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Are Young Refugees More Likely to Enter Training Places With Vacancy Problems? Comparisons Between Immigrant Youths in Germany

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Abstract

Context: In Germany, young refugees participate in vocational education and training (VET) at significantly lower rates than non-migrants and migrants without a refugee background. At the same time, the German training market is increasingly characterized by shortages of applicants in specific training occupations, resulting in a growing number of unfilled training places. During the refugee inflow of 2015 and 2016, policymakers, employers, and researchers emphasized the potential of vocational training to promote refugees' labor market integration while simultaneously alleviating recruitment problems in shortage occupations. Entering VET may also improve refugees' prospects for remaining in Germany, particularly for those with insecure residence status. Against this background, this study examines whether young refugees are disproportionately likely to enter training occupations with vacancy problems and whether legal insecurity further shapes these transitions.

Methods: The analysis draws on pooled cross-sectional data from the BA/BIBB Applicant Surveys 2018 and 2020, linked with official statistics on unfilled training places at the

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occupational level. The analytical sample includes 7,176 applicants who successfully entered dual vocational training. The dependent variable measures the proportion of unfilled training places in the occupation entered. Ordinary least squares regressions are used to estimate differences by migration status. To test whether human capital endowments account for group differences, mediation analyses focusing on school-leaving certificates recognized or acquired in Germany are conducted. The role of residence status is examined using a subsample of refugee applicants from 2018 ($N = 2,043$), for whom detailed legal status information is available.

Findings: The findings show that young refugees enter training occupations with significantly higher vacancy rates than both non-migrants and migrants without a refugee background. Compared to non-migrants, refugees transition into occupations in which the share of unfilled training places is, on average, 39 percent higher. Differences in school-leaving certificates partially, but not fully, mediate this association. Among refugees, those with an insecure residence status or who are still in the asylum process are more likely to enter shortage occupations, even after controlling for formal qualification levels. This pattern suggests that legal considerations shape occupational choices beyond human capital constraints.

Conclusion: The results indicate that disadvantaged legal and educational positions contribute to the concentration of young refugees in training occupations with vacancy problems. While this dynamic may appear as a short-term win-win situation for employers and refugees, it also entails risks such as increased training dropout rates and long-term occupational segregation.

Keywords: Refugees, Vocational Education and Training, VET, Residence Status, Integration

1 Introduction

Between 2015 to 2021, almost 5.1 million refugees applied for asylum in the European Union (Eurostat, 2025). They mainly originated from Syria, Afghanistan, and Iraq and one third was aged younger than 18. For young people in general, an essential prerequisite for successful labor market insertion is usually the completion of a vocational education and training (VET) program (Muja et al., 2019; Rözer & van de Werfhorst, 2020). For refugees in particular, who have a high risk of unemployment or entering low-wage work, completion of VET plays a key role in integrating newly arrived immigrants into education and employment (Bergseng et al., 2019; Jørgensen et al., 2021). With almost two million refugees, Germany is one of the most important host countries for refugee migration worldwide (United Nations, 2023). The vast majority stated to intend to stay in Germany permanently (Brücker et al., 2020). Contrary to other countries with VET systems, opportunities to enter VET in Germany are

comparatively favorable (Jørgensen et al., 2021). Formally, access to the German VET system is open even to persons without school-leaving certificates. However, during the recruiting process, companies often demand certain qualification levels from those interested in training (Protsch & Solga, 2016). For many young refugees in most host countries, requirements in terms of credentials create difficulties in accessing training places because their school trajectories are often interrupted or they are still in the process of acquiring sufficient second-language proficiency (Aerne & Bonoli, 2021; Jeon, 2019; Kosyakova et al., 2022). Accordingly, inclusion of refugees and newly arrived immigrants into VET faces major challenges (Sebastián et al., 2025). In the German context in particular, it has been shown that refugees are underrepresented in VET and have relatively low transition rates (Eberhard et al., 2017).

From a structural perspective, however, matching problems are seen as a key challenge on several training markets in Europe (e.g., Aarkrog, 2020; Kuczera & Jeon, 2019). Germany is no exception (Dummert et al., 2019) and disparities became even more pronounced at the start of the COVID-19 pandemic (Oeynhausen et al., 2021). In Germany, the training positions offered by companies are less and less suited to the interests and aspirations of the young people seeking training, with the result that both the number of unfilled training places and the number of unsuccessful training place applicants are increasing (National Report on Education, 2024). For the unfilled training places, vacancy problems are particularly severe in occupations in the construction industry and skilled crafts sector (Christ et al., 2025a; Weller et al., 2025). When refugee-related migration to Germany was at its peak in 2015 and 2016 (Federal Office for Migration and Refugees [BAMF], 2024a), stakeholders from politics, business, and academia saw the influx of refugees as an opportunity to improve the future prospects of new immigrants through vocational integration into sectors of the economy particularly affected by recruitment problems for trainees (Allianz für Aus- und Weiterbildung [AAW], 2015). According to the tenor, the strong influx of young people seeking protection in Germany could therefore result in a win-win situation for everyone involved. Vocational integration would offer young refugees employment prospects in Germany, while companies would be given additional opportunities to meet their need of trainees (AAW, 2015). Similar discussions also emerged in other countries (Foged et al., 2024; Jeon, 2019; Saner et al., 2020). In Austria and Switzerland, migrants are already being recruited specifically for occupations with a particularly high shortage of skilled workers, both directly for the labor market and for training (Organisation for Economic Co-operation and Development [OECD], 2024). For the German case, integration of young refugees into VET is favored for two reasons. Firstly, young refugees, who on average have lower host country-specific qualifications levels, may have greater chances to access VET as recruiters may accept low-qualified applicants for training occupations with staffing problems. Secondly, in an international comparison, Germany has the special situation that the right of residence has a strong influence on vocational integration (Dörr & Faist, 1997; Schreyer et al.,

2022). For refugees with an insecure residential status, inclusion in training can have a strong impact on their chances of remaining in Germany or on their risk of deportation. These refugees may benefit from "training toleration" that is granted for those in VET. As access to training occupations with staffing problems tends to have fewer entrance requirements, refugees with uncertain residence status may be more likely to enter these apprenticeships. In view of precarious residence statuses, the legal situation may lead to training places with vacancy problems being more frequently filled with young refugees, regardless of their individual qualification level (Ebbinghaus, 2021; Gerhards, 2019). Investigating the German case therefore offers unique insights into how links between the VET system and residence law can influence the integration of asylum seekers.

