



Article

Place of Residence Does Matter for Educational Integration: The Relevance of Spatial Contexts for Refugees' Transition to VET in Germany

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Abstract: For the mostly young refugees who arrived in Germany around 2015/2016, completing vocational education and training (VET) represents the most promising opportunity for professional and social integration. However, access opportunities to VET are characterized by spatial inequalities: German districts vary considerably according to labour market structure, economic productivity and demographic development, which constitute the supply and demand for training places in the dual VET sector, to which refugees predominantly have access. This paper examines if the transition chances of young refugees aged 18–30 to VET depend on their place of residence. For this, we analysed the IAB-BAMF-SOEP Survey of Refugees ($n = 5216$) using multi-level discrete-time event history analysis. On the supply side, higher economic productivity (measured by GDP), a low unemployment rate and a greater number of small versus large businesses in the district are positively associated with refugees' transition chances. On the demand side, an increasing number of school leavers with no school-leaving certificate and of refugees in the district are negatively associated with the respective chances. Our results suggest that spatial characteristics essentially matter for young refugees' training opportunities and thus support recommendations to reform current distribution policies, in which central spatial contextual factors remain largely disregarded.



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Keywords: refugees; regional disparities; regional opportunity structures; inequality of educational opportunities; vocational education and training (VET); dual system

1. Introduction

The worldwide increase in political, ethnic and religious conflicts has driven the number of people fleeing their homes to new heights in recent years. In the period from 2014 to 2018 alone, 4.4 million refugees¹ arrived in Europe seeking protection and an opportunity for a viable future. Nearly half of them, 1.8 million people, applied for asylum in Germany (Eurostat 2022). As a majority of the refugees wish to stay there indefinitely (Brücker et al. 2020b) their integration into the central social subsystems of society, such as education and employment, poses a substantial challenge for the host country. In Germany, life chances are closely linked to the acquisition of educational qualifications (Roth et al. 2010, p. 179). The successful completion of the general academic or vocational track of education is an essential prerequisite for qualified employment. Individuals without an educational certificate, regardless of their ethnic background, are more likely to enter precarious employment with lower earnings and fewer career prospects or even to be unemployed (Solga 2005). This is not only detrimental to the individuals themselves, whose social position and further life opportunities in the host country are decisively shaped by their situation in the labour market, but it also entails major disadvantages for the German labour market, as it is thus deprived of a vast amount of potential human capital at a time of increased demand for skilled workers (Fuchs et al. 2019). Therefore, scientific research on the determinants relevant to the integration of asylum seekers into the educational system and, subsequently, the labour market, can be considered essential.

With this in mind, we can identify one predominant commonality among the cohort of refugees who migrated to Germany after 2014–15: a large proportion of this group is of the appropriate age to participate in vocational education and training (VET). In 2016, 44% of the refugees were aged between 16 and 30, and in the near future, another 7% will reach the age to enter VET (BAMF 2017). Although most people in Germany start a VET programme at around 20 years of age (Statistisches Bundesamt 2020, Table 2.7), the age limit can be assumed to be shifted upwards for people with a refugee background. Since access to the VET system in Germany is not subject to any restrictions in terms of previous educational qualifications (Solga et al. 2014, p. 8), transitioning to VET represents a promising prospect for young refugees. This refers not only to the possibility of acquiring work-related skills and certifying them by means of a recognised qualification but also to the possibility of establishing contact with companies at an early stage and thus gaining access to the labour market (Aerne and Bonoli 2021; Schreyer et al. 2015).

However, it can be assumed that the regionally varying socioeconomic conditions in Germany are associated with the young refugees' chances of transitioning to VET. As most refugees who are interested in VET have either completed only lower secondary education or have no school-leaving certificate that is recognised in Germany (Eberhard and Schuß 2021), taking up dual training is usually their only option. Access to training places in the dual sector is primarily determined by the regional interplay of supply and demand. However, the factors constitutive of this interplay, such as the labour market structure, economic productivity and demographic development, vary to a considerable extent between individual districts in Germany (Baethge et al. 2017, p. 15ff). This leads to different fit ratios between available training places and applicants depending on the region (Baethge et al. 2017, p. 66). From previous research, it is known that such problems of fit are particularly detrimental to the transition of individuals with a migrant background to VET (Michaelis and Busse 2021; Ulrich 2013; Baethge et al. 2017, p. 35ff). Yet, very little research has been carried out to date on the extent to which regionally varying contextual factors are associated with the chances of refugees to transition to VET. At the same time, this issue is highly relevant given the allocation mechanism of asylum seekers in Germany: upon arrival, they are distributed proportionally among the individual federal states by means of the EASY (*Erstverteilung von Asylbegehrenden*) quota system.² The resulting distribution, first at the federal and finally at the municipal level, largely corresponds to the respective population numbers (OECD 2017; Geis and Orth 2016). This mode of allocation, however, fails to consider the socioeconomic contextual factors of the respective regions, which we assume to be associated with refugees' chances to transition to VET.

Our study addresses this issue by examining the processes that can influence the regional supply of training places in the dual VET sector and subsequently the regional competitive situation for the transition of refugees to VET. Our research question asks: *Which spatial characteristics of their place of residence are associated with increased chances of refugees to transition to VET?* For this purpose, we give an overview of the structure of the German VET system and the respective regulations that govern refugees' access to its individual sectors. Secondly, we discuss what evidence can be found for a relationship between specific spatial contextual factors and the transition of refugees to VET. We then review the current state of research regarding the respective transition of persons with an immigrant and refugee background as well as with a relatively unfavourable endowment of resources against the backdrop of regionally varying socioeconomic conditions. Our empirical analyses examine these transitions for 18- to 30-year-old asylum seekers in Germany using data from the IAB-BAMF-SOEP Survey of Refugees (2016–2020) (e.g., Brücker et al. 2016). For our estimations, we use multilevel discrete-time event history analysis. Finally, we discuss the results with regard to the previously formulated hypotheses and assess their significance for the social reality of asylum seekers in Germany.

2. Refugees in the German VET System

With around one million people entering VET each year compared to about half a million people entering university (Federal Institute for Vocational Education and Training 2018, p. 42), the vocational track can be considered to be of particular importance within the German educational system. The VET system overall consists of three sectors: the *dual system*, fully qualifying school-based vocational education programmes and the sector of prevocational training measures called the *transitional system*. However, only the first two sectors lead to a nationally recognised VET certificate, whereas the third sector comprises preparatory programmes for a potentially later entry to a fully qualifying VET programme. The primary and secondary VET sectors each train for different occupational fields (Solga et al. 2014). Admission to the secondary VET sector, however, generally depends on the acquisition of an intermediate school-leaving certificate (Granato and Ulrich 2014), which persons with a refugee background do not usually possess (Eberhard and Schuß 2021). For this reason, this study focusses exclusively on the conditions of access for refugees to the dual system. The decision for this focus is supported by the fact that 70% of the training place applicants with a refugee background who registered with the German Federal Employment Agency (*Bundesagentur für Arbeit*) and entered one of the three VET sectors in 2018 transitioned to the primary sector, and only 6% transitioned to the secondary VET sector (BIBB 2019, p. 222).

Beginning VET in Germany requires having completed full-time compulsory education. In most German federal states, full-time compulsory schooling ends after 9 or 10 school years, when students are 15 years old on average (KMK 2021, p. 26). More than 97.5% of training place applicants enter VET before the age of 30 (Statistisches Bundesamt 2020, Table 2.7). If asylum seekers manage to find a training place or a job, all restrictions on their residential mobility³ are lifted (Brücker et al. 2020a), so that these legal regulations do not constitute an obstacle for transitioning to VET.

