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Master Thesis Economics of Sustainability

THE GENDERED DIMENSION OF OCCUPATION-EDUCATION MISMATCH FOR EUROPE IMMIGRANTS

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Abstract

Amidst the surge in global migration, the interplay between gender and migration has profound implications for the labour market. We examine occupation-education mismatch, focusing on overeducation, within the context of migration, with a specific emphasis on gender. Analysing over a decade of European Social Survey data, we find that gender, immigrant status, and their interaction significantly influence overeducation. Immigrant women, in particular, face unique challenges, rendering them more susceptible to overeducation.

Our investigation uncovers the mechanisms behind this "double disadvantage," highlighting the pivotal role of personal characteristics (education, marital status, language integration) and country-level factors (gender equality, female participation, immigrant count). Furthermore, the presence of female and immigrant role models in the workforce reduces overeducation.

These findings have vital implications for policymakers and organisations involved in labour market integration, allowing for targeted policies that promote skill efficiency and equitable job opportunities. In addition, this research extends our understanding of overeducation, particularly at the intersection of gender and migration. Addressing the challenges faced by immigrant women and other marginalised groups fosters inclusive and equitable labour markets.

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1. Introduction

In an era of unprecedented global migration, hundreds of millions of individuals embark on journeys in search of better lives, economic opportunities, and refuge from adversity. These numbers are thought only to rise further and even during a global pandemic have risen 3,4% since 2019 (IOM, 2021). However, these journeys are often fraught with challenges, as migrants navigate not only geographical boundaries but also complex social and economic landscapes. The intricacies of migration have given rise to a multifaceted tapestry of issues, where sociodemographic factors such as gender play a pivotal role in shaping the experiences of those who choose or are compelled to leave their homelands.

Migrants, facing the daunting task of adaptation to new societies and labour markets, encounter a multitude of barriers. These barriers extend from language and cultural differences to discriminatory practices and legal complexities. While the challenges faced by migrants are numerous and diverse, one dimension that stands out prominently in the landscape of migration is the gendered aspect. The interaction between gender and migration introduces unique dynamics that impact every facet of a migrant's journey, from the moment they cross borders to their participation in the labour market of their host country.

Females have had a disadvantage in the labour market relative to men from the moment they entered. In the twentieth century, this disadvantage was easily allocated to prejudice and discrimination, and although today we don't see such explicit causes the gap still exists (Goldin, 2021). In recent years this disadvantage has only increased. COVID-19 has had more impact on women's labour force participation and employment compared to men's (Goldin, 2022). Contact industries such as restaurants, beauty salons and child daycare were hit harder by the pandemic due to enforced closing and reduced demand afterwards which led to this pandemic disproportionately hitting female-dominated industries. Next to this, mothers greatly increased their childcare time and with the employment of females decreasing less than expected and less than for men, stress, frustration and anxiety have increased for mothers and female caregivers.

Within this intricate web of challenges and opportunities, the labour market emerges as a crucial arena where the effects of migration and gender intersect. It is here that the allocation and utilisation of skills and qualifications become paramount. The ability to secure employment commensurate with one's education is not only a matter of personal fulfilment but also holds profound economic implications. Occupation-education mismatch occurs when individuals find themselves in jobs that do not align with their educational qualifications and experiences (IOM,

2012). This phenomenon has garnered significant attention in the literature due to its implications for labour market outcomes, career advancement, and overall productivity. The mismatch can occur in various forms, such as over-qualification (when individuals possess higher education or skills than required for their current job)(Chen et al., 2010), under-qualification (when individuals are undereducated or lack the necessary skills for their job), or horizontal mismatch (when individuals are employed in a different field or occupation than their educational background suggests). Occupation-education mismatch has been identified as a crucial aspect of labour market dynamics, particularly in the context of migration (Adalet McGowan and Andrews, 2015a). In this study, the emphasis will be on over-qualification. This phenomenon has been referred to by various terms in the literature, such as downward occupational mobility (Bauer and Zimmermann, 1999), underemployment (Jong and Madamba, 2001), the degrading of skills (Grandea, 2008) and over-education (Grießhaber & Seibel, 2014). This latter definition will be further used in this paper.

Occupation-education mismatch is a subject of growing importance, particularly in an era where the global labour market is marked by increasing complexity and mobility. For migrants, this complexity is heightened, with additional layers of adjustment as they seek to establish themselves in new countries. The effect of gender on occupation-education mismatch is a critical and relatively underexplored dimension of labour market integration for migrants. Gender intersects with migration to introduce unique experiences and challenges, with migrant women often facing distinct barriers compared to their male counterparts.

Although very limited studies show that female migrants are less affected by overeducation (Grießhaber & Seibel (2014) show that for immigrants in Europe, females have a lower probability of overeducation compared to male immigrants), most literature points to a clear "double disadvantage" for migrant woman (IOM,2012). Rubin et al (2008) shed light on the challenges faced by migrant women in Europe. The report highlighted that third-country migrant women were at a higher risk of unemployment compared to their male counterparts, migrants for EU countries and native-born women. This indicates that factors beyond migrant status should be taken into account when examining this issue. Nevertheless, this finding suggests that migrant women are more likely to be employed in jobs that do not match their qualifications compared to native-born women and migrant men. Although the report acknowledged that migrant men face difficulties in the job market, migrant women were found to be in the most disadvantageous position, falling short compared to migrant men when it comes to finding job opportunities that match their skill set.

As we unravel this intricate interplay between gender and education within the context of migration, we aim to provide valuable insights into the nuanced challenges faced by migrant women and men. By understanding the gendered dynamics of skill utilisation and mismatch in the labour market, we endeavour to inform policies and practices that foster equitable labour market outcomes for all, irrespective of gender or migration status. This paper, thus, sets out on a journey of its own, seeking to uncover the intricate relationship between gender, migration, and occupation-education mismatch, offering a comprehensive understanding of the challenges and opportunities that lie ahead for migrants in our increasingly interconnected world. By delving deeper into the complexities of this issue, we hope to contribute to a more inclusive and equitable future for migrants and the labour markets they enter.

Beyond its intrinsic importance, this study holds significant social and academic relevance. On the societal front, the intersection of gender, migration, and occupation-education mismatch has profound implications for the equitable integration of migrants into host societies. As nations grapple with the challenges and opportunities presented by migration, understanding how gender shapes the labour market experiences of migrants is essential for creating inclusive and supportive policies. By identifying the gender-specific barriers that contribute to occupation-education mismatch, we can better address the needs of migrant women and men, ultimately fostering their economic empowerment and social inclusion. This paper can contribute to a better understanding of how systemic gender discrimination affects labour market outcomes. Next to this, the rate of increase for the stock of human capital is slowing down, which puts more weight on productivity for a healthy labour market (Braconier et al., 2014). Skill mismatch could explain a share of cross-country labour productivity gaps (Adalet McGowan and Andrews, 2015a) which leads to the increasing importance of matching skills for an efficient deployment of existing human capital. This paper can shed light on the extent to which these factors contribute to a loss of human capital and productivity, and inform strategies to mitigate these losses. Lastly, this paper could have important policy implications for the development of gender-sensitive policies and practices that promote gender equity in migration and employment. This can benefit female migrant workers and other marginalised groups.