The extent to which young people with a refugee background enter occupations with staffing problems has rarely been empirically investigated so far. In 2016, i.e., for many refugees shortly after their arrival in Germany, regional problems filling training places were not linked to more frequent transitions into vocational training among young refugees (Matthes et al., 2018). On the company level, there is mixed evidence that companies with staffing problems are more likely to recruit refugees as trainees (Ebbinghaus, 2017; Gerhards, 2019; Weis, 2019). Comparing young refugees to non-migrant youths and youths from migrant families but without refugee experience, empirical evidence on their vocational choices for apprenticeships with shortages of trainees is sparse (Michaelis & Busse, 2021).

We contribute to this under-researched issue by analyzing two research questions: *Firstly, how do patterns of entry into training places with vacancy problems differ among non-migrant youths, immigrant youths from non-refugee families, and young refugees in Germany? Secondly, how does young refugees' residence status influence their access to training places with vacancy problems?* For the first question, we test if refugees' on average lower endowments of host country-specific human capital are associated with accessing training places with vacancy problems that are possibly more open towards young people with low qualification levels. We compare differences in human capital endowments between a) young people with a refugee background, b) young people who have a migration background, but no refugee background, and c) young people without a migration background regarding their chances to enter apprenticeships with vacancy problems in the dual system. For the second question, we investigate if refugees with an insecure residence status are more likely to enter training occupations with staffing problems and whether this association can also be observed net of school-leaving certificates acquired in Germany.

Empirically, we use cross-sectional data collected by the Federal Institute for Vocational Training and Education (BIBB) which have been hardly analyzed to date. We pool two large representative surveys on apprenticeship applicants in Germany using data from the BA/BIBB Applicant Survey (*Fluchtmigrationsstudie* 2018 and BA/BIBB *Bewerberbefragung* 2020, N=10,686). We combine them with administrative data collected by the Federal Employment

Agency (FEA) and BIBB on training occupations with vacancy problems ("*Ausbildungsberufe mit Besetzungsproblemen im dualen System*") for 2018 and 2020. The first survey covers early 2018, when the influx of refugees to Germany was at a maximum. The second survey includes early 2020, i.e., before the COVID-19 pandemic led to long-lasting changes on the training market. We only focus on training places in the dual system (company-based apprenticeships), excluding the school-based sector (vocational schools/colleges). Our dependent variable depicts the share of unfilled vacancies in the training occupations the young people entered.

2 The Market for Training Places and Legal Conditions in Germany

In the following chapter, we first outline the development of the German VET-market and the recent surge of training occupations with staffing problems. Following this, we examine the situation of refugees in Germany, specifically addressing the migration-related barriers that affect their access to and integration into the vocational education system.

2.1 Training Occupations With Vacancy Problems

In recent years, the problems and challenges faced by companies on the German training market in recruiting young people for training have increased considerably. In 2018, i.e., at the height of refugee migration, the proportion of unfilled training places was 10.0%; in 2020, i.e., shortly before the COVID-19 pandemic, the share was 11.7% (Christ et al., 2025a). With regard to the long-term development, the proportion of training places with vacancy problems in relation to the total number of training places on offer has almost quadrupled from 3.3% in 2009 to 13.4% in 2023 (Christ et al., 2025a). In the training year 2022/23, at the top of the list of occupations with strong vacancy problems are occupations in the skilled trades, particularly in the food trade, and also occupations in the construction industry (Oeynhausens, 2023). More than half (56%) of all training companies in Germany were only able to fill some or none of their training places on offer in the 2022/23 training year (Mohr, 2024).

A central reason advanced in the discussion for the increasing number of unfilled apprenticeships is that it results from the declining number of school leavers due to demographic trends. While a total of around 930,000 young people left school with a general school-leaving qualification in 2000, 20 years later (2020) their number fell to around 750,000, i.e., an almost 20% drop on the potential demand side (Federal Statistical Office, 2022). While the number of young people declined continuously, the proportion of school leavers who left school with a university entrance qualification has been increasing and, conversely, the proportion of

school leavers with a lower secondary school-leaving certificate has been decreasing over the same period (Federal Statistical Office, 2022).

However, not all training occupations and sectors on the German training market are affected by recruitment problems. Commercial occupations or occupations in the media or IT sector in particular experience a high demand, while demand for occupations in the skilled trades in particular is low and in some cases continues to fall (Christ et al., 2025a; Weller et al., 2025). Previous studies show that there is a correlation between the market situation and the image of a training occupation: More training opportunities remain unutilized in those training occupations for which an above-average number of the surveyed applicants assumed image problems (Ulrich, 2016).

2.2 Refugees in the German VET System

Regardless of the increasing number of unfilled training places, many young people come out empty-handed in their search for a training place. The training market statistics produced by the FEA show that more than half of all applicants looking for a training place do not find one in the dual system (Federal Employment Agency, 2024). In particular, applicants with a refugee background are less likely to make the transition into training according to the statistics (Granato & Christ, 2022). Furthermore, as analyses of the 2018 BA/BIBB applicant survey show, they are less likely to succeed in the transition to training than applicants without a refugee or other migration background (Eberhard & Schuß, 2021). Event history analyses with longitudinal data indicate low transition rates into VET for young refugees (Meyer, 2025; Meyer & Winkler, 2023).

For refugees, accessing VET in Germany is conditional on certain legal and formal conditions. Recognized refugees (i.e., who have been granted asylum) have full access to dual training programs (i.e., primary VET sector) and school-based VET (i.e., secondary VET sector). Asylum applicants and asylum seekers whose asylum application has been rejected but who have a temporary suspension of deportation ("toleration status") require an employment permit from the local foreigner's office to start a dual VET program. Additionally, access is denied to those who come from a so-called *safe country of origin*¹, those who have been residing in Germany for less than three months, and those who must reside in an initial reception center (§61 AsylG). In contrast to admission to the dual VET sector, no legal restrictions with regard to the asylum status, length of stay, or the possession of a work permit apply for the school-based VET sector.

