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Overeducation in Europe: differences between native

and immigrant older workers

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"Una volta avevi scritto in un tema che siamo tutti convinti di andare verso il cielo e non ci accorgiamo che in mezzo c'è il soffitto.

Però stavo pensando che, se saltiamo tutti insieme, magari 'sto soffitto lo sfondiamo.

Vuoi provare?"

Alt er love - Skam

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INTRODUCTION

Workers face various challenges in the labour market nowadays, such as inequalities, technological changes, the disappearances of many jobs and the population ageing. To be prepared for the current complexities of the labour market, governments and international organisations have promoted education as the fundamental tool for acquiring knowledge, capability and skills. Through that, people are able to offer their abilities in exchange for a reward, boosting innovations, growth and development, firstly at firm level but also in their local territories. Education is also a fundamental process for the personal and professional development of individuals, making them able to achieve their goals and ambitions. However, demand and supply in the labour market are not always aligned, meaning that it might happen that some people who achieved certain levels of education are not able to find an adequate job related to their background. This condition implies that skills and knowledge of individuals are sometimes not employed and exploited through their jobs, and this represents a loss of efficiency for the labour market and for workers themselves who will not be rewarded for their time and resources invested in their education. It is a waste of human capital for the labour market as well, which does not take full advantage of all the potential resources provided by workers. Overeducation is then a phenomenon that exists in the labour market and it is a condition that affect workers who have higher school attainments than what it is required and necessary to carry out their jobs. It has been studied in the literature as a condition that affects in particular certain categories of workers, such as young people with low job experiences, women and immigrants (Morano, 2014; Esposito and Scicchitano, 2022; Albert et al., 2023; Carroll and Tani, 2013; Lindley, 2009).

Cross-country migrations are important social and economic events that challenge the labour market and societies in both departure and destination countries. People not only move from one country to another for economic reasons, but also for national and international crises, such as wars, climate change and geopolitical conditions, which are determinants that induce people, especially in working age, leaving their countries. On the other hand, one current issue that many States are facing nowadays is the ageing of the population, which represents a problem for the labour market that requires a workforce to fulfil consumers' demand and needs. Migration flows may be therefore a significant contribution to those States who struggle with that issue, and it also might be beneficial for those territories who lack job opportunities

and may advantage them through remittances (Alpaslan et al., 2021). In this context, immigrant workers are sources of knowledge and capabilities which can interestingly overcome those vacancies in the labour market, bringing new ideas and innovations, contributing to economic, social and demographic development of world society (ILO 2021). However, transferability of human capital resources from one country to another is not immediate nor easy and it takes time; immigrants go through a process of integration in the society and in the labour market of the arrival country, which takes time and further resources to be invested. Therefore, it is likely to think that the phenomenon of overeducation might affect more intensely immigrant workers in the destination country, since they might accept job for which they are overqualified meanwhile they acquire the necessary skills and capability required in the local labour market. Existing literature outstands that immigrant workers are more affected by overeducation in the destination countries and therefore, the incidence of that is higher compared to native workers, leading to a great loss of opportunities for them and for the labour market (Dustmann and Glitz, 2011; Piracha and Vadean, 2013; Aleksynska and Tritah, 2013; Nielsen, 2011; Lindley, 2009; Green and Leeves, 2007)

This brings us to our research, which attempts to conduct an empirical analysis of overeducation in Europe, analysing the differences in the probability of being overeducated between native-born and immigrant older workers. Individual-level micro-data are drawn from the "Survey of Health, Ageing and Retirement in Europe" (SHARE). SHARE is based on a representative sample of the population of individuals aged 50 or over residing in various European countries and administers a multi-purpose questionnaire collecting information about different well-being dimensions, including health and employment. Based on SHARE, we will select a sample of workers aged between 50 and 70 and living in 11 countries. Focusing on older workers is important for at least two reasons. The former is that population ageing, and pension system reforms are increasing the mature part of the workforce, making it particularly policy-relevant to understand the potentialities and the needs of individuals at work at older ages. The latter is that the older workers in the reference population of SHARE typically arrived in their current country of residence many years ago (on average 38 years spent in the destination country) and this makes the sample considered in our analysis an ideal laboratory to understand whether the overeducation gap associated with migration is persistent over time or reduces, potentially as a result of an assimilation process. From a methodological point of view, it is worth noting that workers in our sample will be classified as overeducated or not by comparing their own educational attainments available in SHARE data with the education level required by the job and collected by the open-source O*NET database. The match between

the individual-level data from SHARE and the job-level O*NET database is carried out by using the ISCO-08 work codes, which refers to the International Standards Occupation Classification developed by the International Labour Organisation. The analysis is also carried out separately by gender following the prescriptions highlighted in the literature, which observe that women's participation to the labour market often differs from the men's, since they still are affected from cultural expectations, limited job mobility because of family obligations, and enduring gender biases; for these reasons, existing literature emphasizes that women experience higher levels of overeducation (Albert et al., 2023; Carroll and Tani, 2013; Fleming and Kler, 2014).

The thesis is organised as follows: the first chapter offers a review of the existing literature, analysing the phenomenon of overeducation. Overeducation is examined across its determinants and the consequences in the labour market in terms of unemployment likelihood, economic reward, and job satisfaction. Furthermore, overeducation is analysed over the population, studying effects of it separately for genders and immigration status. The second chapter explains in detail the methodology employed to assess overeducation in our sample and provides descriptive analysis to show the contents of the key variables used in our analysis. The last chapter, after having explained the econometric specification adopted, shows the main results of our empirical analysis, and gives specific interpretations of them, analysing the phenomenon separately between genders and across European regions (Weast and East Europe).

CHAPTER I: OVEREDUCATION: LITERATURE REVIEW

1.1 EDUCATION AND OVEREDUCATION

1.1.1 THE IMPORTANCE OF EDUCATION IN OUR SOCIETY

Education is a vital instrument for personal growth since it provides the skills and knowledge necessary to acquire new abilities and, ultimately, land a job. Moreover, education titles give people the freedom of choosing how to professionally develop and achieve their personal goals. Having a satisfactory and fairly paid job lets workers to save and invest capitals, spend money around the economy and contribute to the tax system. For these reasons, education might be understood as an investment that families do for their children, in order to prepare them as aware citizens and trained workers. Thus, developing strong educational systems, composed of institutions, and financial and human resources, is the basis of the modern society, oriented towards democracy, growth, and political, socio-economic development. For these reasons, the United Nations includes in the 2030 Agenda for Sustainable Development, the goal 4 "Quality Education", with the aim of "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all"[1]. This is a call for everyone, from local and national governments to international organisations, to transform education systems worldwide, ensuring that everyone has the opportunity to acquire the knowledge and skills needed to build a more sustainable and prosperous future.

Due to the advantages for society and the economy, numerous governments over the years have implemented policies aimed at increasing access to education for their citizens. When taken as a whole, these have led to notable gains in educational achievement in OECD (Organisation for economic cooperation and development) and partner nations during the past few decades. The increase in tertiary education attainments rates over the last few decades are largely indicative of rising levels of educational attainment. The percentage of men aged 25 to 34 who holds a tertiary degree, such as a bachelor, master, doctorate, or equivalent degrees, has risen from 36% in 2015 to 41% in 2022 ,on average, across OECD nations. The percentage among women in the same age group has increased from 47% to 54% (OECD 2023).

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[1] Goal 4 of Sustainable Development Goals (Agenda 2030). Further details are available on the webpage [1] in the sitography.

"Education at a glance 2023: OECD INDICATORS" is a report from the OECD Publishing, which investigates the quality of learning outcomes, as well as the policy levers and contextual elements that influence them, in OECD member countries. This is essential to develop a better understanding of how the resources are allocated and invested worldwide on education, and which is the return on those investments; furthermore, it is useful to compare different educational and learning systems, the output of different educational institutions, and the impact of learning on individuals and society. According to the indicator A3 which investigates whether employment rate and level of education are correlated, many considerations can be made. Economic growth has changed labour market over the years, new professional and skilled profiles are required by both public and private sectors, and this leads to higher demand for skilled labour. Therefore, to comply with the labour demand, people increase their preparation and skills via obtaining higher levels of education. Thus, higher skilled workers have more chances to be employed: for individuals aged 25 to 64, the employment rate for those with lower secondary attainment is 59%; for those with upper secondary or post-secondary non-tertiary attainments, it increases to 77%, and for those with tertiary attainments, it jumps to 86%. Moreover, another benefit for higher educated people is that, even though the employment rate on average is higher for men that women, the higher the educational level, the lower the difference is between the gender employment rates. In addition, better employment opportunities are related to better career perspectives and higher earnings. The indicator A4 measures the reward benefits from education and confirms that positive relation; however, there are also other factors that influence the earnings perspectives in the labour market, such as the gender, age, sector and fields of studies, legislation, countries' or regions' demand and supply structures (OECD 2023).

At the base of a strong educational system, there is the general objective of well-preparing citizens proving them knowledge about civil and democratic life as well, in order to make them actively participate in civil society. Civil engagement is an important tool for democratic life and for citizens' participation in decision making process; this can influence policy makers programs and also help boosting a greater cohesion and community-belong feeling within the civil society. Educated people are more ready to be civil engaged, such as to participate in public demonstrations and in voluntary activities. In addition to this, education is a fundamental tool for individual and social development, it increases personal wellbeing and life perspectives, and it also improves firms' productivity and economic growth, boosting ideas and innovations. Therefore, it is an important public investment for governments, since better educated citizens have better access to the job market, higher salaries and greater outcomes. Furthermore, it is a

tool that permit citizens to improve their social conditions and status, increasing the chance of creating social-equality, and helping those people who for lack of opportunities and could be more likely to fall into crime and illegal activities. The overall welfare increases thanks to skilled citizens contributing to the general development and growth of the country. However, education might be wrongly seen as a process designed for young people or students who have not entered into the labour market yet, but learning and training processes need to be life-long, both in formal and informal way, since it provides essential tools to deal with economic and technological changes and innovations, at any age, firm-sectors and individual's life (OECD 2023).

1.1.2   OVEREDUCATION: DEFINITION AND DETERMINANTS

General education level has increased in many countries around the world, especially in those societies where education is considered as an important tool for the personal and professional development of individuals and where governments see it as one of the primaries means for fighting against social inequalities and discriminations. High educated people offer high levels of knowledge and skills to the labour market that can be used and exploited, and this is translated into greater possibilities for innovations, as well as personal and economic growth. However, education systems and labour market sometimes might be not aligned, and some knowledge and skilled acquired through education may not be necessary or useful for certain job positions. Students try to choose their study path according to many factors, such as personal preferences, family's attitudes, local job opportunities, job markets' beliefs and career expectations. Nevertheless, real job opportunities and choices come later, and expectations might not be always satisfied, due to the fact that job market supply and demand are not ahead established, and some people might find only jobs which are not in line with their education background. Mismatch between personal skills and the job position is commonly called "skills/education mismatch", and that can happen both at individual level and at firm-level. For what concerns the individual level the "vertical mismatch" refers to a worker who holds a higher school degree that is not required or may lack specific skills or school-titles for their current job. If their degree is higher to the one that is required, the person is said to be "overeducated", and on the other side, whether the degree is under the necessary level, the person is said to be "undereducated". The individual level mismatch can be also "horizontal" and is divided in "field of study-mismatch", meaning that the specific-field knowledge and

competences acquired during studies are not used in the current job position, and it can be analysed also in terms of "skills obsolescence", thus the case in which acquired skills are not useful or suitable for the job anymore, due to technical changes, innovations, and progress in that specific market. On the other hand, skill mismatch at firm level is interpreted as "skill gaps" and "skill shortage", that are the cases in which employers believes that their employees do not have the required capabilities to carry out their job, or the situation that happen when employers are not able to find workers having the required skills due to market supply side characteristics (McGuinness et al., 2018). With that being said, this research will focus particularly on vertical mismatch at individual level analysing the phenomenon of overeducation.

Overeducation is the most studied mismatch-type over the literature since it implies a bad allocation of resources and an inefficient exploitation of human capital in the labour market. Overeducation, as a research phenomenon, is usually determined through three different methods: the "subjective method", the "job evaluation method", and the "empirical method". The first technique includes the self-assessment of the interviewed worker in declaring whether their education level matches their job, or which should be the minimum level of education to carry out their job (which can be compared to their educational attainment by the researcher); the "job-evaluation method", sometimes called "normative method", implies that researchers check for the required levels of education for each job through an external source that has previously defined that. Finally, the "empirical method", or "realized matches method" assesses the educational needs for a job by examining the average or modal educational level within that specific occupation, usually referring to respondent's answers in the dataset. Individuals with education levels that exceeds the average or the modal (or it is one standard deviation above) are classified as overeducated (McGuinness et al., 2018).

 According to previous studies, there exist individual characteristics, labour market dynamics and further external economic, social, and political conditions that can influence the presence of overeducation among workers. Age, gender, ethnicity, skills, economic recessions, and other macroeconomic factors are some examples usually are considered in the literature. Therefore, there is empirical evidence that highlights the major overeducation "determinants". Morano (2014) studies the Italian context with the aim of developing a better understanding about the factors, both personal and economic context related, that lead to a higher incidence of overeducation. The research data is obtained from the "Rilevazione Continua delle Forze di Lavoro" provided by ISTAT, which is the Italian National Institute of Statistics, and the considered years are from 2006 to 2011. The method applied for the calculation of overeducation is the "realized matches" counting a total sample of 119,854 observations.

Consequently, overeducation is assessed by verifying whether the highest school title of each worker is one standard deviation above from the mean level of education within a specific occupation in the dataset. The model developed for the estimations of overeducation determinants includes time dummies, regional dummies, unemployment rate and a group of individual features, which are age, citizenship, marital status, gender, family composition, career position (according to the hierarchical structure of a company), type of job contract, sector of the firm and size, education field and previous employment status. Estimations show that age is a factor that have a significant incidence on overeducation, with younger workers that have higher probability of experiencing that, in particular overeducation probability is 13.90% times higher over workers between 20 and 24 years of age compared to workers aged 50-54. Moreover, foreign citizens workers in Italy suffer from higher levels of job-education mismatch (13.70% higher probability compared to natives), as well as workers being in a couple or married. Moreover, having experienced unemployment in the previous years increases the chances of being overeducated by almost 5% (only for young workers), likewise being employed in small firms or being a blue-collar worker. For example, being hired by a big firm having more than 250 employees, decreases the likelihood of being overeducated by 9% compared to a small firm having 1 to 10 workers. Field of studies is also a matter when considering job-education match, and this study observes that having a scientific background significantly helps finding an adequate job.

Overeducation is the most alarming phenomenon because it can be seen as a waste of human capital, personal resources, skills, and public investments. Evidence from previous studies highlights some consequences and effects on overeducated workers compared to the well-matched ones: lower salaries and job satisfaction, lower career opportunities and therefore less opportunities to "fully exploit" the human capital at firm level, decreasing then the possibility of growth and development at society- and country- level. However, different studies focus on different effects of the overeducation, observing diverse segments of the population and different educational and labour market contexts. Different samples may lead to different results, therefore there is no unique direction towards how policy makers can face this issue, as it is not so clear how they can deal with its consequences on wages and satisfaction, its incidence and persistence along time and over job sectors, educational fields and countries. Moreover, some categories of workers might be more affected by overeducation, due to discriminations, prejudices or stereotypes, leading to creating less individual career opportunities for them and lower growth-possibilities for firms and the whole society. For these reasons, part of the literature focus their attention to effect of overeducation on female workers, young people and

immigrant workers, in order to check whether the differences exist and are persistent over time. In the next sections of this chapter, the most relevant aspects concerning the determinants and effects of overeducation will be discussed more deeply to develop a better understating of the phenomenon as a whole.

1.1.3   OVEREDUCATION, UNEMPLOYMENT AND LABOUR MARKET

Diverse schools of thoughts regarding overeducation exist, and therefore there is not a common interpretation of the phenomenon. Individual negative effects are often associated with that, and this was mainly confirmed by results found in previous studies. Significant consequences of overeducation can be observed at labour market level, and some research tried to figure out whether there is a negative effect in term of unemployment or employment-conditions for the overeducated workers. If employees take a job for which they are overqualified, they run the risk of becoming unemployed if then they decide to change careers, say to a position better suited to their education. This is known as the "overeducation-unemployment trap". This can be the result of a sort of "stigma" effect, affecting overeducated workers, that might give the signal to future employers of not having the skills and knowledge aligned with their degrees. In addition, another hypothesis for falling into the trap is the deterioration of the skills, meaning that skills and knowledge of overeducated workers are not fully used and exploited over time, thus they are more inclined to lose and forget a part of that due to lack of use (Esposito and Scicchitano, 2022).

Esposito and Scicchitano (2022) investigate whether overeducated workers have higher probabilities of falling into the "unemployment trap" in Italy due to skill-deterioration. They select the Italian context because it is peculiar from the labour market point of view, since there is structural unemployment, high level of education, but the employment is concentrated in low-skill and low-tech sectors. The research tests whether the overeducation phenomenon can be explained better by the "career mobility theory" of Sicherman and Galor (1990), or by overeducation-unemployment trap hypothesis. The first theory argues that overeducation is a transitory phase for workers, that enables them to acquire furhter skills and it increases their human capital, in order to then move to other jobs that match better their studies. The trap-theory, instead, views overeducation as negative signal that workers send to potential employees, so the probability of joining a well-matched job in the future is reduced because of that. The combined data from the PLUS (Participation, Labour and Unemployment Survey)

and INAPP-ISTAT Survey of Professions (ICP) surveys in Italy is used. The sample is made up of 8,312 workers, aged 20 to 65, who have completed at least secondary or postsecondary education, and the time periods that are taken into consideration are 2014–2016 and 2016–2018. The estimated model examines the likelihood of changing jobs or becoming unemployed in the ensuing two years as a function of labour demand characteristics, "vertical" and "horizontal mismatch", and other specific individual control variables. This research considers as workers with unemployment status also inactive people in the age-range considered and does not differentiate between voluntary and obliged redundancy for workers who left their previous occupations. The controlled individual characteristics are living in the South of Italy, marital status, job contract, the search for another job condition, final graduation grade, field of study, prior unemployment periods, age, gender, and horizontal mismatch. In addition, demand side controls are also added to the model, controlling for firm size, firm's sector and further information about the firm hiring of firing other workers during the previous years, and the proportion of highly routine-intensive workers in the different activity sectors. Overeducation is assessed through "realized match methodology"; the authors compare the individual educational attainment with the median level of skill/education provided by ISCO (International Standard Classification of Occupations) for each occupation.

Considering job mobility of workers in terms of moving to another job, to become unemployed/inactive from being employed or from being unemployed finding an occupation, descriptive analysis shows that overeducated workers holding tertiary education suffer from higher unemployment-risk compared to the well-matched ones, and the most affected categories are female, workers with fixed term contract, people employed in social services, in personal services or in micro-firms, who also are found to experience higher job mobility as well. Considering workers with secondary education overeducated workers also proved to face higher transition to unemployment. Econometric estimations highlight that overeducated workers with tertiary education significantly experience higher job mobility at any age and in small firms, with a bit higher mobility observed within workers below 35 years of age. These results are in line with the career mobility theory, meaning that young workers tend to change more frequently their job positions in order to increase their chances of finding a job which matches with their study-level. However, overeducated young workers in the sample significantly suffer from high unemployment risk, and this mostly refers to people working in micro and small-size companies, reflecting the high precariousness associated with working in those firms. In detail, overeducated workers in small firms (<50 workers) experience from 15.8% to 17.8% higher probability of becoming unemployed compared to workers working in

bigger companies. Older workers instead have lower risks of falling into the unemployment trap. In addition to this, overeducated workers with tertiary education in the considered sample mostly employ routine-intensive occupations and this reinforces the relevance of the labour market characteristics in studying overeducation and job mobility. The Italian labour context is mostly composed of small companies and low-skilled occupations and the fact that the job demand is mostly concentrated on those force higher educated workers to stay in those occupations, boosting overeducation. Furthermore, for what concerns overeducated workers with secondary education, results confirms that workers younger than 35 are more exposed in transitioning to unemployed, when working in small size firm (Esposito and Scicchitano, 2022).

The features of the labour market are important when examining the phenomenon of overeducation, because economic and social context may help in overcoming job-education mismatch, as well as facilitate it. Indeed, evaluating the specific economy conditions is essential for policy makers when designing education and labour programs, since the labour demand and supply should be aligned to achieve stronger benefits from efficiency at firm level and from higher economic and social growth. For example, in Ukraine during the past decades the number of tertiary educated workers has increased, thanks to the education reforms. Kupets (2016) carried out a study about the Ukrainian labour context and overeducation during the time shift 2004 – 2013 using data from the Labour Force Survey and considering workers aged from 15 to 70 years. The study determines overeducation via the "normative method", codifying occupation with ISCO codes and looking at ISCO and ISCED-97 assigned skill levels provided by ILO (International Labour Organisation). This research has the goal of investigating how overeducation shapes differently between young and old workers, therefore between categories of workers that have been educated under two different political, economic, and social contexts. The main determinants of overeducation in Ukraine have been investigated across regions, controlling for time-varying and time-invariant indicators. In detail, the first group of variables comprehends the relative supply of higher educated workers, the higher educated workers' demand, the specialization regional coefficient and the unemployment rate in the region. Moreover, share of female workers, share of people aged between 50 and 70, and the rural-areas residents are considered as well. Among the second group of variables, year dummies are included, as well as the number of students enrolled in university per 10,000 people in the academic year 2000-2001, the foreign direct investment per capita in 1996 in the region, the 1996 rate of employment in industry, the region's redundancy rate and the frequency of workers receiving on-the-job training in the year 2000. The phenomenon of overeducation strongly affects the labour market in Ukraine and results highlight values around 40% of

overeducated workers in the analysed years, affecting mostly older workers. The latter are people raised and educated before the transition to the market-oriented economy, so in a different economic and educational context than the current one in Ukraine. During the analysed period, the Ukrainian labour market faced an increase in the employment in the service sector and a decrease of manual job caused by technological changes, computerization, and offshoring of part of production activities by multinational companies. Anyway, the Ukrainian job market is still characterised by the high presence of low skilled and low-tech service occupations difficult to automate and demand of labour is concentrated there. Hence, older workers are more at risk of being overeducated in their employments because of skill deterioration and the acceptance of any job instead of being unemployed. Moreover, it has been observed how companies in Ukraine operating in the recent emerging sectors were not intended to invest in the training to workers previously employed in other sectors, hiring rather young people, which are more flexible and trainable. In addition, results of this study confirm the importance of the characteristics of the labour market in analysing the phenomenon of overeducation. In the context of Ukraine labour demand for skilled labour in most of the Ukrainian regions is low and has a slow growth rate; therefore regional unemployment rate has significative influence on overeducation, and this is interpreted as, whether there is lack of job opportunity in a specific location, people choose job in a less selective way, and due to low job mobility, they stuck in those jobs even if they are overqualified. Hence, these results do not support theories that consider overeducation as a short-term adjustment in the labour market, since structural dimensions and regional characteristics, such as unemployment, influence the persistence of that over time. Finally, considering the Ukrainian labour market, the mismatch between the labour demand and supply causes lack of opportunity for high skilled workers due to poor investments in high-tech sectors and knowledge-intense services, and especially older people, who are not included in training program to adapt their knowledge and skills to the current labour market needs.

