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Why are some EU immigrant groups more disadvantaged on the German labor market than others?

The role of institutional similarities between home and host country for labor market success

Abstract: Limited transferability of foreign human capital and limited signaling value of foreign degrees are important explanations for immigrants' labor market disadvantages. While previous scholarship analysed the role of institutional settings in home countries in shaping this limited transferability and signaling value, scholars did not investigate whether similarities between institutional settings of immigrants' host and home countries matter. This article investigates the role of occupation-specific degrees acquired in the educational institutions of the home country for labor market success in Germany, the archetype of an occupation-specific labor market. To minimize unobserved heterogeneity, we employ a rather homogenous sample of foreign-trained immigrants (FTI) from seven EU countries. Using German Micro Census data, the results show a positive association between occupational specificity in the home country and employment probabilities as well as wages in Germany. This association is particularly strong for FTI working in occupation-specific jobs, highlighting the importance of occupation-specific degrees for labor market integration in countries with occupation-specific labor markets. In summary, institutional similarities between home and host countries shape immigrants' labor market success.

Keywords: Immigration; Education; Inequality; Labor; European Union

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SozW, 77 (1) 2026, 61 – 82 DOI: 10.5771/0038-6073-2026-1-61

Warum sind einige Gruppen von EU-Zugewanderten stärker auf dem deutschen Arbeitsmarkt benachteiligt als andere?

Die Rolle von institutionellen Ähnlichkeiten zwischen Herkunftsland und Zielland für den Arbeitsmarkterfolg

Zusammenfassung: Die eingeschränkte Übertragbarkeit von ausländischem Humankapital und der eingeschränkte Signalwert von ausländischen Abschlüssen sind wichtige Erklärungen für die Benachteiligung von Zugewanderten auf dem Arbeitsmarkt. Während die bisherige Forschung die Rolle der institutionellen Rahmenbedingungen in den Herkunftsländern für diese eingeschränkte Übertragbarkeit analysiert hat, wurde bisher nicht untersucht, ob Ähnlichkeiten zwischen den institutionellen Rahmenbedingungen in den Ziel- und Herkunftsländern von Zugewanderten eine Rolle spielen. In diesem Beitrag wird die Rolle der im Herkunftsland erworbenen berufsspezifischen Bildungsabschlüsse für den Arbeitsmarkterfolg in Deutschland, dem Archetyp eines berufsspezifischen Arbeitsmarktes, untersucht. Um unbeobachtete Heterogenität zu minimieren, verwenden wir eine vergleichsweise homogene Stichprobe von männlichen Zugewanderten mit ausländischer Ausbildung (Foreign-Trained Immigrants, FTI) aus sieben EU-Ländern. Die Ergebnisse zeigen einen positiven Zusammenhang zwischen der Berufsspezifität im Herkunftsland und der Beschäftigungswahrscheinlichkeit sowie den Löhnen in Deutschland. Dieser Zusammenhang ist besonders stark für FTI, die in berufsspezifischen Jobs arbeiten, was die Bedeutung von berufsspezifischen Bildungsabschlüssen für die Arbeitsmarktintegration in Ländern mit berufsspezifischen Arbeitsmärkten unterstreicht. Insgesamt zeigen wir, dass institutionelle Ähnlichkeit den Arbeitsmarkterfolg von Zugewanderten mitbestimmt.

Stichworte: Einwanderung; Bildung; Ungleichheit; Arbeit; Europäische Union

1. Introduction

Scholars have long documented that immigrants have labor market disadvantages compared to the native population (Chiswick 1978; Borjas 1985; Guzi et al. 2021) and that some immigrant groups have more labor market success than other immigrant groups (Cantalini et al. 2023; Damelang et al. 2021; Lancee and Bol 2017; Zimmermann et al. 2025). These differences between groups even persist for immigrants with comparable educational degrees because the same formal educational degrees differ in provided skills (Breen 2005). These skill differences lead to a different valuation of educational degrees based on the institutional setting of the home country (Lancee and Bol 2017). In this study, we argue that the cross-national institutional variation in occupation-specific training systems is a major cause of differences in labor market success for immigrants.

Occupation-specific skills are an essential matching mechanism for the allocation of workers to occupations. While the institutionalization of the training system prepares native-born individuals for the requirements of a job, the adaptation of foreign occupation-specific training may influence labor market success for immigrants. The organization of labor markets regarding skill development and skill usage varies across countries and their training systems. In particular, the institutional linkage between school and work varies considerably across industrialized countries (Bol et al. 2019). Institutionalized school-to-work linkages in both host and home countries are a key factor in determining the transferability of foreign human capital and the signaling power of degrees (Kogan 2016; Lancee 2016; Spörlein 2018). Consequently, differences between training systems may hinder the transferability of human capital and the signaling power of occupation-specific foreign training.

Comparative integration research stresses the importance of host countries' context of reception (e.g., Rumbaut and Portes 2001; Heisig and Schaeffer 2020), which also determines the labor market success of immigrants (van Tubergen et al. 2004; Ebner and Helbling 2016). In this context, occupational specificity in the host country has emerged as a crucial institutional characteristic (e.g., Lancee and Bol 2017; Spörlein 2018). For example, Lancee (2016) shows that the unemployment rate of non-Western immigrants compared to Western immigrants is higher in countries where the labor market is occupation-specific. Thus, labor market opportunities for immigrants may depend on the adaptability and matching of specific skills. While most studies focused on the variation of the institutional setting in the host country, the variation in the institutional setting of the home country has been neglected. These considerations lead to our research question: To what extent does the similarity in occupation-specific training between home and host countries affect the labor market success after migration? In particular, does occupation-specific training in the home country affect the labor market outcomes after migration in countries with occupation-specific labor markets?

An emerging literature analyzes the influence of immigrants' institutionalized training systems on their labor market success in the host country. In this context, Stumpf et al. (2020) find that employers prefer applicants from countries with standardized systems, independent of the host labor market. Regarding specificity, Geven and Spörlein (2022) find that immigrants benefit less from their foreign degrees than native-born individuals and immigrants with domestic degrees. However, this study does not consider the variation in occupation-specific skills in foreign degrees. A degree obtained in an occupation-specific country, such as the Netherlands, might, on average, convey more occupation-specific skills and be more beneficial for immigrants in other occupation-specific countries than degrees obtained in non-occupation-specific countries, such as Italy.