On the academic front, this research fills a critical gap in the existing literature. While occupation-education mismatch has been explored extensively, the unique gendered dimensions of this phenomenon within the context of migration remain largely uncharted territory. In Europe and Northern America, female migrants make up more than half of the overall international migrant population. Despite this, there is a notable gap in our

understanding of the degree of skill waste experienced by immigrant women and the factors that contribute to it compared to males (Akgüç & Parasnis, 2023). This article presents an opportunity to advance our understanding of the complex interplay between gender, migration, and labour market outcomes. By conducting a rigorous analysis, this study not only contributes to the academic discourse but also provides a foundation for future research in this underrepresented field and can be applied to other contexts, beyond migration.

The primary objective of this research is to examine how gender influences occupation-education mismatch for migrant workers in Europe, with a specific focus on female migrants. We will explore the mechanisms that underlie these gendered differences, aiming to identify the specific challenges faced by migrant women in their quest for equitable labour market integration. To achieve this, we employ a comprehensive dataset from the European Social Survey, encompassing over a decade of survey responses. Our analysis will include a detailed investigation of the probability of overqualification in the occupation, a phenomenon often referred to as 'overeducation,' within the context of migration.

In the pages that follow, we will delve into the intricate web of gendered migration experiences, shedding light on the factors that contribute to occupation-education mismatch. By presenting a nuanced analysis, we hope to facilitate a deeper understanding of the complex realities faced by migrant workers in Europe. Ultimately, this research aims to inform evidence-based policy initiatives and practices that can lead to more equitable and inclusive labour market outcomes for migrants, regardless of their gender. As we embark on this academic journey, we are poised to uncover the unique challenges faced by migrant women in their pursuit of meaningful employment and successful integration into the host society.

2. Theoretical Background

In this section, we examine relevant studies and introduce our hypotheses concerning the influence of gender and migration status on over-education and the underlying mechanisms. Over-education is a phenomenon we can see across all population groups with various explaining variables, yet within immigrant populations this happening plays a relatively big role. The disparity between an individual's level of education and the requirements of their occupation can have significant implications for labour market efficiency, individual career trajectories, and overall economic productivity. Within migration studies, understanding the dynamics of occupation-education mismatch is crucial as it sheds light on the intricate relationship between migration, labour market integration, and human capital utilisation. Factors such as language barriers, differences in credential recognition across borders, and discrimination in host countries can all contribute to the prevalence of occupation-education mismatch among immigrant populations. Many studies have consistently shown that immigrants, especially recent arrivals, are more likely to experience occupation-education mismatch compared to native-born workers.

2.1. Individual determinants

Individual characteristics such as origin and marital status can play a big part in the prevalence of over-education for immigrants and/or females. Host country language proficiency plays a paradoxical role in the context of immigrants' labour market integration. On one hand, language proficiency is regarded as "the invisible facilitator," greatly valued by migrants (Csedö, 2008). It is indeed a fundamental skill for effective communication and successful social integration. However, this proficiency does not guarantee immigrants a qualified job in the destination country, where being fluent in the local language is considered the norm. Another important factor for overeducation, specifically for migrant women, is family-tied migration. A significant portion of migrant that are educated enter labour markets as "family-tied" migrants with their primary motivation for migration often centring around providing employment opportunities for their spouses, with individual employment objectives being secondary (Liebig, 2009). This plays into the gendered dimension as women are more likely than their male counterparts to migrate for reasons other than direct employment, often resulting in challenges when seeking suitable work opportunities (Kofman & Raghuram, 2005). Lastly, The duration of residence in the host country can influence the extent of occupation-education mismatch. Some studies suggest that recent migrants are more likely to be overqualified, but as

they accumulate local experience and credentials, the mismatch may decrease over time (Grießhaber & Seibel, 2014).

2.2. Country determinants

The general characteristics of destination countries, such as income levels, supply and demand in the labour market, gender inequality and immigration numbers play a big role in the level of integration for foreign workers. These conditions affect the matching of skills in the labour market and can vary between native-born and immigrant populations. Nonnenmacher (2007) notes that one of the key reasons for a higher occupation-education mismatch for migrants is the non-recognition of migrant workers' professional qualifications, such as their diplomas, which determines their suitability for specific professions in the receiving country. Lack of information or imperfect screening can lead to overeducation and temporary mismatches through information gaps in the labour market. Employers, for example, may find it more challenging to assess the quality of foreign schooling, potentially leading to higher overeducation rates among immigrants. Skill transferability and discrimination against immigrants also play pivotal roles in explaining this phenomenon (Chiswick and Miller, 2009). Furthermore, immigration policies, both general and those specific to skill transferability and selection, play a role in determining the degree of mismatch experienced by immigrants. When there is a lack of a good system for re-accreditation, migrants face more difficulties in accessing the host countries' labour market (Liebig, 2009). Lastly, labour and skill shortages or surplusses can create a response from the employers to create strategies to address these mismatches (Fang, 2009). When there is a large demand, compared to supply, for occupations, employers adjust the educational requirements downward (Tijdens, Beblavý & Thum-Thysen 2018). We can hypothesize that a similar, opposite effect becomes visible with low demand, asking for higher educational achievements and thus increasing over-education.

2.3. Hypotheses

With regards to previous studies around the topic of occupation-education mismatch, migration and gender, we hypothesise that for migrant women a "double disadvantage" is present where, compared to all other combinations of gender and migration status, migrant women have the largest change of ending up in an occupation for with they are overqualified for. Next to this, we hypothesise that this double disadvantage is derived from multiple mechanisms on personal and country level. On a personal level, we expect that characteristics

such as education, marital status and integration in the country through for example the language play a crucial role. On a country level, policies towards equal gender rights, attitudes towards migrants and the total immigrant count could explain the double disadvantage (Aleksynska & Tritah 2013). Lastly, from previous literature, we see that leading by example works and thus we suspect that the visibility of female and immigrant role models in the workforce, on personal and country level, decreases over-education for this group (Akgüç & Parasnis, 2023).

3. Methodology

In this section, we outline the research design, creation of the dependent variable and model used to investigate the intricate relationship between gender, migration, and occupation-education mismatch. Our goal is to shed light on the methods employed in this study, ensuring transparency, reproducibility, and a sound foundation for the subsequent analysis.

3.1. Dependent variable

The dependent variable is the categorical variable education-occupation mismatch. To create this variable, the method known as the realised matches procedure is used (Aleksynska & Tritah, 2013; Chiswick, & Miller, 2011; Hartog, 2000). This involves calculating the average educational attainment and standard deviation within each occupation. Individuals whose education level exceeds the mean by one standard deviation are classified as overeducated, while those whose education level falls below the mean by one standard deviation are categorised as undereducated (Kiker, Santos, & Mendes de Oliveira, 1997).

To create the dependent variable to measure education-occupation mismatch, two variables are used. The first variable (EISCED) is computed by categorising all answers of the respondents within the International Standard Classification of Education (ISCED) which gives us 7 levels of education (table 1). The second variable (ISCO08) is a variable created according to the International Standard Classification of Occupations (ISCO) and categorises all respondents according to their occupation into nine thousand categories. To create the dependent variable (edfit), for each of the occupations at a 4-digit occupational classification level, the mean education level is computed, after which the upper bound is computed by adding one standard deviation to the mean. Since educational levels within occupations can vary across countries, this measure is constructed per country. This gives us the binary variable (edfit) which reads 0 if the education level is below or similar to the upper bound and reads 1 if the education level is above the upper bound. In our sample around 15 percent is overeducated according to this variable (table 2).