1.1.4   EFFECTS OF OVEREDUCATION ON WAGES AND JOB SATISFACTION

The relationship between education and wages has drawn the attention of academic researchers, due to the fact that by being overeducated, workers do not efficiently exploit all their human capital, and by having a job below their potential they may suffer from a wage penalty as well. The increasing importance of knowledge-based jobs and businesses in our economy and society has brought greater attention to the role that education plays in determining an individual's

earning potential. Workers provide their job in exchange for rewarding, which includes financial, psychological and social returns, such as the salary, personal growth, satisfaction and social status. Therefore, the better the job matches the personal characteristics of the individual and the most fairly the job is compensated, the higher the individual's performance will be. Hence, the congruence between education and job, in terms of educational attainment, wages and other types of return, is beneficial for the individual, the company and the whole economic and social system (Neumann et al., 2009).

Korpi and Tåhlin (2009) carried out a research investigating about job-education mismatch and wages in Sweden considering the long-run effects of overeducation on workers' earnings in the years 1974-2000. Sweden is an interesting context to analyse this phenomenon, since the average level of education increased significantly in the 1970s, as well as demand for skilled workers. Considering the career mobility hypothesis, overeducated workers should move to higher-level occupations that better match their school achievements in the short run, hence, even if their return on education is lower at the beginning of their career, job mobility leads to higher wages and return on education, compensating the initial loss (Sicherman and Galor, 1990). The research considers this hypothesis; however it takes into account also an opposite assumption, defined by them as "human capital compensation hypothesis", which states that overeducation is only apparent and reflect the real abilities of workers, meaning that overeducated workers are in reality merely less capable compared to their colleagues having the same degree. The study is based on the Swedish Level of living survey data in the years 1974, 1981, 1991 and 2000. The survey is longitudinal, so potentially survey's participants are interviewed in any of those years. However, new members took part to interviews every time-point, joining through immigration or age threshold. The analysed sample counts 6426 individuals, considering employed workers ageing from 19 to 65. The "subjective method" is used to look for overeducation, since in the survey respondents are directly asked for the required year of education for their jobs. In the analysis they first estimate overeducation in relation to experience, tenure verbal ability and health in order to check if the "human capital compensation" assumption can be supported by evidence. However, this is not the case since overeducated workers appear to be more capable than correctly matched individuals in the same occupations. Secondly, wages and wage growth are tested, using the Mincer wage equation introduced by Duncan and Hoffman (1981) which controls the effects of time (years) spent in education on wages. In particular the model includes control variables which define the required amount of education for a specific job position, and the education-years in excess or defect that the individual might have. These elements are then estimated with the aim of

controlling whether years in excess (or defect) influence wages. The other variables added to the model are hourly wage, gender, total job experience, tenure with current employment, health and verbal abilities, job satisfaction, formal and informal training, learning perspective and future advancement prospects. These calculations show that education excess-years as well as correctly matched years of education contribute significantly to a salary increase over time. However, it is also shown that, on average, overeducated workers are penalised early by a lower rate of return on education from which they do not recover. As a result, when compared to other workers with the same level of education, their salary growth curve begins lower and eventually parallels the curve of matched workers. In conclusion, mobility career theory cannot be proved in this analysis.

More empirical evidence can be also found in the research done by Iriondo and Pérez-Amaral (2016). Their goal is to test and analyse the consequences on wages caused by educational mismatch. The theoretical framework behind their study embraces the human capital theory and the job competition theory. The first one developed by Becker (1964), states that wages are function of worker's educational attainment and investments. Whether the demand for skilled workers is lower than the supply, earnings for workers decrease, but this is not a permanent phenomenon. The other theory, reviewed by Lydall (1977) , affirms that wages depend on the job and not on worker's characteristics, and the competition between individuals in the job market is not about wages, but about job opportunities; so employers are looking for those workers who have the most aligned background for the job position, in order to have lower costs in training them; hence if the supply of higher educated workers exceeds the demand, only some of them will get the highly paid jobs and the other will accept lower paid occupations which require less education. Data used in this analysis are taken from the Eurostat's EU-SILC from year 2006 to 2009, including 66,538 workers. Only full-time employees' workers from some of the Eurozone countries are considered: Belgium, France, Finland, Italy, Ireland, Spain, Portugal, The Netherlands and Luxemburg. Overeducation is defined with the "empirical method"; they first compute the mean-years of education for each occupation separately for countries and years; then they assess overeducation to individuals whose educational attainment is above one standard deviation of the mean. This analysis makes use of the Duncan and Hoffman's wage models mentioned before, and the controlled variables introduced in the model are gender, job experience, job experience squared, marital status and disability. Moreover, another specification model is taken in consideration while this analysis, the one of Verdugo and Verdugo (1989), which is similar to the Duncan and Hoffman's one, but instead of incorporating the required schooling by the job, they use only the individual's

education attainment. Different econometric models are utilized to test for the influence of education on wages. Estimations of Verdugo and Verdugo's model highlight that overeducation negatively influence wages, and the wage penalization is estimated to be from 2.5% to 7.7% depending on the considered model. In addition to this, testing for the significance of the human capital theory, meaning that wages are not influenced by educational attainment, this hypothesis is rejected in every specification models. Furthermore, the job competition model hypothesis is rejected through the developed models. On the other side, carrying out regression using Duncan and Hoffman's model it is seen that required education have positive and significant effects on wages, and overeducation as well, but in a lower intensity compared to their potential match, in particular overeducated workers should benefit from a wage increase from 0.6% to 4.2% for each year of overeducation according to the different models. Moreover, human capital theory is tested and rejected in any models, and job competition theory is rejected in any specifications. The general conclusion of this study is that, in Eurozone, overeducated workers have a salary penalty compared to well-matched ones. As a result, one of the primary determinants of wages is the educational requirements of employment, and the benefit of completing an extra year of study above what is necessary to perform a job is small (Iriondo and Pérez-Amaral, 2016).

Further investigations find evidence of the negative effects of overeducation over salaries; Dolton and Vignoles (2000) analyses the consequences of overeducation on salaries in the UK through 1980 National Survey of Graduates and Diplomates, which collects information on UK graduate workers six years after graduation. The sample includes 4551 workers plus 466 graduated non-workers. Overeducation is computed through the "subjective method", since in the survey respondents are directly asked about the required level of school necessary for their job. Overeducation incidence is found to be relevant in the considered years in the UK, with an incidence of 38% of overeducated graduates workers in their first job, and 30% who are still overeducated after six years from their graduation. Following to this, earning functions are estimated considering both the sample's first job and the occupation in 1986. The dependent variables included in the model are age, type of school the individual attended, social class, marital status, number, and age of children in case he/she had. In addition, faculty of degree, postgraduate qualifications, type of university (university or polytechnic), job tenure, work experience, unemployment time spent before finding the first job or in total, number of jobs done after graduation, number of training days, job location, employment sector, type of job (full or part time), firm size and social status of the job. According to the estimations provided by the study, overeducated graduates are paid less than well-matched workers and the loss is

proportional to the job requirements, meaning that the greater the difference is between the workers' education and the job's required education, the larger the loss in terms of educational return experienced. Overeducation is detected as a persistent phenomenon over the time considered, therefore the lower return to education is continuous over the years as well, and women typically paid a larger price for having surplus schooling.

In addition to the detrimental effects that overeducation has on the economic return of education, it has been shown that overeducation has consequences on other factors as well, such as job satisfaction, which is crucial for productivity and employee retention. The recent literature has noted that employee turnover has generally increased, particularly among younger workers. As a result, it is crucial to identify financial and non-financial incentives to keep employees on board, with job satisfaction being one of the most important of such incentives. In this regard, Jovanovic's (1979) job-match theory suggests that workers who obtain an employment that correspond with their abilities and knowledge have more elevated levels of job satisfaction, work performances and low turnover. However, job satisfaction is subjective, and it is noted that often it differs among the different job sectors. With the aim to understand whether job satisfaction is positively influenced by job-education match and if it diverges in different employment sectors, Lee and Sabharwal (2016) carried out a research in the Unites States of America, using National Science Foundation's 2006 National Survey of Recent College Graduates (NSRCG). Bachelor's, master's graduated and employed workers are included in the sample, which counts in total 15,525 observations. Determinants of respondent's job satisfaction are measured in the analysis. The list of control variables is composed on education-job match, salary, training related to work, age, job tenure, gender, racial or ethnic minority status, task variety, whether the respondent has a supervisory role, overtime working, educational attainment and student debt. Finally, estimations are done separately for employment sectors: for-profit, non-profit and public. In particular, the match between educational attainment and the occupation are directly asked in along the survey, inquiring to respondents the degree of congruence between the highest educational title and their job ("subjective method"). Overall results stress out that job satisfaction is positive influenced by education-job match in a significant way in all the three sectors. Even though private sector is the leader for mismatch incidence and for the general dissatisfaction of workers, when education closely relates to their job duties, for-profit employees are 18.8% more likely to be satisfied with their jobs than when a worker's education has no bearing on their work. This probability is 16.8% in the non-profit sector and 15.5% in the public sector. In conclusion, it can be argued that overeducation leads to lower satisfaction with the job for

workers, which among other aspects, is an extremely important factor to consider in the labour market for productivity and efficiency; therefore, it is essential to boost elements that positively influence and increase it, such as job-education match.

1.2 HETEROGENEITY IN OVEREDUCATION ACROSS POPULATION GROUPS

1.2.1 GENDER AND AGE EFFECTS OF OVEREDUCATION

In modern societies, a person's career trajectory and professional results are shaped by the interplay of age, gender, and educational attainment. A particularly interesting aspect of this intersection includes the phenomenon of overeducation which is not only influenced by individual aspirations but is also deeply rooted in broader societal structures that vary across genders and age groups. In addition, gender, the age at which persons graduate, the field of education they pursue, and the sort of programme they undertake are all key drivers of numerous outcome variables. Factors such as limited mobility owing to household responsibilities may increase the chance for women of suffering job mismatches. Older graduates, on the other hand, may be more likely to accept positions that do not exactly match their qualifications, due to personal or family obligations. Likewise, their reluctance to tackle periods of non-employment may contribute to limited career mobility, due to personal or family issues (Albert et al., 2023).

While investigating whether overeducation incidence is persistent over time for workers in Spain, Albert et al. (2023) finds interesting results concerning the phenomenon of educational mismatch controlling for genders and age groups. Data from the 2014 Survey on the Labour Insertion of University Graduates (EILU-2014) are used in the research since it contains information regarding 2010 university graduates' first job and their job four years after graduating in 2014, by the time of the survey. The sample counts 24,170 observations. Educational mismatch is measured with the "subjective method" thanks to the direct question to respondents in the survey about the occupation and the required level of occupation both in the current and first employee. The control variables included in the model are: number of jobs after graduation, job rotation rate, having short work experiences (less than 2 years), gender, age, graduation age, unemployment rate in the residence region, education field, type of university, whether in that moment the worker is enrolled in another education program,

study experiences abroad, grants received during studies, internship programmes before working, working experiences while studying, job status and job contract, firm size, whether the first job or the current job are abroad, time spent to find an occupation and how it was found (i.e. through internship or university). Overeducation incidence is found to be persistent in the time considered and being overeducated increases the probability of almost 27% to move to another occupation for which the individual is still overeducated. In addition, controlling for gender and age effects, it is observed that graduated men and women experience the same overeducation probability in their first job, however women four years after graduation are 2.2% times more exposed to that. Dividing the effect in two ages categories, results outstand that younger graduates go through higher overeducation likelihood in their first job compared to older (<35 years old); however, they move easily to other jobs, having higher chances to get out of the so called "overeducation trap", decreasing their probability of being overeducated in their following jobs. Instead, older graduates face higher probability of being still overeducated even if they move to new occupations, so remaining overeducated over time; it is also observed lower mobility across different works. Therefore, it is noted that younger workers, who have more recently graduated, are more at risk of overeducation at the beginning of their career, and this can easily be interpreted with the consideration that they are abundant in terms of knowledge-human capital but in need of occupation-related human capital, lacking therefore of work experiences. However, they increase their chances of better matching their educational attainment with the occupation by work-experiences carried out in the job market, acquiring more skills, and through labour mobility (Sicherman and Galor, 1990). According to this scenario, there should not be older worker who are still overeducated, however, not every worker is able to move to other occupations that easily, and spending a long time as an overeducated worker makes knowledge and skill become obsolete, and therefore, this puts older overeducated workers in conditions to have more difficulties in finding a job that matches their study achievements (De Grip et al., 2008).

Not far from the previous results, a research done in Australia based on the Beyond Graduation Survey, confirm the ideas already explained in this paragraph. Carroll and Tani (2013) realize an investigation studying the earnings' effect of overeducation among graduates, observing effects on genders and separate for age groups. Four different waves of the survey are included in the analysis, respectively the ones in the years 2007, 2008, 2009 and 2010. Only employed workers who previously obtained a bachelor's degree are considered in order to create a homogeneous sample counting 2005 observations. The "job evaluation method" is the technique chosen to assess overeducation, obtaining information about the minimum skill

levels for each occupation from the ANZSCO (Australian and New Zealand Standard Classification). Looking at the incidence of overeducation and the job mobility differentiating genders and ages cohorts (>25 and <25 years old), the descriptive analysis suggests that young females experience higher overeducation than young and older males. Afterwards, the general overeducation rate has decreased in the following considered periods of time, mostly for young workers, which were then more at risk of being overeducated at the beginning of their career, but thanks to greater mobility across jobs, they are able to slip away from overeducation. Specifically, in 2007 overeducated young female are 37% and both old and young males' incidence of overeducation is 30%; at the end of the considered period in 2010, the incidence of overeducated in young female is 17% via-a-vis 12% of young males, and 21% of older men. Older graduate women are less likely to be overeducated (incidence of 24% in 2007) because they previously did further work experiences, however it is not observed that much mobility in the following waves, since there are lower changes in the rate of overeducation considering the beginning and the end of the period, compared to men and the younger women. Moreover, there is part of the observations, who are overeducated in 2007 but are able to be aligned with their studies at the end of the considered period without changing occupation, suggesting that also firm internal changes in tasks and responsibility are tools for escaping overeducation which might affect workers in the first job years.

The gender gap in overeducation underlines one of the problems that female workers face, which are frequently related to cultural expectations, limited job mobility due to family commitments, and persistent gender biases. Understanding the subtle impact of overeducation on women in the workforce becomes critical when we delve into the complexities of overeducation to address bigger issues of gender equality and professional advancement. Some research about overeducation does not study separate effects on genders and this may have a negative impact on female workers in the labour market, since policy makers using those evidence take decisions without considering the specificity of women's needs. One important aspect to consider for women workers is the presence of children, which might slow their career growth and aspirations. Therefore, one could think that having children may increase the possibility for a woman to accept a job below the individual's education and therefore being less satisfied with job and career path. In this regard Fleming and Kler (2014) investigate about the female's satisfaction at workplace in Australia and whether overeducation has an influence on that, examining the effect separately for those who have children and those who do not. The dataset is extrapolated from the Waves 1 to 11 of the Household, Income and Labour Dynamics in Australia (HILDA) survey, covering the period 2001 to 2011. The sample

considers 21,486 observations, which correspond to 6,162 female employed workers. The main goal of the research is to assess how overeducation influences the different levels of satisfaction across the sample composed on only women. Overeducation is defined according to the "job evaluation method", defining overeducated those workers who have educational attainments above compared to the minimum established by the Australian Standard Classification of Education for each occupation. Correctly matched female workers are more overall satisfied with their job, also when it comes for satisfaction with salary, job security, type of work and flexibility. Levels of satisfaction are then controlled separately for those individuals who have children at home and those who do not, and descriptive statistics shows that non-overeducated female workers with children are significantly more overall satisfied with their job, with their salary, their type of work and job security. The results for those workers without children but well-matched are similar. The specification controls for elements that influence satisfaction, and it contains control variables about the wage, socio-demographic characteristics such as the age, the interview year, immigration background, health, marital status, status of child raising, city location and education level. Moreover, information about the firm and working conditions, unemployment previous periods, time working experiences are also controlled. Results show that overeducation has a negative impact on wage satisfaction and satisfaction with the type of work but does not negatively influence overall job satisfaction on female workers with children. On the other side, considering women without children estimations confirm the statistical findings, therefore overeducated females are less overall satisfied with their job, type of work and job security. Hence results confirm that the presence of children matters when looking at the job satisfaction for female workers, since women with children are still generally satisfied with their jobs despite being overeducated. A possible interpretation from the author of the research is the idea that females with children, compared to the ones without, might have a different purpose for taking up a job than matching it their school attainments, which may be, for example, the simply support to the finance of the household.

The overeducation effects among female employees highlight the need for proactive policies that tackle the particular difficulties faced by women in the workforce, especially those who have family responsibilities. It becomes crucial to put policies in place to support labour demand and enhance working conditions for women, particularly those who are juggling work and childcare obligations. In addition to improving gender equality, labour market has to become more inclusive and efficient by creating an atmosphere that acknowledges and meets the varied needs of both female and male employees.

1.2.2 OVEREDUCATION AND MIGRATIONS

1.2.2.1 OVEREDUCATION INCIDENCE AMONG IMMIGRANTS

Migration is a contentious issue that has been addressed at the national and international level. There are numerous economic and non-economic factors that incite it, and the repercussions are relevant in both departure and arrival countries, thus the phenomenon must be examined from multiple perspectives. Because social and economic integration of migrants is not always immediate, it is a challenge for both the host country and the migrants themselves. However, it can be seen as an opportunity since new people bring new knowledge, ideas, and resources to society and to the labour market. In this paragraph the relationship between overeducation and migrants is the main topic of investigation; when people travel borders in search of work, factors including educational credentials, language ability, and qualification recognition all play important roles in determining the level of overeducation among migrant populations. Examining this interaction sheds light on the issues that migrants face in aligning their educational credentials with available job possibilities, as well as the larger dynamics of workforce integration and skill utilisation within varied cultural and economic contexts. People with migration background in the arrival country are generally found to be more exposed to experience overeducation, first because of ethnical discrimination, prejudices, and racism that they might suffer, especially those people belonging to different ethnic minorities. Moreover, they deal with the difficulty of transferring their "human capital" across borders, and this refers to the fact that they might have specific skills and knowledge related to a specific area of the world, which are then difficult to be applied somewhere else. These include language skills, country laws, regulations and labour market functioning knowledge, education titles and social integration and network. Therefore, it is presumed that as long time as an immigrant person spends in the host country, integration should be higher thanks to investments in acquiring new skills and knowledge specifically related to the new economic and social context, and for these reasons immigrant workers should experience less overeducation (Dustmann and Glitz, 2011).

Piracha and Vadean (2013) reviewing the existing literature concerning migration and educational mismatch individuate some reasons that may justify the higher level of overeducation, experienced by immigrants in the host country. One general finding is that immigrants who recently arrive to a culturally and economically different country, having low local language skills and little work experience, are more prone to be overeducated. The provenience country is a factor that influence mismatch levels because distinction in culture and language reflect differences in the labour market, work habits, way of doing business, and

it usually implies diverse school systems and education quality. Thereby, similarity in languages, culture and education systems lead to less incidence of overeducation among migrants. Additionally, one more determinant of overeducation in the host country is the previous status of overeducation in the origin country, since employers in the arrival country might evaluate past work experiences as a "skill-benchmark", therefore whether individuals migrate because of being overeducated, they might experience overeducation in the host country as well, given a signal of being lower skilled compared their academic background (Piracha et al., 2011). On the other side, there are some observed actions in previous studies, that help experiencing lower levels of overeducation. The first one may be an internationally validated education title or to have an educational degree of the host country (Nielsen, 2011). It is highlighted the importance of work experiences in the host country to integrate, learn and understand the different dynamics of the local job market.

Reasons for higher levels of overeducation across immigrant workers can be investigated across individuals features, home country and destination country determinants. Individual characteristics of the worker do influence their probability of being mismatched in the destination country, even if skill-transferability across labour markets is not flawless due to disparities in education and non-recognition of education-titles, as well as barriers to entry into certain occupations, and discrimination suffered by immigrants. Conversely, immigrants may be selected based on their positive traits, meaning that they have suitable features for the labour market of the arrival country and therefore this leads to a positive outcome for them in terms of education-job match. On the other side, the negative selection of immigrants is still an option, meaning that they are not selected on their positive skills, but on other pull-factors that attract them into the destination country. These include all those factors that reduce the monetary and non-monetary costs of a migration, likewise lower income inequalities and possible salary achievement, better career prospectives, lower distance, common language, immigration policies in the destination country, lower unemployment rate, education of quality and flexibility of labour market. Furthermore, all those public measures, such as policies aiming at reducing anti-discrimination and labour market integration, should also reduce levels of overeducation; however, there is also the risk that they attract more educated immigrants, leading to an excess of workers in certain sectors increasing overeducation levels (Aleksynska and Tritah, 2013).

Aleksynska and Tritah (2013) contributes to the existing literature investigating about the job-education mismatch (and its determinants) of immigrant workers compared to the native

workers in the destination country labour market analysing 22 European countries[2]. Data are obtained from the ESS – European Social Survey, using the first four waves in the time range 2002 – 2009, and only employed workers between 20 and 64 years old are considered, with a final sample including 4,425 immigrants and 59,477 natives. To calculate the overeducation incidence, the "realized matches" method is computed, calculating the mean level of education (and its standard deviation) for each job in the sample; overeducated workers are those who have an education degree one standard deviation above the mean of education levels of workers in that occupation. Descriptive statistics suggest that overeducation is higher on immigrants, counting almost 22% of overeducated immigrant workers vis-à-vis 13% of natives. The econometric analysis estimates the phenomenon of overeducation separately for immigrants and native workers. Covariates variables inserted in the model estimating determinants of overeducation can be classified in three groups: individual characteristics, home country and host countries features. The first group includes gender, marital status and number of people in the household, ethnic minority, past unemployment periods, being a union worker, number of hours worked, and time spent in the local labour market, citizenship and mother tongue. For what concerns the other groups of variables, they include geographical distance and common border sharing, past relationships in terms of colony interdependence, general economic variables of the countries, such as GDP and GDP per capita, rate of unemployment but also proxy variables to measure the quality of education (human capital) with international measures. Finally, some immigrant-integration policy areas in the arrival country are also controlled through the MIPEX (Migration Integration Policy Index) database, focusing on the indices regarding the levels of anti-discrimination, labour market integration and access to specific jobs for migrants. Considering the overall sample and the individual-characteristics control variables, being an immigrant increases the chances of being overeducated, and past unemployment and belonging to an ethnic minority do it as well. On the other side, speaking the official language(s) of the host country and obtaining the citizenship decrease the likelihood of overeducation. Considering the country's features in the model, estimations show that short-distance between countries influences level of immigration by boosting it, and this might be because proximity is an incentive to migrate, and therefore it might negatively select migrants, not according to their positive traits aligned with local labour market characteristics. Moreover, looking at provenience it is observed that workers form Africa and Middle East experience higher overeducation compared to immigrants from other regions of the world. Adding destination

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[2] Austria, Belgium, Switzerland, Cyprus, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, The UK, Greece, Hungary, Ireland, Luxemburg, The Netherlands, Norway, Portugal, Sweden, Slovenia, Slovakia.

country policies to the analysis, it is observed that countries that have better policies protecting minority communities, meaning that they have stronger or better implemented anti-discrimination policies, attract higher migrants flows with different school levels and backgrounds, increasing their chances of being overeducated.