Our first contribution to the literature is to extend existing findings on the role of occupational specificity in the context of immigrants by highlighting the importance of the educational system in the home country of immigrants for the skill specificity of the degrees obtained abroad. We explore the role of occupation-specific foreign degrees on two outcomes of labor market success: employment probability and wages. While previous research mostly focused on the host country's context of reception, we focus on a single host country, varying the occupational specificity in which immigrants received their education instead. Therefore, we focus on foreign-trained immigrants (FTI) who acquired at least a vocational certificate in different home countries. This approach allows us to additionally address inequalities between migrant groups caused by the institutional settings of their home countries.

Previous studies investigating institutional measures at the country-level might be confounded by other factors, such as prejudice and culture (e.g., Ebner and Helbling 2016; Zimmermann 2025). For example, European immigrants are, on average, from countries with highly rated education systems (Li and Sweetman 2014) and are less prone to ethnic prejudice than non-Western immigrant groups (Holbrow 2020; Kim 2015). Thus, the positive correlation between education systems and immigrants' labor market success (e.g., Lancee 2016) may be confounded by discrimination. Our second contribution to the literature is employing a rather homogenous sample of European Union (EU) immigrants who share common political institutions, common work values, a common economic area, and can work in any EU country without legal restrictions. Therefore, EU immigrants' differences in social and cultural contexts are smaller in our study compared to the differences between non-Western and Western immigrants (e.g., Lancee 2016; Lancee and Bol 2017). In summary, we can extract the effect of occupational specificity on labor market success by limiting differences in discrimination and cultural contexts through focusing on EU immigrants.

The lack of occupation-specific skills may be especially severe in highly institutionalized labor markets. In Germany, the archetype of an occupational labor market, for example, occupation-specific skills are mandatory (Stumpf et al. 2020), and Germany has the highest share of occupation-specific dual-vocational training in Europe. Immigrants from countries where the education system provides occupation-specific skills to a lesser extent lack the occupational-specific aspect of human capital. Thus, we focus on Germany as a host country in our study, which also has one of the highest levels of immigration in Europe. In 2022, approximately 28% of people living in Germany had a migration background, with 64% of them being first-generation immigrants (DeStatis 2023a; DeStatis 2023b). The majority of immigrants in Germany are from other European countries (62%) (DeStatis 2023a) and more than 70% of these immigrants are high-skilled (Tarchi et al. 2019), highlighting the importance of FTI for the German and European labor market.

In our empirical analyses, we employ the German Micro Census, which provides a 1% sample of the population living in Germany. The German Micro Census's large sample size enables us to distinguish between male FTI from France, Greece, Hungary, Italy, the Netherlands, Poland, and Spain at the home-country level. Since high-skilled immigrants represent 70% of immigration from other European countries to Germany, our focused FTI sample represents the majority of EU-born immigrants in Germany. To measure the effects at the home-country level, we employ an indicator for occupational specificity which measures the share of vocational trainees in dual vocational education (Bol and Werfhorst 2012). As outcome variables, we consider two distinct dimensions of labor market success, representing both the quantity and quality of employment: the employment probability and wages. By considering these two dimensions of labor market integration, we provide an extensive analysis of labor market access and returns.

2. Theory

In Europe, the institutional organization of the educational systems varies widely (e.g., Allmendinger 1989; Marczuk 2024), despite efforts to harmonize those systems (European Centre for the Development of Vocational Training 2009). In this context, educational systems with less occupational specificity, as in Italy and Spain, provide graduates with more general skills that are not tailored to specific occupations. In these educational systems, graduates require significant on-the-job training to learn the demanded skills (Bassanini et al. 2005; Maurice et al. 1986). In contrast, graduates of the apprenticeship training system in countries with a dual training system have ready-to-use skills and are productive at job entry without requiring further training (Blossfeld 1992; Forster and Bol 2018; Shavit and Muller 2000).

In this context, Germany is the archetype of an occupation-specific labor market, with 327 defined occupation-specific curricula and nationally harmonized certificates. The dual training system combines part-time schooling and apprenticeships (Pollmann-Schult and Büchel 2004; Haasler 2020). Apprenticeships convey occupation-specific skills (Marsden 1990) and lead to a tight linkage between education and occupation (DiPrete et al. 2017). Summarizing, graduates from differently configured training systems might have formally comparable levels of education, but the types of skills they possess vary (Breen 2005).

Similarities in educational systems simplify the transfer of foreign human capital between the home and host countries. Following human capital theory, individuals who provide occupation-specific skills have higher productivity (Becker 1976; Forster and Bol 2018; Lancee and Bol 2017). While these skills are common and in demand in countries with occupation-specific labor markets, these skills might be less common in host countries with a more general labor market and less in demand. Thus, occupational specificity might facilitate the transfer of human capi-

tal in occupation-specific labor markets and limit the transfer of human capital if the specific capital is not demanded in the host country labor market. This varying transferability highlights the importance of similarities in educational systems for the transferability of human capital.

Next to the transferability of human capital, FTI from countries with a distinct occupational-specific training system might also benefit from having degrees that signal occupation-specific skills. According to signaling theory, individuals with occupation-specific skills are not necessarily more skilled compared to other individuals, but their educational degree signals quality and productivity to the employer (Weeden 2002). Compared to degrees conveying general skills, an educational degree with high occupational specificity is denoted as being a clear quality signal to the employer (Spörlein 2018), resulting in higher hiring probabilities for skilled jobs in the German labor market (Damelang et al. 2019), which are also higher paid.

In summary, arguments derived from the human capital and signaling theories both suggest that FTI from countries with a distinct occupational-specific training system have increased labor market success in Germany, a labor market with a highly occupation-specific training system, leading to our first set of hypotheses.

H1 The more occupation-specific the training system in FTI' home countries are, the higher are the employment probabilities of FTI in Germany.

H2 The more occupation-specific the training system in FTI' home countries are, the higher the wages of FTI are in Germany.

While both human capital theory and signaling predict higher hiring chances and higher wages, their effects on in which jobs FTI work and which jobs get paid higher wages might differ regarding their relative importance. Thus, the following set of hypotheses tests the mechanisms behind the wage outcomes of specific foreign degrees. First, signaling theory proposes that occupation-specific educational degrees clearly signal quality and productivity to the employer (Spörlein 2018; Weeden 2002), regardless of individuals' actual occupation-specific skills. Thus, FTI with degrees signaling occupation-specific skills could have higher hiring chances for skilled jobs requiring occupation specific knowledge in the German labor market (Damelang et al. 2019) due to their higher signal quality. These considerations lead to our third hypothesis:

H3 The more occupation-specific the training system in FTI' home countries are, the higher are the employment probabilities of FTI in occupations requiring occupation-specific skills in Germany.