Table 1 ISCED categorisation for education and distribution of the sample in this categorisation

Highest level of education, ES - ISCED	Frequency	Percent	Cumulative
ES-ISCED I , less than lower secondary	*4,243*	*3.12*	*3.12*
ES-ISCED II, lower secondary	*13,697*	*10.06*	*13.17*
ES-ISCED IIIb, lower tier upper secondary	*24,446*	*17.95*	*31.13*
ES-ISCED IIIa, upper tier upper secondary	*30,040*	*22.06*	*53.19*
ES-ISCED IV, advanced vocational, sub-degree	*21,158*	*15.54*	*68.73*
ES-ISCED V1, lower tertiary education,	*19,068*	*14.00*	*82.73*
ES-ISCED V2, higher tertiary education,	*23,519*	*17.27*	*100.00*
Total	*136,171*	*100.00*	

Source: European Social survey (2008-2018), sample size: 136,171

Table 2 Distribution of variable edfit (education to occupation upper mismatch)

Education to occupation mismatch	Frequency	Percent	Cumulative
Not overeducated	*116,527*	*85.43*	*85.43*
Overeducated	*19,866*	*14.57*	*100.00*
Total	*136,393*	*100.00*	

Source: European Social survey (2008-2018) and authors calculation, sample size: 136,393

3.2. Model

As the main focus of this study is on overqualification, the empirical approach focuses on the estimation of the probability of this overqualification. This estimation is done using a probabilistic model. We estimate the likelihood of the binary outcome variable, denoted as Yict, to be overqualified (Y=1), for individual i in country c at time t. The following baseline model is used:

$$P(Y_{ict} = 1|X) = \Phi(X\beta)$$

Where X includes individual-specific characteristics such as age, health, educational attainment level, civil status, and other household characteristics. Next to this, we explore whether workplace and/ or country characteristics play a role in explaining overqualification in the job. To account for these factors, we include control variables such as trade union

membership, type of organisation, company size, a measure for country gender inequality and total (non-EU) immigrants.

4. Data and Descriptive Statistics

This chapter provides an overview of the data and descriptive statistics of the variables employed in our research. In this way, we can begin our exploration of gender, migration, and occupation-education mismatch with a clear understanding of the data that underpins our analysis. This chapter introduces the datasets and the key variables, offering insights into the characteristics of the sample population

4.1. Data

In this research, we utilize the most recent data derived from the European Social Survey (ESS) to perform an economic analysis of occupation-education mismatch in a cross-country framework. The survey is conducted biennially in over 30 countries, including EU members and non-members, covering individuals aged 15 and above living in private households in participating countries. The survey provides demographic, socioeconomic, and labour market variables, as well as information on social attitudes and behaviour patterns. This particular study focuses on participants within the working age range (20-65) who are currently employed and defines immigrants as individuals born in a country different from their country of residence. We use a pooled sample of six waves covering the period 2008-2018, which allows us to take into account variations in control variables and the outcome variable over several years.

4.2. Descriptive statistics

Next, we look at the descriptive statistics which provide essential insights into the demographic and socioeconomic characteristics of our study participants, forming a foundation for our subsequent analysis. The cleaned dataset contains around 136.00 usable observations from 6 waves between 2008-2018 (table 3). Within the data set gender is equally distributed and about 10 percent of the participants are immigrants (table 4).

Table 3 Distribution of the sample over the waves

ESS round	Frequency	Percent	Cumulative
Wave 4 (2008)	18,901	13.86	13.86
Wave 5 (2010)	24,029	17.62	31.48
Wave 6 (2012)	25,873	18.97	50.44
Wave 7 (2014)	20,088	14.73	65.17
Wave 8 (2016)	23,094	16.93	82.10
Wave 9 (2018)	24,408	17.90	100.00
Total	136,393	100.00	

Source: European Social survey (2008-2018), sample size: 136,393

Table 4 Distribution of gender and immigration status

Gender	Frequency	Percent	Cumulative
Male	*68,825*	*50.47*	*50.47*
Female	*67,542*	*49.53*	*100.00*
Total	*136,367*	*100.00*	
Born in country	**Frequency**	**Percent**	**Cumulative**
Yes	*122,916*	*90.19*	*90.19*
No	*13,373*	*9.81*	*100.00*
Total	*136,289*	*100.00*	

Source: European Social survey (2008-2018), sample size: 136,289

Table 5 and 6 present the descriptive statistics for the control variables in our study, both for the full sample and the subsample of migrants. These statistics offer a snapshot of the characteristics of our study participants.

For the full sample, we find that the average age is approximately 42.79 years, with a standard deviation of 11.514. On average, respondents rate their health at around 1.998 (SD = 0.783), with ratings ranging from 1 to 5. About 19.3% of the participants are married (SD = 0.394), while household sizes vary from a minimum of 1 to a maximum of 20, with an average of 2.884. The average years of education among respondents is 13.912, and this variable exhibits some variability, with a standard deviation of 3.636. Regarding the number of hours worked per

week, the mean is approximately 40.630 hours, with some respondents reporting as few as 0 hours and others working up to 168 hours per week.

In the migrant subsample, the average age is quite similar, with a mean of 42.610 (SD = 11.103). Ratings of health average around 1.965 (SD = 0.803) for this group. A slightly higher proportion, 20.8%, are married (SD = 0.406). The average household size is 2.972, ranging from 1 to 11. Migrants report an average of 13.927 years of education (SD = 4.135). On average, migrants work about 39.487 hours per week. Notably, the years since migration vary widely in this subsample, with an average of 22.645 years and a standard deviation of 14.559.

Table 5 Descriptive statistics for full sample

Statistic	Mean	SD	Minimum	Maximum
Age	*42.786*	*11.514*	*20*	*65*
Health	*1.998*	*0.783*	*1*	*5*
Married	*0.193*	*0.394*	*0*	*1*
Household size	*2.884*	*1.352*	*1*	*20*
Years of education	*13.912*	*3.636*	*0*	*60*
Hours worked per week	*40.630*	*13.426*	*0*	*168*

Source: European Social Survey (2008-2018): sample size: 136,000

Table 6 Descriptive statistics for migrants

Statistic	Mean	SD	Minimum	Maximum
Age	*42.610*	*11.103*	*20*	*65*
Health	*1.965*	*0.803*	*1*	*5*
Married	*0.208*	*0.406*	*0*	*1*
Household size	*2.972*	*1.423*	*1*	*11*
Years of education	*13.927*	*4.135*	*0*	*50*
Hours worked per week	*39.487*	*14.107*	*0*	*168*
Years since migration	*22.645*	*14.559*	*0*	*94*