Asylum seekers whose asylum application was rejected and who are required to leave the country but who are undergoing training in a recognized occupation are entitled, under

¹ In Germany, the following countries are currently considered safe countries of origin: The member states of the European Union, Albania, Georgia, Bosnia and Herzegovina, Ghana, Kosovo, Montenegro, North Macedonia, Republic of Moldova, Senegal, and Serbia (BAMF, 2024b).

certain conditions, to obtain a training toleration permit for the entire duration of their training (§60c AufenthG). This "training toleration" (Junggeburth, 2017; Schreyer et al., 2022) is also granted for shorter assistant or helper training courses in occupations with vacancy problems if subsequent training is guaranteed. Refugees who already have obtained a toleration status are also eligible to continue their training and must receive toleration for this duration. After successful completion of the training program, toleration is extended by six months to look for employment. Before 2020, a residence permit was issued for a further two years if the employment corresponds to the training. After 2020, a residence permit is granted to skilled professionals with vocational training to pursue any qualified employment (§18a AufenthG). This residence permit is granted for up to four years (§18 AufenthG).

For dual training programs, the number of training places offered in a given year as well as the final selection of applicants depend on the companies offering the places. Accordingly, there are technically no formal access restrictions to the dual VET sector, for example in terms of final grades or the level of education achieved (Solga et al., 2014). Empirically, the majority of all training places on offer (57%) only require a lower secondary school-leaving certificate as a minimum requirement (Federal Employment Agency, 2024). This is beneficial for young refugees, who on average have lower levels of education, both in absolute terms and relative to the German population (Brücker et al., 2020). Regarding participation in dual training programs, the number of refugees registered with the FEA as seeking a training place was increasing strongly until 2018. It has fallen since its peak in 2018 and 2019. This development might be related to the trend in refugee immigration to Germany, which has also fallen sharply between 2018 and 2020 (BAMF, 2024a).

3 Theoretical Framework and Previous Research

This chapter develops a theoretical framework to explain inequalities in access to training occupations with vacancy problems among young people by migration status. Section 3.1 outlines how matching, human capital, and signaling theories account for differential transition opportunities, while Section 3.2 focuses on the role of refugees' residence status and derives hypotheses on how legal insecurity shapes occupational choices.

3.1 Inequality in Accessing Training Occupations With Vacancy Problems by Migration Status

From a theoretical view, allocation of trainees to training places can be explained by matching models. In this theoretical framework, the training place market in the company-based sector is characterized by demand and supply for training places and transitions to vocational training can be assumed to result from a matching process (Sorensen & Kalleberg, 1981)

between training place applicants and recruiters at companies. On the applicant side, individuals rank training places according to their subjectively perceived attractiveness (e.g., by salary, working conditions, employment prospects, etc.) and base their application decision on their preferred options. Similarly, companies rank applicants for vacant training places. Human capital theory (Becker, 1964) suggests that companies seek trainees who promise high productivity and performance. Recruiters are therefore assumed to sort applicants according to their human capital endowments. However, signaling theory argues that skills relevant to training are not directly observable (information deficit) and companies tend to rely on signals of potential performance (e.g., language skills, qualifications, age, etc.; Spence, 1973). Given the qualification levels signaled by applicants, companies evaluate if they suffice for the offered training places. Compared to other training place applicants without immigrant or refugee experience, young refugees are in a disadvantageous situation as they potentially lack these signals because their educational trajectory in their origin country has been interrupted and continuing education as well as acquiring credentials in the destination country can be difficult. Furthermore, host-country recruiters may even assess foreign education as a "negative" signal (Akerlof, 1970). In the first case, school-leaving qualifications are usually not available, and refugees have usually only recently started learning the majority language of the host country. In the host country, it is therefore mostly difficult for young refugees to acquire favorable school-leaving certificates that may improve their formal qualifications. For companies, hiring young refugees for vocational training is risky when refugees possess no school credentials acquired (or recognized) in the host country. They may refrain from hiring refugees with no or low formal qualifications because they perceive that the given individual qualification levels are not sufficient for the training positions on offer. In the second case, recruiters may devalue foreign qualifications or consider them inferior to human capital acquired in the host country (Damelang et al., 2020). Especially for refugees, companies face more uncertainties in assessing the level of qualification (Damelang et al., 2020). Furthermore, the status "refugee" or "immigrant" is in itself a signal/index (Spence, 1973) that can affect companies hiring decisions (Söhn, 2020). Overall, in the competition for training places, young refugees tend to be in a less advantageous situation compared to their peers without migration background or to their peers with migration experience but without refugee background. Refugees tend to have spent less time in the German education system and have fewer formal, host country specific-school credentials (Eberhard et al., 2017).

This situation could be different with regard to the transition opportunities for training places in occupations with vacancy problems. Companies that operate in sectors or regions that experience recruitment problems and shortages of qualified training place applicants could be more likely to also include applicants with lower qualification levels and lower human capital endowments in their search process. Company surveys conducted in Germany indicate that when recruiting trainees, such companies tend to accept applicants with low

qualifications, poor grades, or little knowledge of German (Gerhards, 2019; Protsch, 2021; Weis, 2019). On the applicant side, it can be attractive for young people with lower qualification levels to apply for training places if those interested in training know or anticipate that companies with recruitment problems for certain training occupations offer easier access to these training places. Among those who are interested in vocational training, young refugees usually have the highest risk to hold only limited host country-specific human capital endowments compared to their peers without refugee background. Their peers without migration background are more likely to have averagely achieved higher school-leaving certificates. Youths with migration background but from non-refugee families tend to range in between, i.e., they have averagely achieved more favorable school-leaving certificates than young refugees but have, on average, lower school-leaving certificates compared to young people from non-immigrant families (Beicht & Walden, 2017, 2019). Youths with migration experience but without refugee background tend to have lower formal qualification levels compared to their peers without migration background due to a (on average) less favorable socioeconomic background (Hunkler, 2014; Tjaden, 2017). In Germany, in 2018, 41.3% of young refugees who were officially registered with the FEA as training place applicants did not (yet) have a school-leaving certificate. Among those with other or no migration background, the proportions were only 2.8% and 1.9% respectively (Eberhard & Schuß, 2021). *Overall, we expect that differential human capital endowments (recognized or acquired in Germany) to some extent influence young refugees to enter training occupations in which the proportion of vacancies is higher than in the training occupations of young people without migration background and young people with migration background but without a refugee background (H1).*