Second, FTI from a system providing occupation-specific skills have better labor market outcomes in a host country with high specificity because FTI' occupation-specific skills are in demand in the host country. However, even in occupation-specific labor markets, non-occupation-specific jobs are in demand, although to

a lesser extent. According to human capital theory, occupational-specific human capital should be particularly transferable to occupation-specific jobs (Lancee and Bol 2017), resulting in higher wages in occupation-specific jobs. In this context, Geven and Spörlein (2022) find evidence that only immigrants working in occupation-specific jobs in Germany benefit from occupation-specific skills acquired in a domestic vocational degree. This argument leads to our fourth hypothesis:

H4 The more occupation-specific the training system in FTI' home countries are, the higher are the wages of FTI working in occupation-specific jobs in Germany.

3. Data, variables, and method

3.1 Data and sample

To test our hypotheses, we use pooled German Micro Census data from 2012 to 2014 (RDC of the Federal Statistical Office and Statistical Offices of the Federal States 2023). The Micro Census data is well suited for our analysis because its sample size covers 1% of the population living in Germany. Its huge sample size allows us to identify male FTI from different EU countries. We compare male FTI from France, Greece, Hungary, Italy, the Netherlands, Poland, and Spain.[1] These countries vary widely in their institutional characteristics, which allows us to identify why the transferability of foreign human capital is limited. In our main analyses, we focus on male respondents because females exhibit interrupted employment biographies, different levels of labor supply, and varying migration motives (Adsera and Chiswick 2007; Banerjee and Phan 2015).

We define FTI as immigrants who obtained at least vocational education in their home country. We focus on newly arrived immigrants between the ages of 18 and 40 years to ensure that the main signals of FTI originate from the foreign credential, as other signals, such as work experience, gain more significance over the life course (Gangl 2004). For a similar reason, we observe only FTI with a maximum length of stay of ten years (cf., Tibajev and Hellgren 2019). By doing so, we mitigate assimilation and acculturation effects that might diminish the signal of a foreign degree (Borjas 1985; Dustmann 1993).

We remove observations in the top and bottom 1% of hours worked and hourly wages to eliminate implausibly high or low values, such as working 80 hours per week. Our results remain robust to keeping these outliers. Since 2012, the Micro Census has been a rotating panel, which means that respondents may appear more than once in the dataset. We restrict the sample to the first observation of each

1 We excluded the remaining EU countries because these countries either lack information about occupational specificity at the country level or are grouped with other countries in the German Micro Census data (see Table A 1). Moreover, we excluded Austria from the sample as Austria and Germany are very similar in many respects, e.g. language, potentially distorting our effects of interest.

person to avoid an unbalanced panel. This restriction removes about 10% of the observations. Again, the results are robust to not removing them. After these steps, we observe 1,027 FTI in the employment sample and 896 FTI in the wage sample.

3.2 Dependent variables

We analyze two different dimensions of labor market success, employment probability and wages. While employment probability is a quantitative dimension of immigrants' labor market success, the individual wage reflects the quality of immigrants' labor market success. Investigating both dimensions is necessary to provide comprehensive insights into the labor market success, as jobs in the low-skilled sector may provide decent employment opportunities but are often low paid and 'mobility traps' (Kanas and van Tubergen 2009; Wiley 1967).

Regarding employment probability, we follow the broader concept of non-employment and define an individual as 'employed' if the individual is working for hire (Luijkx and Wolbers 2009). Inactive and unemployed individuals are defined as "not employed".[2] Regarding wages, we use the log hourly wage based on net monthly income. The Micro Census reports net income in 24 ordinal levels. Following Pischke and von Wachter (2008), we assign the monthly net wage as the midpoint of the 24 monthly income brackets. These narrow brackets minimize measurement error[3] and allow us to use this ordinal variable as an interval-scaled variable. To calculate hourly wages, we divide the monthly wage by weekly hours multiplied by 4.3, the average number of weeks per month. Finally, we deflate the wages to 2012 values. Because net income depends on the employees' tax-relevant characteristics, we account for related information such as marital status.

3.3 Independent variables

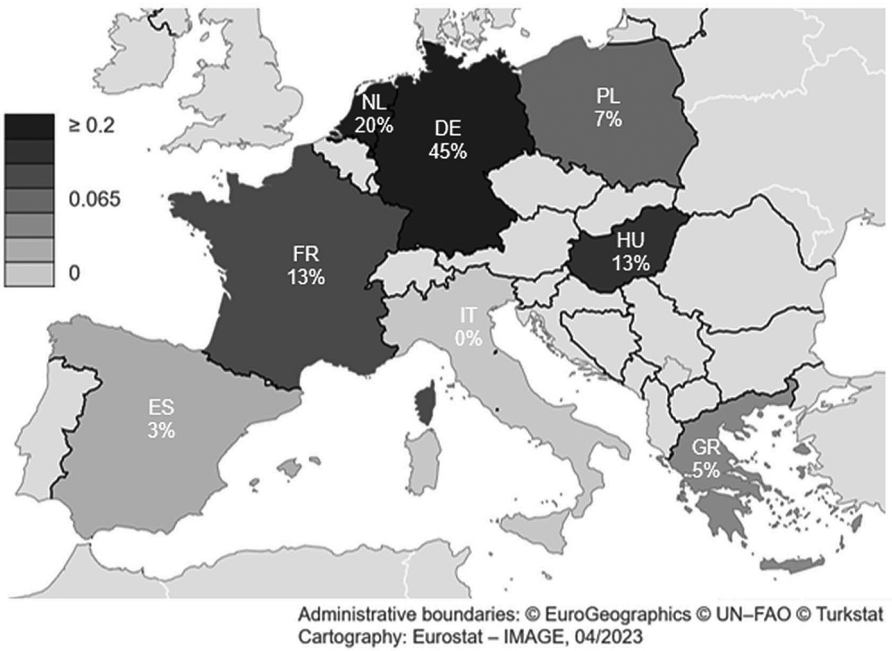
We investigate the transferability of foreign human capital to Germany and the signaling values of foreign degrees depending on the institutional characteristics of the home country of EU immigrants. For this purpose, we enrich our individual-level analysis with macro-level indicators representing institutional characteristics of immigrants' home countries. To measure occupational specificity, we refer to an indicator developed by Bol and Van de Werfhorst (2012). This indicator represents the proportion of upper-secondary vocational trainees who participate in dual training. We use this share as an indicator for occupation-specific human capital imparted by the institutional setting in the home country because skills acquired in

2 We count unemployed individuals below the age of 75 and non-employed individuals as non-employed. In an alternative specification, we compare employed to unemployed individuals, leading to comparable results. The questionnaire also surveys whether individuals are employed but currently not working or are in voluntary service or voluntary military service. These two groups have been excluded from our sample.