Source: European Social Survey (2008-2018), sample size: 13,000

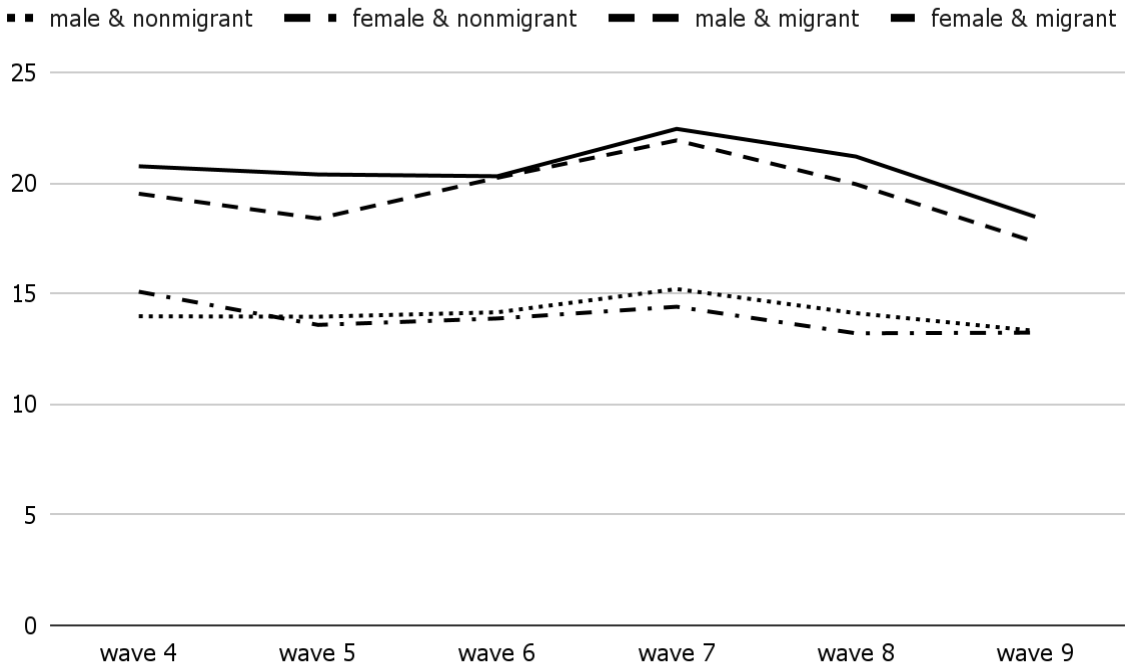
When we look at the education mismatch by gender and by immigrant status (table 7) we can see that the largest percentage of overeducation is found in the group women and immigrant, which supports our assumption of a double disadvantage for this group. Over the time span of the data (figure 1) we see that for all waves this group has the highest percentage of overeducated people. The overall percentage of overeducated remains similar between all waves with a slight peak in wave 7 (2014).

Table 7 Overqualification percentage by gender and born in country

Percentage overeducated		
	Gender	
Born in country	Male	Female
Yes	14.08	13.84
No	19.50	20.54

Source: European Social Survey (2008-2018) and authors calculations, sample size: 136,000

Figure 1 Percentage overeducated by wave for the four groups



Source: European Social Survey (2008-2018) and authors calculations, sample size: 136,000

5. Results

In this section, we present the empirical findings of our analysis, which centres on the impact of gender and immigrant status on the likelihood of being overeducated for one's job. As previously discussed in the methodology chapter, the study employs a probit analysis to examine these relationships. Our primary objective is to shed light on the extent to which gender and immigrant status influence the probability of individuals experiencing overeducation in their occupations. To achieve this, we have undertaken a comprehensive examination of the data, considering both the baseline model and models that incorporate control variables to account for potential confounding factors.

5.1. Baseline model

We present the results of our baseline probit analysis (table 8, column (1)), which explores the relationships between gender, immigrant status, and their interaction effect on the likelihood of overeducation in the labour market. We find that gender is not statistically significant in predicting overeducation (coefficient = -.0110341, $p > 0.05$), suggesting that there is no significant difference in overeducation rates between males (coded as 0) and females (coded as 1). In contrast, immigrant status exhibits a significant effect on overeducation (coefficient = .2169457, $p < 0.01$), indicating that immigrants (coded as 1) are more likely to experience overeducation compared to individuals born in the country (coded as 0).

Furthermore, our analysis reveals a statistically significant interaction effect between gender and immigrant status on overeducation (coefficient = .0482052, $p < 0.10$). While the main effects of gender and immigrant status were not both individually significant, the interaction suggests that the combined effect of being female and an immigrant contributes to a higher likelihood of overeducation compared to other gender-immigrant status combinations.

If look further and interpret the marginal effect we can dissect these variables further. We run a margins test to see if there is a significant difference in the probability of a positive outcome for over-education between female/male and migrant/non-migrant (Appendix A). We find evidence at the 1 % significance level that the predictive margins differ for migrants and non-migrants, but find no evidence for gender. We see when we plot these margins (figure 2) that the effect of gender on the probability of overeducation changes when migrant status changes.

Columns (2) and (3) in Table 8 provide adjusted predictions and margins, respectively. These figures offer a clearer picture of the probabilities of over-education. The adjusted predictions

account for the influence of gender and migration status. For instance, when examining the adjusted prediction for females (1), it reveals that females have a predicted probability of 0.145 ($p < 0.01$) of experiencing over-education. In contrast, the adjusted prediction for males (0) stands at 0.146 ($p < 0.01$). Similarly, when considering migration status, the adjusted prediction for non-migrants (0) is 0.140 ($p < 0.01$), while migrants (1) have an adjusted prediction of 0.200 ($p < 0.01$). These results emphasise the significant effect of migration on increasing the likelihood of over-education.

For the interaction between gender and migration, the adjusted prediction highlights the following probabilities: Non-migrant males (0,0) have an adjusted prediction of 0.141 ($p < 0.01$). non-migrant females (0,1) have an adjusted prediction of 0.195 ($p < 0.01$). Migrant males (1,0) have an adjusted prediction of 0.138 ($p < 0.01$) and migrant females (1,1) have an adjusted prediction of 0.205 ($p < 0.01$).

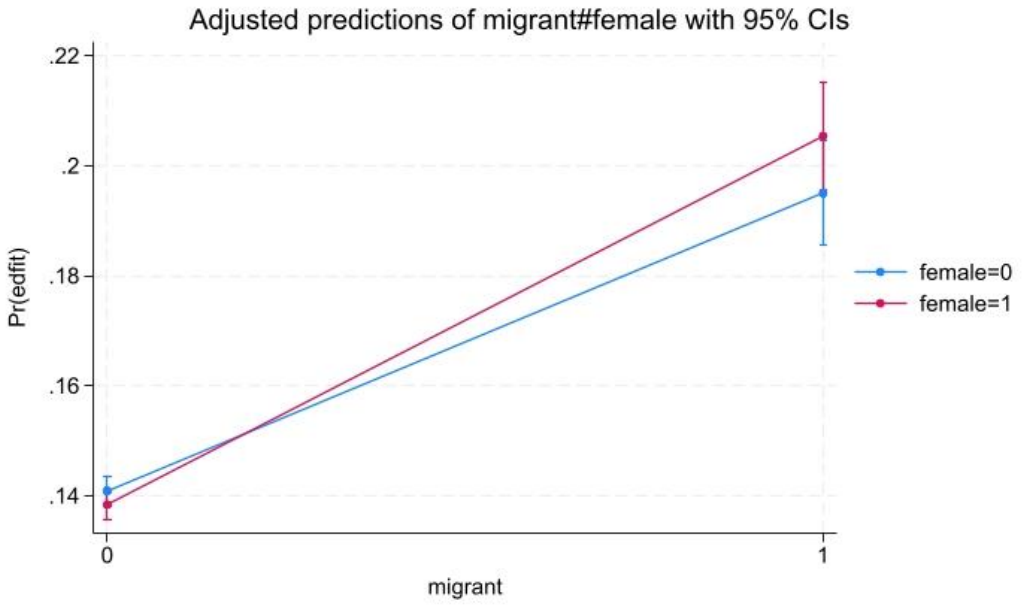
In summary, these results underscore the significance of migration as a contributing factor to over-education, with migrants having a notably higher probability. Additionally, gender plays a role, although its impact is relatively smaller. The interactive effect of being both female and a migrant is associated with a slightly increased probability of over-education.