In addition to previous results, time spent in the arrival job market for immigrants is one of the primary aspects when examining the relations between overeducation and migrations background. Nielsen (2011) carries out an analysis of that relation in the context of Denmark, which through the national immigration policies, tried to create incentives for foreign skilled workers to migrate there with the goal of better fulfils the labour demand. However, integration takes time, and it is important to understand whether time and experience in the local labour market are key factors that reduce the overeducation gap between the native and immigrant workers. Two datasets are used to extrapolate the necessary information and variable for the study; the first serves as a provider of data about the all-immigrant population residing in Denmark, and the second represents a 10% random sample about Danish natives, composing a total sample of 488,773 observations. Non-Western and first-generation male immigrants, ageing 25 to 57 years old, are included in the sample considering the period 1995-2002. Educated population is covered in the analysis, so only those workers with vocational or higher school titles. The method applied to check for overeducation is the "realized matches"; both the mean and modal of education levels of each occupation are assessed, therefore, overeducation is calculated in two ways: workers are considered overeducated if their educational attainment is one standard deviation above the mean (modal) education of occupations within the sample. Results are estimated and examined across three different groups: natives Danish, immigrants with Danish education and immigrants with foreign educational attainments. Overeducation is observed to be a critical phenomenon for immigrants in the Danish labour market, in fact according to the two methods between 38% and 47% of the foreign-educated immigrants population is overeducated; between 20% and 40% of immigrants possessing Danish school titles is overeducated as well, observing instead lower levels among natives. Therefore, it is not surprising the result that Danish-educated immigrants are less prone to be overeducated, because they know better the labour market, probably the language and their education-institutions are more connected or aligned with the job market's needs. Time and experiences in the labour Danish labour market should be crucial and very important for social and labour integration, to also overcome the overeducation gap existing between natives and immigrants. However, only time is not sufficient, since that time should be invested in learning the necessary skills for the local labour market, such as work

experiences or the language, and then it should positively influence the better job-education match of immigrants. However, whether time is spent in unemployment, then the personal skills might become obsolete, and the worker might have more incentive to accept any jobs, even those for which they are overqualified. With the aim of estimating the effect of experiences in the local labour market on overeducation the used econometric model controls for Danish labour market experience, years dummies and education levels; for immigrant sample the following variables are observed: migration age, ethnicity dummies and years since migration. Estimations show that experience in the Danish labour market significantly reduces the overeducation incidence among foreign-educated immigrants and the interpretation given by the author follows the assumption that the transferability of "human capital" is harder for immigrant workers, and only by spending time in the labour market they have the chance to demonstrate their skills and what they are capable to offer, advancing with their career possibilities. Despite the fact that the study clearly highlights the time as a critical factor for reducing the gap between overeducated migrants and natives in terms of chances of matching education and job, the time span considered is very short to make stronger predictions about it, therefore longer periods of time need to be considered to verify the robustness of that.

Overeducation over immigrant populations is a complex question with distinct specific consequences across ethnic-minority groups. The existing literature shows that ethnic and cultural factors can influence worker's match between schooling and labour market's demand. Language skills, recognition of foreign education, and cultural biases may all play important roles in determining the pattern of overeducation in specific ethnic minority communities.

UK is an appealing country for immigration's analysis, since there have been different migration in-flows over the decades, starting from the Commonwealth countries and afterwards also from European Union's states. Therefore, different ethnicities are present in the society and in the labour market. Hence, it is interesting to observe whether ethnicity is an element that matters in the labour market, and if it represents an advantage or disadvantage for the matching job-education of foreign workers. With the purpose of studying the phenomenon of overeducation and its impact on earnings of natives and immigrants who have a UK degree, Lindley (2009) conducted a research using data from the Quarterly Labour Force Survey (QLFS) over the years 1993-2003. The considered sample includes 250,742 natives and 13,894 immigrants, who are from 16 to 65 years old, and overeducation is assessed by the "realized match" method; however, differently than other research applying the same technique, the mode is computed in this study; a worker is considered overeducated whether his education level is higher than the education-mode within the specific occupation in the sample. Data accentuates that female

workers are more overeducated than man, and immigrants experience higher overeducation than natives, affecting more the women workers than men. The econometric model looking for factors influencing overeducation, includes ethnicity of the immigrants, residence region, marital status, age, children, firm size, different arrival cohorts, unemployment rate of the UK and English language skills. Estimates significantly show that diverse ethnicities experience overeducation with different intensities, in particular Black African men are more prone to be overeducated compared to Whites immigrant men. Considering women, Indian and Pakistani, and Bangladeshi women workers experience higher overeducation compared to White immigrant women.

Culture proximity and having the language skills of the arrival country constitute strengths for an easier and more successful job integration, and therefore it helps experiencing less overeducation or at least shorter periods of that. Green and Leeves (2007) carry out a study in Australia investigating the effect of overeducation separately for immigrants with "English-speaking background (ESB)" and "non- English-speaking background (NESB)", which are in turn divided into Asian NESB and Other NESB, using data from LSIA – Longitudinal Survey of Immigrants, covering two cohort of immigrants, the one of 1996 and other of 2001 census. Respondents of the first cohort are interviewed in three different waves in time and comprehend workers immigrated since no more than three years before the interview. Instead, the second cohort has only two waves of surveys, including immigrants arrived since no more than two years before the interview. The dataset supplies information regarding male workers between 16 and 64 years of age. The sample counts 1,063 workers from the first cohort and 659 from the second. ESB immigrants have the highest level of occupation in both cohorts, compared to natives and the other migrants. Asian and other NESB workers with the higher levels of education are more than natives and this means that Australia, through their policies were able to attract skilled workers. Overeducation is computed with the "job evaluation" method, using the 1996 ASCO – Australian Standard Classification of Occupation which provides level of education necessary for each occupation coded and defined by them. Probability of overeducation is estimated and for immigrants workers different variables are controlled in the model, such as visa categories (employed-job, independent skilled, humanitarian, family), cohorts dummy, "regional" categories, unemployment rate in Australia, and personal characteristics (as age, age square, English skills, marital status, educational attainment, part time job, whether the immigrant worker was employed in the previous 12 months, whether the individual had funds on arrival, whether the worker possesses a vehicle, and if the individual had been in Australia before). Immigrants in Australia have higher rates of

overeducation in both cohorts compared to the native population, in particular Asian NESB group suffers from the highest rate of overeducation, followed by other NESB compared to ESB immigrants and natives. However, greater levels of overeducation are found among the immigrant sample also due to the fact that they are on average more educated than native in the whole considered sample, therefore, people with low educational levels usually are not overeducated by definition. Estimations accentuate that age is an important element considering the effect of overeducation across immigrants in Australia; for the ESB group, being older decrease the incidence of overeducation, and this means that those immigrants have higher chances of a good transfer of their human capital, such as knowledge, work experiences and skills, in the arrival country. On the other side, for the other two groups the age affect is not equal, in fact overeducation raises with age, and this is interpreted as higher obstacles in the recognition of previous experiences and studies.

1.2.2.2   EFFECTS OF OVEREDUCATION ON MIGRANT'S WAGES

The overeducation analysis by Nielsen (2011) in Denmark discussed above also investigates the effect of overeducation on immigrant's earnings. As used in some previously discussed research, the Mincer earnings equation is used to estimate the impact of overeducation on wages, considering the years of education required for that occupation, the years in excess or defect in case of mismatch, and labour market experience of the individual. Estimations are done dividing native Danish workers, immigrants with a Danish school title and immigrants with foreign education. The return to every year more of schooling is basically equivalent for natives and immigrants with Danish education, but the one of immigrant workers with foreign school titles is 3% lower. However, overeducated workers' salaries are higher than well-matched ones in the same occupation, but less than what it could be if adequately matched.

Different ethnicities experience overeducation levels at different intensities as shown in the previous paragraph. The same research by Lindley (2009) also deals with developing an understanding of whether overeducation's effect on wages are different among diverse ethnic groups of immigrants in the UK. Therefore, a wage regression model has been carried out for overeducated workers dividing the effects on native and immigrants, controlling for required education of specific occupations, the excess or shortage of years of education, ethnicity, age, gender, marital status, English language as mother tongue, arrival cohorts, residence region and firm size. Estimated results stress out that being English-native speaker increases earnings of overeducated immigrants for both genders. Being overeducated has a sort of prize, meaning

that earnings are higher than their well-matched colleagues, but lower than what it could be if their school attainment equalizes their job actual education necessity. Controlling for ethnicity and men's part of the sample, White immigrants and South Asian immigrants experience higher earning's levels compared to the other ethnic groups of overeducated immigrants and natives, for example Black men. Looking at women sample, both natives and immigrants, Black native workers experience greater salary disadvantages for being overeducated, compared to other natives and immigrants, an also compared to Black native men and immigrant men workers.

In addition, overeducation's effect on earnings can also be influenced by the language background and skills of immigrant workers, seeing language in particular as the first communication tool used in the labour market, and a very important sign of social and economic integration. The Australian research from Green et al. (2007), analysed in the previous paragraph, investigating the effects of overeducation on immigrant workers, deals also with the effect on earnings of overeducated workers; they check whether language background penalizes the salary levels attained, splitting the analysis in three immigrants groups: immigrants with English speaking background (ESB), non-English speaking background (Other NESB) and Asian non- English speaking background (Asian NESB). A wage equation model is estimated, controlling for the education level needed for the job, the return to surplus education, Australian job experience (time spent in the local labour market) and all the other individual-related variables present in the overeducation model analysed in the previous section. Findings emphasise that the return to the education surplus is lower for NESB, both Asians and the other group of immigrants compared to ESB immigrants and native workers. This confirms the fact that greater language skills are indeed crucial for having better return to education as well, even when there is a "loss" for being overeducated considering the potential overall return. Moreover, it is observed that work experiences in Australia increase the earnings for immigrants in a significant way and older ESB immigrant workers earn more than NESB immigrants (both groups), for which age is negative related to wages.

1.3 OVEREDUCATION: TIME-FACTOR AND THESIS INVESTIGATION

1.3.1 PERSISTANCE OF OVEREDUCATION

Time is a crucial factor that shapes the learning environment and the process of matching education to jobs in the dynamic and ever-changing domains of education and the labour market. It is a key element while considering the phenomenon of overeducation, since it is influenced by the fluidity of learning, technological progress, and social change, and effects on workers, and the labour market might present some differences considering the long run than a short period of time. In the existing literature persistence over time of overeducation has been investigated, and whether it can be a stepping stone for future better job-educational matched works or a trap for overeducated workers. The latter would imply the consequent disadvantages and the lower returns to education already mentioned in the previous sections of the literature review.

A 20 year-long research is undertaken in Poland by Kiersztyn (2013) considering the period 1988 – 2008, so the post-communist transition in the country. This study has the objective of analysing the persistence of overeducation among individuals, therefore whether an overeducated worker is stuck in overeducation-trap, and whether the incidence of overeducated workers increases or decreases over time. Data are obtained through five waves surveyed every four years in the considered period by the POLAN – the Polish Panel Survey. The sample includes 8,960 workers older than 21 years. The technique used to determine overeducation is mixed, using both the "job evaluation method" and the "realized matches". In fact, required levels of education for each occupation are obtained from SKZ -Polish Social Classification of Occupations; in addition the mean-education for each occupation is also computed (relative to the first wave in year 1988) and a worker is considered overeducated if the required level of education from SKZ is below one standard deviation the mean level of education for that specific job and then comparing it with the educational attainment of the respondent. The econometric model developed to better understand the pattern of overeducation over time in Poland, controls for individuals' characteristics of the respondents and for other socio-economic benchmarks, such as age, interview wave, cohort based on the year of birth, gender, educational attainment, year of tenure with current job, occupation, overeducation in the previous wave, unemployment rate in the region of residence. Overall, overeducation seems to

grow across the first 15 years of the considered periods and to slightly decrease in the last survey-year in 2008. Individual persistence of overeducation, understood as the likelihood of being still overeducated from one wave to the following one, has been estimated to be significantly positive: results point out that the overeducated workers have 4 times higher chances of remaining overeducated five years later. However, persistence of overeducation, intended as growth of the number of people still being overeducated from one wave to the following one, it is not observed, since the percentage of overeducated workers increases from the first to the second wave, but then it decreases. In conclusion, results of this study partially confirm both the stepping stone and the trap-hypothesis. What it is missing in the research is taking into account the migration phenomenon, especially the out- flows from Poland, because overeducated workers might have migrated to other countries in search for better matched occupations, even more in the last years of the survey because of joining the European Union; it can be observed that many overeducated individuals in 2003 left the survey and did not participate in the 2008 one.

Other studies investigate about the overeducation and its persistence over time, such as the one of Meroni and Vera-Toscano (2017). They focus on studying whether accepting a job for which one is overeducated at the beginning of the career is a "stepping stone" to better matched occupations in the future or is a "trap" over time. The sample contains workers recently graduated by the time of the survey in 14 countries[3] in Europe who found an employment within five years after graduation. Samples' data are seized from 2005 REFLEX (Research into employment and professional FLEXibility) counting 10,526 individuals in total. Overeducation is assessed through the "subjective method" relying on information from the survey provided by respondents, who are asked about the necessary level of education to carry out their jobs. Descriptive statistics point out that 25% of graduates are overeducated in their first employ, but that rate decreases over time and after five years from graduation only 13.44% workers are overeducated in the sample. The model for estimating overeducation probability controls for other variables related to the respondents, such as gender, immigrant status, parents' education, education level, subjective information regarding education-years experiences, time when looking for the first job after graduation, employment status, type of job contract and field of study. Overeducation in this analysis is considered as an alternative choice of being unemployed for those workers who do not find a well-matched job. Estimates of overeducation probability are divided according to job-search time thresholds, referred to the number of months after

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[3] Austria, Belgium (Flanders), Czech Republic, Estonia, Finland, France, Germany, Italy, The Netherlands, Norway, Portugal, Spain, United Kingdom

graduation when the respondents accepted his/her first overeducated-job instead of choosing staying unemployed. Considering the whole sample, accepting a job for which one is overeducated always leads to higher probability of being overeducated later in the following job considering any moment in time. Moreover, regional differences across Europe and internal labour market exists, hence estimations differentiated by regions (Continental, East, South, Scandinavia and the UK) carry out different implications. In general, results show that accepting an overeducated job in the first three months after graduation, instead of being unemployed and waiting for a more adequate occupation, reduces the probability of finding a well-matched occupation later, and this is valid for every considered region of countries. However, this is not significantly verified for the UK later on, meaning that after three months, accepting a job for which an individual is overeducated or staying unemployed means no difference in the probability of having a well-matched job. However, in the South-Continental and Eastern Europe results are different, since accepting an overeducated occupation at any time after graduation is always a trap, increasing the chances of being overeducated in the following jobs as well. In Scandinavian countries results are mixed, and it is found that by accepting a mismatched job in the first year after graduation will induce to the overeducation trap, later this is no significant anymore. These results have to be interpreted also according to the labour mobility habits of those regions, since it may be that in the UK and in the Scandinavian countries, average job mobility is higher, so workers have lower chances of being stuck in a job, as it often happen in the other European regions. In conclusion, results from this study are quite in line with the theory of overeducation trap, meaning that overeducation is generally persistent over time for an individual that has accepted an employ even if they are overqualified; however, the time span considered in the research refers only to five years after graduation, which is not that long period of time to make long run implications and predictions.

1.3.2   OUR RESEARCH: REASONS AND GOALS

Examining the overeducation phenomenon is essential for comprehending and resolving discrepancies between people's educational backgrounds and the demands for their employment. Overeducation becomes more common as long as society and governments keep emphasising the value of a higher education attainment, because of personal and community benefits already explained above, without controlling for the labour demand side. This mismatch has wider economic ramifications that result in inefficiencies in the labour market, in

terms of allocation of resources, in addition to having an impact on an individual's return to education and job satisfaction.

As mentioned in the section 1.2.2, immigrant workers struggle more, compared to natives, in finding a job which is in line with their school attainment, due to difficulties in transferring their "human capital" from one country to another, and due to lack of information, knowledge, and skills adequate with the host country's labour market. However, there is not much evidence about the long run effects of immigrations on overeducation, considering that immigrant workers after a certain period spent in the arrival country should possess the requirements for accessing to the labour market, such as language skills, experiencing, competences and social integration. It would be interesting and important from a policy perspective to understand the pattern of the overeducation phenomenon among the adult immigrant population, because according to the International Labour Organisation most of immigrant workers are aged between 25 and 64, but the trend of young workers immigration is increasing more and more over time. Therefore, studying the relation between overeducation and immigration in the long-term means studying the workers' labour condition when they are adult (ILO 2021).

Our research has the goal of carrying out an empirical analysis about overeducation in Europe, controlling for the incidence of the phenomenon over time and in particular how the probability of being overeducated differs between immigrants and native workers. Moreover, this study aims at analysing whether the time spent in the arrival country for immigrants reduces the overeducation likelihood with the acquisition of specific knowledge and skills. We would like to see if an assimilation process exists (Chiswick, 1978), however related to overeducation probability; therefore, we will control whether by the time spent in the country of residence the probability of overeducation for immigrant workers converges to the one experienced by natives; this is the results of being able of transferring all their potential human capital in terms of education to the host country and acquiring new human capital related to the new labour market. Through the dataset SHARE, which is the Survey of Health, Ageing and Retirement in Europe, we are able to reach adult workers' information (50+ years old) living in different countries in Europe. The observations considered by our study refer to workers based in 11 European countries who are close to their retirement age; for what concerns immigrants in our sample, we are considering foreign-born workers who have been in the arrival countries since many years (mean time from arrival: 38 years). Therefore, the long run overeducation effects for immigrants in the labour market can be observed and in particular the persistence of the overeducation gap associated with migration over time. Data about educational levels of workers and their jobs are provided from SHARE and so we able to observe if native and in

immigrant workers still experience overeducation in their last years of employment, despite the time and experiences in the labour market. Results from our analysis will contribute to develop a better understanding of the phenomenon of overeducation in Europe, in particular how the chances of experiencing that are different between native and immigrant workers, focusing on the older population in the labour market, which will be increasingly present in the labour market given the ageing population in Europe.

CHAPTER II: DATA AND DESCRIPTIVE STATISTICS

2.1. SHARE: SURVEY OF HEALTH, AGEING AND RETIREMENT IN EUROPE

The Survey of Health, Ageing and Retirement in Europe (SHARE) is a multidisciplinary, cross-national panel database that contains microdata on the socioeconomic status, social networks, and health of about 140,000 individuals (more than 293,000 interviews) who are 50+ years of age living in 20 European countries and Israel. This longitudinal survey is done by and for researchers covering different disciplines in the social studies, and it has become one important framework in the European research sector. SHARE was established as a cross-national venture to allow researchers to investigate how different European welfare state structures handle the consequences and implications of population ageing, in order to develop a correct and deep understanding of how economic, social, health and wealth factors influence older population's quality of life (Share-eric[4]).

SHARE's data come from eight waves of questionnaires surveyed during the period 2004 – 2019 (beginning of 2020), and they are divided into regular and retrospective waves. The latter forms SHARELIFE, that is the interview concerning respondent's life history. This includes further information about demographic, socio-economic and gerontology which build more comprehensive understanding of respondents' lives, starting from their eldest experiences. On the other hand, the regular interviews investigate about respondent's life at the time of the interview, for what concerns demography, childhood conditions that may still have an impact, household composition, social support and respondent's social network, health, functional limitations, work habits and money.

The SHARE target population includes 50+ years old people living in the SHARE countries, which are: Austria, Germany, Sweden, Netherlands, Spain, Italy, France, Denmark, Greece, Switzerland, Belgium, Israel, Czech Republic, Poland, Luxemburg, Hungary, Slovenia, Estonia, Croatia, Lithuania, Bulgaria, Cyprus, Finland, Latvia, Malta, Romania and Slovakia. SHARE has continually expanded its reach by incorporating additional countries and respondents over time, therefore not all countries took part to all surveys, and some joined later increasing therefore the number of participants, observations and the heterogeneity over the population. The longitudinal sample includes every interviewee from SHARE who participated in a prior wave.

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[4] Further details are available on the webpage [2] in the sitography

Respondent's partners are eligible for an interview as well and so are new partners across time. Therefore, respondents are traced and re-interviewed in the different waves', even if they move to another country within the SHARE interviews area, and in case of death, there are end-of-life interviews (Share-eric -Release Guide 7.1.1[5]). Despite facing challenges like declining survey participation rates, and economic and pandemic crises, SHARE maintains a relatively high overall response rate compared to other European and recent US survey studies. The main pillars of the data set are the trustworthy information of individuals over time and the considered period of time, which is rich in terms of economic and policy variations; for those reasons, it is possible to derive interesting and reliable results using SHARES' data, covering a challenging socio-economic environment, and making researchers policymakers able to gain insights from experiences and attempted strategies in different places learning thanks to cross-country comparability of SHARE (Gruber, 2019).

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[5] Further details are available on the webpage [3] in the sitography

2.2. DEFINITION OF OVEREDUCATION IN THE RESEARCH

Overeducation can be determined through three different methods: the "subjective method", the "job-evaluation method", and the "empirical method", which are more deeply explained in the section 1.1.2 of the chapter 1. These methods have been applied to empirical studies and some examples of that are highlighted in the previous chapter.

Through the following sections all stages done in the empirical analysis are explained, in particular the phenomenon of overeducation and its impact on immigrants in the arrival country has been studied, considering time as an expected crucial factor for reducing the overeducation-gap between natives and immigrant found in the previous studies. Therefore, it will be described the different steps for determining the necessary levels of education for any specific occupations, which constitutes our base for the assessment of overeducation. Afterward, the comparison between the required education level for a job and the actual educational attainment of individuals is done.

2.2.1 ISCED and ISCO

Table 2.1: ISCED-97 levels

NAME	EDUCATIONAL ATTAINMENT
Level 0	Pre-primary education
Level 1	Primary education or first stage of basic education
Level 2	Lower secondary education or second stage of basic education
Level 3	(Upper) secondary education
Level 4	Post-secondary non-tertiary education
Level 5	First stage of tertiary education
Level 6	Second stage of tertiary education

Source: unesco.org[6]

Overeducation is not a variable which can directly be extrapolated from the dataset SHARE, since there is neither the direct question about it, nor the respondent's opinion about the necessary level of education for their job. However, a variable regarding the educational highest attainment of the interviewer is provided which classifies educational levels according to

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[6] Further details are available on the webpage [4] in the sitography

ISCED-97 coding. ISCED-97 (International Standard Classification of Education, 1997) is a framework created by the United Nations Educational, Scientific, and Cultural Organisation (UNESCO) to define and compare educational systems from various countries. It serves as a single international reference for organising educational programmes and levels. ISCED-97 comprises seven levels of education, each representing a different stage in the educational process. Table 2.1 presents a summary of the ISCED-97 levels. The variable concerning education-level on SHARE assumes values 0 to 6 according to the education attainment of the respondent, leaving also the possibility of being still in school or to specify other options if the respondent's educational level does not fall into the previous possibilities.