3.2 The Role of the Residence Status of Young Refugees

Net of formal qualification levels, we theoretically expect that those refugees with an insecure residential status ("toleration status") or those who are currently in the asylum process are more likely to enter training occupations with vacancy problems than those with a residence permission, i.e., secure asylum status. Among young refugees, we assume that those with an insecure residential status could be more motivated to search for and to accept training occupations that are not in line with their actual occupational aspirations or interests, but where trainees are urgently needed and sought. According to job queuing models (Reskin, 2019), applicants seek to maximize different attributes and rewards (e.g., income) that are related to a vacant training position. However, young refugees may also attach importance to other benefits that may be associated with the position. Taking up a training occupation may increase prospects to be granted a secure asylum status. Gottfredson's (1981, 1996) career theory assumes that young people make compromises in favor of more realistic career opportunities during the career decision-making process. This could mean that young refugees

value training occupations with vacancy problems more highly, as they appear to have realistic chances of obtaining these positions. Qualitative studies have shown that young refugees with toleration status are guided by a "career pragmatism" when choosing a training occupation (Wehking, 2023): They tend to perceive transition into vocational training as a survival strategy to secure residence in Germany. Their career choices are characterized by the desire to attain a temporary suspension of deportation for the purpose of training. Teachers and careers advisors tend to specifically point out to young refugees that there are apprenticeships that are less in demand on the training market and that the lack of trainees in these occupations can increase the chances of refugees entering VET (Wehking, 2020b). Therefore, we assume that refugees with an insecure residence status or who are currently still in the asylum process are more likely to consider vocational training for certain occupations in order to be granted "training toleration". If they perceive that occupations with vacancy problems are less difficult to access, they can be assumed to make compromises regarding their actual careers goals and favor vocational training in an occupation with a shortage of trainees. If securing one's residence status is a strong desire, the assumed association should also be found when qualification levels are controlled for. *Overall, we expect that refugees with an insecure residential status or who are currently still in the asylum process enter training occupations in which vacancies are higher than in the training occupations of young refugees with a secure residence status (H2).*

4 Data and Methods

This chapter describes the data sources, variables, and analytical sample used to empirically test the theoretical expectations developed in Chapter 3. Section 4.1 introduces the linked survey and administrative data and the sample construction, while Sections 4.2 and 4.3 define the dependent variable capturing occupational vacancy levels and the key independent variables on migration background, residence status, and human capital.

4.1 Database and Analytical Sample

For our analyses, we use representative survey data from young training place applicants and match them with official statistics that depict the development of supply and demand on the German training market. For the survey data, we use the BA/BIBB Applicant Survey, a representative written postal survey of young people (applicants) who were looking for a training place with the help of the FEA's counseling and support. Specifically, we use the data from the BA/BIBB Applicant Surveys 2018 and 2020.

In 2018, the BA/BIBB Applicant Survey (Eberhard et. al., 2022) was supplemented by refugee applicants as part of an additional study. The 2018 survey therefore features refugee applicants (BA/BIBB Refugee Migration Study, 2018) and non-refugee applicants (BA/BIBB Applicant Survey, 2018). For the BA/BIBB Refugee Migration Study 2018, only applicants who had been assigned the status "applicant in the context of refugee migration" in the FEA's training market statistics and whose residence status had been clarified were included. A 75.2 percent random sample was drawn from the population of "applicants in the context of refugee migration". The sample comprised 25,015 refugee applicants. The adjusted response rate in the BA/BIBB Refugee Migration Study 2018 was 26% and includes $N=5,581$ questionnaires completed by refugees. The BA/BIBB Applicant Survey 2018 was a 6.3 percent random sample from the population of non-refugee applicants and comprised 30,008 persons. The adjusted response rate was 16% with a total of $N=4,366$ questionnaires². In 2020, the BA/BIBB Applicant Survey (Eberhard & Christ 2025) was an 8.8 percent random sample from the entire population of applicants, i.e., both refugees and non-refugees, and comprised 40,000 applicants. To ensure that a sufficient number of refugee applicants was surveyed, the sample was drawn disproportionately and the number of refugee applicants was set at 3,000 people. The adjusted response rate was 18.2 %, resulting in a total of $N=6,861$ questionnaires³.

Additionally, at the level of training occupations, we use official statistics that are derived from the BIBB survey of newly concluded training contracts as of September 30th ("*BIBB-Erhebung über neu abgeschlossene Ausbildungsverträge zum 30.09.*") and the FEA's training market statistics. The interlinked data sources provide figures for supply and demand on the German training market (Flemming & Granath, 2016). Indicators in this data base report proportions of unfilled training places in the approximately 340 different dual training occupations in Germany.

For our analytical sample, we pooled the BA/BIBB Applicant Surveys 2018 and 2020 as well as the BA/BIBB Refugee Migration Study 2018 ($N_{\text{Total}}=16,808$; $N_{2018}=9,947$; $N_{2020}=6,861$). This was done to capture training market processes between the height of refugee migration and the COVID-19 pandemic. We only analyze those respondents who successfully entered vocational training in the dual system ($N_{\text{Total}}=7,176$; $N_{2018}=4,172$; $N_{2020}=3,004$).

4.2 Dependent Variable

Study participants in the surveys provided information on their training occupation, i.e., dual company-based training occupations that are regulated by the Vocational Training Act

² For each survey, we excluded questionnaires with missing information in the weighting characteristics.

³ The results of all surveys were weighted through a target-actual adjustment procedure and projected to the total population of applicants. This procedure allows for generalizations about the entire group of registered vocational training applicants and ensures the representativeness of all surveys. Weighting was performed according to the applicants' registration location, gender, region of residence, and refugee background.

(BBiG) and the Crafts and Trades Regulation Code (Handwerksordnung [HwO]). Training occupations that are regulated outside of the BBiG/HwO, such as full-time school-based training, particularly in the fields of nursing, health, and education, are not surveyed. Our sample was merged with official statistics from the BIBB survey of newly concluded training contracts as of September 30th on the proportion of unfilled training places in the respective training occupation that a respondent indicated in the survey questionnaire. For this proportion, the total number of unfilled training places is divided by the number of company-based training places on offer, the latter is calculated from the total number of newly concluded company-based training contracts and the total number of unfilled training places. All vocational training places registered with the FEA that were either not filled or withdrawn by September 30th are considered unfilled vocational training places and are included in the calculation of the indicator. The indicator is available for individual training occupations (Flemming & Granath, 2016), e.g., the share of unfilled training places in the occupation "plumber" was 46.1% in 2023 (National Report on Education, 2024). In alignment with the year of the applicant surveys, we used data from the corresponding reporting years 2017/18 and 2019/20. Our dependent variable, the proportion of unfilled training places in the occupation stated by the respondent in the survey of the respective year, is given as a percentage (%).