Table 8 Estimation results and margins of the baseline model

Over-education probabilities	*(1)*	*(2) Predictive margins*	*(3) Adjusted predictions*
Female	*-0.011*		
	(0.009)		
0		*0.146****	
		(0.001)	
1		*0.145****	
		(0.001)	
Migrant	*0.217****		
	(0.019)		
0		*0.140****	
		(0.001)	
1		*0.200****	
		(0.003)	
Female x Migrant	*0.048**		
	(0.026)		
0 0			*0.141****
			(0.001)
0 1			*0.195 ****
			(0.005)
1 0			*0.138****
			(0.001)
1 1			*0.205****
			(0.005)
Observations	*136,263*	*136,263*	*136,263*
Pseudo R-squared	*0.0029*		

*Source: European Social Survey (2008-2018) and authors calculation, note: stars denote *p<0.10, **p<0.05, ***p<0.01.*

Figure 2 Marginsplot for overeducation and the interaction between immigrant status and gender



5.2. Extended model

Building upon the baseline model, we extend our analysis to incorporate a comprehensive set of control variables. This allows us to account for potential confounding factors and gain a more nuanced understanding of how gender and immigrant status influence over-education in the labour market. Table 9 presents the results of the probit analysis for the extended model, which includes gender, immigrant status, their interaction, and control variables.

5.2.1. Individual characteristics

If we extend the model with individual characteristics we see that our variables of interest change. The coefficient for the female variable is -0.136*** ($p < 0.01$), indicating that, after controlling for other variables, being female is associated with a statistically significant reduction in the likelihood of overqualification. This suggests that, on average, women are less likely to be overqualified for their jobs. The coefficient for migrant is 0.249*** ($p < 0.01$), signifying that migrants have a higher likelihood of experiencing overqualification compared to non-migrants. This suggests that migration status is associated with an increased risk of overqualification. Lastly, the interaction effect between being female and a migrant is captured by the coefficient of 0.089*** ($p < 0.01$). This indicates that the combined effect of being both

female and a migrant results in a significantly higher probability of overqualification compared to other groups.

5.2.2. Full model

To create a full model (Table 9, column (5) & (6)), workplace as well as country characteristics are added to the model. In this comprehensive analysis, it is seen that all three principal variables of interest—gender, immigrant status, and the interaction term between these factors—emerge as significant predictors of overeducation in this model. This stands in contrast to our baseline model, where gender was not found to be a significant factor. We see that gender, even after accounting for a range of control variables, exerts a significant impact, with females having a reduced likelihood of experiencing overeducation compared to males. Immigrant status remains significant, indicating that immigrants are more likely to face overeducation in the labour market. Lastly, the interaction effect between gender and immigrant status has stayed significant, underscoring the unique vulnerabilities faced by female immigrants in the context of occupation-education mismatch.

Table 9 Estimation results with control variables

Overqualification probability	(1)	(4)	(5)	(6)
Female	*-0.011*	*-0.212****	*-0.136****	*-0.138****
	(0.009)	*(0.011)*	*(0.012)*	*(0.012)*
Migrant	*0.217****	*0.268****	*0.249****	*0.254****
	(0.019)	*(0.024)*	*(0.025)*	*(0.025)*
Female x Migrant	*0.048**	*0.124****	*0.089****	*0.085***
	(0.026)	*(0.033)*	*(0.034)*	*(0.035)*
Individual characteristics	*No*	*Yes*	*Yes*	*Yes*
Work characteristics	*No*	*No*	*Yes*	*Yes*
Country characteristics	*No*	*No*	*No*	*Yes*
Country fixed effects	*No*	*Yes*	*Yes*	*Yes*
Year effects	*No*	*Yes*	*Yes*	*Yes*
Observations	*136,263*	*130,527*	*118,092*	*116,071*
Pseudo R-squared	*0.003*	*0.280*	*0.290*	*0.263*

*Source: European Social Survey (2008-2018) and authors calculations. Note: Individual characteristics include age, age squared, part of a group discriminated against, health, household size and education. Work characteristics include hours worked per week, part of a trade union, establishment size and type of organisation. Country characteristics include Gii index (full table in Appendix B). Stars denote *p<0.10, **p<0.05, ***p<0.01*

5.3. Mechanisms

To investigate the interplay between migration, gender and overeducation further we wil explore multiple possible factors contributing to the "double disadvantage" faced by immigrant women in terms of overeducation. We wil investigate multiple mechanisms, both at the personal and country levels, that could potentially elucidate the unique challenges encountered by this specific demographic.

5.3.1. Personal level

In Table 10 the personal level mechanisms influencing the probability of overqualification are explored. The number of years of education play a significant role in overqualification. For each additional year of education, there is a substantial reduction in the likelihood of overqualification (-0.058***), but when we interaction this term with Female we see an opposite results (0.042***) It is ambiguous if individuals who face discrimination based on

language proficiency are more likely to experience overqualification as the results are not significant. Being married is associated with a lower probability of overqualification (-0.144***) for the full population but when we look at the interaction with Female or Migrant, (0.111***) and (0.288**) respectively, we see that the probability of overeducation increases. Being Female or Migrant, compared to the full sample, having a mother who worked during the respondents childhood significantly reduces the likelihood of overqualification (-0.044*; -0.126**). This may be linked to the modeling of a strong work ethic and career choices, influencing one's career trajectory. Lastly, having a partner who stays at home is associated with a decreased probability of overqualification (-0.056**) and this is even bigger when interacted with Female and Migrant. Although these different personal level mechanisms could explain some part of overeducation we see that for all of the tests Female, Migrant and their interaction remains significant and thus still a big part of the effect remains in these variables.

Table 10 Personal level mechanisms

Overqualification probability	Z = Years of education	Z = Discriminated on language	Z = Married	Z = Mother worked	Z= Stay at home partner
Female	*-0.799****	*-0.128****	*-0.143****	*-0.094****	*-0.138****
	(0.061)	*(0.012)*	*(0.018)*	*(0.022)*	*(0.013)*
Migrant	*0.239***	*0.218****	*0.145****	*0.303****	*0.225****
	(0.115)	*(0.025)*	*(0.041)*	*(0.039)*	*(0.028)*
Female x Migrant	*0.467****	*0.076***	*0.106**	*0.023*	*0.079***
	(0.161)	*(0.035)*	*(0.056)*	*(0.058)*	*(0.037)*
Z	*-0.058****	*0.024*	*-0.144****	*0.050****	*-0.056****
	(0.003)	*(0.090)*	*(0.035)*	*(0.019)*	*(0.022)*
Female x Z	*0.042****	*0.193*	*0.111****	*-0.044**	*0.072**
	(0.004)	*(0.127)*	*(0.043)*	*(0.026)*	*(0.040)*
Migrant x Z	*-0.000*	*0.152*	*0.288****	*-0.126***	*-0.009*
	(0.007)	*(0.166)*	*(0.092)*	*(0.051)*	*(0.061)*
Female x Migrant x Z	*-0.025****	*-0.434**	*-0.050*	*0.075*	*-0.311***
	(0.010)	*(0.224)*	*(0.128)*	*(0.073)*	*(0.129)*
Individual characteristics	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Work characteristics	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Country characteristics	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Country fixed effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	*116,308*	*116,748*	*60,762*	*115,358*	*116,748*
Pseudo R-squared	*0.296*	*0.291*	*0.296*	*0.291*	*0.262*