For what concerns employment classification through SHARE we are able to find out the occupation carried out by workers in the dataset. For the SHARE wave 1, 4-digit code of ISCO-88 related to the occupations are available (1988 International Standard Classification of Occupation developed by ILO – International Labour Organisation), but in waves 2,4 and 5 classification is not done according to the specific code for each occupation, but it is done only by the major groups of ISCO-88 codification,[7]. Nevertheless, from SHARE wave 6 on occupations are classified according to ISCO-08 with 4 digits, that is a more up-to-date version of the ISCO-88, particularly in some job areas more affected by technological changes. Through a process of conversion, we are able to classify every occupation according to ISCO-08 with the aim of having a more homogeneous job classification, greater comparability between occupations and a unique method to then assign the minimum required level of education.[8]

The importance of using ISCO-08 stands that it is a global standard for classifying and arranging occupations. This classification system is essential for supporting labour market analysis, enabling cross-border comparability of labour market data, and advancing the understanding of employment structures around the world. Governments, statistical organizations, academics, and other stakeholders frequently utilize ISCO-08 to improve the precision and uniformity of occupational data across various nations and areas. Occupations are classified according to a hierarchical structure from the top-down as highlighted in the table 2.2: the major groups represent the more general terms under which a job may be classified and it denotes jobs by a

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[7] Managers, Professionals, Technicians and Associate Professionals, Clerical Support Workers, Service and Sales Workers, Skilled Agricultural, Forestry and Fishery Workers, Craft and Related Trades Workers, Plant and Machine Operators, and Assemblers, Elementary Occupations and Armed Forces Occupations (ILO)

[8] Conversion of from ISCO-88 to ISCO-08 in wave 1 is done with the command "iscogen" in Stata. For the other waves' occupation codes, a reconstruction of ISCO-08 is made starting from the most recent one (wave 8), with the aim of importing and substituting to the missing values with the corresponding ISCO-08 values or ISCO-majors from the other waves.

1-digit code, then there are sub-major groups of 2-digit code, minor groups of 3-digit code and finally the unit groups which are the most detailed classification corresponding to a specific 4-digit code (ILO[9]).

Table 2.2: Number of groups at each level - ISCO-08

Major group (1 digit)	Sub-major groups (2 digits)	Minor groups (3 digits)	Unit groups (4 digits)
1 Managers	4	11	31
2 Professionals	6	27	92
3 Technicians and Associate Professionals	5	20	84
4 Clerical Support Workers	4	8	29
5 Service and Sales Workers	4	13	40
6 Skilled Agricultural, Forestry and Fishery Workers	3	9	18
7 Craft and Related Trades Workers	5	14	66
8 Plant and Machine Operators, and Assemblers	3	14	40
9 Elementary Occupations	6	11	33
0 Armed Forces Occupations	3	3	3
TOTAL	43	130	436

Source: ILO – International Labour Organisation[10]

ISCO-08 provides a huge possibility to classify occupations, and despite the fact that ILO already provides an approximation for skills and education levels required for each major group, they are very general. For this reason for what concerns this research, there is not satisfying direct association between each 4-digit occupation and a specific level of education necessary to carry out that job. This is the reason why an external source, O*NET, is applied to the research to assess the correspondence between required educational levels and jobs.

2.2.2 O*NET

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[9] Further details are available on the webpage [5] in the sitography
[10] Ibidem

The Occupational Information Network - O*NET Programme is the leading provider of the occupational information in the United States.It is promoted through the sponsorship of the U.S. Department of Labor/Employment and Training Administration. Data are collected in an accurate and reliable way and are critical to develop a good understanding of the dynamic changes in the workplaces and their implications for both the workforce and the US economy. These data serve as the base for applications to research and policy that help promoting the development and maintenance of a skilled workforce. At the heart of this initiative there is the O*NET database, which contains a vast range of standardised descriptors for nearly 1,000 occupations across the entire US economy. The database is free and open to the public, and it is constantly updated based on input from diverse workers representing various occupations. The O*NET-SOC 2019 taxonomy configuration has been constructed starting from the 2018 SOC System (Standard Occupational Classification). The new O*NET-SOC taxonomy in composed on 1,016 occupational titles. Therefore O*NET classification of occupation starts from the 2018 SOC System, and it adds two digits followed by a dot, as an extension and a better specification of the SOC system; so O*NET categorizes occupations according to 6-digit codes.

Table 2.3: O*NET job zones and relative education levels

O*NET JOB ZONE	REQUIRED EDUCATION
Job zone 1	Less than high school
Job zone 2	High school diploma
Job zone 3	High school plus
Job zone 4	Bachelor's degree
Job zone 5	Bachelor's degree plus

Source: https://www.onetcenter.org/reports/JobZoneProcedureUpdate.html

However, there are some occupations codified by SOC which O*NET did not take in consideration because unnecessary for their purposes. Moreover, a crosswalk between O*NET and SOC 2018 has been developed by the agency and it is publicly available on their website[11]. For every occupation coded by O*NET there is a relative job zone, from 1 to 5, that establishes the educational level needed for that occupation and they are reported in the Table 2.3 (O*net

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[11] Further details are available on the webpage [6] in the sitography

center[12]). In conclusion, through O*NET every occupation is assigned to a minimum level of education needed, therefore those workers who have higher levels of education and carry out that employ can be classified as overeducated.

2.2.3 CALCULATION OF OVEREDUCATION IN OUR RESEARCH

At this stage, the choice of the methodology to assess overeducation in our research is straightforward and is the so-called "job evaluation method", which is the one that objectively assigns to a specific occupation the required level of education obtained from an external source. SHARE provides ISCO-08 codes for occupations and through O*NET we are able to assign to each job a specific required level of education; however, O*NET classifies occupation with their own codes called "onesocode" and therefore, we need to find a crosswalk between O*NET and ISCO codes. By finding a correspondence between ISCO codes and onesocodes we are able to assign a minimum level of education to each occupation.

ESCO, which stands for European Skills, Competences, Qualifications, and Occupations, serves as the multilingual categorization system for skills, competences, and occupations in Europe. It serves as a comprehensive reference guide by defining, recognising, and classifying 3008 professional occupations and skills that are important in the labour market of the European Union and in the fields of education and training (esco.eu.europa[13]). An official crosswalk between O*NET and ESCO occupation exists. The ESCO Data Science Team (European Commission) aimed at creating a method to identify the most semantically similar ESCO occupations for an O*NET occupation in order to create a reliable crosswalk between the European and American classification of occupations. They focused on assessing how closely related or similar the linguistic and conceptual elements are between the two systems to establish a meaningful comparison (Frugoli P. and ESCO Secretariat, 2022). ESCO codes are built up to ISCO codes; ISCO-08 serves as the occupations pillar's structure of hierarchy. The top four levels for the occupations pillar are provided by ISCO-08 and level 5 and below are where ESCO jobs are located. This was made because a more specific adaptation of occupation for the European Union job market was necessary. There are some ISCO-08 groups that are not included in ESCO occupations, because some ISCO occupations are not economically

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[12] Further details are available on the webpage [7] in the sitography
[13] Further details are available on the webpage [8] in the sitography

relevant in Europe. To sum up, at 4-digit level ESCO and ISCO-08 codes are identical (esco.ec.europa[14]).

At this point, with the goal of assigning a required level of education to each ISCO-08 occupation-code we have from the SHARE surveys, the starting point is the official crosswalk between ESCO and O*NET[15]. Using to this crosswalk we are able to assign to any ESCO occupation a job zone established by O*NET. However, there are some ESCO codes that cannot be assigned to a relative O*NET occupation and hence to a minimum educational level, because of the fact that ESCO codes are almost three times higher in terms of number. Despite of that, through the crosswalk it is doable for most of ESCO occupations to assign a relative education attainment required. From this point, we will consider only the only ESCO four-digits codes, which forms the ISCO-08 codes. From the SHARE waves, 563 different ISCO-08 occupations are extracted, therefore it is crucial to look for the education requirements related to those jobs. Unfortunately, there are 39% of ISCO-08 code for which the association previously done is not successful, hence those occupations still not have a related level of education.

In order to assign a job zone to the occupations that still have not, we apply different methods, since we have to deal with 1-digit ISCO-08 codes, 3-digits ISCO-08 codes and some 4-digits ISCO-08 codes without a corresponding job zone. The first method assigns to 1 digit ISCO-08 codes the job zone which is the median value of the required minimum education between the 4 digits ISCO-08 codes that have the first digit in common; then it attributes as job zone to 3 digits ISCO-08 and 4 digits ISCO-08 codes the median value of the minimum education between the 4 digits ISCO-08 codes that have the first three digits in common. Applying it, 72% of the occupation with missing job zones have a minimum level of education assigned at this point. Since we now have only 3 and 4 digits ISCO-08 occupations without a relative job zone, via the second method we assign, when possible, the median value of the minimum education between the 4 digits ISCO-08 codes to that have the first two digits in common, and whether not possible the median value of the minimum education between the 4 digits ISCO-08 codes to that have the first digit in common. Finally, we do observe that only three 1 digit ISCO-08 codes do not have a corresponding education zone, however, they are negative values and we are not going to consider them in the analysis.

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[14] Further details are available on the webpage [8] in the sitography
[15] Further details are available on the webpage [9] in the sitography

We do have ISCO-08 codes with a minimum level of education required obtained from O*NET; however, easySHARE data codify respondent's educational attainments through ISCED-1997 levels of education. Consequently, an association between O*NET job zones and ISCED-1997 education levels needs to be done, in order to assign to each individual a corresponding O*NET job zone quantifying his/her level of schooling.

Table 2.4: Comparison between O*NET job zones and ISCED-1997 education level

O*NET JOB ZONE	EDUCATION LEVEL	ISCED-1997	EDUCATION LEVEL
Job zone 1	Less than high school	**Level 0**	Pre-primary education
Job zone 1	Less than high school	**Level 1**	Primary education or first stage of basic education
Job zone 1	Less than high school	**Level 2**	Lower secondary education or second stage of basic education
Job zone 2	High school diploma	**Level 3**	(Upper) secondary education
Job zone 3	High school plus	**Level 4**	Post-secondary non-tertiary education
Job zone 4 + Job zone 5	Bachelor's degree + Bachelor's degree plus	**Level 5**	First stage of tertiary education
		Level 6	Second stage of tertiary education

Source: Onetonline and ILO – International Labour Organisation[16]

We need to make a comparison between ISCED-1997 education levels and O*NET job zones, finding as more precise as possible congruences between them. This is shown in the table 2.4; the lowest school attainment for O*NET comprehends a very broad category of education levels, therefore job zone 1 is assigned to levels 0,1 and 2 of ISCED. Instead, there is an exact match between O*NET's job zone 2 and level 3 of ISCED; the same occurs with job zone 3 and level 4. However, there is not exact equivalence between job zone 5 (Bachelor's degree plus) and level 6 of ISCED-1997, since the highest level of ISCED education refers to education attainment, such as P.hD, that are more oriented to carry out research and institutional-academic jobs, instead job zone 5 is more related to master's degree, which are usually more related to skills needed in the private sector (Onetonline & ILO – International

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[16] Further details are available on the webpage [4] and [7] in the sitography

Labour Organisation[17]). For this reason, it is chosen to aggregate job zones 4 and 5 from O*NET into a unique job zone, associating it with both levels 5 and 6 from ISCE-97 creating therefore a unique category for tertiary education. Anyway, a clearer correspondence of the minimum educational levels required for a job is highlighted in the table 2.5. In the last column it is highlighted then the levels of education used in our research which goes from 1 to 4.

Table 2.5: Minimum educational level for our research

O*NET JOB ZONE	ISCED-1997	MINIMUM EDUCATIONAL LEVEL FOR OUR RESEARCH
Job zone 1	Level 0, 1 and 2	1
Job zone 2	Level 3	2
Job zone 3	Level 4	3
Job zone 4 and 5	Level 5 and 6	4

Finally, we possess all the elements to assess whether a SHARE respondent's is overeducated in his/her current job. Individuals are considered overeducated whether their educational attainment is greater than what it is required for their job according to our crosswalk analysis using ISCO-08 codes, O*NET and ISCED-1997.

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[17] Further details are available on the webpage [4] and [7] in the sitography

2.3 DESRIPTIVE STATISTICS ANALYSIS

2.3.1 SAMPLE DEFINITION

SHARE developed additional documents with the aim of harmonizing data, such as EasySHARE, which collects all data coming from the different waves into one single file, considering a shorter list of variables, with the goal of reducing the complexity of the dataset. The data is stored in a long format, meaning that respondent's answers appear as many times as the number of waves he or she took part in, taking their information from all regular waves and creating therefore a single panel dataset that can be worked on. For instance, if there are seven observations with the same respondent identifier ("mergeid"), it indicates that this respondent participated in seven waves of SHARE (Share-eric[18]).

EasySHARE[19] provides 412,110 observations divided in the 8 waves. In our analysis we only consider observations in the regular waves, therefore excluding the retrospective analysis contained in part of the wave 7 and in the whole wave 3, since information about people working at the time of the interview and their occupations are contained in the regular ones. As just mentioned, only workers at the time of the interviews are considered, including every type of job in the analysis, therefore self-employment, employment, and civil servant. Age is a key factor for this research and only people who are closer to retirement from job are considered, restricting our sample for individuals aged between 50 and 70 years old. Furthermore, only observations for which it is possible to assess overeducation are considered, meaning that all those individuals for which educational attainment or employment status are missing are excluded from the study. In order to work with a more a homogeneous sample between natives and immigrants, only people with the citizenship of the State of residence are taken into account, therefore for what concerns immigrant workers, they are included in the sample only if they hold the citizenship of the country of residence.

SHARE's surveys are carried out in 29 countries in Europe and Israel, however only part of those is considered in this analysis, in particular only the countries which are more relevant from a sample perspective are worth it to be included, so when the participation in the surveys

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is high and also the immigrant population is substantial. Countries that took part to all the regular waves are Austria, Germany, Sweden, Spain, Italy, France, Denmark, Switzerland and Belgium. However, this way our analysis would only focuses on Western European countries; there are other countries whose contribution to the Share-surveys has been significant even if they did not take part to all of them. In particular Czech Republic, Slovenia, Poland and Estonia participated in at least five regular waves (out of seven) and contributed increasingly to the dataset. However, this analysis aims at studying the overeducation phenomenon, differentiating native to immigrant workers; for this reason, we need to consider those countries that have a relevant incidence from the immigration point of view, otherwise we would not be able to find significant results about the phenomenon. However, among SHARE's country we would consider, there are some of them which present very low percentage of immigrant workers who participated in the surveys, such as Italy (1.71%) and Poland (0.28%)[20]. For this reason, the final sample of the study includes the following countries: Austria, Germany, Sweden, Spain, France, Denmark, Switzerland, Belgium, Czech Republic, Slovenia and Estonia.

In addition to this, it is relevant to include in our analysis different countries in Europe, both from Western and Eastern Europe because of heterogeneity of the analysis, in particular from the immigration flows perspective. European states went through different phases in the last century for what concerns migration and immigration; however, from the 90s, after the end of the Cold-war and with the event of the Jugoslavia conflict, migration-flows from Est to Weast countries became more intense. However, some years later migrations and immigrations patterns within Europe have been liberalized with the enlargement and the consolidation of the European Union and with the creation of the European Single Market, joined by most of European countries; this has clearly changed internal flows and dynamics of migrations. Immigrations from the Eastern Europe contributed to the economic development of the West and at the same time, remittances to the origin countries boosted economic and social growth. Moreover, economic shocks and international crisis, such as wars, financial crisis and climate crisis transformed the pattern of migrations within countries of EU and immigration from

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[20] EasySHARE does not provide a variable classifying individuals as immigrant or native in the residence country. However, it is possible to build a dummy variable "migrant" thanks to the information in SHARE about people born in the country of the interview and people who are not. Therefore, "migrant" assumes value 1 whether the individual was not born in the country of residence, 0 otherwise. Moreover, some interviewed people were born in countries who were formally part of other States in the past; in our analysis those people born in a country comprehended more territories which are separate today, they are considered natives whether they still live in one of the new formed countries.

outside the region, increasing therefore in-flows from the other continents to both West and East Europe, challenging social and economic dynamics (Van Mol and De Valk, 2016).

The final sample counts 45,249 observations, almost half male (48%) and half female (52%). The average age of the population is 57 years old, and it is basically the same even considering separately man and women. Total immigrant observation represents the 6.20% of the sample, with female workers representation slightly higher than male. Observing any single countries frequencies are reported in the figure 2.1: the presence of immigrant workers differs, and this may be due to greater "pull-factors" that attract more workers from other countries. Slovenia, Estonia, Switzerland, France, Belgium and Germany have more than the average presence of immigrants in their labour markets, with 10.60% of foreign-provenience workers in Slovenia, 9.45% in Switzerland and 8.95% in Estonia, and thus they are the States which have more representation in these terms in the analysis.

Figure 2.1: Immigration over countries
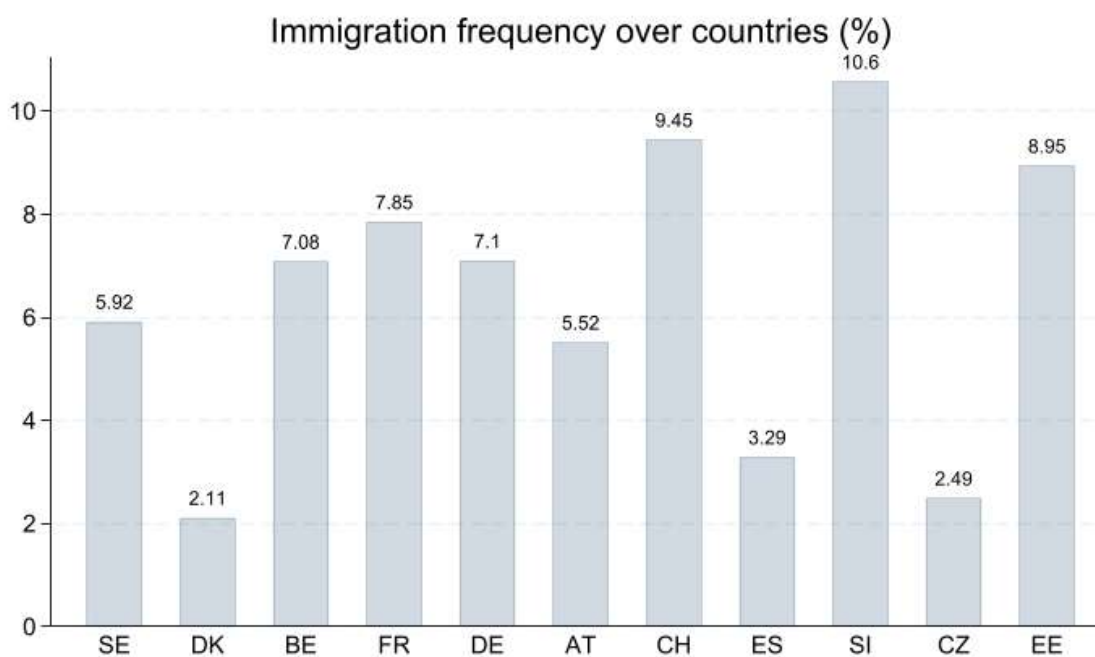
Source: SHARE (2004-2020)

Looking at provenience of immigrant workers considered in the sample, we divided regions of the world into five areas, considering the numerical and logical relevance observed in the dataset. The five areas are Western Europe, Eastern Europe, Asia and Oceania, Africa, and North-South America. Asians immigrants are the most represented (26.95%), followed by Eastern (26.17%) and Western European (24.13%). The least represented are people from

African countries (11.53%) and from the American continent (11.21%). To develop a clearer understanding of that, table 2.6 resumes all of these results together.

Table 2.6: Immigrants and provenance in our sample

ORIGIN AREA	IMMIGRANTS
1. **Western Europe**	24.13%
2. **Eastern Europe**	26.17%
3. **Asia and Oceania**	26.95%
4. **Africa**	11.53%
5. **North and South America**	11.21%
Total	100%

Source: SHARE (2004 – 2020)

Figure 2.2: Average time since migration
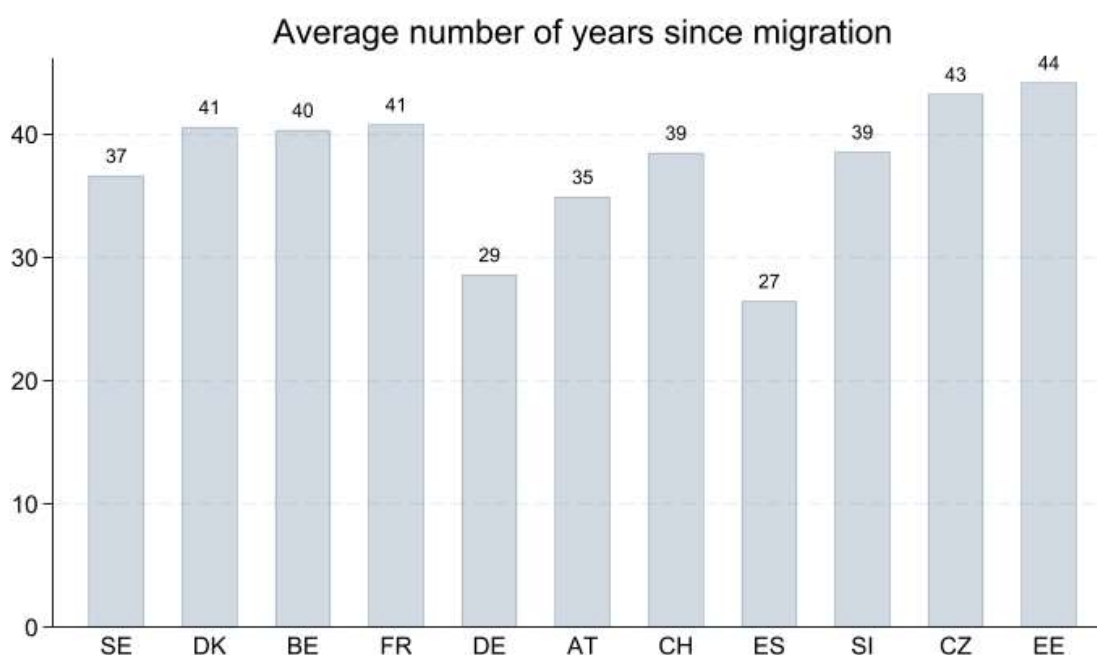
Source: SHARE (2004 – 2020)

In addition, examining the mean-time spent in the arrival country labour market is 38 years, and this represent a great average amount of time which is significant to control for long time migration-effects of overeducation. This can be interpreted as workers who on average have already spent quite long time in the arrival country, consequently they should be integrated in the civil society and in the labour market and should also have acquired knowledge, training and skills related to the local economy. As shown in the bar chart in figure 2.2, the eldest

immigration flows are in Estonia (mean 44 years), Czech Republic (mean 43 years) and in France, Belgium and Denmark (on average 40-41 years).

2.3.2 OVEREDUCATION IN THE SAMPLE

This paragraph will be focused on a descriptive analysis concerning education and overeducation in the sample, according to the education classification method explained in the previous sections of this chapter.