The dual system plays the most dominant role in the German VET system, as it accounts for about half of all new entrants to VET (Federal Institute for Vocational Education and Training 2018, p. 42). It has a duration of two to three years, depending on the occupational field, and combines both school-based education and company-based training programmes (apprenticeships). In the according vocational schools (*Berufsschulen*), apprentices acquire the theoretical knowledge relevant to their training occupation as well as an upper secondary general education in core subjects such as the German language and mathematics. In addition, the apprenticeships are intended to provide them with practical knowledge and hands-on training in their future occupational field and to facilitate their later labour market entry through early contact with companies (Solga et al. 2014). The number of available apprenticeships and the specific selection criteria for applicants are determined by the companies themselves. On the one hand, the supply of apprenticeships is primarily oriented toward the supply side of the economy, particularly its need for qualified skilled workers, rather than toward the educational demand on the part of those seeking training positions. On the other hand, the lack of formal entry requirements implies that school leavers with no or below-average qualifications also have the prospect of making the transition to VET (Granato and Ulrich 2013). This aspect can be a great advantage for young refugees in particular, whose educational qualifications acquired in their home country are often not formally recognised in Germany and whose educational qualifications acquired in the host country are usually at a lower level than those of the majority population due to various factors such as the language barrier (Eberhard and Schuß 2021). Legally, there are no significant restrictions of access to the dual system for asylum seekers, provided that they do not come from a so-called *safe country of origin*⁴, have already resided in Germany for at least three months and are no longer required to live in an initial reception facility (Granato and Junggeburth 2017; Braun and Lex 2016).

3. Theoretical Framework

In the previous section, we examined the formal access requirements of refugees to the three sectors of the German VET system. The legal aspect, however, comprises only a small part of the overall opportunity structure of refugees in the transition to VET. As discussed above, the provision of training places in the primary (dual) VET sector is entirely determined by market logic. Companies are not only free to decide whether and how many training places they provide but also which applicants they ultimately hire. Accordingly, the chances of obtaining a training place are additionally determined by the interplay of supply and demand, which varies both by region and over time (Eberhard 2016).

Let us first take a look at the *supply side*. For refugees to be able to enter the dual VET sector, a sufficient number of apprenticeships are a necessary prerequisite. However, the provision of training places by companies depends to a large extent on the economic situation of the respective region. Companies are essentially interested in securing both current and future production by means of a cost-efficient labour force. The first relevant aspect in this regard is therefore the level of production itself. In economically weak regions, the order situation is usually comparatively low, which implies a lower demand for labour and, consequently, for apprentices (Brunello 2009; Wolter and Ryan 2011). The second relevant aspect relates to the economic calculations of companies, in which the expected costs of different groups of employees are weighed against the returns. At a general level, companies have the choice of either hiring already qualified workers or training new apprentices themselves, both of which come with different costs: “Training costs include the wage paid to apprentices—net of their contribution to output during training—and the costs of training facilities, materials and trainers. Compared to training costs, the costs of recruiting skilled labour are only born when recruitment occurs” (Brunello 2009, pp. 147f). Thus, if companies have the opportunity to draw on a large supply of already qualified workers, their incentive to train apprentices themselves is relatively low. Accordingly, the number of apprenticeships provided depends to some extent on the regional supply of available labour. As the unemployment rate in a region increases, so does the available supply of qualified workers, thus reducing the recruitment costs and rendering the training of new apprentices less attractive (Brunello and Medio 2001; Brunello 2009; Wolter and Ryan 2011).

However, it must be taken into account that training costs differ between companies depending on their size and economic sector. According to the segmentation approach, the labour market is divided into a primary and a secondary segment, to each of which specific types of jobs are attributed. The primary segment includes workers with professional skills that are in high demand in the labour market as well as workers whose company-specific training has required a high investment of time and money. As such, these qualifications are not readily substitutable, and the corresponding jobs are relatively stable and well remunerated. In contrast, the secondary segment includes those workers whose recruitment is comparatively effortless and inexpensive due to their wide availability in the external labour market and whose employment does not require extensive, particularly company-specific, training (Sengenberger 1987; Mendijs and Sengenberger 1976; Lex 1997). Depending on the specific segment, companies pursue different goals by training new apprentices. Since the training of skilled workers in the primary labour market involves a high expenditure of resources, the investment in the apprentices’ human capital only pays off over the course of a longer period of employment. As a result, companies train only few apprentices but try to retain them for the purpose of securing their production in the long term. This applies mainly to companies in the core industrial sector and in some parts of the service sector such as banking and insurance as well as to large companies, which are better able to redeploy employees internally over time. Training in the secondary labour market, by contrast, is aimed less at imparting company-specific and more at conveying rather broad technical knowledge and is accordingly less resource-intensive. Since apprentices can be quickly deployed as almost full-fledged workers, they are hired in numbers that exceed the company’s actual need for new recruits in order to secure current production. It is

primarily skilled craft enterprises as well as micro and small enterprises that thus provide a large number of training places but rarely continue to employ their graduates after they have completed their training (Lex 1997, p. 36ff.; Büchel and Neubäumer 2003).

All this considered, we assume that the number of training places made available in the primary and secondary segment is significantly influenced by the economic situation of a region, particularly with regard to its economic structure. Given the regional heterogeneity of the prevailing economic structure in Germany, this can lead to widely differing opportunities in the transition to VET across the country. After all, Germany is differentiated into regions with a predominantly traditional economic structure of micro and small enterprises as well as skilled craft enterprises on the one hand and economically more modern regions with large core industrial and service enterprises on the other. In addition, the regions also exhibit significant differences in terms of their economic productivity as well as the number of skilled workers available in the labour market (Blien and Hirschenauer 2018). Depending on the district to which they are assigned, refugees therefore have access to a different number of apprenticeships, which can have a considerable impact on their chances of transitioning to VET. With regard to the supply side, we can thus derive the following hypotheses:

Hypothesis 1a. *The higher the level of production in a district, the more likely young refugees are to transition to VET.*

Hypothesis 1b. *The lower the unemployment rate in a district, the more likely young refugees are to transition to VET.*

Hypothesis 1c. *The higher the number of skilled craft, micro and small enterprises in a district, the more likely young refugees are to transition to VET.*

However, when it comes to refugees' opportunities for transitioning to VET, it is not only the number of available training places but also the demand for them that plays a decisive role. Let us therefore now turn to the *demand side*. Germany's regions not only vary in terms of their population density but also with respect to their demographic development (Spellerberg and Kirch 2021, pp. 295ff.; Klein et al. 2016). In regions with more available apprenticeships than potential applicants, the chances of a successful transition are accordingly promising. Conversely, in those regions where demand exceeds the available supply of apprenticeships—as in the case of a larger number of school leavers—bottlenecks arise that are likely to reduce the chances of refugees entering VET. At the same time, it is reasonable to assume that asylum seekers do not compete with all school leavers for training places. According to theories of educational and occupational aspirations, young people prefer those types of occupational fields in the highly segmented VET market that offer the greatest possible prestige and thus future social status that can be achieved on the basis of their school performance (Esser 1999; Gottfredson 1981, 2002). After completing their respective course of education, young people with either an intermediate or an upper secondary school-leaving certificate have the comparatively most promising opportunities in that they can most likely find a training place in the higher-quality segment of the VET market (Michaelis and Busse 2021) as well as gain further qualifications by obtaining a general or vocational baccalaureate or pursuing a university education (KMK 2021). As opposed to the native population, refugees, however, generally not only have lower educational qualifications (Eberhard and Schuß 2021) but, in view of their shorter educational career in Germany⁵ and mostly insufficient German language skills, also have less human capital that can be utilised in the host country (Chiswick 1991; Friedberg 2000; de Vroome and van Tubergen 2010). It can therefore be assumed that they occupy qualitatively entirely different segments of the VET market than individuals with an intermediate or upper secondary school-leaving certificate. That said, their much more serious competitors in the search for an apprenticeship are likely to be persons with no or a lower secondary school-

leaving certificate. Since the ratio of school leavers with different educational certificates varies not only over time but, as a result of different schooling policies, also regionally (Statistisches Bundesamt 2022b), we can expect refugees to have better chances of transitioning to VET in districts with a low proportion of school leavers with no or a lower secondary school-leaving certificate.