3 The effect of potential measurement error in monthly wages on regression results is negligible, particularly when employing cross-sectional regression analyses (e.g., Collischon et al. 2025).

dual training are closely linked to specific tasks. Figure 1 shows that occupational specificity ranges from 0.0 percent (Italy) to 20.0 percent (Netherlands) in the EU countries of our analysis. In Germany, the indicator is very high with 45.0 percent of vocational trainees being in dual training, reflecting an overall high level of occupational specificity in the labor market. Thus, higher occupational specificity in the country of origin indicates higher similarity to the German labor market institutions.

Figure 1: Occupational specificity in selected EU countries



Note: See Table A 2 for summary statistics at the home-country level.

Source: Own calculations using the educational systems database v4 (Bol and Van de Werfhorst 2012).

To operationalize occupational specificity in the German labor market, we use an indicator for standardized credentials ranging on a scale from 0 to 1. This indicator measures the degree to which the vocational certificate of an occupation is comparable across the country or state and is derived from the occupation database of the federal employment agency (Vicari 2014). This standardization shows how strongly occupations are tied to matching certificates and, thus, indicates occupational specificity. We categorize occupations on the German labor market into two groups, where occupations with a value above 0.5 are classified as highly occupation-specific jobs.

3.4 Control variables

In addition to institutional characteristics of the home country, we include variables that depict individual characteristics, in particular age, its square, level of education, and variables that depict household characteristics, such as marital status and whether there are children in the household. Moreover, we include years since migration to account for any possible positive effects of assimilation on the labor market success of immigrants. At the home-country level, we also control for the economic strength, the GDP per Capita (World Bank 2015), as a proxy for general human capital quality (Coulombe 2014). Finally, we consider year-fixed effects. Table A 3 presents the summary statistics for the employment sample and the wage sample.

4. Analytical strategy

Our empirical analysis aims to assess the extent to which occupational specificity of foreign human capital determines its transferability and, thus, labor market success. We analyze two dimensions of labor market success, employment status and wages. For the probability of being employed, we estimate a pooled linear probability model. These regressions retain the intuitively interpretable coefficients, which are comparable across different models while generally yielding the same results as logistic regressions (Hellevik 2009). For analyzing log hourly wages, we employ a linear regression model. We cluster the standard errors at the home-country level because individuals are nested within countries (Angrist and Pischke 2009).

Because country-level estimations with a small number of countries might be unreliable, we first estimate a two-stage approach to provide graphical results, which Bryan and Jenkins (2016) recommend as a benchmark test for other methods when the number of countries is small. This estimation method allows us to plot our results graphically to identify potential outliers. For the second robustness check, we employ a multilevel model with random intercepts. This method explicitly models the hierarchical structure of the data, i.e. that individuals are nested in countries (Bryan and Jenkins 2016). Third, we use estimations without single countries, i.e., jackknifing, to ensure that single countries do not drive our results (Bryan and Jenkins 2016).

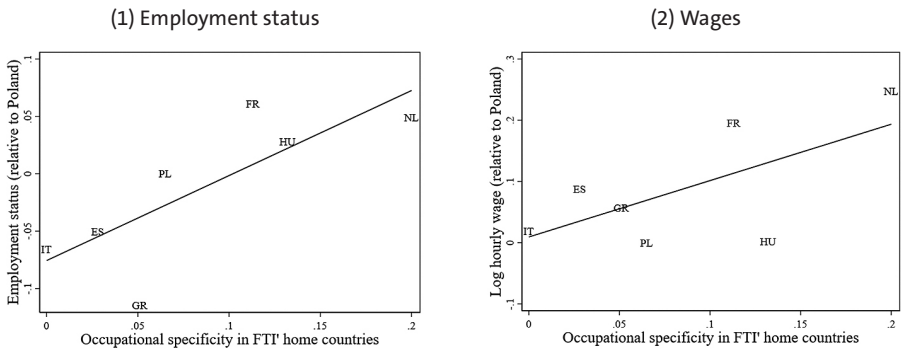
5. Results

5.1 Graphical results

We first provide graphical evidence for the association between institutional characteristics and labor market success at the home-country level net of composition effects. We plot occupational specificity in home countries on the x-axis and differences in labor market outcomes at the country level on the y-axis to illustrate the association between the similarities in educational institutions and the labor market

outcomes of FTI (Figure 2). The home countries are represented by their two-digit ISO codes, such as IT for Italy. The line in the plot represents the linear fit for the association between the x- and y-axes. Figure 2 shows that occupational specificity is positively associated with employment status (Panel 1) and log hourly wages (Panel 2). This positive linear association is the first evidence supporting hypotheses 1 and 2.

Figure 2: Association between occupational specificity and the labor market outcomes of FTIs at the country level

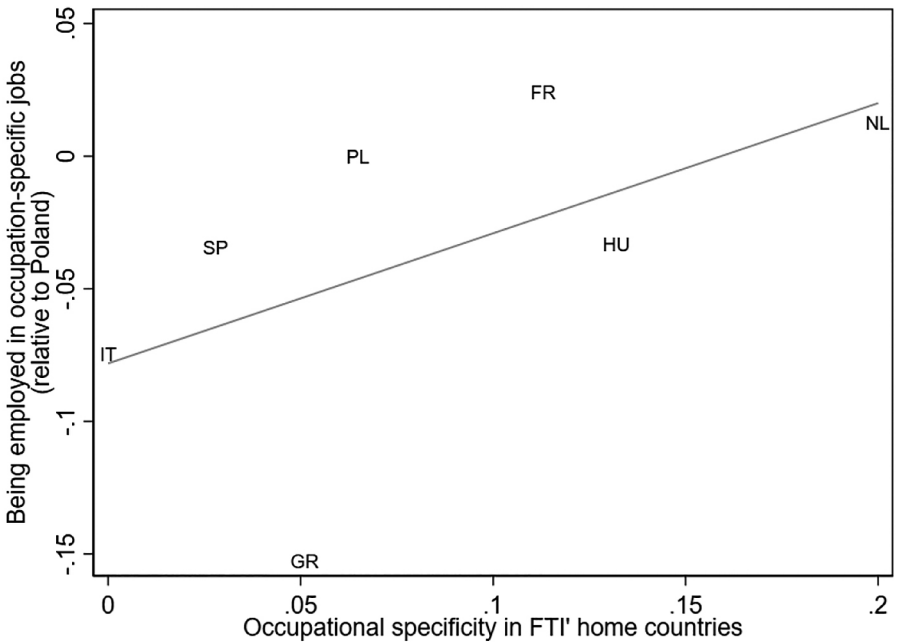


Note: The coefficients at the home-country level represent net differences in labor market outcomes at the home country level and are derived from regressions specified in Figure A 1. The dependent variable is the employment status (Panel (1) and the log hourly wage (2). See Figure A 1 for a list of the control variables.