Table 2.7: Education levels frequency (%) separate for native and immigrants

EDUCATION LEVEL	NATIVES	IMMGRANTS
1	19.54%	16.96%
2	39.47%	32.31%
3	6.42%	8.85%
4	34.56%	41.88%
TOTAL	100%	100%

Source: SHARE (2004 -2020)

Levels of education derived from ISCED-97 adapted to O*NET job zones assume values between 1 and 4 in our analysis. Considering the whole sample, 39% of the workers has the second educational level and 35% the fourth. In this context we do not consider workers with level 2 of education at high risk of overeducation, since it is logical to think that people with higher education levels are more exposed to be overeducated. Analysing the distribution of educational levels separately for native and immigrant workers, it is observed in the table 2.7 that immigrants in our sample are slightly more educated compared to natives, showing higher frequency of workers with the two highest educational attainments; in fact, for what concerns native workers, in the lower educational levels a higher frequency of native workers is concentrated compared to immigrants workers. Nevertheless, considering time invested in education, this is quite homogeneous between native and immigrant workers, observing in both categories almost 13 years of schooling.

Considering the different countries in the analysis, there are diverse results in terms of educational attainments; in particular considering the overall sample, Belgium, Germany, Austria and Sweden present almost half of the population having the first and second levels of education and therefore the other half is better educated creating a good homogeneity in terms

of education. On the other hand, Estonia and Denmark have more than half of the population who have achieved the highest levels of education, and in particular there is a 54% of workers in Denmark that possess the highest level of education, instead Estonia's higher educated workers are distributed across both level 3 and 4. For what concerns the rest of the countries, they have more concentration of workers in the second level of education, but Spain, which have the most of workers with the lowest level. More details about the highest levels educated workers are present in the figure 2.3. It highlights the two highest educational levels considered in our analysis (3 and 4).

Figure 2.3: Education levels 3 and 4 over countries (%)
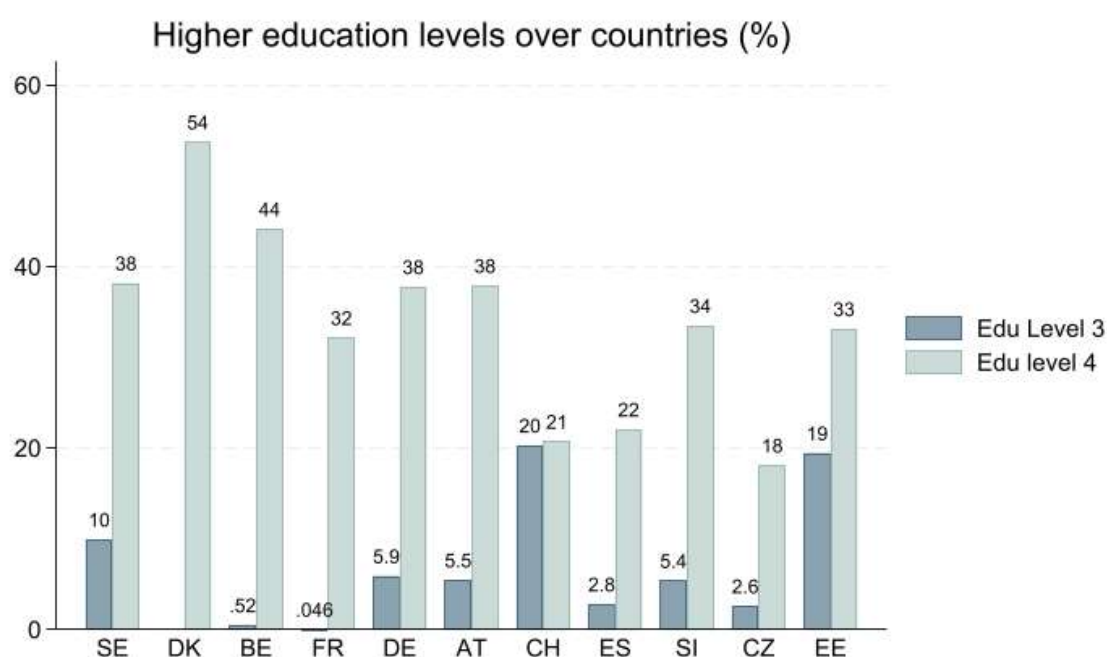
Source: SHARE (2004-2020)

As already mentioned we can observe that actually Denmark has the highest number of observation of high educated workers, but also Belgium has a significant occurrence of workers who attained the level 4 of education (44%), as well as Sweden, Germany and Austria (38%).

Separating the analysis between natives and immigrant workers and considering first the native part of the sample, in Denmark more than half of the workers has the highest school attainments, observing almost 54% of native workers having the fourth level of education. That is followed by Estonia which presents 51% of workers with levels 3 and 4 of education. Sweden, Germany and Belgium have a homogeneous ratio between native workers sample in terms education levels, counting almost half of natives in the level 1 and 2, and the other half in 3 and

4. The other countries concentrate their workers on the first two levels of occupation, mainly on the second anyway, but Spain has the lowest educated native workers with almost 60% of them with level 1. As shown in the figure 2.4, frequencies of higher educational levels over workers in our sample are in line with the ones in the overall sample.

Figure 2.4: Education levels 3 and 4 over countries among native workers (%)
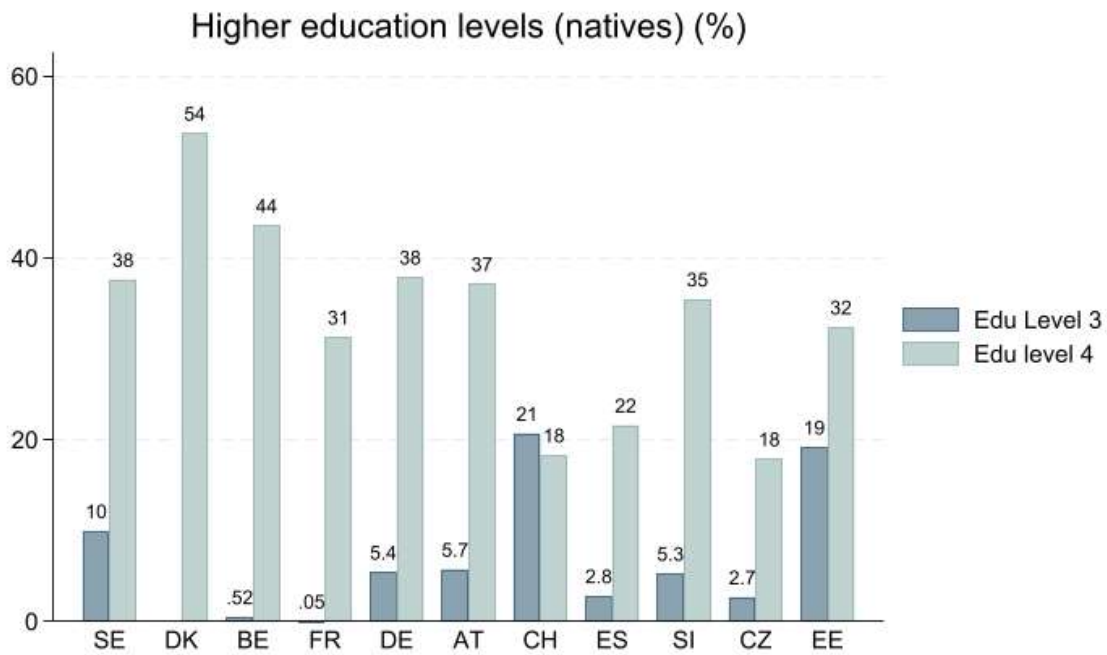
Source: SHARE (2004-2020)

Regarding educational attainment of immigrant workers by country of residence, the figure 2.5 illustrates the main results: the countries that were able to attract the highest educated workers from outside have been Estonia, Switzerland and Sweden. Respectively, 63% of foreign-born workers Estonia have educational levels 3 and 4, 60% in Switzerland and 57% in Sweden. However, in Denmark the whole 56% higher educated immigrants have the highest level of education which represents one more time the highest educated country, followed by Belgium and Austria that count respectively 52% and 51% of workers whose possess the fourth level of educational attainment. On the other side, Slovenia and Czech Republic have the lowest educated immigrant workers (almost only 30% possessing the two highest levels of education), which might reflect a greater demand for low-skilled job or a negative selection of immigration, due to pull factors that attract them; however, this will be verified controlling for the overeducation level. Overall, it is observed that most of the countries in the considered sample present better educated immigrants than natives, which is an interesting start point considering the goals of our analysis.

Figure 2.5: Education levels 3 and 4 over countries among immigrant workers (%)
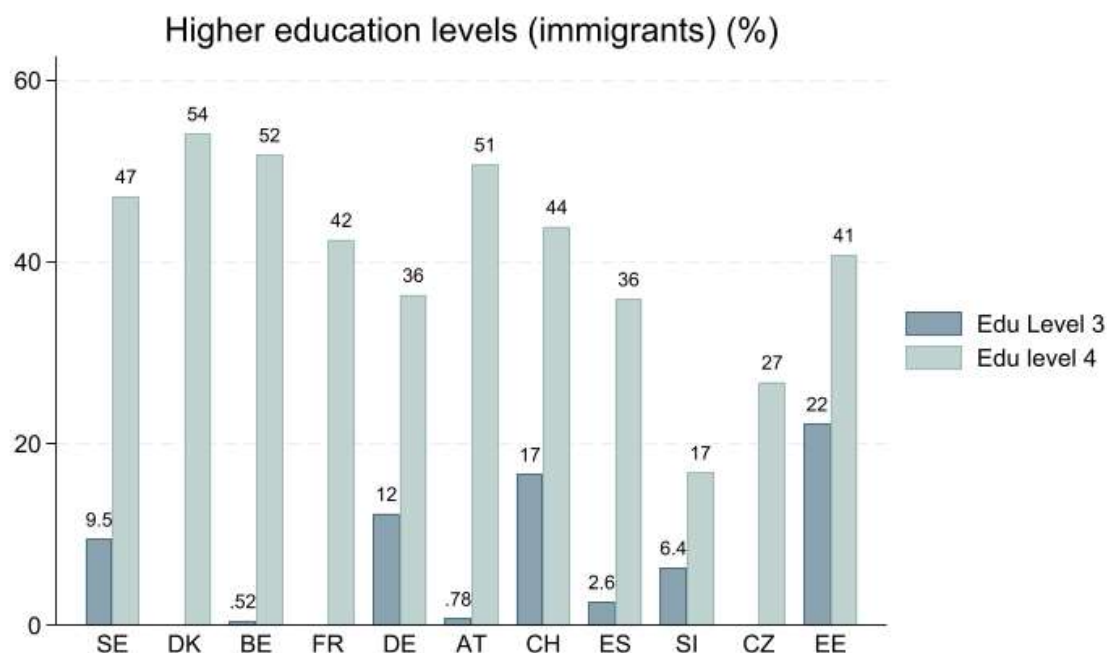
Source: SHARE (2004-2020)

Considering the period of time 2004 – 2020 and 11 countries in Western and Eastern Europe, overeducation is a relevant issue affecting workers in the labour market, with an incidence of 19.77% in our sample. Moreover, considering gender differences, overeducation is more prevalent among women, in particular overeducated women are almost 6% higher than men workers. It is a very peculiar phenomenon significantly present in the labour market, and as expected it affects only higher educated workers, hence, in our analysis, those people having level of education 3 and 4, but mostly the highest one. In addition, it is quite persistent over time, in particular from 2004 it increases until the wave 5, which was surveyed in 2013 and then it decreases over time having a lower incidence in 2019-2020 (wave 8) compared to the others; however it is not clear whether overeducation significantly decreases during wave 8 because the survey had to be interrupted at the beginning of 2020 due to the COVID-19 pandemic. Analysing overeducation incidence over countries as shown in the figure 2.6, it is noted that overeducation is distributed differently around them, with higher levels in Denmark (28.6%), Estonia (26.7%) and Germany (26.2%), and lower incidence in Spain (12.8%) and Czech Republic (9.62%). This is consistent with previous observations in terms of number of higher educated workers in each country, given the fact that overall, it was shown that overeducation is a matter in Europe, but it occurs especially among worker having higher educational

attainments. However, Sweden is shown to present a high educated labour market but it has lower levels of overeducation overall (14.3%).

Figure 2.6: Overeducation over countries (%)

Overeducation incidence over countries (%)

Country	%
SE	14.3
DK	28.6
BE	19.3
FR	14.7
DE	26.2
AT	24.7
CH	18.2
ES	12.8
SI	14.3
CZ	9.62
EE	26.7
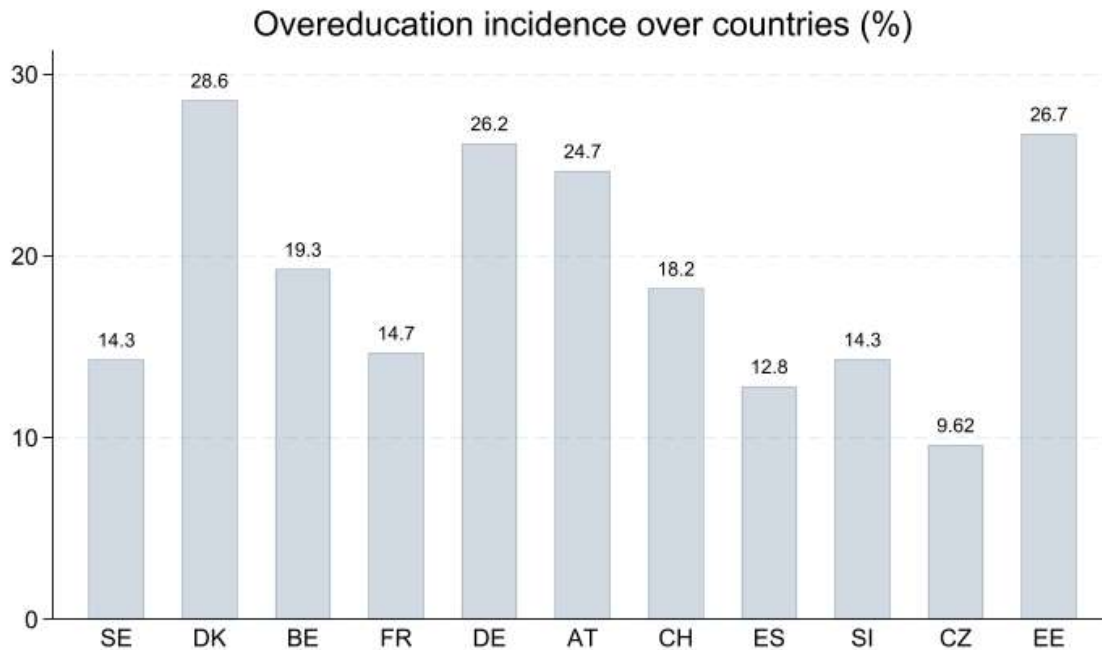
Source: SHARE (2004-2020)

Gender analysis is a crucial point for the analysis, since it has been acknowledged from previous studies that gender difference matters in the incidence of overeducation (see chapter 1). Considering our sample, overeducation affects 16.50% of male workers and 22.75% of females. Analysing data over countries, the highest overeducation rate is observed in Austria for men and in Denmark for women. Moreover, in the latter country the gender difference is huge, presenting almost 18% of overeducated vis-à-vis 39.40% of overeducated women. Statistical frequences shows an overall higher incidence of overeducation among women in all countries, but not in Germany and Czech Republic as shown in figure 2.7. Looking at how overeducation behaves differently between native and immigrant workers, data highlights a much stronger incidence of overeducation among the latter. In fact, the overeducated immigrants are the 27.90% vis-à-vis the 19.20% of overeducated native workers. This result confirms that workers with foreign provenience still suffer from higher chances to realise the mismatch between their studies and their occupation, even when they have spent lots of time in the arrival country and during their last years before retirement. This is the evidence of greater difficulties in transferring the human capital from one country to another; moreover, on one side time is a crucial factor for social and economic integration and development of a good understanding of

a new labour market's dynamics, but on the other it is a signal of obsolesce of skills and knowledge, that if not put in practise, trained or update, it may become non-useful and no-adapt to the future context

Figure 2.7 Overeducation incidence separate for genders over countries
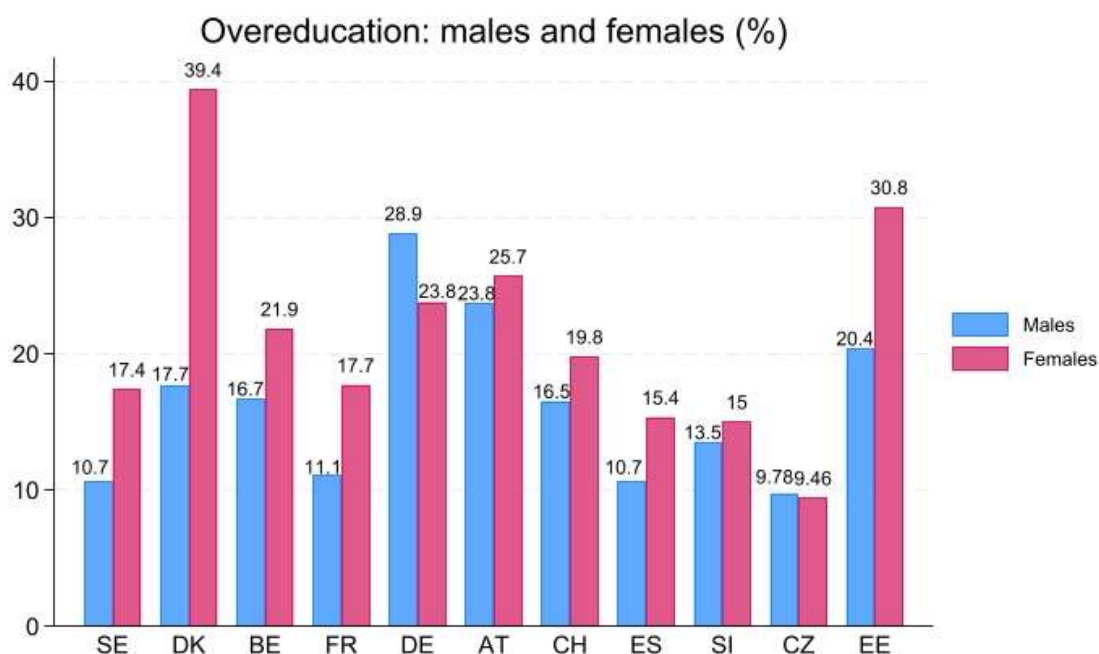
Source: SHARE (2004-2020)

. It was also found in the literature review (see Chapter 1) that older workers experience lower job-mobility, partially also for the just mentioned reasons, and this is translated into lower chances of finding a job that match education. However, the analysis reveals that the number of overeducated workers, both natives and immigrants, decreases starting from wave 5, following the general trend of overeducation incidence in our sample along time mentioned above.

Considering the analysis for countries studying the overeducation incidence separately between native and immigrant workers, it is found that overeducation incidence for what concerns the native sample.is basically in line with results found for the overall sample, as illustrated in figure 2.8.

For what concerns overeducation among immigrants, all countries (but Slovenia) confirm that immigrants workers in Europe experience higher overeducation mismatch. The highest level of overeducation across immigrant workers are spotted in Germany (38.50%), Austria (36.72%), Estonia (37.64%) and Denmark (34.29%), and this is almost in line with descriptive

results regarding educational attainments for country. At this point a misalignment between the demand and supply for high educated occupations exists in the labour market and this affects more educated immigrants than native workers. It is found that immigrants from provenience area 3 (Asia and Oceania) have higher presence of overeducated workers in the European countries included in the analysis. In the next chapter, through the econometric analysis overeducation is going to be studied more deeply, studying the overeducation probability controlling for different factors, such as migrations, time since arrival and other socio-economic personal conditions.

Figure 2.8: Overeducation incidence: natives and immigrants
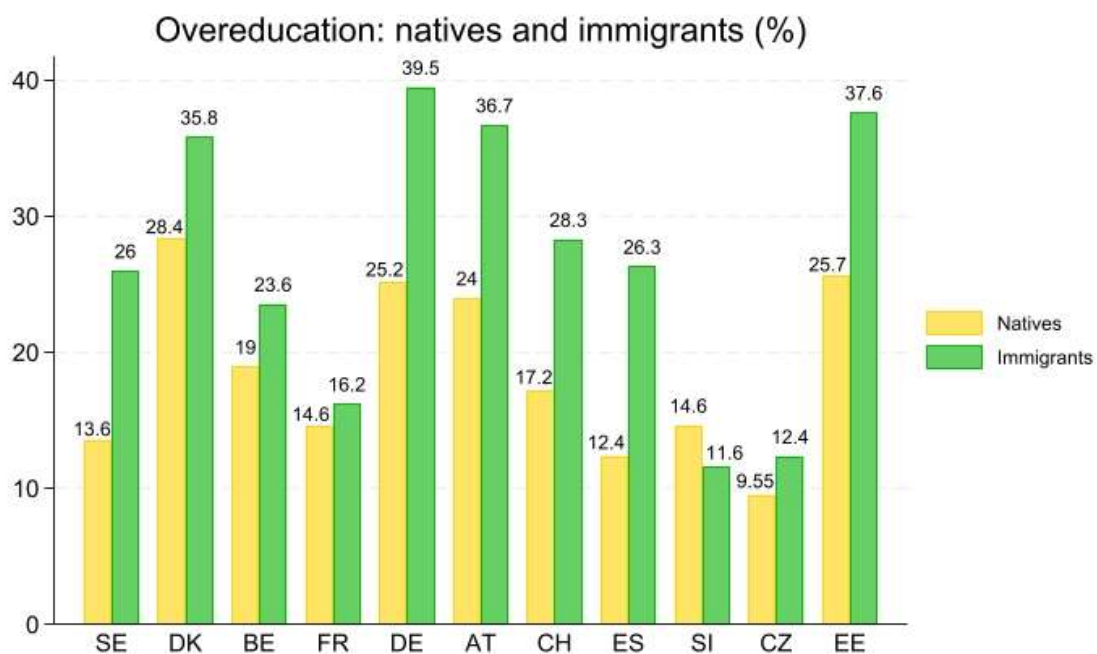
Source: SHARE (2004-2020)

CHAPTER III: RESULTS OF THE ANALYSIS

Through this chapter the most relevant results from the analysis are highlighted and this allow to develop a better understanding of the overeducation phenomenon in Europe considering specifically the eldest part of the workforce. Estimates are carried out with the two models presented in section 3.1. Moreover, interpretation of results, heterogeneity and robustness analysis are considered to reinforce reliable results and a correct interpretation of them, in order to challenge the previous theories and studies done in the field of education, overeducation and migrations.

