades
5249	Electrical and electronic trades n.e.c.
5434	Chefs