Source: Own calculations using the pooled German Micro Census data from 2012 to 2014 and the educational systems database v4 (Bol and Van de Werfhorst 2012).

In Figure 3, we investigate the associations between working in occupation-specific jobs and the specificity of the occupation in the home country. Figure 3 shows that occupational specificity in the home country correlates positively with FTI working in occupation-specific jobs in Germany, which is first evidence for hypothesis H3.

Figure 3: Occupational specificity of jobs

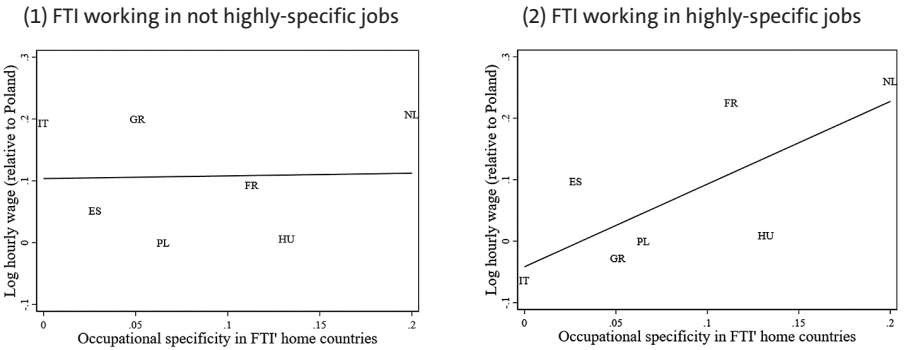


Note: The coefficients at the home-country level represent net differences in labor market outcomes at the home country level and are derived from regressions specified in Figure A 2. The dependent variable is being employed in occupation-specific jobs, i.e., jobs with a standardized credential value of at least 0.5.

Source: Own calculations using the pooled German Micro Census data from 2012 to 2014, the educational systems database v4 (Bol and Van de Werfhorst 2012), and standardized credential values (Vicari 2014).

In Figure 4, we disentangle the associations between occupational specificity and wages by the specificity of the occupation after migration. Panel (1) of Figure 4 shows that in non-specific occupations, the occupational specificity in the home country does not correlate with FTI' wages in Germany. In specific occupations, on the other hand, occupational specificity in the home country correlates with FTI' wages. These results are first evidence for hypothesis H4, because FTI' wages only benefit from occupational specificity in the home country if they work in occupation-specific jobs in Germany.

Figure 4: Occupational specificity of jobs and wages



Note: The coefficients at the home-country level represent net differences in labor market outcomes at the home country level and are derived from regressions specified in Figure A 3. The dependent variable is log hourly wage. The regressions are split into a sample with not highly occupational-specific jobs, i.e., jobs with a standardized credential value of less than 0.5, and a sample with highly occupational-specific jobs, i.e., jobs with a standardized credential value of at least 0.5.

Source: Own calculations using the pooled German Micro Census data from 2012 to 2014, the educational systems database v4 (Bol and Van de Werfhorst 2012), and standardized credential values (Vicari 2014).

5.2 Multivariate results

Table 1 shows the results of our multivariate regression analyses. Column (1) shows that occupational specificity correlates positively with employment status. A one percentage point (PP) increase in occupational specificity is associated with a 0.66-PP higher probability of being employed in Germany. Thus, an FTI from the Netherlands with an occupational specificity of 20% has, ceteris paribus, on average a 13.2 PP higher chance of being employed than an FTI from Italy with an occupational specificity of 0%. This result represents a substantial association given the average non-employment rate of 12.8% for FTIs in our sample. This association is evidence for H1 that occupational specificity increases employment chances in Germany. Column (2) shows that occupational specificity also correlates positively with wages, providing evidence for H2 that occupational specificity increases wages in Germany. In summary, our results provide evidence supporting H1 and H2.

Table 1: The transferability of foreign human capital and FTI labor market success

	(1) Employment status	(2) Log hourly wages	(3) Employment status in highly-specific occupations	(4) Log hourly wages in not highly-specific occupations	(5) Log hourly wages in highly-specific occupations
Occupational specificity	0.682** (0.115)	0.621* (0.235)	0.307 (0.188)	-0.174 (0.272)	0.952+ (0.395)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	1,027	896	896	182	714
Countries	7	7	7	7	7

Note: Column (1) shows the results of linear probability models with employment status as the dependent variable. Columns (2), (4), and (5) show the results of linear regressions with log hourly wages as the dependent variable. Column (3) shows linear regressions with highly occupational-specific jobs as the dependent variable, i.e., jobs with a standardized credential value of at least 0.5. Columns (2) and (3) involve only employed FTI, column (4) only FTI employed in not-highly-specific jobs, and column (5) only FTI employed in highly-specific jobs. Not highly occupational-specific jobs are jobs with a standardized credential value of less than 0.5, highly occupational-specific jobs are jobs with a standardized credential value of at least 0.5. The occupational specificity represents the share of upper secondary vocational education in the home country that is in a dual system. The year dummies are in reference to 2012 and control for the years 2013 and 2014. The standard errors are clustered at the country level. * 5%, ** 1%, *** 0.1% (two-tailed tests)

Source: Own calculations using the pooled German Micro Census data from 2012 to 2014, the Educational Systems Database v4 (Bol and Van de Werfhorst 2012), and the World Bank (2015).

In Column 3 of Table 1, we investigate whether FTI from occupational-specific countries are more often employed in jobs with high occupational specificity in Germany to find evidence for the signaling value of foreign occupation-specific degrees. The coefficient is large in size but not statistically significant (P=0.153). In contrast to the graphical results, the analytical results do not provide clear evidence for H3 that FTI from occupational-specific countries are more often employed in occupation-specific jobs in Germany.