*Source: European Social Survey (2008-2018) and authors calculations. Note: Individual characteristics include age, age squared, part of a group discriminated against, health, household size and education. Work characteristics include hours worked per week, part of a trade union, establishment size and type of organisation. Country characteristics include Gii index. Stars denote *p<0.10, **p<0.05, ***p<0.01*

5.3.2. Country level

Table 11 delves into the influence of country-level factors on the probability of overqualification. Gender inequality within a country, shows a significant positive coefficient (2.005**), but more interestingly its interaction with Female shows a significant negative effect (-1.002***) suggesting lower probability of overeducation for females in countries with a better score on gender inequality. An other notable fact is that the significance of the variable Female

and its interaction with Migrant completely diminishes. For both the total count of immigrants and non-EU immigrants their interaction with the variable Migrant give increased probability for overeducation (6.07e-07***;9.03e-07) and the significance of Migrant and its interaction with Female disappears. The relationship between the proportion of women in a country's parliament and overqualification is ambigious, and lastly, membership in the European Union has a significant negative effect on overqualification, with a coefficient of -0.188***, with no interactions showing significance.

Table 11 Country level mechanisms

Overqualification probability	Z = Gender inequality	Z= Count total Immigrants	Z= Count non-eu Immigrants	Z= Seat share women in parliament	Z= European Union member
Female	*0.003*	*-0.108****	*-0.109****	*-0.402****	*-0.188****
	(0.022)	*(0.036)*	*(0.035)*	*(0.065)*	*(0.057)*
Migrant	*0.214****	*0.063*	*0.087*	*-0.115*	*0.116*
	(0 .047)	*(0.078)*	*(0.075)*	*(0.143)*	*(0.085)*
Female x Migrant	*0.005*	*0.157*	*0.127*	*0.301*	*0.266***
	(0.065)	*(0.107)*	*(0.104)*	*(0.199)*	*(0.124)*
Z	*2.005****	*-3.33e-07****	*-4.81e-07****	*-0.010****	*0.214****
	(0.113)	*(7.71e-08)*	*(1.26e-07)*	*(0.002)*	*(0.039)*
Female x Z	*-1.002****	*2.25e-08*	*7.23e-08*	*0.008****	*0.053*
	(0.144)	*(1.12e-07)*	*(1.82e-07)*	*(0.002)*	*(0.060)*
Migrant x Z	*0.157*	*6.07e-07****	*9.03e-07****	*0.010***	*0.118*
	(0.364)	*(2.03e-07)*	*(3.28e-07)*	*(0.004)*	*(0.093)*
Female x Migrant x Z	*0.376*	*-5.86e-07***	*-8.43e-07**	*-0.007*	*-0.224**
	(0.498)	*(2.89e-07)*	*(4.62e-07)*	*(0.006)*	*(0.135)*
Individual characteristics	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Work characteristics	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year effects	*Yes*	*No*	*No*	*Yes*	*Yes*
Observations	*116,748*	*19,106*	*19,106*	*49,717*	*50,805*
Pseudo R-squared	*0.292*	*0.254*	*0.253*	*0.261*	*0.264*

*Source: European Social Survey (2008-2018) and authors calculations. Note: Individual characteristics include age, age squared, part of a group discriminated against, health, household size and education. Work characteristics include hours worked per week, part of a trade union, establishment size and type of organisation. Stars denote *p<0.10, **p<0.05, ***p<0.01*

5.4. Robustness checks

To validate and strengthen the findings of our main analysis, we conducted a series of robustness checks. These checks were designed to test the stability and consistency of our key results in various scenarios and under different model specifications. Through these checks, visible in Table 14, we aim to confirm the robustness of our conclusions.

5.4.1. Alternative model specifications

To assess the sensitivity of our results to different model specifications, we evaluate the use of a logistic model as an alternative to the probit model used in the main analysis. The aim is to determine whether the choice of modelling technique impacts the significance of our variables of interest. We see similar results to the probit model with the significance and direction of the three main variables of interest remaining identical. These results indicate that the alternative model produces consistent and significant results for our key variables (table 14, column (rb.1)).

5.4.2. Alternative definitions

To explore the robustness of our findings within alternative definitions of key variables, we considered variations in the categorization of overeducation and immigrant status thresholds. In this study, overeducation is computed using the mean and standard deviation of education for each occupation. Some studies suggest that using the mean is not the best option as it is susceptible to outliers and other measures such as the mode are more reliable (Grießhaber & Seibel, 2014).

To check for robustness the mode instead of the mean is used as a measuring tool for overeducation. Computing overeducation with the mode gives us an overall overeducated percentage of 14.95 compared to the percentage of 14.57 with the method of using the mean. The distribution between the different groups also stays very similar (table 12). When we use this variable in our analysis (table 14, column (rb.2)), our results remain in line with those obtained using the mean, reinforcing the robustness of our initial conclusions.

Table 12 Overqualification percentage (mode) by gender and born in country

Percentage overeducated (by mode)		
	Gender	
Born in country	Male	Female
Yes	14.33	14.44
No	18.37	21.81

Source: European Social Survey (2008-2018) and authors calculation, sample size: 136,000

We categorise the participants in workplace categories through ISCO, as this method produces more than 9000 categories, some of these categories have only very few participants in them. This could lead to bias as the over-education threshold for these workplace categories is created with a very limited number of observations. To assess the impact of these small occupations, we conduct an analysis where occupations with fewer than 100 individuals (robustness check 3a, table 10) and 150 individuals (robustness check 3b, table 10) are removed from the dataset. The purpose is to determine if the calculations used to compute the overeducation threshold in small occupations significantly affect our results. We see that our findings remain stable, indicating that the calculations in these occupations do not alter the significance of our variables.

In our main analysis, we have used all immigrants who migrated to a European country. We could argue that there are vast differences between immigrants from inside and outside Europe that could lead to different results of our analysis. In this analysis, we focus solely on immigrants from outside Europe. This test allows us to investigate whether the inclusion of Europe immigrants influences our results. We use first-generation ancestry to categorise immigrants in European descent and outside European descent. When we look at the distribution of the sample we see that now around 4 per cent is categorised as immigrants (table 13) compared to the 10 per cent in our main analysis. The results show that gender and immigrant status remain significant predictors of overqualification even with this different definition of immigrant (table 14, column (rb.4a)). However, the interaction term between gender and immigrant status loses significance. This suggests that the interplay between gender and immigrant status may differ for EU and non-EU immigrants.

When we add the categorical variable ancestry as a control variable within this robustness check we see that the main variables of interest remain the same. Although not all categories show significant results we see that being of North African, Middle Eastern and Central Asian,

South and South-East Asian and North American and Australasian descent decreases the chances of being over-educated compared to being of European descent (Appendix C).

Table 13 Non-EU immigration status

Non-EU migrant	Frequency	Percent	Cumulative
No	65,058	96,26	96,26
Yes	2,528	3.74	100.00
Total	67,586	100.00	

Source: European Social Survey (2008-2018) and authors calculation, sample size: 136,000

The overall consistent outcomes observed in our robustness checks provide strong support for the reliability of our primary results. These checks demonstrate that the significance of gender, immigrant status, and the interaction effect is not dependent on specific variable definitions, model specifications, or the inclusion of additional control variables.

In conclusion, our robustness checks have reinforced the stability and validity of our key findings. The persistence of significant relationships between gender, immigrant status, and overeducation across various scenarios underscores the robust nature of these associations. These checks enhance our confidence in the generalizability and reliability of our research outcomes.