4.3 Independent Variables

In the BA/BIBB Applicant Surveys, the *migration status* is measured using three categories (1: Persons with a refugee background; 2: Persons who have a migration background⁴ but no refugee background; 3: Persons without a migration background = reference group). A refugee background is officially recorded in the FEA's training market statistics, from which the sample of the BA/BIBB Applicant Survey is drawn. Applicants with a refugee background are foreign nationals from third countries who either have a residence permit (§ 55 AsylG), a residence permit for refugees (§ 22-26 AufenthG), or a toleration status (§ 60a AufenthG). In the BA/BIBB Applicant Surveys, people with a migration background, but without a refugee background, are defined as either being born outside Germany, having a non-German nationality, or did not state German as their first language in the survey. Persons without a migration background are applicants who state that they were born in Germany, have German citizenship, and learned German as their first language. To analyze the *residence status* of a refugee applicant, we use the three characteristics on refugee background from the surveys (1: Residence permit, § 22-26 AufenthG = reference group; 2: Persons whose asylum application has not yet been decided, § 55 AsylG; 3: Persons with an insecure status, i.e., temporary suspension of deportation (tolerated stay), § 60a AufenthG). Detailed information on the

⁴ For data protection reasons, the operationalization of "migration background" in the BA/BIBB applicant surveys differs from that of the German Federal Statistical Office, according to which a person has a migration background if they or at least one parent was not born with German citizenship.

residence status is only available in the 2018 survey; in 2020, only general information on refugee background is given. For *human capital endowments*, we use information on a person's school-leaving certificate, either recognized or acquired in Germany (1: Lower secondary = reference group; 2: None; 3: Intermediate; 4: Upper secondary). In addition, we consider the following control variables: *Year* (1: 2018 = reference group; 2: 2020), *gender* (1: Male = reference group; 2: Female), and *age* (1: Younger than 18 = reference group; 2: 18-20; 3: 21-25; 4: Older than 25). Characteristics of our analytical sample are given in Table 1. Crosstabulations between the main independent variables (migration status, residence status, human capital endowments) and the dependent variable are presented in Table A1 (appendix).

Table 1: Sample Characteristics (Dependent and Independent Variables)

	n	Mean/%	Missing
<i>Share of unfilled training places in the occupation entered</i>	6644	9.5	532
<i>Migration Status</i>	7109		67
Non-immigrant youths	3741	52.6	
Refugees	2224	31.3	
<i>Migration background</i>	1144	16.1	
<i>School-leaving certificate</i>	7155		21
None	816	11.4	
Lower secondary	1923	26.9	
Intermediate	3091	43.2	
Upper secondary	1325	18.5	
<i>Residence Status (only 2018)</i>	2043		0
Permission	1237	60.5	
Insecure Status	147	7.2	
Application still undecided	659	32.3	
<i>Year</i>	7176		0
2018	4172	58.1	
2020	3004	41.9	
<i>Age</i>	7058		118
Younger than 18	2597	36.8	
18-20	1749	24.8	
21-25	2075	29.4	
Older than 25	637	9.0	
<i>Gender</i>	7176		0
Male	4220	58.8	
Female	2956	41.2	

Note. Source: BA/BIBB Applicant Survey 2018-2020, own calculations.

4.4 Analytical Approach

For our empirical analysis, we estimate stepwise OLS regression models. In the estimations, we treat missing data with full information maximum likelihood (FIML). We clustered standard errors by employment agency districts. Due to the skewed distribution of training places with vacancy problems (Figure 1, appendix), we log transformed the dependent variable. Estimations were carried out with the *sem* command in Stata 18. We proceed in two steps. First, we analyze the full sample regarding the association between migration status and the proportion of unfilled training places in a person's training occupation (model 1). For easier interpretation, we exponentiate coefficients ($e^b - 1$), which denotes the difference between groups in percent. Technically, a change of one unit in the coefficient of the independent variable *migration status* indicates: "Compared to young people without migration background, youths from another migrant group take up training occupations where the proportion of unfilled vacancies is "x" percent higher/lower on average". Due to our statistical modeling approach, coefficients should not be interpreted as (causal) effects. In model 2, we include control variables. For H1, we test whether human capital endowments (*ceteris paribus*) partially mitigate the association between migration status and the share of unfilled vacancies in the training occupation entered (model 3). To assess whether human capital endowments mediate the assumed association in H1, we estimate the indirect association ("indirect effect") and test whether the amount of mediation is statistically significant (Baron & Kenny, 1986). In the second step, we analyze a subsample from the 2018 survey including only persons with refugee background (N=2,043). For H2, we investigate whether the applicant's residence status is associated with the proportion of unfilled training places in their training occupation (model 4). In model 5, we test whether this association changes when human capital endowments and control variables are considered.

As a robustness check, we also tested three categorizations of the dependent variable: Average shortage (7.6%-12.5% unfilled positions), below-average shortage (below 25% of the mean = 0% to 7.5% unfilled positions), above-average shortage (above 25% of the mean = greater than or equal to 12.6% unfilled positions). We examined this alternative operationalization in an ordered logit model (proportionality assumption was not violated) indicating that a person is more (or less) likely to have entered a training occupation with vacancy problems. Although the modeling strategy is straightforward in interpretation and led to similar results (robust findings), we did not use it for our main analyses. Ordering occupations by using thresholds is to some extent arbitrary and requires further assumptions about stratification and segmentation of training occupations which is not the objective of this study. Results of the robustness checks are reported in tables A3 and A4 (appendix).

5 Results

Looking at the proportion of unfilled training places in occupations that the study participants were working in, differentiated by type of migration status, both surveys show at the descriptive level that refugees are more frequently in occupations with vacancy problems than applicants without a refugee or migration background. Table A2 (appendix) lists for both surveys in descending order the 10 most frequently practiced occupations by type of migration status. In the group of refugees, 6 of the 10 most frequently practiced occupations had an above-average proportion of training place vacancies: Hairdressers (pos. 3), sales assistant for retail services (pos. 4), painter and varnisher (pos. 5), qualified dental employee (pos. 6), management assistant for retail services (pos. 8), and cook (pos. 10). In contrast, in the group of applicants without a refugee or migration background, only one occupation was represented in the top 10 occupations with an above-average proportion of training place vacancies.