Moreover, it seems reasonable to assume that people with a refugee background are in a competitive relationship not only with the resident school leavers but also with each other. This becomes particularly relevant against the backdrop of the uneven distribution of refugees in Germany (Statistisches Bundesamt 2022a, Table 2.1). In districts with a high concentration of people with a refugee background, the opportunities for individuals to transition to VET should therefore be lower than in regions with fewer refugees. This leads us to the following hypotheses:

Hypothesis 2a. *The lower the number of school leavers particularly with no or a lower secondary school-leaving certificate in a district, the more likely young refugees are to transition to VET.*

Hypothesis 2b. *The lower the number of people with a refugee background in a district, the more likely young refugees are to transition to VET.*

4. State of Research

Given the short time horizon, research is still scarce on the transition to the German VET system of persons who fled to Germany after 2013. However, surveys on the life courses of earlier cohorts of refugees have shown that their integration into both the VET system and the labour market has not been realised to a sufficient degree. Between 1995 and 2010, 56% of asylum seekers did not obtain a professional qualification in Germany, compared to only 35% of the remaining migrant groups (Fendel and Romiti 2016). The labour market participation rate and the gross earnings of those asylum seekers without a professional qualification were 19 percentage points and, on average, 141 euros lower than those of asylum seekers with a vocational or general academic qualification. The proportion of people receiving social benefits was 9% higher than that of asylum seekers with a vocational or general academic qualification. This clearly illustrates the immense importance of completing a VET programme for the socioeconomic integration of refugees in Germany.

Concerning transitions of the post-2013 refugee cohort to VET, 45% of people with a refugee background who had registered with the Federal Employment Agency as applicants for a training place were able to enter a VET programme in 2018 (Eberhard and Schuß 2021).⁶ Training place applicants with a refugee background were less successful in transitioning to VET compared to persons without an immigrant background (66.2%) but had a similar transition rate to persons with a migration but not refugee background (45.2%).

With regard to possible regional determinants of a successful transition to VET, little research has been carried out to test the relevant factors for refugees. Eberhard and Schuß (2021) found that a favourable ratio of training places to applicants is positively associated with a higher likelihood of refugees transitioning to VET, but did not specifically address the underlying relationships.

Nonetheless, there are a number of studies that have examined the impact of regional contextual factors on the transition to VET of individuals with a migration background as well as school leavers with relatively low school-leaving certificates. Given that the majority of asylum seekers who are interested in VET have a lower secondary or no recognised school-leaving certificate (Eberhard and Schuß 2021), it can be assumed that the results are largely transferable.

Regional unemployment at the level of the German administrative districts has been shown to differentially affect the transition of school leavers with various certificates to VET. The probability of making this transition decreases when the regional unemployment rate is high (Weßling et al. 2015; Hillmert et al. 2017). This effect is particularly pronounced

for school leavers with a lower school-leaving certificate, yet although [Weßling et al. \(2015\)](#) found that the relative transition probability increases for those with an intermediate certificate but decreases for those with a lower secondary certificate, [Kleinert and Jacob \(2012\)](#) came to the conclusion that both groups of school leavers are impaired in their transition chances to VET when the regional unemployment rate is high.

The influence of the regional company size on the transition chances of young people with low reading skills has been examined for Switzerland by [Buchholz et al. \(2012\)](#). They found that the chances of low-performing school leavers finding a training place increases significantly in cantons with a higher proportion of micro and small enterprises. Their findings further revealed that young people with low reading skills are more likely to obtain a training place with low professional standards than those with high reading skills.

This result is supported by [Michaelis and Busse \(2021\)](#), who observed that in Germany, young people transition to different VET market segments depending on their school-leaving certificates. School leavers with no or a lower secondary certificate are most likely to take up VET in occupational fields with lower attractiveness, and consequently face higher hiring challenges. The same holds for persons with a migration background.

5. Data and Methods

5.1. Database

For our empirical analysis, we used the IAB-BAMF-SOEP Survey of Refugees ([Brücker et al. 2018](#); [Kühne et al. 2019](#)). This survey is an ongoing representative annual panel study on refugees that was launched in 2016. The sample was obtained through an examination of administrative data and surveys of refugees who had migrated to Germany within the period from 2013 to 2016. Among other things, respondents were questioned about their place of origin and the route taken to Germany, the state of asylum proceedings, the type of accommodation obtained in Germany, their proficiency in the German language, educational background and degrees, their participation in VET, financial situation and personal health.

5.2. Analytical Sample, Time Axis and Destination State

The IAB-BAMF-SOEP survey collects data on participation in VET by means of an individual, household and youth questionnaire. For individuals under the age of 18, information regarding their educational trajectories is provided by their parents. However, a substantial amount of information from the individual questionnaire that we mostly relied on was not available for these persons. We therefore restricted our sample to young adults between 18 and 30 years of age, since this group is most likely to be interested in transitioning to VET. Expanding the observation window to include refugees over the age of 18 is a common practice when using IAB-BAMF-SOEP data ([Brücker et al. 2019](#)) and thus increases the comparability of our results. To verify the robustness of our findings, we conducted a secondary analysis that considered individuals aged 15 to 30 with a necessarily truncated number of control variables.⁷ Additionally, some individuals might aspire to higher education and not pursue VET in Germany at all. As a further robustness check, we carried out our analyses with the full number of control variables for persons aged 18 to 30 but excluded those from our sample who transitioned to higher education during the observation period.

In Germany, VET programmes usually start on the 1st of August or September ([Federal Institute for Vocational Education and Training 2018](#), p. 64).⁸ We therefore only used the annual data on the VET status of the respondents. Our observation period spans a duration of five years (2016–2020) with a maximum of five observation points (i.e., five *single spells*) per person. We excluded persons whose foreign vocational or higher education qualifications were officially recognised in Germany as this recognition enables them to pursue an occupation for which they had received training in their country of origin. Additionally, we also excluded persons who were still in the general education system at the time of investigation.

We analysed the time to transition to VET, i.e., the *duration time*. In our analysis, we defined a transition to VET (*event*) as the entry of an individual into a VET programme in the dual or the school-based VET sector. We did not consider integration into the transitional system as a transition to VET, as it does not lead to a recognised VET certificate (see Section 2).

5.3. Independent Variables

To test our hypotheses, we used annual administrative data on the district level (NUTS-3), i.e., level 2, between 2016 and 2020 that are provided by the Federal Statistical Office and the statistical offices of the federal states of Germany. To measure the level of production in a district (Hypothesis 1a), we used the gross domestic product (GDP) per capita, relative to 1000 inhabitants, divided by one thousand. Furthermore, to avoid the effect of GDP being distorted by the unequal representation of economic sectors in the individual districts, we conducted a supplementary analysis as a robustness check, which controlled for the proportion of employees covered by social security contributions in both the manufacturing and the service sector for all corresponding employees. The unemployment rate in a district (Hypothesis 1b) is the number of unemployed persons relative to the labour force, i.e., relative to the sum of employed and unemployed persons. To estimate the effects of existing skilled craft enterprises as well as micro and small enterprises in a district (Hypothesis 1c), we calculated five regional concentration measures, each relative to the district population: the number of skilled craft enterprises (density of craft enterprises), the number of enterprises with 0–9 employees (micro enterprises), 10–49 employees (small enterprises), 50–249 employees (medium-sized enterprises) and more than 249 employees (large enterprises) per 1000 inhabitants.

The number of school leavers in total and by school-leaving certificate (Hypothesis 2a) as well as the number of refugees (Hypothesis 2b) who represented potential competition regarding the transition to VET in a district were measured per 1000 inhabitants in the respective district. We categorised the number of school leavers by certificate according to the following groups: no school-leaving certificate, lower secondary school-leaving certificate (*Hauptschulabschluss*), intermediate secondary school-leaving certificate (*Realschulabschluss*) and upper secondary school-leaving certificate (*Abitur*). A statistical description of these variables concerning their means and standard deviations is presented in Table 1. Additionally, we considered control variables at the individual level (level 1), which are also included in Table 1.

Table 1. Sample characteristics and description (non-imputed data).