Table 14 Robustness checks

Overqualification probability	(6)Full	(rb.1)	(rb.2)	(rb.3a)	(rb.3b)	(rb.4a)	(rb.4b)
Female	*-0.138*** (0.012)*	-0.228*** (0.021)	-0.101*** (0.011)	*-0.104*** (0.012)*	*-0.109*** (0.013)*	*-0.157*** (0.017)*	-0.157*** (0.017)
Migrant	*0.254*** (0.025)*	0.431*** (0.043)	0.187*** (0.024)	*0.178*** (0.027)*	*0.182*** (0.028)*		
Female x Migrant	*-0.085** (0.035)*	0.134** (0.058)	0.162*** (0.032)	*0.181*** (0.035)*	*0.186*** (0.037)*		
Non EU migrant						*0.328*** (0.052)*	0.390*** (0.077)
Female x Non EU migrant						*0.072 (0.074)*	0.034 (0.081)
Individual characteristics	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Ancestry	*No*	*No*	*No*	*No*	*No*	*No*	*Yes*
Work characteristics	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Country characteristics	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Country effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	*116,071*	*116,071*	*116,071*	*90,701*	*83,636*	*53,105*	*52,710*

*Source: European Social Survey (2008-2018) and authors calculations. Note: Individual characteristics include age, age squared, part of a group discriminated against, health, household size and education. Work characteristics include hours worked per week, part of a trade union, establishment size and type of organisation. Country characteristics include Gii index. Stars denote *p<0.10, **p<0.05, ***p<0.01.*

6. Conclusion

In this study, we sought to investigate the relationship between gender, immigrant status, and the interaction between these variables on the likelihood of overeducation. We aimed to shed light on the factors contributing to overqualification in the labour market, with a particular focus on immigrant women. Through a comprehensive analysis of these factors, we have uncovered important insights that enhance our understanding of overeducation.

Our analysis has revealed compelling evidence that gender, immigrant status, and the interaction between these variables play pivotal roles in determining overeducation in the labour market. These findings have remained consistent and robust across our full model and various robustness checks. The significance of gender, immigrant status, and their interaction suggests that labour market dynamics are influenced by complex interplays of sociodemographic factors. Our results highlight that immigrant women face unique challenges that make them particularly susceptible to overeducation.

Next to this, we explored the intricate web of factors contributing to the double disadvantage faced by immigrant women in terms of overeducation. Our research hypotheses led us to investigate multiple mechanisms, both at the personal and country levels, that could potentially elucidate the unique challenges encountered by this specific demographic.

Our examination of personal-level mechanisms affirmed the importance of individual characteristics in understanding overeducation among immigrant women. As anticipated, characteristics such as education, marital status, and language integration play pivotal roles in shaping the overeducation landscape for this group. Immigrant women with higher levels of education are less likely to experience overeducation, indicating that investing in education can act as a protective factor against skill mismatch. Marital status emerged as another crucial personal-level determinant. Being married increases the chances of overeducation for immigrant women. This underscores the need for targeted policies and interventions to address the unique challenges faced by married immigrant women in the labour market. Lastly, language integration plays a role in over-education. Those who face discrimination based on language are more likely to be overeducated. This reinforces the importance of fostering inclusive language policies and addressing linguistic barriers to promote equitable access to suitable job opportunities.

On the country level, our study delved into the influence of broader contextual factors that may contribute to the double disadvantage experienced by immigrant women in terms of overeducation. Countries with more robust policies on promoting gender equality tend to

exhibit lower rates of overeducation among immigrant women. These findings underscore the importance of advocating for and implementing gender-inclusive policies that can mitigate the overeducation disparity. The overall count of immigrants within a country emerged as a noteworthy factor. Higher counts of immigrants were associated with higher overeducation rates among immigrant women.

Lastly, building on previous literature, our investigation into the visibility of female and immigrant role models in the workforce provided essential insights. We discovered that the presence of such role models, both at the personal and country levels, plays a significant role in reducing overeducation for this group. This finding emphasizes the importance of promoting diversity and representation in the workforce as a means to inspire and guide future generations of immigrant women.

These findings carry significant implications for policymakers, employers, and organisations involved in labour market integration. Recognizing the factors contributing to overeducation can guide the development of targeted policies and initiatives aimed at reducing skill waste and promoting equitable access to suitable job opportunities. Furthermore, this research extends our understanding of the factors underlying overeducation, with a specific focus on the often neglected intersection of gender and immigrant status. By highlighting the experiences of immigrant women, we have illuminated a critical area of concern in labour market integration and skill utilisation.

While this study provides valuable insights into the relationship between gender, immigrant status, and overeducation, it is essential to acknowledge its limitations. Understanding these limitations is crucial for interpreting the results and guiding future research efforts. This study relies on existing data sources, such as the European Social Survey, which may have limitations in terms of the variables available and the representativeness of the sample. The data may not capture the full complexity of the overeducation phenomenon, and the results are contingent on the quality and accuracy of the data as well as the availability of observable variables available in the dataset. There may be unobserved or omitted variables that could provide additional insights into the overeducation phenomenon. Secondly, while we have identified associations between gender, immigrant status, and overeducation, we cannot definitively determine the direction of causality. Longitudinal or experimental studies would be necessary to explore causality further. Third, the study is based on data from specific time frames and only looks at European countries, limiting the generalizability of the findings to different contexts. Labour market dynamics, immigration policies, and societal attitudes can vary significantly across countries and over time. Therefore, the results might not be universally

applicable. Lastly, the study focuses on the broad category of "immigrants". It does not delve into the nuances of specific immigrant groups, such as refugees, asylum seekers, or those with various immigration statuses. Future research could explore these specific groups to gain a deeper understanding of their unique experiences.

In conclusion, this study underscores the importance of considering gender and immigrant status as crucial determinants of overeducation. Our findings serve as a foundation for informed policymaking and intervention strategies aimed at promoting efficient skill utilisation in the labour market. By addressing the challenges faced by immigrant women and other marginalised groups, we move closer to fostering inclusive and equitable labour markets.

7. Bibliography

Akgüç, M., Parasnis, J. Occupation–Education Mismatch of Immigrant Women in Europe. *Soc Indic Res* (2023). https://doi.org/10.1007/s11205-023-03066-0

Adalet McGowan, M. and D. Andrews (2015a), "Labour Market Mismatch and Labour Productivity: Evidence from PIAAC Data", OECD Economics Department Working Papers, N

Adalet McGowan, M. and Andrews, D. (2015b), Skill Mismatch and Public Policy in OECD Countries, *OECD Economics Department Working Papers*, No. 1210, OECD Publishing, Paris, https://doi.org/10. 1787/5js1pzw9lnwk-en

Aleksynska, M., & Tritah, A. (2013). Occupation–education mismatch of immigrant workers in Europe: Context and policies. *Economics of Education Review*, *36*(C), 229–244.

Bauer T.K. & K.F. Zimmermann. (1999) Occupational mobility of ethnic migrants. Institute for the Study of Labor, Discussion Paper No. 58.

Braconier, H., G. Nicoletti and B. Westmore (2014), "Policy Challenges for the Next 50 Years", OECD Economics Department Policy Papers, No. 9.

Chen, C. et al. 2010 The prevalence of over-qualification and its association with health status among occupationally active new immigrants to Canada. *Ethnicity & Health*, 15(6): 601–619.