In Columns 4 and 5 of Table 1, we disentangle the association between occupational specificity and foreign human capital quality depending on the specificity of the occupation after migration based on productivity arguments of the human capital theory. The coefficient is not statistically significant in not highly occupation-specific jobs (Column 4), but is statistically significant in highly occupation-specific jobs (Column 5). Since only FTI working in occupation-specific jobs benefit from having occupation-specific skills, we find support for H4 that institutional similarity is an influential factor for skill transferability. Even in an occupation-specific labor market like Germany, occupation-specific human capital can only be

transferred by FTI working in occupation-specific jobs. These results highlight the influential role of human capital for the labor market success of FTI.

5.3 Robustness checks

Estimating country-level effects on individuals with a small sample of countries might be unreliable (Bryan and Jenkins 2016). To ensure the robustness of our results, we supplement our main regression models with two additional analyses. First, we provide results of a two-stage regression (Table A 4), which Bryan and Jenkins (2016) recommend as a reliable estimation method when the number of countries is small. Second, we employ a multilevel model with random intercepts, which explicitly models the hierarchical structure of the data, i.e., the nesting of individuals within countries (Table A 5) (Bryan and Jenkins 2016). Regarding employment status, wages, and wages by occupational specificity, both checks yield similar results and support the robustness of our analysis. Regarding working in jobs with occupational-specific skills, the results are mixed. While the associations are statistically significant in the country-level regressions, they are not statistically significant in the multilevel-model (P=0.266).

Furthermore, we test whether our results are sensitive to the exclusion of individual countries. Because we observe only a small number of home countries, one outlier regarding institutional characteristics can influence the results to a substantial degree (cf., Bryan and Jenkins 2016). To identify potential outlier countries, we successively exclude each country once from our analysis. Overall, the results are robust, and the patterns remain the same, yet the coefficients fluctuate slightly (Table A 6, Table A 7, Table A 9, and Table A 10). A notable exception is again being employed in occupation-specific jobs (Table A 8). When omitting Hungary or Poland, the coefficient is statistically significant. When omitting other countries, the coefficient is not statistically significant, supporting the main results that occupational specificity in the home country is not associated with working in occupation-specific jobs in Germany.

We also consider two macro indicators at the home-country level which might affect our results: cultural similarity and language skills. First, although we have a rather homogenous sample consisting of EU immigrants, differences in the cultural proximity of FTI to Germany might influence FTI' labor market success. We employ a cultural similarity index to consider the cultural proximity between Germany and different home countries (Roose 2012). This index is based on the European Social Survey and encompasses ten value dimensions to measure cultural similarity between countries, such as tradition, achievement, and conformity. Considering this index yields the same results, indicating that cultural proximity does not bias our results (Table A 11).

Second, despite the similarities of EU countries, differences remain, for example, concerning their native language. On the individual level, host country language

proficiency affects labor market success (e.g., Dustmann and Van Soest 2002). Since our data lack information on individual language skills for the full sample, we consider average German language skills of male immigrants in Germany aged 16 to 40 at the home country level.[4] These skills do not affect our results, indicating that differing average levels of language skills do not bias our results (Table A 12). A notable exception is working in occupation-specific jobs. In contrast to the main results (Column 3 of Table 1), that coefficient is statistically significant (Column 3 of Table A 12).

We also consider the educational expenses per capita as an alternative measurement of human capital quality instead of a country's GDP per Capita (Table A 13). Our results are robust to this alternative measure.

In summary, the results of our hypotheses are robust to the robustness checks, except for the results regarding working in jobs requiring occupation-specific skills. While the main results show no statistically significant association between working in these jobs and the occupational-specificity in FTI' home countries, some robustness checks yield a statistically significant coefficient. Thus, we find some evidence for H3 that FTI from countries with occupation-specific skills work more often in jobs requiring occupation-specific skills but these results are not robust.

6. Discussion and conclusion

In our analyses, we show that institutional similarity between the home and host countries contributes to the transferability of foreign human capital. Male FTI from countries with institutional settings providing occupation-specific skills have, on average, better labor market opportunities in the occupational-specific German labor market. This institutional similarity is associated with both FTI' employment probabilities and wages. We find that occupation-specific human capital only affects wages in highly occupation-specific jobs, supporting the hypothesis that the transferability of occupation-specific human capital drives our results. While we find robust evidence for human capital theory, we only find some evidence for signaling theory because FTI from countries with high occupational-specificity work more often in jobs requiring occupational specificity in some models. However, these results are not robust. Furthermore, signaling might also contribute to our main results, e.g., the signaling quality of degrees helping FTI to find easier access to jobs in general (e.g., Damelang et al. 2019).

Our findings on institutional similarity deepen our understanding of the transferability of occupation-specific human capital acquired abroad. Lancee and Bol (2017) show that FTI with non-Western degrees have lower labor market returns

4 Since language skills are only surveyed for a small subsample, we calculate average language skills for all male immigrants aged 16 to 40 from a home country, including but not limited to FTI.

due to the limited transferability of skills and educational degrees. We show that even within Western degrees, there is considerable variance regarding labor market returns to foreign educational degrees and that this variance can partially be explained by the occupational specificity of the home country. Our results also tie in with findings by Geven and Spörlein (2022), who show that in Germany, immigrants with occupational-specific skills, i.e., domestic degrees, only earn higher wages when working in occupation-specific jobs. We expand on these findings by showing that even within the group of FTI, the occupational specificity of foreign human capital determines differences in labor market success for FTI working in occupation-specific jobs.

While our sample and analytical strategy address several challenges in immigration research, five limitations remain. First, we argue that our results showcase the importance of institutional similarity between home and host countries while focusing on a single host country with an occupation-specific labor market. A high occupational specificity could also lead to better labor market opportunities in general. Occupation-specific skills can be beneficial independent of the host labor market, as these skills enable better job matches through high signaling value and higher productivity through in-depth expertise. Since we do not find a positive association between occupational specificity in FTI' home countries and wages in Germany for FTI working in not-highly occupation-specific jobs, we provide evidence against the general usefulness of occupation-specific human capital. Instead, our results indicate that occupation-specific capital can only be transferred in occupation-specific labor markets, supporting the institutional similarity argument. We cannot, however, assess whether occupation-specific degrees adversely affect labor market outcomes in countries that lack occupation-specific labor markets. Future research could examine how the interaction of institutions across multiple origin and host countries—each with varying degrees of occupational specificity—shapes the returns to occupation-specific credentials.