Variables	Values	d	N
Transition to VET	0 (no), 1 (yes)	378	11,883
Duration time	1–5 (years: 2016–2020)	Incidence rate per 1000: 23.9	
<i>Level-2 independent variables</i>	Min–Max	Mean	SD
GDP per capita ($k = 309$)	11.2–2345.6 (EUR)	276.8	289.4
Unemployment rate ($k = 309$)	1.5–13.6 (%)	5.3	2.34
No. of micro enterprises (0–9 employees) per 1000 inh. ($k = 309$)	20.7–71.0	37.9	6.02
No. of small enterprises (10–49 employees) per 1000 inh. ($k = 309$)	2.9–7.8	4.8	0.85
No. of medium-sized enterprises (50–249 employees) per 1000 inh. ($k = 309$)	0.5–2.1	1.1	0.31
No. of large enterprises (>250 employees) per 1000 inh. ($k = 309$)	0.0–0.5	0.2	0.18
Density of craft enterprises ($k = 309$)	3.0–12.2	6.9	1.68

Table 1. Cont.

Variables	Values	d	N
No. of school leavers per 1000 inh. ($k = 309$)	4.6–21.2	10.1	2.36
No. of school leavers with no school-leaving certificate per 1000 inh. ($k = 309$)	0.2–2.1	0.6	0.23
No. of school leavers with a lower secondary school-leaving certificate per 1000 inh. ($k = 309$)	0.5–3.5	1.7	0.54
No. of school leavers with an intermediate secondary school-leaving certificate per 1000 inh. ($k = 309$)	2.1–10.4	4.4	1.14
No. of school leavers with an upper secondary school-leaving certificate per 1000 inh. ($k = 307$)	0.5–9.6	3.4	1.31
No. of refugees per 1000 inh. ($k = 302$)	6.0–104.9	21.1	10.26
<i>Level-1 independent (categorical) variables</i>		%	N
Gender ($N = 11,883$)	0 (m)	57.3	6804
	1 (f)	42.7	5079
Period of arrival in Germany ($N = 10,990$)	1 (before 2015)	21.8	2392
	2 (in 2015)	59.0	6488
	3 (after 2015)	19.2	2110
Country of origin ($N = 11,883$)	1 (Syria)	51.0	6057
	2 (Afghanistan)	12.5	1490
	3 (Iraq)	14.8	1760
	4 (Somalia/Eritrea)	8.3	987
	5 (Other)	13.4	1589
Level of education ($N = 8745$)	1 (primary education)	42.8	3745
	2 (lower secondary)	25.6	2241
	3 (upper secondary and post-secondary non-tertiary)	18.5	1614
	4 (tertiary)	13.1	1145
Residence title ($N = 9314$)	1 (temporary residence permit)	18.9	1759
	2 (temporary suspension of deportation)	5.5	509
	3 (permanent residence permit)	75.7	7046
Participation in an integration course by BAMF, an occupation-specific language course by the German Employment Agency or ESF-BAMF, or other German language courses during the year in question ($N = 7909$)	0 (no)	39.6	3128
	1 (yes)	60.5	4781
Type of household ($N = 11,813$)	0 (private household)	76.0	8977
	1 (collective accommodation)	24.0	2836
<i>Level-1 independent (continuous) variables</i>		Mean	SD
Age at the start of the observation ($N = 11,883$)	18–30 [15–30]	22.8	3.69
Self-assessed German writing skills ($N = 8000$)	1 (very good)–5 (very bad)	2.8	1.12
Contact with Germans ($N = 7954$)	1 (daily)–6 (never)	3.2	1.93
Contact with co-ethnics ($N = 7946$)	1 (daily)–6 (never)	2.9	1.66
No. of children under 14 years of age ($N = 11,883$)	0–10	0.8	1.28
Current health ($N = 8049$)	1 (very good)–5 (bad)	1.7	0.93

Source: IAB-BAMF-SOEP Survey of Refugees (2016–2020). Our own calculations. Note: Descriptive statistics in Table 1 (means, SD, %, d (number of transitions) and N) refer to person-years (spells) in the analytical sample of persons aged 18 to 30.

5.4. Analytic Strategy

For our empirical analysis, we tested the direct effect of the district-specific variables and unobserved characteristics on the district level on the time to transition to VET. Since we have event history data on a yearly basis with a hierarchical structure, we used multilevel discrete-time hazard rate models. Discrete-time event history models assume a hazard rate h for a finite number of time points that is defined as $Pr[T_i = t | T_i \geq t, \mathbf{x}_i]$ (Allison 1982). T represents the duration (or waiting) time within a certain state for individual i . The hazard rate is the conditional probability for an event to occur given that the event has not yet occurred at time point t ($t = 1, 2, \dots$) (i.e., given that the person is still at risk). It is conditional as the probability of the occurrence of an event is influenced by a set of independent variables (x). The hazard rate can be specified as a logistic regression function with a random intercept:

$$\log h_{ikt} = \alpha_{tk} + \beta'x_{ik} + u_k$$

The hazard rate is estimated as a linear function. It is defined by a set of covariates $\beta'x_{ik}$ for person i in the district k that are assumed to have the same effect at all time points (proportional hazards). α_{tk} is a set of dummy variables for each time point t (baseline hazard) in district k without a separate intercept. This corresponds to a Cox model (Singer and Willett 1993).⁹ $\alpha_{tk} + \beta'x_{ik}$ is the fixed part of the model and involves all district-level and individual-level variables. u_k is the random intercept: it is assumed to be normally distributed with variance σ^2 (i.e., if σ^2 deviates significantly from zero, then district effects are present). Technically, we estimated random intercept models.

Around 33% of our data contain missing values. We use iterated chained equations (White et al. 2011) to multiply imputed missing data of all independent variables. In accordance with von Hippel (2020), we applied a quadratic rule to determine the required number of imputations ($M = 12$) based on the fraction of missing information in our fully specified model. In the fully imputed dataset, the number of spells is $N = 11,883$, the number of subjects is $n = 5126$, the number of transitions is $d = 378$ and the number of districts is $k = 309$. To relax the normal distribution assumption of standard errors and to allow for intragroup correlation, we used cluster robust standard errors.

We estimated ten models. Model 1 is a random-intercept-only model that we used to calculate the intraclass correlation (ICC). Model 2 includes the control variables, which were all measured on level 1 (individuals). Model 3 tests Hypothesis 1a (adding the district-specific GDP per capita to Model 2); Model 4 tests Hypothesis 1b (adding the district-specific unemployment rate to Model 2); Models 5 and 6 test Hypothesis 1c (adding the district-specific number of micro, small, medium-sized and large enterprises first and the district-specific density of craft enterprises next to Model 2); Models 7 and 8 test Hypothesis 2a (adding the district-specific number of school leavers first and the number of school leavers with no, a lower secondary, an intermediate secondary and an upper secondary school-leaving certificate next to Model 2); Model 9 tests Hypothesis 2b (adding the district-specific number of refugees to Model 2). Lastly, since the individual regional variables also correlate with each other, we estimated a model in which we include all of these variables at the same time (Model 10). In this way, we want to examine which of the regional variables' effects remain significant when controlling for all relevant processes.

6. Results

Of the 5126 individuals in the sample, 378 transitioned to VET during the five-year observation period, which accounts for 14% of the sample (Figure 1). This corresponds to an incidence rate of approximately 24 persons per 1000 individuals.

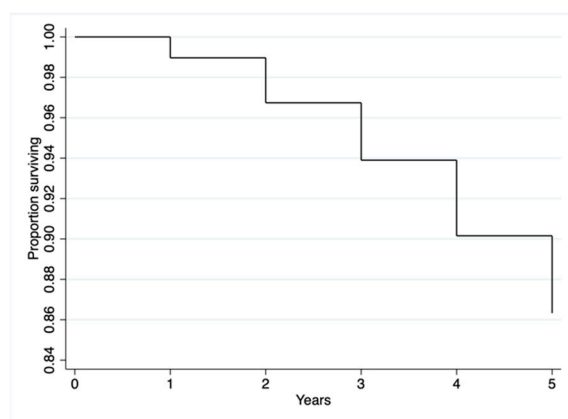


Figure 1. Kaplan–Meier survival function for transitions to VET. Source: IAB-BAMF-SOEP Survey of Refugees (2016–2020). Our own calculations.