Chiswick, B. R., & Miller, P. W. (2011). The negative assimilation of immigrants: special case. Industrial and Labor Relations Review, 64(3), 502-525.

Csedő, K. (2008). Negotiating skills in the global City: Hungarian and Romanian professionals and graduates in London. *Journal of Ethnic and Migration Studies*, *34*(5), 803–823. https://doi.org/10.1080/13691830802106093

Fang, T. (2009). Workplace responses to vacancies and skill shortages in Canada. *International Journal of Manpower*, *30*(4), 326–348. https://doi.org/10.1108/01437720910973034

Goldin, C. (2022). Understanding the economic impact of COVID-19 on women. *Brookings papers on economic activity*, *2022*(1), 65–139. https://doi.org/10.1353/eca.2022.0019

Goldin, C. (2021). *Career and family: Women's Century-Long Journey Toward Equity*. Princeton University Press.

Grandea, N. 2008 Gender, skills and integration: Policy issues and implications. Paper presented at the 13th International Metropolis Conference, held in Bonn, Germany.

Grießhaber, N., & Seibel, V. (2014). Over-education among Immigrants in Europe: The Value of Civic Involvement. *Journal of Ethnic and Migration Studies*, *41*(3), 374–398. https://doi.org/10.1080/1369183x.2014.915192

Hartog, J. (2000). Over-education and earnings: Where are we, where should we go? *Economics of Education Review*, *19*(2), 131–147. https://doi.org/10.1016/s0272-7757(99)00050-3

IOM. (2012). CRUSHED HOPES: Underemployment and deskilling among skilled migrant women. In *IOM*. https://publications.iom.int/system/files/pdf/crushed_hopes_3jan2013.pdf

De Jong, G. F., & Madamba, A. B. (2001). A double disadvantage? minority group, immigrant status, and underemployment in the United States. *Social Science Quarterly*, *82*(1), 117–130. https://doi.org/10.1111/0038-4941.00011

Kiker, B. F., Santos, M. C., & De Oliveira, M. M. (1997). Overeducation and undereducation: evidence for Portugal. *Economics of Education Review*, *16*(2), 111–125. https://doi.org/10.1016/s0272-7757(96)00040-4

Kofman, E., & Raghuram, P. (2005). Gender and skilled migrants: into and beyond the work place. *Geoforum*, *36*(2), 149–154. https://doi.org/10.1016/j.geoforum.2004.06.001

Liebig, T., (2009). Jobs for Immigrants: Labour Market Integration in Norway. OECD Social, Employment and Migration. Working Papers No. 94. OECD Publishing. http://dx.doi.org/10.1787/221336486778

McAuliffe, M. & A. Triandafyllidou (eds.), (2021). *World Migration Report 2022*. International Organization for Migration (IOM), Geneva.

Nonnenmacher, S., (2007) Recognition of the qualifications of migrant workers: Reconciling the interests of individuals, countries of origin and countries of destination. *International Journal on Multicultural Societies*, *9*(1), 91–112.

Preston, K., & Grimes, A. (2019). Migration, gender, wages and wellbeing: who gains and in which ways? *Social Indicators Research*, *144*(3), 1415–1452. https://doi.org/10.1007/s11205-019-02079-y

Rubin, J., Rendall, M. S., Rabinovich, L., Tsang, F., Van Oranje-Nassau, C., & Janta, B. (2008). Migrant women in the European labour force: Current situation and future prospects. Report prepared for the *European Commission*. https://www.rand.org/content/dam/rand/pubs/technical_reports/2008/RAND_TR591.pdf

Tijdens, K., Beblavý, M., & Thum-Thysen, A. (2018). Skill mismatch comparing educational requirements vs attainments by occupation. *International Journal of Manpower*, *39*(8), 996–1009. https://doi.org/10.1108/ijm-10-2018-0328

8. Appendix

Appendix A: Margins test for variable migrant and female

. test 0.migrant = 1.migrant

(1) 0bn.migrant - 1.migrant = 0

chi2(1) = 283.04

Prob > chi2 = 0.0000

. test 0.female = 1.female

(1) 0bn.female - 1.female = 0

chi2(1) = 0.39

Prob > chi2 = 0.5333

Appendix B: Probit regression with results for all control variables

Overqualification probability	(1)	(4)	(5)	(6)
Female	*-0.011*	*-0.212****	*-0.136****	*-0.138****
	(0.009)	*(0.011)*	*(0.012)*	*(0.012)*
Migrant	*0.217****	*0.268****	*0.249****	*0.254****
	(0.019)	*(0.024)*	*(0.025)*	*(0.025)*
Female x Migrant	*0.048**	*0.124****	*0.089****	*-0.085***
	(0.026)	*(0.033)*	*(0.034)*	*(0.035)*
Individual characteristics	*No*	*Yes*	*Yes*	*Yes*
Age		-0.029***	-0.025***	-0.024***
		(1 .004)	(0.004)	(0 .004)
Age squared		0.000***	0.000***	0.000***
		(0.000)	(0.000)	(0.000)
Group discriminated		-0.045**	-0.053**	-0.054**
		(0 .020)	(0.021)	(0 .021)
Health		0.074***	0.074***	0.074***
		(0 .007)	(0.008)	(0.008)
Household size		0.004	0.004	0.004
		(0.004)	(0.004)	(0.004)
Education (ref. group primary or less)				

lower secondary		-3.663*** (0.255)	-3.761*** (0.258)	-3.758*** (0.258)
lower tier upper secondary		-3.095*** (0.086)	-3.204*** (0.088)	-3.193*** (0.088)
upper tier upper secondary		-1.972*** (0 .021)	-2.097*** (0.023)	-2.094*** (0.023)
advanced vocational, sub-degree		-0.505*** (0 .013)	-0.592*** (0.014)	-0.590*** (0.014)
tertiary education		-0.375*** (0 .014)	-0.403*** (0.015)	-0.401*** (0.015)
Work characteristics	*No*	*No*	Yes	*Yes*
Hours worked per week			-0.001** (0.000)	-0.001*** (0.000)
Trade union membership (ref. group: not part)				
Yes, currently			0.000 (0.015)	-0.001 (0.016)
Yes, previously			0.041** (0.017)	0.037** (0.017)
Establishment size (ref. group: under 10)				
10 to 24			-0.066*** (0.018)	-0.065*** (0.017)
25 to 99			-0.139*** (0.017)	-0.140*** (0.017)
100 to 499			-0.138*** (0.019)	-0.144*** (0.019)
500 or more			-0.211*** (0.020)	-0.214*** (0.020)
Type of organisation (ref. group: Central or local government)				
Other public sector (such as education and health)			-0.203*** (0.022)	-0.203*** (0.022)
A state owned enterprise			0.154*** (0.027)	0.146*** (0.027)
A private firm			0.299*** (0.019)	0.295*** (0.019)
Self employed			0.299*** (0.028)	0.291*** (0.028)

Other			0.115***	0.110***
			(0.042)	(0.042)
Country characteristics	*No*	*No*	*No*	Yes
Gender inequality index				0.130
				(0.299)
Country effects	*No*	*Yes*	*Yes*	*Yes*
Year effects	*No*	*Yes*	*Yes*	*Yes*
Observations	*136,263*	*130,527*	*118,092*	*116,071*
Pseudo R-squared	*0.003*	*0.280*	*0.290*	*0.263*

Note: *stars denote *p<0.10, **p<0.05, ***p<0.01*