A second issue is the general self-selection into migration. Since our data do not allow us to compare the migrating population with their home country peers, we cannot determine whether individuals are positively or negatively selected. This uncertainty may inadvertently bias our findings regarding labor market success. This bias is less concerning if the selection process is consistent across countries and not influenced by the education system. A third limitation is that migration motives are unobserved in our data. To mitigate this shortcoming, we focus exclusively on male foreign-trained immigrants (FTIs) from European countries, who are known to migrate primarily for economic reasons and are less likely to be tied movers (Banerjee and Phan 2015; Freitas-Monteiro 2024). Nevertheless, our analysis does not explicitly account for the role of tied migration or the broader spectrum of migration motives. Fourth, we are unable to investigate individual language skills or cultural similarities. However, our supplementary analysis indicates that these factors do not have a significant effect at the country level. A fifth limitation is

that we focus on one dimension of institutional similarity regarding education, the dual vocational training, educational institutions have multiple dimensions, such as standardization (Marczuk 2024). Future research could investigate other dimensions to deepen our insights into the importance of institutional similarity for immigrants' labor market success.

In summary, while FTI from EU countries have comparable formal degrees, we show that some groups are more disadvantaged due to differences in the transferability of occupation-specific skills. Understanding the roots of these disparities is valuable for policymakers to tackle these inequalities and develop new legislation in a targeted manner. Because skills and their transferability vary across migrant groups, a general labor market integration process cannot address inequalities between these groups. Therefore, policymakers could provide modular further training depending on the education system in the country of origin. In an occupation-specific country, for example, this modular strategy could target deficits in occupation-specific skills and reduce inequalities between immigrants' labor market success.

References

Adsera A., Chiswick B. R. (2007) 'Are there gender and country of origin differences in immigrant labor market outcomes across European destinations?', *Journal of population economics,* 20/3: 495–526.

Allmendinger J. (1989) 'Educational Systems and Labor Market Outcomes', *European Sociological Review,* 5: 231–250.

Angrist, J. D., Pischke, J. (2009) *Mostly harmless econometrics: An empiricist's companion*. Princeton: University Press.

Banerjee, R., Phan, M. B. (2015) Do tied movers get tied down? The occupational displacement of dependent applicant immigrants in Canada. *Journal of International Migration and Integration*, 16, 333-353.

Bassanini, A., Booth, A. L., Giorgio, B., Maria, D. P., Leuven, E. (2005) *Workplace training in Europe*, available at SSRN 756405 accessed 2 May 2022.

Becker, G. S. (1976) *Human Capital*. New York: National Bureau of Economic Research.

Blossfeld, H.-P. (1992) 'Is the German dual system a model for a modern vocational training system?', *International Journal of Comparative Sociology,* 33/3: 168–181.

Bol, T., Van der Werfhorst. H. G. (2012) 'Measuring Educational Diversity: Tracking, Vocational Orientation, and Standardization*', AMCIS Working Paper,* 1, January 2012.

Bol, T., Ciocca Eller, C., Van De Werfhorst, H. G., DiPrete, T. A. (2019) 'School-to-work linkages, educational mismatches, and labor market outcomes', *American Sociological Review,* 84/2, 275-307.

Borjas, G. J. (1985) 'Assimilation, changes in cohort quality, and the earnings of immigrants', *Journal of labor Economics,* 3/4: 463–489.

Breen, R. (2005) 'Explaining cross-national variation in youth unemployment: Market and institutional factors', *European Sociological Review,* 21/2: 125–134.

Bryan, M. L., Jenkins, S. P. (2016) 'Multilevel modelling of country effects: A cautionary tale', *European Sociological Review,* 32/1: 3–22.

Cantalini, S., Guetto, R., & Panichella, N. (2023) Ethnic wage penalty and human capital transferability: A comparative study of recent migrants in 11 European countries. *International Migration Review*, 57(1), 328-356.

Chiswick, B. R. (1978) 'The effect of Americanization on the earnings of foreign-born men', *Journal of political Economy,* 86/5: 897–921.

Collischon, M., Zimmermann, F., Wolbring, T. (2025) 'Measurement error in the outcome variable and its consequences for first-difference and fixed-effects panel models', SocArxiv Paper.

Coulombe, S., Grenier, G., Nadeau, S. (2014) 'Human capital quality and the immigrant wage gap', *IZA Journal of Migration,* 3/1: 1–22.

Damelang, A., Abraham, M., Ebensperger, S., Stumpf, F. (2019) 'The hiring prospects of foreign-educated immigrants: A factorial survey among German employers', *Work, Employment and Society,* 33/5: 739–758.

Damelang, A., Ebensperger, S., & Stumpf, F. (2021) Immigrants' labour market disadvantages across Western Europe: the role of composition and context. *Journal of International Migration and Integration*, 22(4), 1525-1550.

Destatis. (2023a) *Bevölkerung in Privathaushalten nach Migrationshintergrund im weiteren Sinn nach Geburtsstaat in Staatengruppen.* https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Migration-Integration/Tabellen/migrationshintergrund-staatsangehoerigkeit-staatengruppen.html (last accessed 20th July 2023).

Destatis. (2023b) *Bevölkerungsstand: Amtliche Einwohnerzahl Deutschland 2022*. https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Bevoelkerungsstand/_inhalt.html (last accessed 20th July 2023).

DiPrete, T. A., Eller, C. C., Bol, T., Van de Werfhorst, H. G. (2017) 'School-to-work linkages in the United States, Germany, and France', *American Journal of Sociology,* 122/6: 1869–1938.

Dustmann, C., Van Soest, A. (2002) 'Language and the earnings of immigrants', *ILR Review,* 55/3: 473–492.

Dustmann, C. (1993) 'Earnings Adjustment of Temporary Migrants', *Journal of Population Economics,* 6/2: 153–168.

Forster, A. G., & Bol, T. (2018) Vocational education and employment over the life course using a new measure of occupational specificity. Social Science Research, 70, 176-197.

Ebner, C., Helbling, M. (2016) 'Social distance and wage inequalities for immigrants in Switzerland', *Work, Employment and Society,* 30/3: 436–454.

European Centre for the Development of Vocational Training. (2009) *Modernizing Vocational Education and Training: Fourth Report on Vocational Training Research in Europe: Background Report, Volume 2*. Office for Official Publications of the European communities.

Freitas-Monteiro, T. (2024) Migration motivation and ethnic identity of migrant couples: tied versus lead movers. Review of Economics of the Household, 1-37.Gangl, M. (2004) 'Welfare states and the scar effects of unemployment: a comparative analysis of the United States and West Germany', *American Journal of Sociology,* 109/6: 1319–1364.

Geven, S., Spörlein, C. (2022) 'Who benefits from school-to-work linkages in the labour market? A comparison between natives, migrants educated abroad, and those educated domestically', *European Sociological Review*, 39/3: 418–432.