Table 2 presents the estimated coefficients from the multilevel discrete-time hazard rate model.

Model 1 reports the overall chances for refugees aged 18 to 30 to transition to VET in Germany (random-intercept-only model). We found significant district effects in the variance σ^2 . Unobserved heterogeneity on level 2 (districts) explains around 6.1% of the variation in transitions to VET.

Model 2 indicates the chances for refugees to transition to VET while controlling for the previously selected individual characteristics. On level 1 (individuals), an individual's educational level has the strongest effect on their chances of transitioning to VET. Persons with lower secondary education have the highest chances of transitioning to VET (compared to those with primary education only). The chances are lower for those with upper secondary/post-secondary (non-university) and tertiary education. This might indicate that persons with upper secondary and tertiary education aspire more to higher education than to VET.

In the subsequent analytical steps, the regional variables corresponding to our hypotheses were successively included in the model.¹⁰ Model 3 shows that the chances of refugees to take up VET increase considerably with a higher GDP in the district, with significance at the 1% level. This result is replicated in the robustness check with an additional control for the share of employees subject to social security contributions in the manufacturing and the service sector for all corresponding employees. This suggests that the order situation of companies in regions with a low GDP is too unfavourable to provide numerous additional apprenticeships. Hypothesis 1a is thus confirmed. Similarly, the hypothesis relating to the unemployment rate (1b) is also confirmed: an increase in the unemployment rate in the respective district corresponds with decreasing chances of young refugees to transition to VET (Model 4). The result is significant at the 1% level. In light of our theoretical considerations in Hypothesis 1b, the results suggest that hiring semi-skilled workers is more resource-efficient than hiring new apprentices. Therefore, when the regional availability of potentially skilled workers is low, more apprenticeships are provided, which appears to be associated with higher chances of refugees to enter VET.

Table 2. Discrete-time multilevel model for the transition of young refugees ages 18 to 30 to vocational education and training (VET).

	Model 1 Time	Model 2 Covariates	Model 3 GDP per Capita	Model 4 Unemployment Rate	Model 5 Size of Enterprises	Model 6 No. of Craft Enterprises	Model 7 No. of School Leavers	Model 8 School-Leav. Certificates	Model 9 No. of Refugees	Model 10 Overall Model
Survey year										
2016	−3.942 *** (0.165)	−4.871 *** (0.657)	−4.968 *** (0.661)	−4.280 *** (0.660)	−5.588 *** (0.750)	−5.079 *** (0.736)	−5.300 *** (0.707)	−5.253 *** (0.716)	−4.561 *** (0.658)	−3.873 *** (0.986)
2017	−3.643 *** (0.117)	−4.698 *** (0.627)	−4.787 *** (0.631)	−4.140 *** (0.630)	−5.427 *** (0.735)	−4.899 *** (0.706)	−5.105 *** (0.683)	−5.034 *** (0.692)	−4.369 *** (0.637)	−3.719 *** (0.974)
2018	−3.416 *** (0.123)	−4.714 *** (0.607)	−4.810 *** (0.611)	−4.186 *** (0.611)	−5.448 *** (0.713)	−4.915 *** (0.688)	−5.111 *** (0.658)	−5.017 *** (0.667)	−4.362 *** (0.616)	−3.746 *** (0.941)
2019	−3.151 *** (0.119)	−4.677 *** (0.617)	−4.772 *** (0.622)	−4.180 *** (0.614)	−5.633 *** (0.746)	−4.880 *** (0.702)	−5.067 *** (0.667)	−4.990 *** (0.677)	−4.313 *** (0.625)	−3.871 *** (0.962)
2020	−3.171 *** (0.144)	−4.676 *** (0.608)	−4.766 *** (0.610)	−4.088 *** (0.614)	−5.629 *** (0.735)	−4.878 *** (0.688)	−5.041 *** (0.651)	−5.012 *** (0.659)	−4.304 *** (0.619)	−3.812 *** (0.976)
Gender (ref. male)										
Female		−0.436 ** (0.156)	−0.418 ** (0.155)	−0.424 ** (0.154)	−0.424 ** (0.154)	−0.436 ** (0.155)	−0.427 ** (0.155)	−0.430 ** (0.155)	−0.437 ** (0.155)	−0.398 * (0.154)
Age at the start of the observation		0.029 (0.021)	0.027 (0.021)	−0.028 (0.021)	0.030 (0.021)	0.028 (0.021)	0.028 (0.021)	0.027 (0.021)	0.028 (0.021)	0.029 (0.021)
Period of arrival in Germany (ref. before 2015)										
In 2015		−0.198 (0.128)	−0.197 (0.128)	−0.204 (0.129)	−0.175 (0.128)	−0.202 (0.129)	−0.192 (0.127)	−0.184 (0.127)	−0.208 (0.129)	−0.179 (0.128)
After 2015		−0.468 * (0.202)	−0.470 * (0.202)	−0.471 * (0.205)	−0.440 * (0.204)	−0.470 * (0.203)	−0.462 * (0.202)	−0.437 * (0.201)	−0.472 * (0.203)	−0.434 * (0.205)
Country of origin (ref. Syria)										
Afghanistan		0.598 ** (0.187)	0.579 ** (0.190)	0.597 ** (0.186)	0.571 ** (0.188)	0.593 ** (0.187)	0.596 ** (0.189)	0.602 ** (0.186)	0.590 ** (0.187)	0.578 ** (0.187)
Iraq		−0.122 (0.201)	−0.115 (0.199)	−0.143 (0.197)	−0.144 (0.199)	−0.122 (0.201)	−0.119 (0.200)	−0.140 (0.200)	−0.121 (0.199)	−0.154 (0.194)

Table 2. Cont.

	Model 1 Time	Model 2 Covariates	Model 3 GDP per Capita	Model 4 Unemployment Rate	Model 5 Size of Enterprises	Model 6 No. of Craft Enterprises	Model 7 No. of School Leavers	Model 8 School-Leav. Certificates	Model 9 No. of Refugees	Model 10 Overall Model
Somalia/Eritrea		0.575 * (0.252)	0.578 * (0.252)	0.563 * (0.253)	0.579 * (0.252)	0.563 * (0.253)	0.580 * (0.253)	0.584 * (0.252)	0.558 * (0.254)	0.596 * (0.251)
Other		0.312 + (0.183)	0.321 + (0.184)	0.318 + (0.182)	0.309 + (0.182)	0.301 + (0.183)	0.326 + (0.183)	0.323 + (0.183)	0.299 (0.184)	0.342 + (0.179)
Level of education (ref. primary)										
Lower secondary		4.256 *** (0.436)	4.259 *** (0.436)	4.231 *** (0.435)	4.256 *** (0.436)	4.253 *** (0.436)	4.257 *** (0.436)	4.246 *** (0.436)	4.247 *** (0.435)	4.240 *** (0.435)
Upper secondary and post-secondary (non-tertiary)		3.424 *** (0.457)	3.424 *** (0.457)	3.429 *** (0.458)	3.429 *** (0.457)	3.424 *** (0.457)	3.419 *** (0.457)	3.414 *** (0.458)	3.434 *** (0.458)	3.434 *** (0.458)
Tertiary		3.047 *** (0.457)	3.043 *** (0.459)	3.036 *** (0.458)	3.041 *** (0.460)	3.048 *** (0.458)	3.047 *** (0.459)	3.049 *** (0.459)	3.043 *** (0.457)	3.026 *** (0.463)
Self-assessed German writing skills		−0.661 *** (0.081)	−0.660 *** (0.081)	−0.666 *** (0.082)	−0.662 *** (0.082)	−0.660 *** (0.081)	−0.661 *** (0.081)	−0.663 *** (0.081)	−0.662 *** (0.081)	−0.670 *** (0.083)
Contact with Germans		−0.428 *** (0.050)	−0.428 *** (0.049)	−0.423 *** (0.049)	−0.426 *** (0.049)	−0.428 *** (0.050)	−0.428 *** (0.050)	−0.425 *** (0.050)	−0.425 *** (0.050)	−0.419 *** (0.049)
Contact with co-ethnics		0.136 *** (0.034)	0.138 *** (0.034)	0.135 *** (0.034)	0.134 *** (0.034)	0.136 *** (0.034)	0.137 *** (0.034)	0.138 *** (0.035)	0.136 *** (0.034)	0.136 *** (0.034)
Residence title (ref. temporary residence permit)										
Temporary suspension of deportation		−0.018 (0.271)	−0.020 (0.273)	0.008 (0.270)	−0.030 (0.272)	−0.015 (0.272)	−0.017 (0.272)	0.000 (0.271)	−0.023 (0.271)	−0.004 (0.272)
Residence permission		−0.087 (0.177)	−0.101 (0.178)	−0.065 (0.180)	−0.105 (0.176)	−0.087 (0.178)	−0.091 (0.178)	−0.077 (0.177)	−0.083 (0.179)	−0.083 (0.178)
Participation in an integration/ language course										
Yes		−0.265 + (0.147)	−0.261 + (0.147)	−0.255 + (0.148)	−0.268 + (0.148)	−0.264 + (0.148)	−0.259 + (0.148)	−0.255 + (0.147)	−0.266 + (0.148)	−0.258 + (0.148)

Table 2. Cont.