3.1 ECONOMETRIC MODELS

In our research two models are estimated, the first one assesses the difference in the probability of being overeducated between immigrant and native, looking at the same individual and familiar control variables. We have already acknowledged information about the incidence of overeducation in our sample, exanimating some differences across the sample, in particular differentiating immigrant and native workers. However, through the econometric analysis it would be crucial to understand how each factor included in the model influences (positively or negatively) the likelihood of being overeducated.

$$overedu_{it} = \beta_0 + \beta_1 migrant_{it} + \boldsymbol{\beta'_3 X_{it}} + u_{it} \tag{1}$$

$overedu_{it}$ is a binary variable, assuming value equal to 1 whether the individual $i=1,…N$ is overeducated at time $t=1,…T$, and 0 otherwise. Time t refers to the specific moment in time, which corresponds to the specific SHARE wave (1,2,4,5,6,7,8) in our analysis. In addition, $migrant_{it}$ is another dummy variable assuming value 1 whether the individual $i=1,…N$ was not born in the country of residence at time $t=1,…T$, and 0 otherwise (the individual is a native in the country of residence); as previously mentioned the variable is built through the information contained in SHARE which specifies whether observations in the dataset refers to people born in the country of the interview or not. A set of personal and socio-economic factors X_{it}, which might have a considerable impact on the possibility of experiencing overeducation, is included in the model. The complete list of variable is shown in the Table A.1

in the Appendix section; they include age and gender, which may affect the incidence of overeducation as reported in the previous chapter 1 about the "literature review"; it is found that young workers experience higher levels of overeducation at the beginning of their career, however they are more flexible and mobile in the labour market, increasing their chances of finding a well job-education matched job. Female workers are observed to be more penalised in the labour market, in term of finding an adequate job according to their educational attainment as well. Individual health is also an important factor to be considered in the labour market especially among an adult-workers' sample, therefore an indicator of self-perceived health is included in the analysis, expecting to decrease the possibility of experiencing overeducation while being in a very good health status. In addition, other control variables about the family circumstances are contained in the model, as marital status, household size and the number of children, because family composition and needs might affect job decisions and persistence of being overeducated along time as well. Then variables regarding type of job are added as controls for the overeducation, because as mentioned in the chapter 1 they might influence effects of overeducation; in particular, the type of occupation such as employed and civil servants might affect differently overeducation levels than being self-employed, in which an individual does not go across a human resources selection process. Finally, control variable about the waves of interview, country of residence and provenience area for immigrants, are included in the model in order to develop a better understanding of whether in this analysis they are factors that can better explain overeducation. The provenience area variable consists of five areas of the world and then it assumes five different values: 1 (Western Europe), 2 (Eastern Europe), 3 (Asia and Oceania), 4 (Africa) and 5 (North and South America).

Overeducation, its probability and differences between native and immigrant workers in the research are estimated through a linear probability model, which refers to a binary choice model, since overeducation is intended to be a binary variable assuming only values 1 and 0, respectively when overeducation is verified or it is not verified, and this is done according to worker's educational attainment and corresponding occupation. Estimations are carried out via Ordinary Least Square (OLS) thanks to the linearity of the model. Due to the longitudinal structure of the data, the variance and covariance matrix is estimated by taking into account the error terms (u_{it}) referring to the same individual; they are expected to be correlated due to the presence of individual-specific unobserved heterogeneity. However, this is in contrast with the assumptions to carry out consistent OLS estimations which states that the covariates-conditional mean of the error is zero, meaning that the error term on average is independent

from the other variables in the models. To face this problem "mergeid", which are the personal identification numbers of an individual who take part to SHARE surveys, are clustered.

For what concerns the model, we are able to assess whether differences in the likelihood of being overeducated exist between native and immigrant workers, who migrated from their born country on average 38 years before. The estimated coefficient β_1 is interpreted as the difference between overeducation-probability between native workers and immigrant workers, net of other control variables. This is one of the crucial estimations to be done for our research and it is expected to have a positive influence towards overeducation, so that the chances of being mismatched for immigrant workers are higher. Moreover, the sign of β_3 is expected to be different according to the considered explanatory variable.

Afterwards, the second model includes the time effect factor, which is the time spent in the host country that is a crucial element for social and economic integration, as well as acquisition of knowledge and skills locally required. Therefore, the time effect would be controlled if it is significantly able to reduce the overeducation-gap between native and immigrant workers in terms of persistence of higher probability of being overeducated for immigrants over time.

$$overedu_{it} = \beta_0 + \beta_1 migrant_{it} + \beta_2 years\_since\_migration + \boldsymbol{\beta'_3 X_{it}} + u_{it} \qquad (2)$$

In this second model, migration time effect is added to the control variables for overeducation. In particular the variable $years\_since\_migration$ is calculated as the difference between the year in which the responded declared to have done the migration in the SHARE interviews, and their year of birth; hence it assumes positive values for immigrant workers and 0 for natives. According to the previous analysed literature (Chapter 1), immigrants have higher likelihood of being overeducated, and they also struggle with getting out of it finding a job more in line with their school attainments; therefore, adding the time-control variable should contribute to a better comprehension of how the phenomenon shapes over time for immigrant workers. The existing literature (Chapter 1) highlights that time spent in the host country and in the local labour market help developing more suitable skills, higher social integration and job networks, and better chances of transferring personal human capital. Moreover, it is crucial and very interesting to understand if adult immigrant workers, who are on average experiencing their last years of job-life and who obtained citizens-status of their host countries, still suffer from higher level of job-education mismatch compared to native workers. Estimation of the model would be central to realize it, since the coefficient β_2 is interpreted as the effect that one more year

spent in the host country's labour market has on the probability of being overeducated for an immigrant worker. It is expected to have a negative impact, therefore, to decrease overeducation chances for the mentioned reasons. In the sample a high variability of time since migration is observed, observing the first quartile (q25) 28 years after migration, the second (q50) 37 years since migration and the third (q75) 49 years. This variability over time is crucial to develop a better understanding of the assimilation process in terms of probability of being overeducated; we are interested in estimating whether gap between natives and immigrants reduces overtime or even disappears after a certain amount of time. To control that, the estimation $\beta_1 + \beta_2 n$years is carried out. It refers to the difference in the likelihood of being overeducated between a native and an immigrant who has been in the country of residence for n number of years, net of the other factors. In practise in our analysis, the number of years spent since migration need to be search along the distribution of the variable *year_since_migration*, and we choose to employ the three quartiles already mentioned, since they represent three objective moments in time.

3.2 MAIN RESULTS

According to the chapter 1 of this research (the one regarding the literature review of the phenomenon of overeducation and in particular how consequences can be different while separating native and immigrant worker), we acknowledged that immigrant workers suffer from higher levels of overeducation in the arrival country. The reasons are various, from the culture, the language and working habits to the actual struggle with transferring one's own knowledge, skills and the general human capital across borders. It has been found that time is an important factor that helps reducing the native migrant -gap, reflecting the difference in matching job and personal school achievements. However, longer time periods need to be considered to produce estimations which can be used as reliable information, since the long run analysis can develop a better understanding of the phenomenon and then influence policy makers.

In our econometric analysis we consider two separate linear probability models. The first one predicts overeducation probability considering a basic set of control variables; the second one is the same model with the time control added, which assesses the years since the immigrants have been present in the arrival country, assuming that the longer an individual has lived in that country, the greater the social, cultural and economic integration is. Immigrant people, after a while, should have learnt the language, the working culture, and different habits; they may also have converted their study-titles, learnt and acquired further skills, at least the ones more useful for the local labour market. With that being said, we expect that having an immigration background would lead to higher probability of being overeducated; however, time since migration should be a crucial factor for having the chances of a better match between job and study attainments, and for this reason, we are also interested in checking if after a certain number of years spent in another place, the previously mentioned immigrant-native gap declines and becomes null.

The most remarkable estimations from our models are shown in the table 3.1. Being an immigrant in the labour market in Europe, considering data surveyed in the period $2004 - 2020$, significantly increases the probability of being overeducated of 8.30 percentage points compared to a native worker; hence it is shown the negative effect experienced by immigrants in terms of overeducation in our sample which is higher than one third of the incidence of overeducation in the sample (19.77%). With the addition to the equation of the control variable referring to the years spent in the host country, it is observed that an additional year spent in the residence country for an immigrant leads to an average statistically significant decrease of 0.3 percentage point in the probability of being overeducated, confirming what already found

in the previous literature (chapter 1). Therefore, time is a key factor while considering immigration analysis or personal immigration choice.

Table 3.1: Differences in the probability of being overeducated between immigrants and native workers.

	(1)	(2)	(3)	(4)
Migrant	0.083***	0.216***	0.068***	0.207***
	(0.013)	(0.038)	(0.018)	(0.044)
Year since migration		-0.003***		-0.003***
		(0.001)		(0.001)
Basic set of controls	X	X	X	X
Additional set of controls			X	X
Observations	45,249	45,249	45,249	45,249

Note: Linear probability models estimated by OLS. The basic set of controls includes country of residence, gender and age. The full set of controls is augmented with presence of a cohabiting partner, household size, number of children, years of education, type of employment (employee, self-employed, civil servant), area of the country of origin. A constant term is always included in the specifications. Robust Standard errors in parentheses are robust to arbitrary heteroskedasticity and correlation at the individual level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Human capital takes time in transferring resources and adapting them to a different context, as does gaining the new knowledge and capabilities demanded to new entrant workers. According to these results, an assimilation process in the probability-gap between natives and immigrant workers exists, however the converge is very slow and takes 65 years in the arrival country to be reached. Another way to verify the already mentioned assimilation process is to control the probability of being overeducated for an immigrant along the distribution of the time control variable, therefore observing the difference in the probability of being overeducated between a native and an immigrant worker who has spent a certain period of time in the country of residence. The objective measure chosen to look for specific moments in time considers the three quartiles (q1,q2 and q3) along the distribution of the variable which are respectively 28, 37 and 49 years spent in the arrival country. Estimated coefficients confirm what already examined above, therefore, comparing the first with the second quartiles, it is noticed that the probability of being overeducated for an immigrant worker, in respect to a native one, drops along the distribution of the variable; thus, the higher the time since the immigration, the lower the likelihood of experiencing overeducation for migrants. On average, an immigrant worker who arrived in the residence country 28 years ago has a 11.80 percentage points higher probability of being overeducated compared to a native worker. However, this probability lowers to 8.66 percentage points whether the worker immigrated 37 years ago, and to 4.47

percentage points for the remotest immigrants' flows from 49 years ago. These average values are interesting results for our research to remark the significance of time spent in the labour market for improving the school-job match. The gap has been reduced over time, but still it does not become null even after 49 years since migration, and this can be seen as a failure of the labour market in terms of resources allocation and opportunities given to workers. Moreover, it is straightforward to presume that foreign-born workers, who spent a huge amount of time in the arrival country (on average 38 years) and even obtained the citizenship status, are integrated in the social and economic culture and society; According to results found in the previous studies (Chapter 1), overeducation affecting older worker can be partially explained by skills and knowledge which may become obsolete and useless when not put in practice and applied to real world. Moreover, despite the fact that immigrant workers are substantially penalised in terms of job-study alignments compared to natives who have the same school attainments, time has been demonstrated to help getting out of it for some workers. thus, it would be useful to understand if immigrants suffer from prejudices from employers or they are simply negative selected and migrate to other country without considering the local labour market demand or job real opportunities.

Adding the other socio-economic variables, therefore considering a more robust model shown in the third and fourth columns of the table 3.1, estimations support the hypothesis that immigrant workers are more overeducated than natives, facing on average 6.8 percentage points higher chances of being overeducated. Moreover, adding the time control variable, time since migration is confirmed to significantly decrease on average such probability, lowering that of 0.3 percentage points for each year more spent in the arrival country. Immigrant-native gap is very hard to minimise, even if it is supported that there are greater chances of decreasing overeducation with the higher time after migration has happened. As previously done to verify that, differences in the probability of overeducation between natives and immigrants are monitored along the distribution of the variable measuring the time since migration; the likelihood of being overeducated for an immigrant is significantly confirmed to diminish with time, observing lower estimated values for immigrants being in the residence country for 37 years in respect to those being there for 28.

Furthermore, gender differences are detected in all models, which indicates that women workers experience higher probability to accept jobs for which they are over-qualified and more precisely, they experience on average 5.65 percentage points more likelihood of being overeducated in their jobs compared to men workers considering the whole sample.

In addition, to prove the solidity of findings obtained so far, a robustness analysis has been executed. Strong and reliable results come from the estimation through the developed model, since results do not change whether we carry out the estimates from the models taking away one country each time, consolidating then our previous findings and interpretations of them.

The first chapter of this study highlights that different effects of overeducation can be observed across genders as well, and it is already found that women are affected by more sever likelihood of being overeducated in our sample as well. There are still consistent differences in the labour market participation across genders in Europe. According to Eurostat (2021), the gender gap in terms of employment rate is 10.8%, meaning that male employment rate is way higher than female, even though the European population is gender-balanced, being formed by almost half men and half women. Thus, participation to the labour market in Europe is actually characterised by higher presence of male workers and it can be reasonable explained because of different gender roles, social and family expectations still existing in our society[21]. On the other hand, it has been verified a strong increase in the female education attainments in the last decades, in fact in 2020, according to the European Institute for Gender Equality, there are more women between the age threshold 15-49 with tertiary education than men. However, considering older women in Europe, the situation is the opposite, that male are higher educated than women[22]. Considering variation in the participation in the labour market separately for men and women, it is observed that in most of European countries from 1995 to 2019, there has been an increase in women's employment and especially for older women; this is verified in Germany, France, Spain and Italy mostly in mid- and low-paid jobs; instead, Sweden already had in 1995 an higher adult female presence in the labour market, and still has the lower inactivity of adult women in 2019 compared to the other European countries. On the other side, older male participation increased in the same countries, but at a lower rate, since participation was already great. These trends were significantly influenced by demographic changes and general ageing of the European population, and also by immigration flows which helped in the increase of the workforce. In addition to this, it was found that education in Europe in the time span 1995-2019 is a key to reduce differences between man and women in the labour market, especially in the access to certain categories of jobs typically held by men. Therefore, lower educated people tend to be polarized in some jobs, which are mainly done separately by men or women, instead higher education contribute to expand those mixed-job

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[21] Further details are available on the webpage [11] in the sitography
[22] Further details are available on the webpage [12] in the sitography

sectors reducing gender gap participation and gender differences in the labour market (Eurofound and European Commission Joint Research Centre, 2021).

Since our analysis considers workers aged 50+, it is important and interesting to carry out a gender analysis to check for differences among male and female, expecting in principle women in the labour market to be more penalised in terms of matching their jobs with previous studies. Moreover, since this study focuses on overeducation probability differences between workers with an immigration background and natives, we would like to control for gender differences and immigrant workers at the same time.

Table 3.2: Gender-specific differences in the probability of being overeducated between immigrants and native workers.

	(1) Men	(2) Women	(3) Men	(4) Women
Migrant	0.036	0.086***	0.153**	0.252***
	(0.026)	(0.025)	(0.066)	(0.059)
Year since migration			-0.003*	-0.004***
			(0.001)	(0.001)
Basic set of controls	X	X	X	X
Additional set of controls	X	X	X	X
Observations	21,694	23,555	21,694	23,555

Note: Linear probability models estimated by OLS. The basic set of controls includes country of residence, gender and age. The full set of controls is augmented with presence of a cohabiting partner, household size, number of children, years of education, type of employment (employee, self-employed, civil servant), area of the country of origin. A constant term is always included in the specifications. Robust Standard errors in parentheses are robust to arbitrary heteroskedasticity and correlation at the individual level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

The first and second column of the table 3.2 report the estimation of the first model separated for genders considering all the control variables; in our sample immigrant women have the highest levels of education attainments, in particular, immigrant female having 10% higher incidence in level 3 and 4 of education (considering our education levels) compared to native women; furthermore, they also have higher levels of education than men, both natives and immigrants. Looking at estimations, it is consistent to affirm that immigrant women workers have significantly higher probability of being overeducation compared to native women (8.6 percentage points), however it is not possible to state the same for migrant male workers, since obtained estimations are not statistically significant. This result implies a gender difference in the alignment between education attainments and jobs. That affects especially immigrant women even though the sample considers only citizens in the residence country, thus supposing

good level of integration and great skills acquisition related to the local labour market. As already mentioned above, the reasons why female workers are more likely to be overeducated can be found in gender roles and family expectations as well; these may be the causes for accepting a job no matter the mismatch, since it might not be the main financial source to the family, as women may be expected to have a different domestic role according to an old social vision (Jenkins, 2017).

In addition, time spent in the labour market has been shown to be a determinant factor to get over overeducation for immigrants. It is crucial to check gender differences in this context as well, since even if the household comprehends a couple of two foreign-born, immigrations might have occurred in two different moments in time. One of them, might have migrated before to the current residence country; this may be related to familiar or economic reasons, duties to stay in the home country, or on the other hand, the personal realisation or economic push factor regarding only one of them; as previously mentioned, it is observed that men usually have better employment possibilities than women, therefore it is expected that migration is led firstly by a man in a couple, since he is supposed to benefit by more pull factors in the arrival country, and in a following moment the women reaches him (Brandén and Haandrikman, 2019). Consequently, time since migration is a control variable that needs to be analysed separately for men and women workers and especially for what concerns the immigrant part of the sample

Looking at the third and fourth column of the table 3.2, estimations, including in the covariate time-effect variable, are carried out separately for genders. Consistently with previous estimations, being a migrant positively influence the likelihood of being overeducated, and this is significant for women at any level of significance and for men at the 5% and 10% levels. The number of years spent in the local labour market is estimated to be a crucial factor for reducing the chances of overeducation for both genders. More precisely, results report that, on average, spending an additional year in the labour market in the host country leads to a significant decline in the probability of overeducation of 0.4 percentage points for female immigrant workers and 0.3 percentage points for men; however, the latter estimate is significantly different than zero only at the 10% level of significance. In congruence with what already examined in the whole sample, the chances of experiencing overeducation for a migrant compared to a native are examined at the same three different moments in time, along the distribution of the variable *year since migration*, corresponding to the three quartiles, which are respectively 28, 37 and 49 years after migration. The most appealing estimates can be marked while considering the female sample, in particular it is found that the likelihood of being overeducated for a migrant women

compared to a native women significantly lowers over time: in fact, the probability of experiencing over-schooling decreases to 5.92 percentage points when it has been 49 years since the immigration, compared to 10.65 and 14.19 percentage points , respectively for 37 and 28 years after the migration took place. This implies that an assimilation process exists which converges the different likelihood of being overeducated between native and immigrant females, however it takes much time to become null. The fact that immigrant women still suffer from higher chances of being overeducated compared to natives even after 49 years since migrating leads to more deep implications: immigrant women struggle a lot while transferring their human capital from their origin country, in terms of school titles and experiences conversion and recognitions; this result is in line with the considerations already made above; thus, women still are negatively affected in the labour market and this may be due to social and family roles, making them prioritise other-than career achievements, inducing them accepting jobs for which they have higher knowledge and competences.

3.3 WESTERN AND EASTERN COUNTRIES

In the following section our sample is split according two different areas in Europe, the Western-European countries and Eastern. We aim at verifying how the overeducation phenomenon behaves in these regions and in particular whether overeducation probability differences between the native and immigrant workers are incident in both regions. For what concerns migration, the two European regions have different experiences across the ages; Europe has been dealing with the immigration phenomenon starting from the end of the World War II; immigration in those years was mainly low skilled and within the European countries, more precisely people from the South of the continent migrating to the North-Western states. On the other side, countries in the Eastern part were isolated, exchanging their relations with the Soviet Union or within the Yugoslavia region. Only from the 1990s by the end of the Cold War, Easter European countries entered in the scene of the European migrations flows and even more with the enlargement of the European Union in the first years of this century. Therefore, provenience of immigrants is different due to economic and political past relations between East and Weast Europe, and this is even much reflected among the adult immigrant population; however, due to the influence and harmonization of the European Union for what regards immigration policies, nowadays immigration flows and characteristics of immigrants are more homogeneous between these two European regions (Schieckoff and Sprengholz, 2021). Observing data from our sample, migration incidence is homogeneous between the two regions (both 6%), however there are some differences; for what concerns the West-Europe, internal immigration is great, since the highest rate of the immigrant workers is from the same region of countries (32%), but the other origin regions are all substantially represented. On the other side, in Eastern Europe according to our sample, immigrants come from the same region and Asia (comprehending Russia), with almost no representation of people coming from the other region of Europe and of the World. The intense internal migration flows in Western Europe might be justified by the fact that those countries joined the European Union (but Switzerland) before the Eastern countries, implying higher possibilities for movement of people and workers. Instead, the internal migration flows in Eastern Europe's reasons can be found through the historical relations inside the ex-Yugoslavia and with the Soviet Union. In fact, the major countries of provenience of immigrants to East-Europe in our sample are from Russia, Ukraine, Bosnia and Herzegovina, and Croatia.

Historical and economic reasons make us believe that separating those countries in the analysis may lead to interesting results. Eastern countries went through a different process of social and

economic development that Western Europe. In fact, starting from the end of the Cold War, Eastern European countries experienced an economic transition phase form centrally-planned economies to a market oriented, with consequent efforts in transforming most of the economic and social systems inside those States dealing with privatization, liberalization, new legal frameworks, social challenges and European and global integration (Haynes, 1996). Before the transition there were huge differences between the composition and the characteristics of the labour market in the Western compared to the Eastern of Europe. In particular, the latter was mainly composed by high use of input resources in the labour market, since the production was State controlled and employment was guaranteed; sectors of production were planned and controlled by the State, and production was mainly focused on agriculture and industry, with low development of service sector, that was instead emerging in Western Europe. Education systems were very different between those two European regions and also difficult to compare; nevertheless the population in the East was well-educated in terms of school achievements, but was mostly vocational education oriented to prepare workers in the industry sector, so there was luck of education and training for workers which could employ positions related to entrepreneurship, managerial occupations or in the service sector (Boeri and Keese, 1992). Along the transition period, the education system of Eastern Europe also faced numerous changes with the goal to prepare workers in a market-oriented economy, focused on liberalization, competition and innovation. Moreover, due to technological progress who experienced Eastern European countries in this phase, higher skilled workers (especially tertiary educated) started to be required in the labour market, but also less skilled occupations surged according to the need of new professionals in emerging sectors. In this context, the rate of higher educated workers started to increase especially within the younger population in the 1990s. On the other hand, the transition process declines the manual content (routine-intensive) of routines, increasing the cognitive content of labours and the jobs in the service sector; moreover, the upskilling of part of the workers let the development of new manual routine jobs more related to the emerging labour market (Lewandowski, 2017).

With that being said, economic and social backgrounds differences between Western and Eastern Europe make it is reasonable to assume that there might be still some differences in terms of education systems, labour market and educational levels, especially considering adult workers. Moreover, as shown in our sample immigration flows differs in terms of provenience of immigrants and therefore in educational backgrounds. These are the main reasons why it is interesting to control whether differences in the probability of overeducation between immigrants and natives exists separating the Western to the Eastern part of Europe.

3.3.1 WESTERN EUROPE

Observations about the Western countries are 34,805 which corresponds to the 77% of the previous total sample and comprehends the following eight countries: Austria, Germany, Sweden, Spain, France, Denmark, Switzerland, and Belgium. This new sample is characterized by a gender balanced representation, with almost half of the sample composed by males observations and the other half by females. For what concerns immigration, we note a total 6% of immigrant population over the observations, however who are present in the arrival country since many years, being already all citizens of the country of residence. Immigrant sample is also reasonably balanced in term of gender representation. Provenience of migrants is varied, however observing a great 32% as internal of the considered region immigrations, 19% from Eastern Europe and also 19% from Asia; the rest from Africa and America. According to what already found and described in the previous section of this chapter, estimations are carried out with two models and after that, they are also done separate for genders. In addition to this, educational attainments are in line with the whole sample, including almost 60% of the total observation in the first two levels of education, and 40% with higher educational achievements. Overall overeducation incidence is 20.17% in this part of the sample.