Guzi, M., Kahanec, M., & Kureková, L. M. (2021) What explains immigrant–native gaps in European labor markets: The role of institutions. Migration Studies, 9(4), 1823-1856.

Haasler, S. R. (2020) The German system of vocational education and training: challenges of gender, academisation and the integration of low-achieving youth. Transfer: European Review of Labour and Research, 26(1), 57-71.

Heisig, J. P., Schaeffer, M. (2020) 'The Educational System and the Ethnic Skills Gap among the Working-Age Population: An Analysis of 16 Western Immigration Countries', *Socius,* 6, 2378023120925717.

Hellevik, O. (2009) 'Linear versus logistic regression when the dependent variable is a dichotomy', *Quality & Quantity,* 43: 59-74.

Holbrow, H. J. (2020) 'Detangling capital from context: a critical investigation of human capital explanations for immigrant wage inequality', *Journal of Ethnic and Migration Studies,* 46/19: 4043–4065.

Kanas, A., Van Tubergen, F. (2009) 'The impact of origin and host country schooling on the economic performance of immigrants', *Social Forces,* 88/2: 893–915.

Kim, C. (2015) 'New Color Lines: Racial/Ethnic Inequality in Earnings among College-Educated Men', *The Sociological Quarterly,* 56/1: 152-184.

Kogan, I. (2016) 'Education systems and migrant-specific labour market returns', *Education systems and inequalities*, 279–99.

Lancee, B., Bol, T. (2017) 'The transferability of skills and degrees: Why the place of education affects immigrant earnings', *Social Forces,* 96/2: 691–716.

Lancee, B. (2016) 'The negative side effects of vocational education: A cross-national analysis of the relative unemployment risk of young non-western immigrants in Europe', *American Behavioral Scientist,* 60/5-6: 659–679.

Li, Q., Sweetman, A. (2014) 'The quality of immigrant source country educational outcomes: Do they matter in the receiving country?', *Labour Economics,* 26: 81–93.

Luijkx, R., Wolbers, M. H. (2009) The effects of non-employment in early work-life on subsequent employment chances of individuals in the Netherlands. *European Sociological Review*, 25(6): 647-660.

Marsden, D. (1990) 'Institutions and labour mobility: occupational and internal labour markets in Britain, France, Italy and West Germany', *Labour relations and economic performance,* 414–438. Palgrave Macmillan, London.

Marczuk, A. (2024) Literature review of comparative school-to-work research: how institutional settings shape individual labour market outcomes. *Journal for Labour Market Research, 58*(1), 19.

Maurice, M, Sellier, F., Silvestre, J.-J. (1986) *The social foundations of industrial power: A comparison of France and Germany*. MIT Press, Cambridge, London, Massachusetts.

Pischke, J.-S., Von Wachter, T. (2008) 'Zero returns to compulsory schooling in Germany: Evidence and interpretation', *The Review of Economics and Statistics,* 90/3: 592–598.

Pollmann-Schult, M., Büchel, F. (2004) 'Career Prospects of Overeducated Workers in West Germany', *European Sociological Review,* 20/4: 321–331.

RDC of the Federal Statistical Office and Statistical Offices of the Federal States. (2023) *Scientific use files of the microcensus waves 2012 to 2014*. Berlin: Germany [Data set]. DOI: 10.21242/12211.2012.00.00.1.1.0, 10.21242/12211.2013.00.00.1.1.0, 10.21242/12211.2014.00.00.1.1.0

Roose, J. (2012) 'Die quantitative Bestimmung kultureller Unterschiedlichkeit in Europa', *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie,* 64/2: 361–376.

Rumbaut, R. G., Portes, A. (2001) *Ethnicities: Children of immigrants in America.* University of California Press.

Shavit, Y., Muller, W. (2000) 'Vocational secondary education', *European societies,* 2/1: 29–50.

Spörlein, C. (2018) 'How educational systems structure ethnic inequality among young labour market participants in Europe: occupational placement and variation in the occupational status distribution', *Research in Social Stratification and Mobility,* 55: 109–119.

Stumpf, F., Damelang, A., Abraham, M., Ebensperger, S. (2020) 'How National Institutions Shape Skilled Immigrants' Chances of Getting Hired: Evidence from Harmonised Factorial Surveys with Employers in Germany and England', *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie,* 1–23.

Tarchi, D., Sermi, S., Belmonte, M., McMahon, S., Kalantaryan, S., Gilodi, A. (2019) *Atlas of Migration – 2019*. Luxembourg: Publications Office of the European Union.

Tibajev, A., Hellgren, C. (2019) 'The effects of recognition of foreign education for newly arrived immigrants', *European Sociological Review,* 35/4: 506–521.

Van Tubergen, F., Maas, I., Flap, H. (2004) 'The economic incorporation of immigrants in 18 western societies: Origin, destination, and community effects', *European Sociological Review,* 69/5: 704–727.

Vicari, B. (2014) 'Grad der standardisierten Zertifizierung des Berufs: ein Indikator zur Messung institutioneller Eigenschaften von Berufen (KldB 2010, KldB 1988)', *Institute for Employment Research, Nuremberg, Germany,* 201404.

Weeden, K. A. (2002) 'Why do some occupations pay more than others? Social closure and earnings inequality in the United States', *American journal of sociology,* 108/1: 55-101.

Wiley, N. F. (1967) 'The ethnic mobility trap and stratification theory', *Social Problems,* 15/2: 147–159.

World Bank. (2015) *World Development Indicators*. https://databank.worldbank.org/source/world-development-indicators (last accessed 4th March 2021).

Zimmermann, F., Wolbring, T., Fong, E. (2025) 'Do collective agreements and works councils narrow immigrant-native wage gaps for disadvantaged immigrant groups? Novel evidence from German linked employer-employee data', *Socio-Economic Review*, 10.1093/ser/mwaf046.

Zimmermann, F. (2025) 'Dragons Soaring to Success–Zodiac Sign, Education, and Wages of Immigrants from Chinese Societies in Germany'. *International Migration Review*, 01979183251365910.

Declarations

Availability of data and materials

Scientific use files of the microcensus waves 2012 to 2014 were used. Source: FDZ der Statistischen Ämter des Bundes und der Länder, DOI: 10.21242/12211.2012.00.00.1.1.0, 10.21242/12211.2013.00.00.1.1.0, 10.21242/12211.2014.00.00.1.1.0

The stata code of this project is available at https://osf.io/u4afb.

Competing interests

None of the authors has any competing interests in the manuscript.

Funding

Not applicable

Acknowledgements

We would like to thank Matthias Collischon for his helpful comments.