	Model 1 Time	Model 2 Covariates	Model 3 GDP per Capita	Model 4 Unemployment Rate	Model 5 Size of Enterprises	Model 6 No. of Craft Enterprises	Model 7 No. of School Leavers	Model 8 School-Leav. Certificates	Model 9 No. of Refugees	Model 10 Overall Model
Number of children under 14 years of age		−0.388 *** (0.092)	−0.390 *** (0.091)	−0.399 *** (0.091)	−0.394 *** (0.093)	−0.390 *** (0.091)	−0.389 *** (0.092)	−0.391 *** (0.092)	−0.390 *** (0.091)	−0.402 *** (0.091)
Type of household (ref. private household)										
Collective accommodation		0.208 (0.147)	0.210 (0.147)	0.142 (0.145)	0.188 (0.145)	0.199 (0.145)	0.207 (0.147)	0.177 (0.145)	0.180 (0.147)	0.132 (0.145)
Current health		−0.059 (0.069)	−0.059 (0.070)	−0.057 (0.070)	−0.064 (0.069)	−0.060 (0.069)	−0.059 (0.070)	−0.059 (0.070)	−0.059 (0.069)	−0.062 (0.070)
GDP			0.492 ** (0.168)							0.551 ** (0.263)
Unemployment rate				−0.093 ** (0.028)						−0.083 * (0.047)
No. of micro enterprises (0–9 employees)					−0.005 (0.012)					−0.009 (0.013)
No. of small enterprises (10–49 employees)					0.400 * (0.171)					0.275 (0.167)
No. of medium-sized enterprises (50–249 employees)					−1.093 + (0.616)					−0.974 + (0.541)
No. of large enterprises (>250 employees)					1.406 (1.573)					1.723 (1.609)
Density of craft enterprises						0.033 (0.043)				−0.071 (0.063)
No. of school leavers							0.039 (0.028)			0.890 (2.438)
No. of school leavers with no school-leaving certificate								−0.501 + (0.294)		−1.128 (2.455)
No. of school leavers with a lower secondary school-leaving certificate								0.021 (0.150)		−0.937 (2.453)

Table 2. Cont.

	Model 1 Time	Model 2 Covariates	Model 3 GDP per Capita	Model 4 Unemployment Rate	Model 5 Size of Enterprises	Model 6 No. of Craft Enterprises	Model 7 No. of School Leavers	Model 8 School-Leav. Certificates	Model 9 No. of Refugees	Model 10 Overall Model
No. of school leavers with an intermediate secondary school-leaving certificate								0.116 + (0.069)		−0.883 (2.448)
No. of school leavers with an upper secondary school-leaving certificate								0.039 (0.053)		−0.863 (2.432)
No. of refugees									−0.013 + (0.007)	−0.013 (0.008)
σ^2	0.216 * (0.095)	0.138 (0.094)	0.111 (0.087)	0.064 (0.070)	0.103 (0.098)	0.129 (0.091)	0.126 (0.096)	0.094 (0.088)	0.117 (0.085)	0.021 (0.069)
ICC	0.062	0.040	0.033	0.019	0.030	0.038	0.037	0.028	0.034	0.0063

Source: IAB-BAMF-SOEP Survey of Refugees (2016–2020). Our own calculations. $N = 11,883$. Imputed data, $m = 12$. + $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; log. hazard ratios. Cluster robust standard errors in parentheses.

Next, we tested the assumptions of the segmentation approach by examining whether the size of enterprises as well as the number of skilled craft enterprises in a district are associated with the chances of young refugees transitioning to VET (Model 5). Neither the number of micro enterprises with 0 to 9 employees nor the number of large enterprises with over 250 employees in the district appear to be significantly related to the corresponding transition chances. At the same time, an increasing number of small enterprises with 10 to 49 employees in the district is significantly associated (at the 5% level) with an increase in refugees' chances to obtain a training place. In contrast, as the number of medium-sized enterprises with 50 to 249 employees in a district increases, the transition chances of refugees decrease, with significance at the 10% level. However, the number of skilled craft enterprises in a district is not related to the chances of young refugees to transition to VET (Model 6). Overall, our Hypothesis 1c is only confirmed for the size of enterprises but must be rejected for the number of craft enterprises in a district.

To test Hypothesis 2a, we first calculated a model in which we included the total number of school leavers in the respective district (Model 7) and subsequently one in which we distinguished that number of school leavers by their school-leaving qualifications (Model 8). In the first case, the test detected no significant association with the chances of refugees to transition to VET. Only when differentiating according to educational attainment did it become apparent that not all school leavers represent serious competition for refugees in the search for a training place. However, contrary to our initial hypothesis that both an increasing number of persons with no school-leaving certificate and persons with a lower school-leaving certificate in the respective district are negatively associated with the chances of refugees to obtain a training place, we found that only the former holds true. Moreover, when the number of persons with an intermediate school-leaving certificate increases, so do their chances of transitioning to VET. Both findings are significant at the 10% level. Hypothesis 2a could thus only be confirmed insofar as the number of school leavers with no school-leaving certificate in a district is positively associated with the chances of refugees to transition to VET. No such association could be found for the total number of school leavers nor for the number of school leavers with a lower secondary school-leaving certificate in the district, so Hypothesis 2a must be rejected in this respect. Likewise, a higher number of people with a refugee background in a district is also associated with lower chances of refugees to transition to VET (Model 9) with significance at the 10% level. On this basis, Hypothesis 2b can thus be confirmed. This again points to the fact that persons with comparatively low human capital represent the greatest competition for refugees in their search for a training place. In the overall model (Model 10), when all regional variables are controlled for, each demand-side variable loses its significance. On the supply side, the effect of GDP increases from 0.492 to 0.551, with a remaining significance at the 1% level. The effect of the unemployment rate slightly decreases from -0.093 to -0.083 , with a reduction in the significance level from 1% to 5%. Finally, the effect of the number of medium-sized firms in the region also reduces from -1.093 to -0.974 , with a remaining significance level of 10%. Thus, of all the regional variables considered, regional GDP as well as the regional unemployment rate demonstrate the strongest association with the transition chances of young refugees to VET.

Finally, we performed two robustness checks to assess the consistency of our estimates. First, we ran our analyses for persons aged 18 to 30 while excluding those who transitioned to higher education during the observation period. Next, we conducted a robustness analysis for refugees aged 15 to 30, but with fewer control variables. Our results were robust to both specifications (see Tables A1 and A2 in the Appendix A).

7. Discussion

In this study, we examined the relationship between the socioeconomic contextual factors of individual German districts and the transition of young refugees to VET. The German districts vary considerably according to aspects such as the labour market structure, economic productivity and demographic development, which constitute the supply and demand for training places in the dual VET sector to which refugees predominantly have access. The main question of the study concerned which spatial characteristics of the place of residence are associated with increased chances of refugees to transition to VET. We assumed that certain socioeconomic contextual factors that can influence both the regional supply as well as the regional competitive situation regarding training places are associated with the respective chances of young refugees aged 18 to 30 to transition to VET. The results of our empirical analysis suggest that relationships of both supply and demand side indeed appear to be relevant in this context.