Main results from the estimation models are outlined in the table 3.3. Considering the first model, results are in line the previous findings, therefore immigrant workers have significantly higher chances, on average, of experiencing overeducation, in particular 8.7 percentage points higher probability than native workers. Adding the time control to the model, it is estimated that on average, one more year spent in the country of arrival decreases the likelihood of being overeducated for migrants of 0.4 percentage points. Moreover, it is noticed that women have almost 6 percentage points higher chances of experiencing overeducation than men at any level of significance.

Further argumentation can be done at this point, especially concerning how the probability of being overeducated varies for an immigrant worker along time compared to a native. The same method applied in the previous section helps us making a better understanding of that, which is important since higher incidence of overeducation is present in the labour market according to our sample. The three quartiles along the time control variable are taken in consideration, of course referred only to this part of the total sample and are respectively 26, 36 and 49 years since migration has happened.

These calculations would make us able to control whether an assimilation process exists which makes the overeducation probability gap between native and immigrants tend to zero over time. Estimations highlight that an immigrant worker has 12.56 percentage points higher chances of being overeducated after having spent 26 years in the arrival country compared to a native. Such probability significantly decreases to 8.90 percentage points after 36 years there and finally lowers to 4.16 percentage points 49 years since migration. The same reflection done in the above section can be made considering the context of Western Europe, which is commonly thought to be a labour market offering higher opportunities. Despite of that, immigrant workers still suffer from a greater overeducation prospect even after ages since the migration. However, it has to be considered also that older workers, due to family duties, habits, skills obsolesce and proximity to the retirement are less likely to move to other job, therefore that after a certain age, workers might be not incentivized to move to other jobs and a sort of trap may exist for this category of workers.

Table3.3: Differences in the probability of being overeducated between immigrants and native workers in Western Europe

	(1)	(2)	(3)	(4)
Migrant	0.087***	0.221***	0.056**	0.195***
	(0.015)	(0.042)	(0.025)	(0.053)
Year since migration		-0.004***		-0.003***
		(0.001)		(0.001)
Basic set of controls	X	X	X	X
Additional set of controls			X	X
Observations	34,805	34,805	34,805	34,805

Note: Linear probability models estimated by OLS. The basic set of controls includes country of residence, gender and age. The full set of controls is augmented with presence of a cohabiting partner, household size, number of children, years of education, type of employment (employee, self-employed, civil servant), area of the country of origin. A constant term is always included in the specifications. Robust Standard errors in parentheses are robust to arbitrary heteroskedasticity and correlation at the individual level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Adding further socio-economic control variables and hence considering the second model, estimates are still consistent with the previous ones, according to which immigrants face higher levels of overeducation despite their adult age and experiences already done in the labour market. Estimations are shown in the third and fourth columns of the table 3.3; specifically, on average the probability of being overeducated increase by 5.6 points percentage for immigrants relative to native workers. This model highlights that women are almost 6% more affected by the probability of being overeducated. In addition, whether the time variable is inserted in the

second model, it is one more time emphasized that time spent in the labour marker for immigrants is significantly helpful for overcoming; an additional year in the arrival country leads to a decline of 0.3 percentage points in the probability of being overeducated for a migrant worker. The magnitude of this effect is basically the same we have already found in the shorter model and in the previous section considering all countries in the sample. Controlling for the same three moments in time along the distribution of the variable *year since migration* results are almost the same as the estimates considered in the model 1, therefore, time is a crucial factor for reducing the chances of being overeducated, however, it is significant to affirm that the gap in the probability-difference of experiencing over-schooling still exists decades after migration has happened. Therefore, there is an assimilation process between native and immigrant workers, but it is very slow.

Furthermore, a robustness analysis has been conducted to substantiate the solidity. Our estimation using the developed model yields strong and trustworthy results since the results remain the same whether we run the estimates from the models with one country removed at a time, confirming our earlier conclusions and interpretations of the data.

The observations in the sample considering only the Western countries are numerically homogenous from the gender point of view and also in the time spent in the destination country. However, it is found that women, in general, suffer from higher mismatch incidence (5 percentage points higher in Western Europe), despite the fact that education attainments are homogeneous between men and women. For the reasons explained in the section above a gender analysis is carried out, in order to look whether in our sample gender is also a matter for what concerns overeducation across migrants and over time. Despite the fact that Western Europe, through the decades, became one of areas of the world with the major possibility for women's emancipation and job realization, differences across genders in the labour market can still be observed in the employment rate and level of occupation, in the wage-gap, segregation in some type of occupation and in the time management between job and household's tasks.

As a consequence, it is crucial to verify if there are differences between natives and immigrants in the overeducation probability separate for genders. Looking at our sample, immigrant women workers are on average the highest educated part of the population, having almost 10% of immigrant females with higher education levels than native women and native men.

Main estimations coming from the model including all the control variables are exposed in the table 3.4, separating the analysis for genders. Female immigrant workers significantly experience higher levels of overeducation in the Western European labour market as well, specifically, their

likelihood of being overeducated increases by 8.9 percentage points compared to a native woman even though their grater educational attainments. This reflects the lower possibilities of human capital transferring across borders or the worse selection of immigrant women.

Table 3.4: Gender-specific differences in the probability of being overeducated between immigrants and native workers in Western Europe

	(1) Men	(2) Women	(3) Men	(4) Women
Migrant	0.000	0.089***	0.110	0.261***
	(0.033)	(0.033)	(0.076)	(0.071)
Year since migration			-0.002	-0.004***
			(0.002)	(0.002)
Basic set of controls	X	X	X	X
Additional set of controls	X	X	X	X
Observations	17,047	17,758	17,047	17,758

Note: Linear probability models estimated by OLS. The basic set of controls includes country of residence, gender and age. The full set of controls is augmented with presence of a cohabiting partner, household size, number of children, years of education, type of employment (employee, self-employed, civil servant), area of the country of origin. A constant term is always included in the specifications. Robust Standard errors in parentheses are robust to arbitrary heteroskedasticity and correlation at the individual level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Incorporating time-effect variable in the model, aiming at checking if the time spent in the arrival country positively contributes for the better resource allocation and a better job-education match, it is noticed that for immigrant women, an additional year spent in the arrival country decreases the likelihood of being overeducated by 0.4 percentage points. Spending time in the destination country helps with skills and competences acquisition and hence it permits moving to more adequate jobs. In addition to this, as previously examined we are able to look at the difference in the probability of being overeducated for immigrant women compared to a native one along the distribution of the variable *year since migration* defining the time spent in the host country. As already found, this probability significantly lowers with time, going from 15.50 percentage points of higher probability of being overeducated for an immigrant women 26 years after immigration compared to a native woman, to 11.56 percentage points with 36 years spent in the destination country. After 49 years, such probability downs to 6.32 percentage points, but this result is significant at only 10% level of significance. To sum up, it is confirmed through this analysis that women workers are more affected by overeducation. Especially immigrant women are the ones who struggle more with finding a job aligned with their school titles, even though they are the highest educated part of the sample; even if the chances of being

overeducated for them decrease with time spent in the local labour market, the likelihood of overeducation trap for part of the sample is consistent even during the last years of working before retirement.

3.3.2 EASTERN EUROPE

With the aim at observing differences between regions in the European continent, we study the most represented countries of Eastern Europe in terms of population and immigrantion in our sample, which are Estonia, Czech Republic, and Slovenia. Despite the historical and socio-economic differences compared to European Western countries, the three of them joined the European Union in 2004, hence joining the European Single Market; therefore they are more aligned and coordinated through the common-policy with most of the countries in the continent. It would be interesting to understand if there are differences in the Eastern European labour market compared to the Western, especially in the phenomenon of overeducation. Workers in Estonia, Czech Republic and Slovenia who are 50+ probably educated under a different social and economic system than today, therefore, school attainments recognition and conversion might have been harder, since skills and competences required in the "new" labour market are different. Moreover, different immigration flows in term of provenience and education are expected in this region compared to the Western Europe.

Observations concerning this restricted sample counts 10,444 observations with a 10% higher presence of female workers than male workers. Immigrants represent the 6.80% of total workers and their provenience is half from Eastern Europe and half from Asia, in particular Russian Federation; the other regions in the world are not very relevant in term of numerosity and this reflects a great difference in the provenience of immigration flows to the West compared to this region in Europe. Moreover, immigrant female are more represented than male. According to what already found and described in this chapter, estimations are carried out with two models and after that, a separate analysis for genders is done.

Estimations on the factors influencing the probability of experiencing overeducation are exposed in the table 3.5. It is shown that being an immigrant increases the likelihood of being overeducated by 7 percentage points in Eastern Europe both according to the basic and the additional set of control variable models. This is in line with previous results however slightly lower than the estimation found for Western European countries.

In addition, looking at the second model (column 4), the one containing the whole control variables and the time effect, the probability of being overeducated decreases by the time since migration; spending one more year in the country of residence reduces the chances of being overeducated by 0.4 percentage points, implying a slow assimilation process in the native-immigrant gap. In addition to this, it is examined that female workers are generally more affected by overeducation probability, and it is estimated that the chances of experiencing overeducation grows from 3.10 to 4.80 percentage points in a significant way depending on the considered model. However, a more detailed gender analysis related to migration is discussed below.

Table 3.5: Differences in the probability of being overeducated between immigrants and native workers in Eastern Europe

	(1)	(2)	(3)	(4)
Migrant	0.070***	0.196**	0.074***	0.250***
	(0.025)	(0.092)	(0.028)	(0.090)
Year since migration		-0.003		-0.004**
		(0.002)		(0.002)
Basic set of controls	X	X	X	X
Additional set of controls			X	X
Observations	10,444	10,444	10,444	10,444

Note: Linear probability models estimated by OLS. The basic set of controls includes country of residence, gender and age. The full set of controls is augmented with presence of a cohabiting partner, household size, number of children, years of education, type of employment (employee, self-employed, civil servant), area of the country of origin. A constant term is always included in the specifications. Robust Standard errors in parentheses are robust to arbitrary heteroskedasticity and correlation at the individual level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

With the aim of comparing immigrant and native workers' likelihood of being overeducated, it is interesting to analyse how the overeducation probability lowers for immigrants compared to natives, by the time spent in the arrival country since immigration. The method is the same adopted previously, which consists in taking three different moments along the distribution of the time since migration variable and checking the probability-pattern. It is confirmed the decreasing trend in the probability of being overeducated for immigrants compared to native workers, since it declines as the higher time spent in the country of residence. It is estimated that the probability of experiencing overeducation for an immigrant is significantly 9.73 percentage points higher than the one of a native workers 35 years after migration, and that lowers by 7.1 percentage points for immigrants arrived at the country of residence 41 years before. Hence, the assimilation process is slow in this scenario as well.

According to Eurostat, the female participation in the three considered countries is increasing in the last years (except for female employment rate in the 2020 that was negatively affected by the pandemic). However, employment gap between male and female is still a matter in Europe and in these countries as well. However, Estonia is an exemption since it has one of lowest gender-gap in terms of male-female participation to the labour market in Europe in 2022 which is 3%; on the other side Czech Republic has a consistent high 15% of difference between male and female employment rate, and Slovenia presents a 7% gap[23]. Therefore, differences across genders exist in the labour market participation in Eastern Europe as well and they might imply differences in the overeducation levels as well. In addition to this, in our sample it is observed that the females have higher levels of educational attainments than natives and immigrant man; immigrant female are the group with the highest third and fourth incidence of educational attainments (according to our education classification).

Table 3.6: Gender-specific differences in the probability of being overeducated between immigrants and native workers in Eastern Europe

	(1) Men	(2) Women	(3) Men	(4) Women
Migrant	0.072*	0.070*	0.223	0.242**
	(0.037)	(0.041)	(0.143)	(0.120)
Year since migration			-0.004	-0.004
			(0.003)	(0.003)
Basic set of controls	X	X	X	X
Additional set of controls	X	X	X	X
Observations	4,647	5,797	4,647	5,797

Note: Linear probability models estimated by OLS. The basic set of controls includes country of residence, gender and age. The full set of controls is augmented with presence of a cohabiting partner, household size, number of children, years of education, type of employment (employee, self-employed, civil servant), area of the country of origin. A constant term is always included in the specifications. Robust Standard errors in parentheses are robust to arbitrary heteroskedasticity and correlation at the individual level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 3.6 highlights estimations on how immigration background and time spent in the arrival country influence the levels of overeducation separately for genders. For both males and females, being an immigrant increases the probability of being overeducation in the shorter model not considering the time variable; however, this is significantly different from zero only at 10% significance level. Being an immigrant increases the likelihood by 7 percentage points compared to natives for both men and women. Moreover, the sample is homogeneous between

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[23] Further details are available on the webpage [11] in the sitography.

men and women for what concerns time spent since arrival to the country of residence and adding the time control variable to the model, estimations have a negative sings as previous findings in this research, however, they are not significantly different that zero.

In conclusion, regarding analysis separated for European regions, interesting outcomes are carried out and most of them confirms results coming from the estimations of the entire sample, which are mostly aligned with previous expectations and with the literature review. Having an immigration background lead to greater probability of being overeducated, and this affect particularly immigrant women, even though they are the people with the highest school attainments both in West and East Europe. This is translated into higher difficulties for immigrants and especially for immigrant women in effectively and efficiently transferring their human capital to the arrival country. This is shown in our sample composed on people aged more than 50 in our sample, who probably have been the arrival countries since bunch of years and have acquired skills and knowledge related to the arrival country. However, time spent in the labour market significantly helps getting out of the overeducation trap for immigrants, especially in countries in Western-Europe, but there is still a part of the sample who struggle with overeducation across time.

3.4 GENDER'S ANALYSIS DISCUSSION

From the empirical research we have acknowledged that immigrant women are the part of our sample that significantly struggle more with overeducation, experiencing higher probability compared to native women in the whole sample, and in the analysis in Western and Eastern Europe as well. Moreover, it is observed that an assimilation process for the immigrant-native gap exists, therefore the longer is the time spent in the arrival country the greater is the convergence between the probability of being overeducated among native and immigrant; however, this pattern is long over time, and considering that our sample includes workers in their last years of job; thus, this represents a waste of human capital for both workers and for the whole labour market.

Reasons for the higher levels of overeducation experienced by women in Europe need to be found and investigated across the existing literature, in particular looking at the difference in the contribution and in the participation of women in the labour market compared to men. Schieckoff and Sprengholz (2021) do a review of different research dealing with the understanding of the integration levels of immigrant women in the labour market. Generally, a solid integration in the labour market (having a permanent job aligned with their school-labour background) in the destination country has been observed to be more difficult for women than men; reasons of that are searched firstly in the labour market integration determinants, which are those conditions that positively influence a good integration level and a great outcome in the labour market. Personal knowledge and skills, institutional policies for social and labour integration of immigrants, existing immigrant communities and the local people's perception of immigrants in the destination state have a positive impact in the participation and of immigrant workers and especially of women. In addition, there are some aspects that mostly affect women's outcome in the labour market than men's; they refer to the household characteristics such as marital status, children presence and gender roles in the family. The way the immigrant woman participate in the labour market implies the cost-benefit evaluation of employing a job compared with family-necessities in terms of economic needs, family-roles and gender-expectations. Hence, joining a job for an immigrant woman is often conditioned on the job and on the income of the other family's members; according to a traditional vision of society and family, the role the women has inside the family plays a crucial constraint, hence it is observed that many immigrant women do not join the labour market, join partially through part-time jobs or take up occupations not in line with their school-degrees. However, that is not applicable to any immigrant families, and it depends on the culture-specific mentality of

people, as well as on the religious values and education background within the household. One more aspect that must be considered is the perception of immigrant women (and of the immigrant community) in terms of the level of integration or discrimination within the job environment, both in the hiring process and during the work. Possible discrimination episodes may refer to ethnicity or religious symbols. These are all aspects that influence the decision on how the participation of immigrant women in the destination country's labour market is and thus the possibility of take advantage of their knowledge and skills. In addition to the discussion, the authors outstand that women often are segregated in specific occupation in the labour market, which are related to service and specifically care-service, and teaching; To carry out those jobs however, specific skills and knowledge related to the labour market are required, such as language or communication skills; those requirements for immigrant women might be seen as obstacles, and therefore they might look for jobs in other fields, without considering their previous educational levels (Schieckoff and Sprengholz, 2021).

In the literature, household composition and gender roles in the families seems to be the key factors in analysing the participation in the labour market of immigrant women. Along decades, on the main reasons for women to migrate out of their countries has been family reunification, therefore, reaching their husbands who previously had migrated. Family and gender roles of immigrant women are investigated by Wall and São José (2004), which carries out qualitative research considering 72 immigrant families with kids living in Finland, France, Italy, Portugal and in the UK. The aim of the research is to understand how families of immigrant deal with the handling of house, family-care and children. Families are analysed according to their reasons for migration, likewise marriage, asylum-seeker, labour or school. Data are taken from the SOCCARE project, which includes the interviews to those families. Results highlight that children and family care influences the job decisions for immigrant women when looking for a job, since especially during the first period after arrival they usually do not count on a great helping-network of people. It is shown how, due to gender roles and responsibilities with their families, women decide to not work, work for a shorter number of hours or even accept job not aligned with their educational attainments and background. However, this is observed to be a disadvantage for them even when they eventually decide to take up a job later. Participation to jobs under their capabilities mainly affects those women who migrate for marriage reasons, hence joining the husband in the immigration country; those families are observed to be more prone to isolate the women from the labour market and career opportunities, increasing gender inequalities, dissatisfaction, and lower opportunities for immigrant women to contribute to the labour market with their knowledge and skills. In addition to this, another issue affecting

women in the labour market is the gender pay-gap which refers to lower earnings achievements for women workers, which may induce immigrant workers to preferer taking care of their families with their partners working and providing for the economic livelihood of the whole household.

Moreover, gender stereotypes in the labour market affect women and immigrant women. They are seen, especially in the phase of recruitment, as more discontinuous individuals in their jobs, since according to a traditional view of family, they are often seen as workers less attached to their occupations in order to be able to comply also with their household tasks; therefore, pre-migration reasons are essentially to determine the labour integration of women in the destination country, since if the decision of migration is taken together in the household and it has economic reasons for both the member of couple, women are more likely to join an employment, however, if the reason is the family reunification, the main scope of the migration process is usually not labour integration for women (González-Ferrer, 2011).

Gender and ethnic discriminations are reasons for lower and different participation in the labour market by immigrant women. Research conducted by Riaño and Baghdadi (2007) analyses the Swiss context, in particular investigating the outcomes of immigrant women in the labour market and the reasons for their lower integration levels. The researchers directly interview 57 immigrant skilled women coming from non-EU countries, having different nationality, religions, academic background, social and family conditions. Results show that most of the women are not labour well-integrated; despite they have high school qualifications and language skills, they only found jobs for which they are overeducated. The analysis reports that managerial positions and technical occupations are in Switzerland more accessible to men than women and immigrant women, who would be aligned in those occupations according to their academic backgrounds. Referring to their experiences, higher discrimination levels because of religion, ethnicity and origin are persistently suffered by women in the labour market. Therefore, intersectionality (Crenshaw, 1989) is an important aspect and approach to consider while analysing immigration, social and labour integration, in particular for women workers, since it exists the possibility for a worker to be penalised in the labour market for belonging to multiple communities that are targets of discrimination, such as women and foreign-born people.

CONCLUSIONS

The main purpose of this research is to empirically investigate how the probability of being overeducated differs between native and immigrant older workers in Europe. There are at least two reasons motivating the focus on older workers. The first is that workforce in European countries is ageing as a result of demographic transitions, and reform of pension systems that have postponed the timing of retirement in order to guarantee their economic sustainability in the long run. The second is that older workers might have arrived in their current country many years ago. This makes it possible to whether the overeducation gap between native and immigrant workers reduces with the time spent by immigrants in their destination country as a result of an assimilation process.

The empirical analysis is based on a sample of workers aged between 50 and 70 extracted from SHARE (Survey of Health, Ageing and Retirement in Europe) and residing in Austria, Germany, Sweden, Spain, France, Denmark, Switzerland, Belgium, Czech Republic, Slovenia and Estonia. In our sample the percentage of immigrants is about 6% and on average they arrived in their current country of residence 38 years ago. However, heterogeneity in age at the time of the interview and in the timing of migration decision produces valuable variability in the amount of time spent by immigrants in their destination country, being its first quartile equal to 28 and its third quartile equal to 49. Our econometric strategy will exploit this variability to assess to what extent the difference in overeducation between natives and immigrants is affected by the timing of migration decisions. The overeducation status of the workers in our sample is determined by comparing the educational attainment of respondents recorded by SHARE with the minimum level of education required by their job and gathered by occupation-level database O*NET (Occupational Information Network).

The sample presents 19.77% of overeducated workers, with 6% higher levels of incidence for women. Looking at how overeducation behaves differently between natives and immigrant workers, data highlights a much stronger incidence among immigrants which is of 27.90% compared to the 19.20% of overeducated native workers. In our econometric analysis we consider two separate linear probability models controlling for a wide set of individual and household characteristics (age, gender, years of education, having a partner, household size, number of children, health, type of job, origin area, interview wage and country of residence). Pooling all countries together, we find that being an immigrant significantly increases the probability of overeducation for a worker by 6.8 percentage point. Time spent in the destination

country help converging the differences in the likelihood of being overeducated, reducing that by 0.3 percentage points for each year more spent in the country of residence. Thus, an assimilation process in the probability-gap between natives and immigrant workers exists, however the converge is very slow and takes 65 years in the arrival country to be reached. Everything else constant, women are found to be significantly penalised in this context since their probability of overeducation is higher than that of men by almost 6 percentage points.

We also investigated how the overeducation gap between immigrant and native workers varies across genders. This heterogeneity analysis points out that that the significant gap found in the overall sample is mainly driven by the women subsample. Even though immigrant women are more educated than their native counterparts, they experience 8.6 percentage points higher probability of being overeducated. The assimilation process between native and immigrant probability of being overeducated by the time spent in the labour market exists and confirms the decreasing likelihood of overeducation by the time, however it is very slow in this case as well.

Because of historical background and economic differences in development, the study is carried out separately between European Western and Eastern countries. In both European parts, immigrants suffer from higher probability of being overeducated within their occupations, and this is also across gender within the women sample both in East- and West- Europe; however, in the male sample, immigrant males are observed to suffer from higher chances of experiencing overeducation compared to native male only in the East part of Europe.

Results emphasize that older immigrant population in Europe experience higher likelihood of being overeducated. The probability of being overeducated decreases spending longer time in the destination country, however at a slow rate. Female workers and in particular the immigrant females are affected by higher probability of being mismatched in their jobs in the overall sample and in the analysis considering Western Europe and Eastern Europe separately. Interpretation and justification of that can be found in the determinants of immigration experienced by women, in their previous employment status and in the gender roles in family still affecting our society. In particular immigrant women, when carrying out an immigration for household reasons such as family reunification, are often subject to family-care duties putting behind their career; hence their participation and outcome in the labour market do not exploit their capacity and skills, since it mainly refers to part-time jobs, employee not aligned with their studies or no participation at all (Schieckoff and Sprengholz, 2021; Wall and São José, 2004; Riaño and Baghdadi, 2007).