In the multivariate model 1 of table 2, the coefficient of the log share of unfilled training places in occupations of young refugees is 0.33. This means that young people with refugee background, compared to young people without migration background, have entered vocational training occupations where the share of vacancies was 39 % higher⁵. We calculated Cohen's *d* between refugees and non-immigrant youths: With $d=0.513$, i.e., half a standard deviation, this indicates a medium effect size⁶. Compared to youths with migration background (without refugee background), refugees have entered apprenticeships where the share of unfilled training places is 15 % higher. All differences were significant at $p < 0.001$. Including human capital endowments (school-leaving certificates) in model 3, differences between refugees and non-immigrant youths have numerically decreased compared to model 2, which included control variables: The difference is 0.38 in model 2 and 0.11 in model 3. To test whether the 0.27 decrease is statistically significant, we estimated the indirect association between refugee background and the proportion of unfilled training places in the chosen training occupation that is mediated by human capital endowments. The indirect association of 0.27 is significant at $p < 0.001$, indicating that the decrease (i.e., partial mediation) is not only numerical but statistically significant. This supports H1 that stated that unequal human capital endowments partially influence the fact that immigrant groups differ in whether they train in occupations with staffing problems⁷. Differences to youths with migration but without refugee background have also significantly decreased between model 2 and 3⁸.

Model 4 only includes refugees from the survey in 2018. The findings show that residence status influences the vocational training market behavior of young refugees, as was claimed in H2: Applicants who are still in the asylum process and applicants with refugee background

5 $(e^{0.33} - 1) = 0.390$.

6 $d = b / \text{SD-Residual}$. The residual standard deviation of the dependent variable is 0.65. Therefore: $0.33 / 0.65 = 0.513$.

7 $ab = 0.27$, $SE = 0.014$, $z = 18.48$, $p < 0.001$.

8 $ab = 0.05$, $SE = 0.007$, $z = 8.29$, $p < 0.001$.

with an insecure residence status started out vocational training in occupations where the share of unfilled training places is ($e^{0.17} - 1$) 18 % and ($e^{0.28} - 1$) 32 % higher compared to those refugees with a residence permit. While these differences were slightly reduced in size when school-leaving certificates and control variables were considered in model 5, the coefficient remained strongly significant.

Table 2: OLS Regression of the (Log) Share of Unfilled Training Places in the Occupation Entered

	Model 1	Model 2	Model 3	Model 4	Model 5
Migrations status (Ref.: No migration background)					
Refugee background	0.33*** (0.02)	0.38*** (0.02)	0.11*** (0.03)		
Migration background (no refugee background)	0.14*** (0.02)	0.15*** (0.02)	0.10*** (0.02)		
Year (Ref.: 2018)					
2020	0.21*** (0.02)	0.21*** (0.02)	0.21*** (0.02)		
School-leaving certificate (Ref.: Lower secondary)					
None			-0.04 (0.03)		0.02 (0.04)
Intermediate			-0.30*** (0.02)		-0.23*** (0.04)
Upper secondary			-0.54*** (0.02)		-0.19*** (0.05)
Residence status (Ref.: Permission)					
Insecure status				0.28*** (0.06)	0.23*** (0.06)
Application still undecided				0.17*** (0.03)	0.12*** (0.03)
Controls (Gender; Age)	NO	YES	YES	NO	YES
Constant	1.82*** (0.02)	1.86*** (0.02)	2.09*** (0.02)	2.14*** (0.08)	2.19*** (0.07)
N	7176	7176	7176	2043	2043
R-squared	.0438	.0474	.11	.0279	.0507

Note. Source: BA/BIBB Applicant Survey 2018-2020 (model 1-3), BA/BIBB Applicant Survey 2018 (model 4-5), own calculations. Cluster-robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

6 Discussion

This study investigated whether young refugees in Germany are more likely to enter training occupations with vacancy problems than non-immigrants and immigrant (non-refugee) youths and to which extent this is due to differences in human capital endowments between groups. As a second research question, which is associated with the context of German asylum law, we analyzed whether young refugees are more likely to enter these training occupations if they have an insecure residence status compared to a secure one. Using data from the BA/BIBB Applicant Survey and the BIBB survey of newly concluded training contracts as of September 30th, our findings suggested that refugees are more likely to enter training occupations that are characterized by vacancy problems compared to non-immigrant trainees and also to trainees with migration background (without refugee background). This was indeed related to differences in human capital endowment, as the unequal probabilities between groups decreased significantly after controlling for school-leaving certificates. This supported our assumption that occupations with recruitment problems tend to be more open towards applicants with lower achievements and refugees, who, on average, have lower qualifications. The results indicated that young refugees tend to aspire to these training occupations more frequently to possibly gain easier access to VET. Regarding our second research question, we found that refugees with an insecure residence status were indeed most likely to enter these training occupations. This difference remained significant even when human capital endowments were controlled for. The finding suggests that prospects for "training toleration" could be an important driver to channel asylum seekers into VET as young refugees may aim to improve their prospects for staying in the host country.

Overall, we reach two main conclusions. 1) The features of vocational occupations with vacancy problems regarding their openness to applicants with lower qualifications may indeed create a win-win situation for companies and young refugees. On the one hand, refugee immigration can counteract the shortage of trainees that exists in some occupational areas. Such structural problems are not only relevant for the German training market (e.g., Aarkrog, 2020; Kuczera & Jeon, 2019). For young refugees, on the other hand, vocational training in Germany is crucial for their occupational integration due to strong couplings between vocational training and the employment system. It is relatively low-threshold, which can increase young refugees' chances of occupational and social participation. In addition, taking up dual vocational training opens up medium- to long-term prospects of remaining in Germany, as the 3+2 regulation guarantees residence in Germany for 5 years. In view of the circumstances and personal backgrounds of the refugees, residency prospects may serve as an incentive to take up dual vocational training. Our results support the conclusion that some refugees find themselves in such insecure residence conditions that, even if they have higher qualifications, they tend to seek training occupations where access is comparatively open. However, if integration of refugees into training and work in these particular training

occupations is reduced to a logic of "utilization", as qualitative findings on the impact of vocational orientation underline (Wehking, 2020a), refugees are at risk of experiencing occupational segmentation (Christ et al., 2025b). Our findings show that, even when controlling for qualification characteristics, young refugees are more likely than people without a refugee background to take up training in occupations with staffing problems. While a segmentation on the labor market based on migration-specific and qualification characteristics has already been empirically recorded (e.g., Bürmann et al., 2018), our findings also indicate risks of occupational segmentation in the area of dual training regarding refugee migration.