Most notably, higher economic productivity, as measured by GDP, and a lower unemployment rate in the respective district are associated with higher chances of refugees to obtain a training place. This association remains even under control of all other regional processes. With regard to the structure of the labour and thus also the VET market, it became apparent that, although a larger number of smaller versus larger enterprises in the district are associated with higher chances for refugees, no significant association could be found in this regard for the number of skilled craft enterprises in the districts under study. This might indicate that the transition chances of refugees to VET are greater in regions with a higher number of small enterprises because these generally have less formalised selection procedures for filling their training places than large enterprises. Given their higher number of applicants, large companies rely on systematic and simple criteria to manage the selection process in a resource-efficient manner (Moser 2004; Imdorf 2009). This being the case, objectively assessable indicators such as the duration of education, school-leaving certificates as well as a grammatically correct letter of application signalling an individual's professional performance are becoming increasingly important, which is likely to have a particularly detrimental effect on persons with a refugee background. Furthermore, the fact that neither the number of micro enterprises nor of large enterprises is associated with refugees' chances of transitioning to VET could be due to the fact that this correlation is masked by the different training capacities of these types of enterprises, which, at least in absolute numbers, are in favour of large enterprises (Jost et al. 2019).

With regard to the demand side, the total number of school leavers in a district is not associated with the transition chances of refugees to VET. This could owe itself to the fact that existing group differences were not taken into account in this respect. The empirical results provide indications that a higher number of school leavers with no school-leaving certificate is negatively associated with the respective transition chances of refugees. Although this effect is only significant at the 10% level, it could suggest that it is primarily this group of school leavers that represents serious competition for refugees in their search for a training place, compared to people with a school-leaving certificate. This might indicate that training companies view the human capital of asylum seekers to be similar to that of school leavers without a certificate and therefore often do not consider them to be able to successfully complete a VET programme. Whether this actually corresponds to reality and applies to all refugees regardless of their educational background or language skills are questions to be clarified by further research. Furthermore, our results also provide indications that a greater number of refugees in a district is also negatively associated with this group's chances of transitioning to VET. This again points to the importance of the regional competitive situation for the transition chances of young refugees, although the respective significance level of only 10% must be kept in mind.

Overall, based on the empirical results of this study, we conclude that the place of residence does indeed matter for the educational integration of refugees in vocational education and training in Germany. This raises critical questions about the current spatial allocation of refugees based predominantly on resident population figures, which is common practice both at the federal and municipal level. Although all restrictions on residential mobility are lifted for asylum seekers who manage to enter VET (Brücker et al. 2020a), they nevertheless mostly rely on finding a training place in their immediate surroundings due to a lack of resources (Boockmann and Scheu 2019, p. 408).

Another notable finding of this study concerns the fact that of the 5126 people in the sample, only 378, or 14%, transitioned to VET within the observation period. This is a significantly lower proportion than among autochthones or among individuals in Germany with a migration but not a refugee background (Federal Institute for Vocational Education and Training 2018) and thus reinforces the relevance of this study. Furthermore, it strongly highlights the need for further studies that address the conditions for young refugees to transition to VET.

When interpreting the results of this study, however, one must take into account that it covers only a five-year period while the transition to the VET system will frequently not take place until several years after the refugees' arrival in Germany. Additional research is therefore needed to examine the further course of the respective transition and the associated conditions for success in more detail. Furthermore, as more survey years become available in the coming years, it may be worthwhile for future studies to adopt an approach with yet a third level of analysis, e.g., area-years as proposed by Windzio (2006).

In addition to this temporal aspect, the spatial unit chosen for our analyses also implies some limitations. Since we examine regional effects at the district level, it must be kept in mind that the historical development of regional markets is not comprehensively captured by the administrative NUTS-3 unit. Hence, in future studies, it might be advisable to also examine more functionally delimited market regions (Wicht and Nonnenmacher 2017). Furthermore, the variance at the district level covered in this study is not very high (6.1%). The variance can be assumed to be higher at lower spatial levels, such as the municipal level. However, for scientific analysis, this raises the practical problem of the availability of data on the municipal level. Nonetheless, the respective district of residence is likely to be a central areal reference for refugees in their search for a training place, just as it is for autochthones (Jost et al. 2019). For this reason, we have explicitly placed the focus of this study on the significance of contextual factors of the respective district in which refugees were living at the time of the survey for their chances of transitioning to VET. The role of contextual factors of the neighbouring districts in this regard, as well as the willingness of refugees to relocate in order to take up VET, are further comprehensive questions that need to be explored in separate studies. Similarly, the focus of this study was exclusively on those factors that constitute the regional interplay of supply and demand. Other regionally varying factors that might have an effect on the transition chances of young refugees to VET, whereby particularly discrimination must be mentioned (Cardozo et al. 2022), require closer examination in future studies.

The variables collected in the IAB-BAMF-SOEP panel did not allow an analysis of the dependent variable that distinguishes between the transition to the primary and secondary VET sector. The fact that the regional variables examined in this study nevertheless reveal significant associations with the chances of young refugees to transition to VET suggests that refugees do indeed transition predominantly to the primary VET sector.

A definite strength of the current wave of the IAB-BAMF-SOEP dataset is that it allowed us to include the first year of the COVID-19 pandemic into our observation period. In view of the nationwide lockdown in 2020, which was accompanied by far-reaching upheavals in the labour and thus in the VET market, the question of the consequences for refugees' chances to obtain a training place is of particular interest. Our analysis reveals that this development did not substantially worsen those chances in 2020 compared to previous years. However, further research is needed to assess the explicit impact of the COVID-19 pandemic on the long-term chances and frequency of refugees making the transition to VET.

Finally, we assume that the results of this study may also apply to the training situation of asylum seekers in other countries, as many countries are characterised by internal regional inequalities. Against the backdrop of globally increasing refugee movements, which raise the question of the allocation of refugees within the host countries, we hope for an international transferability of the results of this study.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Discrete-time multilevel model for the transition of young refugees aged 18 to 30 to vocational education and training (VET) with the exclusion of persons who transitioned to higher education during the observation period (robustness check 1).

	Model 1 Time	Model 2 Covariates	Model 3 GDP per Capita	Model 4 Unemployment Rate	Model 5 Size of Enterprises	Model 6 No. of Craft Enterprises	Model 7 No. of School Leavers	Model 8 School-Leav. Certificates	Model 9 No. of Refugees	Model 10 Overall Model
Survey year										
2016	−3.957 *** (0.168)	−4.574 *** (0.718)	−4.691 *** (0.721)	−3.979 *** (0.727)	−5.329 *** (0.805)	−4.711 *** (0.797)	−4.968 *** (0.767)	−4.933 *** (0.779)	−4.244 *** (0.726)	−3.271 ** (1.092)
2017	−3.642 *** (0.121)	−4.393 *** (0.692)	−4.501 *** (0.695)	−3.829 *** (0.702)	−5.160 *** (0.792)	−4.526 *** (0.771)	−4.769 *** (0.742)	−4.707 *** (0.753)	−4.040 *** (0.707)	−3.117 ** (1.074)
2018	−3.400 *** (0.123)	−4.385 *** (0.656)	−4.502 *** (0.658)	−3.852 *** (0.666)	−5.160 *** (0.755)	−4.518 *** (0.737)	−4.754 *** (0.702)	−4.674 *** (0.713)	−4.009 *** (0.672)	−3.129 ** (1.030)
2019	−3.172 *** (0.126)	−4.392 *** (0.680)	−4.510 *** (0.683)	−3.888 *** (0.686)	−5.400 *** (0.795)	−4.526 *** (0.765)	−4.754 *** (0.726)	−4.688 *** (0.739)	−4.001 *** (0.694)	−3.311 ** (1.067)
2020	−3.135 *** (0.146)	−4.339 *** (0.668)	−4.448 *** (0.670)	−3.746 *** (0.683)	−5.340 *** (0.782)	−4.472 *** (0.748)	−4.677 *** (0.706)	−4.655 *** (0.717)	−3.942 *** (0.684)	−3.192 ** (1.078)
Gender (ref. male)										
Female		−0.448 ** (0.152)	−0.429 ** (0.151)	−0.439 ** (0.151)	−0.438 ** (0.151)	−0.449 ** (0.152)	−0.440 ** (0.151)	−0.443 ** (0.152)	−0.452 ** (0.151)	−0.416 ** (0.151)
Age at the start of the observation		0.126 (0.021)	0.011 (0.021)	0.012 (0.021)	0.014 (0.021)	0.013 (0.021)	0.012 (0.021)	0.012 (0.021)	0.012 (0.021)	0.012 (0.022)
Period of arrival in Germany (ref. before 2015)										
In 2015		−0.226 + (0.128)	−0.223 + (0.128)	−0.235 + (0.130)	−0.204 (0.128)	−0.228 + (0.129)	−0.219 + (0.128)	−0.216 + (0.129)	−0.237 + (0.130)	−0.216 + (0.129)
After 2015		−0.541 ** (0.204)	−0.542 * (0.204)	−0.542 ** (0.206)	−0.510 * (0.206)	−0.542 ** (0.204)	−0.534 ** (0.204)	−0.513 * (0.205)	−0.546 ** (0.205)	−0.513 * (0.207)