Overeducation is a waste of human capital for the labour market and the whole society, leading to a loss of opportunities for knowledge and skills exploitation, new ideas and innovations. Therefore, the fact that immigrant people, and in particular immigrant women, experience higher chances of overeducation in the labour market is a negative signal of resources allocation and therefore a requirement for specific policies to address this labour market inefficiency. Policies aiming at positive selection of immigration flows are necessary, but not enough without considering the determinants and personal background of immigrant people; considering skilled people moving from one country for reasons such as family reunification, international geopolitics crisis and environmental reasons, their main purpose for moving might not be finding a job which match their academic attainments. Hence, with the aim of inducing people contributing to the general social and economic development, incentives to actively participate to the labour market have to be created. Economic and cultural barriers for recognition of previous studies and experiences should be reduced, and specific integration policies and programs needs to be developed by governments. In case of immigrant women workers, promoting programs aiming at the support of immigrant families would be definitely beneficial for self- and social integration, giving especially immigrant women the possibility to find jobs with the goal of self-realisation, then more aligned to their educational background. Moreover, governments should invest in life-long educational programs connected with the labour market needs, aiming at training people in skills required for specific occupations; on the other side, the education system's role is not only "delivering" skilled workers to companies and to the market, but also educate citizens who actively participate to the consolidation of our society and States's values such as democracy, justice and equality.

APPENDIX

Table A.1: Control variables

VARIABLE NAME	MEANING	MEAN
Migrant	Variable assuming the value 1 whether the individual is not born in the residence country (country of the interview), 0 otherwise	0.0619
Year since migration	Number of years spent in the host country (0 for native-born people)	38.13
Age	Age of the respondent	57.33
Female	Variable assuming the value 1 if the individual is a female, 0 if male	0.5206
Years of education	Number of years spent in education	12.81
Having a partner	Variable assuming the value 1 if the individual lives with the partner, 0 otherwise	0.8036
Household size	Number of people composing the household	2.38
Number of children	Number of children living at home	2.11
Health	Variable that assumes value 1 whether the self-perceived health level is excellent, very good and good, 0 otherwise.	0.8139
Employee	Variable assuming the value 1 whether the individual has a job as employee, 0 otherwise	0.6125
Civil Servant	Variable assuming the value 1 whether the individual is a civil servant, 0 otherwise	0.2409
Wave	Variable assuming the number of regular wave in which the interview took place (1,2,4,5,6,7,8)	/
Origin area	Variable assuming values 1 to 5 according to the origin area of the immigrant worker	/
Country	Country of the residence where the interview happens (it is codified by SHARE specific numbers)	/

Table A.2 Differences in the probability of being overeducated between immigrants and native workers.

	(1)	(2)	(3)	(4)
Migrant	0.083***	0.216***	0.068***	0.207***
	(0.013)	(0.038)	(0.018)	(0.044)
Year since migration		-0.003***		-0.003***
		(0.001)		(0.001)
Age	-0.001**	-0.001*	-0.001**	-0.001**
	(0.001)	(0.001)	(0.001)	(0.001)
Female	0.056***	0.056***	0.057***	0.057***
	(0.006)	(0.006)	(0.006)	(0.006)
Years of education			0.024***	0.024***
			(0.001)	(0.001)
Having a partner			-0.008	-0.008
			(0.008)	(0.008)
Household size			-0.002	-0.002
			(0.003)	(0.003)
Number of children			-0.004**	-0.004**
			(0.002)	(0.002)
Health			0.008	0.008
			(0.006)	(0.006)
Employee			0.005	0.004
			(0.007)	(0.007)
Civil Servant			0.006	0.005
			(0.009)	(0.009)
Wave 2	0.043***	0.042***	0.037***	0.037***
	(0.005)	(0.005)	(0.005)	(0.005)
Wave 4	0.085***	0.085***	0.083***	0.083***
	(0.007)	(0.007)	(0.007)	(0.007)
Wave 5	0.087***	0.087***	0.080***	0.080***
	(0.007)	(0.007)	(0.007)	(0.007)
Wave 6	0.088***	0.088***	0.079***	0.079***
	(0.007)	(0.007)	(0.007)	(0.007)
Wave 7	0.090***	0.089***	0.062***	0.061***
	(0.016)	(0.016)	(0.016)	(0.016)
Wave 8	0.065***	0.064***	0.051***	0.051***
	(0.010)	(0.010)	(0.010)	(0.010)
Origin area 2 (Eastern Europe)			0.061**	0.019
			(0.031)	(0.032)
Origin area 3 (Asia)			0.065*	0.023
			(0.037)	(0.038)
Origin area 4 (Africa)			-0.089***	-0.096***
			(0.034)	(0.033)
Origin area 5 (North and South America)			0.022	-0.003
			(0.042)	(0.043)
Country 12 (Germany)	0.019	0.017	-0.068***	-0.069***
	(0.016)	(0.016)	(0.016)	(0.016)
Country 13 (Sweden)	-0.088***	-0.089***	-0.153***	-0.154***

	(0.015)	(0.015)	(0.016)	(0.016)
Country 15 (Spain)	-0.111***	-0.112***	-0.141***	-0.142***
	(0.016)	(0.016)	(0.016)	(0.016)
Country 17 (France)	-0.098***	-0.097***	-0.168***	-0.167***
	(0.016)	(0.016)	(0.016)	(0.016)
Country 18 (Denmark)	0.048***	0.049***	-0.055***	-0.055***
	(0.016)	(0.016)	(0.016)	(0.016)
Country 20 (Switzerland)	-0.064***	-0.064***	-0.053***	-0.054***
	(0.016)	(0.016)	(0.016)	(0.016)
Country 23 (Belgium)	-0.050***	-0.049***	-0.131***	-0.131***
	(0.015)	(0.015)	(0.015)	(0.015)
Country 28 (Czech Republic)	-0.149***	-0.148***	-0.279***	-0.237***
	(0.015)	(0.015)	(0.033)	(0.034)
Country 34 (Slovenia)	-0.118***	-0.117***	-0.228***	-0.187***
	(0.018)	(0.018)	(0.034)	(0.035)
Country 35 (Estonia)	0.007	0.009	-0.124***	-0.081**
	(0.016)	(0.016)	(0.033)	(0.034)
Constant	0.212***	0.199***	-0.006	-0.015
	(0.037)	(0.037)	(0.042)	(0.042)
Observations	45,249	45,249	45,249	45,249

Note: Linear probability models estimated by OLS. Standard errors in parentheses are robust to arbitrary heteroskedasticity and correlation at the individual level. *** p<0.01, ** p<0.05, * p<0.1

Table A.3 Gender-specific differences in the probability of being overeducated between immigrants and native workers.

	(1)	(2)	(3)	(4)
VARIABLES	Men	Women	Men	Women
Migrant	0.036	0.086***	0.153**	0.252***
	(0.026)	(0.025)	(0.066)	(0.059)
Year since migration			-0.003*	-0.004***
			(0.001)	(0.001)
Age	-0.002*	-0.001	-0.002*	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Years of Education	0.021***	0.026***	0.021***	0.026***
	(0.001)	(0.001)	(0.001)	(0.001)
Having a partner	0.003	-0.013	0.003	-0.013
	(0.011)	(0.010)	(0.011)	(0.010)
Household size	-0.003	-0.001	-0.004	-0.001
	(0.004)	(0.004)	(0.004)	(0.004)
Number of children	-0.002	-0.006*	-0.002	-0.006*
	(0.003)	(0.003)	(0.003)	(0.003)
Health	0.004	0.012	0.005	0.013
	(0.008)	(0.008)	(0.008)	(0.008)
Employee	0.003	0.010	0.003	0.009
	(0.009)	(0.012)	(0.009)	(0.012)
Civil Servant	-0.006	0.010	-0.006	0.009
	(0.012)	(0.014)	(0.012)	(0.014)

Wave 2	0.032***	0.042***	0.032***	0.042***
	(0.007)	(0.008)	(0.007)	(0.008)
Wave 4	0.068***	0.100***	0.067***	0.099***
	(0.009)	(0.010)	(0.009)	(0.010)
Wave 5	0.069***	0.094***	0.069***	0.094***
	(0.009)	(0.010)	(0.009)	(0.010)
Wave 6	0.074***	0.088***	0.074***	0.088***
	(0.010)	(0.011)	(0.010)	(0.011)
Wave 7	0.044**	0.082***	0.043**	0.082***
	(0.021)	(0.023)	(0.021)	(0.023)
Wave 8	0.070***	0.042***	0.070***	0.042***
	(0.014)	(0.014)	(0.014)	(0.014)
Origin area 2 (Eastern Europe)	0.061	0.070*	0.021	0.023
	(0.047)	(0.040)	(0.050)	(0.042)
Origin area 3 (Asia)	0.063	0.070	0.025	0.023
	(0.053)	(0.050)	(0.054)	(0.052)
Origin area 4 (Africa)	-0.040	-0.124***	-0.051	-0.126***
	(0.049)	(0.047)	(0.047)	(0.046)
Origin area 5 (North and South America)	0.032	0.016	0.005	-0.005
	(0.056)	(0.060)	(0.060)	(0.060)
Country 12 (Germany)	-0.033	-0.093***	-0.034	-0.094***
	(0.023)	(0.023)	(0.023)	(0.023)
Country 13 (Sweden)	-0.171***	-0.135***	-0.172***	-0.136***
	(0.021)	(0.023)	(0.021)	(0.023)
Country 15 (Spain)	-0.149***	-0.133***	-0.150***	-0.135***
	(0.021)	(0.023)	(0.021)	(0.023)
Country 17 (France)	-0.188***	-0.144***	-0.188***	-0.143***
	(0.021)	(0.022)	(0.021)	(0.022)
Country 18 (Denmark)	-0.145***	0.038	-0.145***	0.038
	(0.022)	(0.024)	(0.022)	(0.024)
Country 20 (Switzerland)	-0.068***	-0.035	-0.068***	-0.036
	(0.023)	(0.024)	(0.023)	(0.024)
Country 23 (Belgium)	-0.141***	-0.117***	-0.141***	-0.117***
	(0.021)	(0.022)	(0.021)	(0.022)
Country 28 (Czech Republic)	-0.262***	-0.302***	-0.223***	-0.255***
	(0.050)	(0.045)	(0.053)	(0.046)
Country 34 (Slovenia)	-0.217***	-0.239***	-0.178***	-0.194***
	(0.051)	(0.046)	(0.054)	(0.047)
Country 35 (Estonia)	-0.154***	-0.107**	-0.115**	-0.060
	(0.051)	(0.044)	(0.054)	(0.046)
Constant	0.060	-0.022	0.055	-0.036
	(0.056)	(0.060)	(0.056)	(0.060)
Observations	21,694	23,555	21,694	23,555

Note: Linear probability models estimated by OLS. Standard errors in parentheses are robust to arbitrary heteroskedasticity and correlation at the individual level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A.4: Differences in the probability of being overeducated between immigrants and native workers in Western Europe

	(1)	(2)	(3)	(4)
Migrant	0.087***	0.221***	0.056**	0.195***
	(0.015)	(0.042)	(0.025)	(0.053)
Year since migration		-0.004***		-0.003***
		(0.001)		(0.001)
Age	-0.002**	-0.002**	-0.002**	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)
Female	0.059***	0.059***	0.062***	0.062***
	(0.007)	(0.007)	(0.006)	(0.006)
Years of education			0.021***	0.021***
			(0.001)	(0.001)
Having a partner			-0.010	-0.010
			(0.009)	(0.009)
Household size			-0.002	-0.002
			(0.003)	(0.003)
Number of children			-0.003	-0.003
			(0.003)	(0.003)
Health			0.019***	0.019***
			(0.007)	(0.007)
Employee			-0.002	-0.003
			(0.008)	(0.008)
Civil Servant			-0.004	-0.004
			(0.010)	(0.010)
Wave 2	0.042***	0.042***	0.036***	0.036***
	(0.006)	(0.006)	(0.005)	(0.005)
Wave 4	0.086***	0.085***	0.086***	0.086***
	(0.007)	(0.007)	(0.007)	(0.007)
Wave 5	0.088***	0.087***	0.082***	0.082***
	(0.007)	(0.007)	(0.007)	(0.007)
Wave 6	0.089***	0.088***	0.081***	0.081***
	(0.008)	(0.008)	(0.008)	(0.008)
Wave 7	0.096***	0.095***	0.069***	0.069***
	(0.017)	(0.017)	(0.017)	(0.017)
Wave 8	0.066***	0.066***	0.054***	0.054***
	(0.011)	(0.011)	(0.011)	(0.011)
Origin area 2 (Eastern Europe)			0.086**	0.047
			(0.042)	(0.043)
Origin area 3 (Asia)			0.069*	0.019
			(0.042)	(0.045)
Origin area 4 (Africa)			-0.075**	-0.084**
			(0.038)	(0.037)
Origin area (North and South America)			0.039	0.013
			(0.045)	(0.046)
Country 12 (Germany)	0.019	0.017	-0.055***	-0.056***
	(0.016)	(0.016)	(0.016)	(0.016)
Country 13 (Sweden)	-0.086***	-0.087***	-0.143***	-0.144***

	(0.015)	(0.015)	(0.016)	(0.016)
Country 15 (Spain)	-0.111***	-0.112***	-0.136***	-0.137***
	(0.016)	(0.016)	(0.016)	(0.016)
Country 17 (France)	-0.098***	-0.097***	-0.158***	-0.158***
	(0.016)	(0.016)	(0.016)	(0.015)
Country 18 (Denmark)	0.049***	0.050***	-0.041**	-0.041**
	(0.016)	(0.016)	(0.017)	(0.016)
Country 20 (Switzerland)	-0.063***	-0.063***	-0.053***	-0.054***
	(0.016)	(0.016)	(0.016)	(0.016)
Country 23 (Belgium)	-0.050***	-0.049***	-0.121***	-0.120***
	(0.016)	(0.015)	(0.015)	(0.015)
Constant	0.239***	0.226***	0.033	0.025
	(0.042)	(0.042)	(0.048)	(0.048)
Observations	34,805	34,805	34,805	34,805

Note: Linear probability models estimated by OLS. Standard errors in parentheses are robust to arbitrary heteroskedasticity and correlation at the individual level. *** p<0.01, ** p<0.05, * p<0.1

Table A.5: Gender-specific differences in the probability of being overeducated between immigrants and native workers in Western Europe

	(1) Men	(2) Women	(3) Men	(4) Women
Migrant	0.000	0.089***	0.110	0.261***
	(0.033)	(0.033)	(0.076)	(0.071)
Year since migration			-0.002	-0.004***
			(0.002)	(0.002)
Age	-0.002*	-0.002	-0.002*	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Years of education	0.018***	0.024***	0.018***	0.024***
	(0.001)	(0.001)	(0.001)	(0.001)
Having a partner	-0.004	-0.013	-0.003	-0.013
	(0.013)	(0.012)	(0.013)	(0.012)
Household size	-0.002	-0.002	-0.002	-0.002
	(0.004)	(0.005)	(0.004)	(0.005)
Number of children	-0.002	-0.004	-0.002	-0.004
	(0.003)	(0.004)	(0.003)	(0.004)
Health	0.012	0.028***	0.012	0.028***
	(0.010)	(0.010)	(0.010)	(0.010)
Employee	-0.001	0.001	-0.002	0.000
	(0.010)	(0.014)	(0.010)	(0.014)
Civil Servant	-0.019	-0.000	-0.019	-0.001
	(0.013)	(0.016)	(0.013)	(0.016)
Wave 2	0.032***	0.041***	0.032***	0.041***
	(0.007)	(0.008)	(0.007)	(0.008)
Wave 4	0.070***	0.104***	0.070***	0.104***
	(0.009)	(0.011)	(0.009)	(0.011)
Wave 5	0.070***	0.097***	0.070***	0.097***
	(0.009)	(0.011)	(0.009)	(0.011)

	(1)	(2)	(3)	(4)
Wave 6	0.075***	0.090***	0.075***	0.090***
	(0.010)	(0.012)	(0.010)	(0.012)
Wave 7	0.057**	0.085***	0.056**	0.086***
	(0.023)	(0.024)	(0.023)	(0.024)
Wave 8	0.077***	0.039**	0.077***	0.039**
	(0.016)	(0.016)	(0.016)	(0.016)
Origin area 2 (Eastern Europe)	0.103*	0.084	0.068	0.040
	(0.061)	(0.056)	(0.063)	(0.057)
Origin area 3 (Asia)	0.097*	0.058	0.055	-0.001
	(0.057)	(0.058)	(0.061)	(0.062)
Origin area 4 (Africa)	0.001	-0.127**	-0.010	-0.132**
	(0.053)	(0.052)	(0.050)	(0.052)
Origin area 5 (North and South America)	0.074	0.019	0.048	-0.006
	(0.059)	(0.064)	(0.064)	(0.064)
Country 12 (Germany)	-0.019	-0.082***	-0.019	-0.083***
	(0.023)	(0.023)	(0.023)	(0.023)
Country 13 (Sweden)	-0.161***	-0.126***	-0.161***	-0.127***
	(0.021)	(0.023)	(0.021)	(0.023)
Country (Spain)	-0.146***	-0.126***	-0.147***	-0.128***
	(0.021)	(0.023)	(0.021)	(0.023)
Country 17 (France)	-0.178***	-0.135***	-0.178***	-0.134***
	(0.021)	(0.022)	(0.021)	(0.022)
Country 18 (Denmark)	-0.131***	0.050**	-0.131***	0.050**
	(0.022)	(0.024)	(0.022)	(0.024)
Country 20 (Switzerland)	-0.067***	-0.036	-0.067***	-0.037
	(0.023)	(0.024)	(0.023)	(0.024)
Country 23 (Belgium)	-0.129***	-0.108***	-0.129***	-0.108***
	(0.021)	(0.022)	(0.021)	(0.022)
Constant	0.097	0.001	0.094	-0.014
	(0.064)	(0.069)	(0.064)	(0.070)
Observations	17,047	17,758	17,047	17,758

Note: Linear probability models estimated by OLS. Standard errors in parentheses are robust to arbitrary heteroskedasticity and correlation at the individual level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A.6: Differences in the probability of being overeducated between immigrants and native workers in Eastern Europe

	(1)	(2)	(3)	(4)
Migrant	0.070***	0.196**	0.074***	0.250***
	(0.025)	(0.092)	(0.028)	(0.090)
Year since migration		-0.003		-0.004**
		(0.002)		(0.002)
Age	0.000	0.000	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Female	0.048***	0.048***	0.032***	0.031***
	(0.011)	(0.011)	(0.011)	(0.011)
Years of education			0.040***	0.040***

			(0.002)	(0.002)
Having a partner			-0.001	-0.001
			(0.014)	(0.014)
Household size			-0.003	-0.003
			(0.005)	(0.005)
Number of children			-0.008*	-0.008*
			(0.005)	(0.005)
Health			-0.023**	-0.022**
			(0.010)	(0.010)
Employee			0.042***	0.042***
			(0.014)	(0.014)
Civil Servant			0.045**	0.045**
			(0.018)	(0.018)
Wave 4	0.035***	0.035***	0.010	0.010
	(0.012)	(0.012)	(0.011)	(0.011)
Wave 5	0.036***	0.036***	0.012	0.012
	(0.012)	(0.012)	(0.011)	(0.011)
Wave 6	0.039***	0.039***	0.013	0.013
	(0.013)	(0.013)	(0.012)	(0.012)
Wave 7	-0.018	-0.017	-0.030	-0.029
	(0.035)	(0.035)	(0.034)	(0.034)
Wave 8	0.012	0.012	-0.018	-0.017
	(0.019)	(0.019)	(0.018)	(0.018)
Origin area 2 (Eastern Europe)			-0.127	-0.125
			(0.186)	(0.198)
Origin area 3 (Asia)			-0.122	-0.097
			(0.188)	(0.201)
Origin area 4 (Africa)			-0.524***	-0.576***
			(0.192)	(0.208)
Origin area 5 (North and South America)			-0.807***	-0.885***
			(0.186)	(0.201)
Country 34 (Slovenia)	0.034**	0.033**	0.068***	0.067***
	(0.015)	(0.015)	(0.015)	(0.015)
Country 35 (Estonia)	0.155***	0.155***	0.151***	0.150***
	(0.013)	(0.013)	(0.012)	(0.012)
Constant	0.027	0.017	-0.249	-0.265
	(0.073)	(0.073)	(0.201)	(0.212)
Observations	10,444	10,444	10,444	10,444

Note: Linear probability models estimated by OLS. Standard errors in parentheses are robust to arbitrary heteroskedasticity and correlation at the individual level. *** p<0.01, ** p<0.05, * p<0.1

Table A.7: Gender-specific differences in the probability of being overeducated between immigrants and native workers in Eastern Europe

	(1) Men	(2) Women	(3) Men	(4) Women
Migrant	0.072*	0.070*	0.223	0.242**
	(0.037)	(0.041)	(0.143)	(0.120)
Year since migration			-0.004	-0.004
			(0.003)	(0.003)
Age	-0.002	-0.002	-0.002	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Years of education	0.042***	0.037***	0.042***	0.037***
	(0.003)	(0.003)	(0.003)	(0.003)
Having a partner	0.032	-0.011	0.032	-0.012
	(0.021)	(0.019)	(0.021)	(0.019)
Household size	-0.008	-0.001	-0.008	-0.001
	(0.007)	(0.008)	(0.007)	(0.008)
Number of children	-0.003	-0.012*	-0.004	-0.012*
	(0.006)	(0.007)	(0.006)	(0.007)
Health	-0.020	-0.025*	-0.020	-0.025*
	(0.013)	(0.014)	(0.013)	(0.014)
Employee	0.034**	0.056**	0.034**	0.056**
	(0.017)	(0.025)	(0.017)	(0.025)
Civil Servant	0.055**	0.051*	0.055**	0.052*
	(0.025)	(0.027)	(0.025)	(0.027)
Wave 4	0.006	0.020	0.006	0.020
	(0.015)	(0.016)	(0.015)	(0.016)
Wave 5	0.015	0.017	0.015	0.017
	(0.015)	(0.017)	(0.015)	(0.017)
Wave 6	0.016	0.018	0.016	0.018
	(0.017)	(0.018)	(0.017)	(0.018)
Wave 7	-0.086***	0.046	-0.087***	0.051
	(0.023)	(0.071)	(0.023)	(0.071)
Wave 8	-0.010	-0.011	-0.009	-0.012
	(0.025)	(0.025)	(0.025)	(0.025)
Origin area 2 (Eastern Europe)	-0.372	0.064	-0.366	0.060
	(0.251)	(0.073)	(0.281)	(0.059)
Origin area 3 (Asia)	-0.419	0.091	-0.386	0.109*
	(0.255)	(0.078)	(0.282)	(0.065)
Origin area 4 (Africa)	-0.781***		-0.825***	
	(0.251)		(0.291)	
Origin area 5 (North and South America)	-1.068***		-1.134***	
	(0.249)		(0.295)	
Country 34 (Slovenia)	0.065***	0.073***	0.065***	0.072***
	(0.020)	(0.022)	(0.020)	(0.022)
Country 35 (Estonia)	0.111***	0.184***	0.111***	0.183***
	(0.017)	(0.017)	(0.017)	(0.017)
Constant	0.006	-0.379***	-0.011	-0.392***
	(0.274)	(0.130)	(0.300)	(0.122)

| Observations | 4,647 | 5,797 | 4,647 | 5,797 |

Note: Linear probability models estimated by OLS. Standard errors in parentheses are robust to arbitrary heteroskedasticity and correlation at the individual level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

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ancor più meravigliosa perché...

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