2) Regardless of the mentioned advantages, particularly in the form of the prospects for staying in Germany that vocational training offers, the occupational segmentation of refugees could also have negative effects on their occupational integration. Occupations in which the proportion of unfilled training places was above average also had an above-average proportion of prematurely terminated training contracts (Christ, 2019). If training choices are less driven by interest but are often made pragmatically with a view to residence status (Wehking, 2023), it is possible that young people, and particularly young refugees, may experience less professional self-fulfillment and may be dissatisfied with their training as a result. In this context, trainees with a refugee background who are in a training program other than their desired occupation showed lower satisfaction scores than German trainees (Eberhard & Christ, 2019). As this may result in early termination of training contracts, this can also lead to young refugees withdrawing from the dual training system. On the side of the companies, the negative experience of premature terminations of training contracts by refugees could make them more likely to also withdraw from participating in the training market. Therefore, institutional careers guidance⁹ should pay particular attention to the heterogeneity of refugees and their vocational interests, skills, and abilities in order to reduce these risks. We also recommend closer institutional integration between the stakeholders involved in the integration process. There are examples from other countries of the European Union, such as Sweden, where integration programs have already integrated the topics of vocational orientation or access to the labor market as an integral part of their interventions (Mozetič, 2022). In Germany, on the other hand, integration courses (e.g., offered by the Federal Office for Migration and Refugees) focus primarily on language skills, while topics such as employment, training, and further education run in parallel and are carried out by the public employment service (*Jobcenter*). This might be a problem because many refugees in Germany are not aware of the services offered by the public employment service and therefore make less use of them (Brücker et al., 2016).

Although the results presented in this paper are based on survey data collected in 2018 and 2020, our study constitutes one of the first quantitatively analyses to show that refugees living in Germany in general and refugees with an insecure residence status in particular

⁹ E.g., the FEA and its counselling tools such as the potential analysis.

tend to orient themselves towards training occupations with vacancy problems. Nevertheless, the interpretation of these analyses must take into account the demographic composition of the refugee applicants who participated in the study in 2018 and 2020. The vast majority of refugees surveyed during these years originated from Syria, Afghanistan, or Iraq. In the aftermath of Russia's military invasion of Ukraine in the spring of 2022, the demographic profile of the refugee population residing in Germany has undergone substantial transformation and, as of 2025, exhibits a markedly higher degree of heterogeneity. When comparing with later studies that examine thematically comparable questions, the changed structure must be taken into account, particularly with regard to the framework conditions for residence permits.

To not overstep the scope of this paper, further analyses of the structuring of personnel problems were not included. We could not focus on the sectors in which vacancies most often occur. Vacancy problems across fields, sectors, or branches of training occupations differ in their (among other things) working conditions and salary prospects, regional disparities, qualification requirements, or structural conditions (e.g., economic downturns, technological shifts, etc.) that may influence matching processes on the training market (Ebbinghaus & Mohr, 2025; Eckelt et al., 2020).

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Ethics Statement

This study adhered to all of the research ethics regulations of the participating institutions and the funding organizations. This paper follows the Ethical Principles of the IJR/VET Ethics Statement. The authors report there are no competing interests to declare. The requirement for informed consent was also carefully considered and fulfilled.

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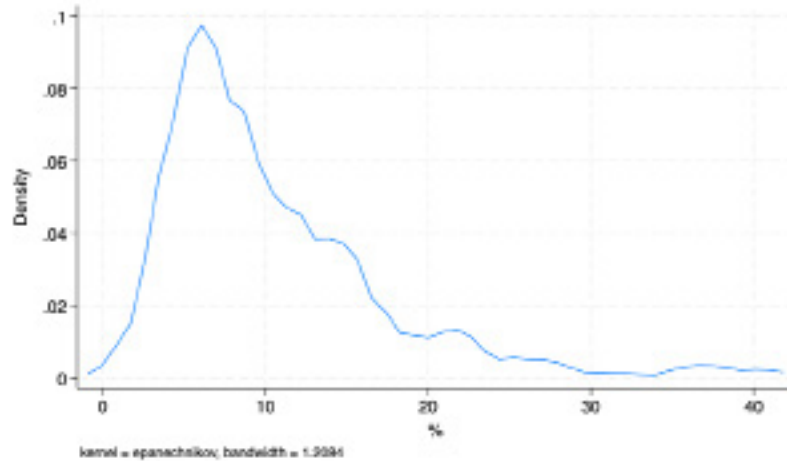
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Appendix



Note. Source: BA/BIBB Applicant Survey 2018-2020, own calculations.

Figure 1: Distribution of Training Places With Vacancy Problems (in %)

Table A1: Descriptive Statistics – Cross Tabulations

	Migration Status			Residence Status (only 2018)		
	No migration background	Refugee background	Migration background (no refugee background)	Permission	Insecure Status	Application still undecided
	M (SD)/ %	M (SD)/ %	M (SD)/ %	M (SD)	M (SD)	M (SD)
Share of unfilled training places in the occupation entered	8.7 (6.8)	10.6 (7.1)	9.7 (6.8)	9.6 (6.2)	13.1 (8.7)	11.6 (7.7)
School-leaving certificate						
None	1.0	34.3	1.4	32.7	50.4	49.3
Lower secondary	18.8	38.5	30.8	31.7	36.5	33.9
Intermediate	57.9	17.1	45.7	21.3	8.8	11.6
Upper secondary	22.3	10.2	22.2	14.3	4.4	5.2
Year						
2018	43.6	91.9	43.4			
2020	56.4	8.1	56.6			
Age						
Younger than 18	54.2	5.6	39.3	5.1	11.8	3.6
18-20	24.8	21.5	30.9	19.7	25.0	25.4

21-25	19.7	48.0	25.8	48.8	44.1	46.1
Older than 25	1.4	24.0	4.1	26.4	19.1	24.9
<i>Gender</i>						
Male	47.8	83.1	48.8	85.8	89.8	92.4
Female	52.2	16.9	51.2	14.2	10.2	7.6

Note. Source: BA/BIBB Applicant Survey 2018-2020, own calculations. Deviations from 100% due to rounding.

Table A2: Descriptive Statistics – Ten Most Frequently Practiced Training Occupations and Their Share of Unfilled Vacancies by Type of Migration Background in 2018 and 2020

No migration background			Migration background (no refugee background)		Refugee background	
2018						
1	Office manager	5.4	Office manager	5.4	Motor vehicle mechatronics technician	4.6
2	Industrial management assistant	8.3	Medical assistant	4.4	Electronics technician	7.0
3	Management assistant for retail services	16.8	Qualified dental employee	10.5	Hairdresser	13.7
4	Industrial mechanic	5.2	Management assistant for retail services	16.8	Sales assistant for retail services	13.7
5	Medical assistant	4.4	Industrial management assistant	8.3	Painter and varnisher	10.3
6	Motor vehicle mechatronics technician	4.6	Motor vehicle mechatronics technician	4.6	Qualified dental employee	10.5
7	Information technology specialist	7.2	Management assistant in wholesale and foreign trade	5.1	Plant mechanic for sanitary, heating and air conditioning systems	8.9
8	Management assistant in wholesale and foreign trade	5.1	Warehouse logistics operator	9.0	Management assistant for retail services	16.8
9	Warehouse logistics operator	9.0	Electronics technician	7.0	Information technology specialist	7.2
10	Mechatronics fitter	4.9	Sales assistant for retail services	13.7	Cook	21.2
2020						
1	Office manager	7.2	Medical assistant	6.6	Hairdresser	11.5
2	Industrial Management Assistant	3.5	Office manager	7.2	Motor vehicle mechatronics technician	5.3
3	Sales assistant for retail services	13.6	Qualified dental employee	14.3	Qualified dental employee	14.3
4	Motor vehicle mechatronics technician	5.3	Sales assistant for retail services	13.6	Sales assistant for retail services	13.6
5	Medical assistant	6.6	Motor vehicle mechatronics technician	5.3	Medical assistant	6.6
6	Industrial mechanic	4.5	Wholesale and foreign trade clerk	7.7	Management assistant for retail services	19.7

7	Information technology specialist	5.1	Management assistant for retail services	19.7	Electronics technician	8.4
8	Management assistant for retail services	19.7	Electronics technician	8.4	Information technology specialist	5.1
9	Wholesale and foreign trade clerk	7.7	Qualified tax assistant	6.5	Office manager	7.2
10	Clerk in public administration	4.2	Hairdresser	11.5	Machine and plant operator	11.4

Table A3: Ordinal Dependent Variable (Robustness Check), Ordered Logit, Average Marginal Effects

	(1)	(2)	(3)
Refugees (Ref.: Non-immigrant youths)			
Below average	-0.185*** (0.016)	-0.234*** (0.017)	-0.067*** (0.020)
Average	0.057*** (0.005)	0.072*** (0.006)	0.020*** (0.006)
Above average	0.128*** (0.011)	0.162*** (0.013)	0.047*** (0.014)
Migration background (no refugee background)			
Below average	-0.088*** (0.018)	-0.094*** (0.018)	-0.055*** (0.016)
Average	0.027*** (0.006)	0.029*** (0.006)	0.016*** (0.005)
Above average	0.061*** (0.012)	0.065*** (0.012)	0.038*** (0.012)
Year: 2020 (Ref.: 2018)			
Below average	0.006 (0.014)	0.009 (0.014)	0.014 (0.013)
Average	-0.002 (0.004)	-0.003 (0.004)	-0.004 (0.004)
Above average	-0.004 (0.010)	-0.006 (0.010)	-0.010 (0.009)
Gender: Female (Ref.: Male)			
Below average		-0.015 (0.014)	-0.019 (0.013)
Average		0.005 (0.004)	0.006 (0.004)
Above average		0.010 (0.009)	0.013 (0.009)
Age: 18-20 (Ref. Younger than 18)			
Below average		0.002 (0.015)	-0.050** (0.016)
Average		-0.000 (0.005)	0.015** (0.005)
Above average		-0.001 (0.011)	0.035** (0.011)
Age: 21-25 (Ref. Younger than 18)			

Below average	0.064*** (0.016)	-0.025 (0.018)
Average	-0.020*** (0.005)	0.007 (0.005)
Above average	-0.044*** (0.011)	0.018 (0.013)
Age: Older than 25 (Ref. Younger than 18)		
Below average	0.119*** (0.023)	0.022 (0.023)
Average	-0.037*** (0.007)	-0.006 (0.007)
Above average	-0.083*** (0.016)	-0.015 (0.016)
None (Ref.: Lower secondary)		
Below average		0.006 (0.023)
Average		-0.002 (0.007)
Above average		-0.004 (0.016)
Intermediate (Ref.: Lower secondary)		
Below average		0.190*** (0.013)
Average		-0.057*** (0.004)
Above average		-0.133*** (0.009)
Upper secondary (Ref.: Lower secondary)		
Below average		0.313*** (0.019)
Average		-0.093*** (0.006)
Above average		-0.220*** (0.014)
N	7176	7176

Note. Source: BA/BIBB Applicant Survey 2018-2020, own calculations. M = 50 imputations. Cluster-robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A4: Ordinal Dependent Variable (Robustness Check), Ordered Logit, Refugees Only, Average Marginal Effects

	(1)	(3)
Insecure Status (Ref.: Permission)		
Below average	-0.162*** (0.043)	-0.121** (0.043)
Average	0.028*** (0.008)	0.020** (0.008)

Above average	0.133*** (0.035)	0.100** (0.036)
Application still undecided (Ref.: Permission)		
Below average	-0.093*** (0.025)	-0.068** (0.024)
Average	0.016*** (0.005)	0.011** (0.004)
Above average	0.077*** (0.021)	0.056** (0.020)
Gender: Female (Ref.: Male)		
Below average		-0.079** (0.028)
Average		0.013* (0.005)
Above average		0.066** (0.023)
Age: 18-20 (Ref. Younger than 18)		
Below average		-0.012 (0.051)
Average		0.002 (0.009)
Above average		0.010 (0.042)
Age: 21-25 (Ref. Younger than 18)		
Below average		0.026 (0.049)
Average		-0.004 (0.008)
Above average		-0.022 (0.041)
Age: Older than 25 (Ref. Younger than 18)		
Below average		0.072 (0.052)
Average		-0.012 (0.009)
Above average		-0.060 (0.044)
None (Ref.: Lower secondary)		
Below average		-0.018 (0.028)
Average		0.003 (0.005)
Above average		0.015 (0.023)
Intermediate (Ref.: Lower secondary)		
Below average		0.189*** (0.029)

Average		-0.032*** (0.006)
Above average		-0.157*** (0.025)
Upper secondary (Ref.: Lower secondary)		
Below average		0.100* (0.040)
Average		-0.017* (0.007)
Above average		-0.083* (0.034)
N	2043	2043

Note. Source: BA/BIBB Applicant Survey 2018, own calculations. M = 50 imputations. Cluster-robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.