Table A1. Cont.

	Model 1 Time	Model 2 Covariates	Model 3 GDP per Capita	Model 4 Unemployment Rate	Model 5 Size of Enterprises	Model 6 No. of Craft Enterprises	Model 7 No. of School Leavers	Model 8 School-Leav. Certificates	Model 9 No. of Refugees	Model 10 Overall Model
Country of origin (ref. Syria)										
Afghanistan		0.540 ** (0.184)	0.520 ** (0.186)	0.541 ** (0.182)	0.516 ** (0.184)	0.537 ** (0.184)	0.540 ** (0.185)	0.544 ** (0.183)	0.531 ** (0.184)	0.514 ** (0.183)
Iraq		−0.208 (0.215)	−0.199 (0.212)	−0.224 (0.211)	−0.227 (0.213)	−0.208 (0.214)	−0.205 (0.214)	−0.223 (0.214)	−0.206 (0.213)	−0.230 (0.207)
Somalia/Eritrea		0.531 * (0.246)	0.536 * (0.246)	0.520 * (0.247)	0.537 * (0.246)	0.523 * (0.246)	0.537 * (0.247)	0.540 * (0.247)	0.514 * (0.248)	0.555 * (0.245)
Other		0.230 (0.183)	0.244 (0.183)	0.232 (0.184)	0.232 (0.181)	0.224 (0.182)	0.246 (0.182)	0.240 (0.182)	0.214 (0.184)	0.258 (0.180)
Level of education (ref. primary)										
Lower secondary		4.480 *** (0.487)	4.485 *** (0.486)	4.456 *** (0.486)	4.480 *** (0.487)	4.478 *** (0.487)	4.482 *** (0.487)	4.473 *** (0.486)	4.472 *** (0.486)	4.468 *** (0.485)
Upper secondary and post-secondary (non-tertiary)		3.704 *** (0.505)	3.704 *** (0.504)	3.708 *** (0.505)	3.709 *** (0.504)	3.703 *** (0.505)	3.700 *** (0.504)	3.694 *** (0.505)	3.715 *** (0.505)	3.725 *** (0.504)
Tertiary		3.520 *** (0.518)	3.521 *** (0.518)	3.512 *** (0.518)	3.517 *** (0.519)	3.520 *** (0.518)	3.520 *** (0.518)	3.520 *** (0.518)	3.517 *** (0.517)	3.515 *** (0.520)
Self-assessed German writing skills		−0.719 *** (0.083)	−0.719 *** (0.083)	−0.723 *** (0.084)	−0.721 *** (0.084)	−0.718 *** (0.083)	−0.719 *** (0.083)	−0.721 *** (0.829)	−0.719 *** (0.083)	−0.728 *** (0.086)
Contact with Germans		−0.428 *** (0.049)	−0.428 *** (0.049)	−0.422 *** (0.049)	−0.426 *** (0.049)	−0.427 *** (0.049)	−0.427 *** (0.049)	−0.425 *** (0.050)	−0.424 *** (0.049)	−0.419 *** (0.049)
Contact with co-ethnics		0.139 *** (0.038)	0.142 *** (0.038)	0.137 *** (0.037)	0.137 *** (0.038)	0.139 *** (0.038)	0.140 *** (0.038)	0.140 *** (0.038)	0.138 *** (0.037)	0.139 *** (0.038)
Residence title (ref. temporary residence permit)										
Temporary suspension of deportation		−0.032 (0.270)	−0.029 (0.271)	0.000 (0.271)	−0.044 (0.271)	−0.030 (0.270)	−0.028 (0.270)	−0.010 (0.270)	−0.036 (0.270)	−0.016 (0.272)
Permanent residence permit		−0.105 (0.181)	−0.116 (0.182)	−0.084 (0.183)	−0.121 (0.179)	−0.106 (0.181)	−0.108 (0.181)	−0.099 (0.181)	−0.103 (0.183)	−0.098 (0.182)

Table A1. Cont.

	Model 1 Time	Model 2 Covariates	Model 3 GDP per Capita	Model 4 Unemployment Rate	Model 5 Size of Enterprises	Model 6 No. of Craft Enterprises	Model 7 No. of School Leavers	Model 8 School-Leav. Certificates	Model 9 No. of Refugees	Model 10 Overall Model
Participation in an integration/ language course										
Yes		−0.241 (0.142)	−0.237 + (0.142)	−0.227 (0.142)	−0.241 + (0.142)	−0.240 + (0.142)	−0.236 + (0.142)	−0.233 (0.142)	−0.241 + (0.142)	−0.232 (0.143)
Number of children under 14 years of age		−0.372 *** (0.093)	−0.374 *** (0.093)	−0.383 *** (0.092)	−0.376 *** (0.094)	−0.374 *** (0.093)	−0.373 *** (0.093)	−0.375 *** (0.093)	−0.373 *** (0.092)	−0.381 *** (0.093)
Type of household (ref. private household)										
Collective accommodation		0.248 (0.151)	0.251 + (0.151)	0.185 (0.148)	0.228 (0.149)	0.242 (0.149)	0.246 (0.151)	0.220 (0.149)	0.220 (0.151)	0.182 (0.148)
Current health		−0.074 (0.069)	−0.074 (0.070)	−0.073 (0.069)	−0.080 (0.070)	−0.075 (0.069)	−0.074 (0.070)	−0.073 (0.070)	−0.074 (0.069)	−0.075 (0.070)
GDP			0.532 ** (0.165)							0.637 * (0.272)
Unemployment rate				−0.095 ** (0.031)						−0.091 + (0.052)
No. of micro enterprises (0–9 employees)					−0.005 (0.126)					−0.008 (0.013)
No. of small enterprises (10–49 employees)					0.404 * (0.180)					0.292 + (0.173)
No. of medium-sized enterprises (50–249 employees)					−1.100 + (0.665)					−0.974 (0.592)
No. of large enterprises (>250 employees)					1.646 (1.742)					1.720 (1.818)
Density of craft enterprises						0.021 (0.046)				−0.100 (0.064)

Table A1. Cont.

	Model 1 Time	Model 2 Covariates	Model 3 GDP per Capita	Model 4 Unemployment Rate	Model 5 Size of Enterprises	Model 6 No. of Craft Enterprises	Model 7 No. of School Leavers	Model 8 School-Leav. Certificates	Model 9 No. of Refugees	Model 10 Overall Model
No. of school leavers							0.035 (0.029)			0.463 (2.430)
No. of school leavers with no school-leaving certificate								−0.443 (0.309)		−0.624 (2.443)
No. of school leavers with a lower secondary school-leaving certificate								0.034 (0.151)		−0.501 (2.440)
No. of school leavers with an intermediate secondary school-leaving certificate								0.099 (0.071)		−0.480 (2.436)
No. of school leavers with an upper secondary school-leaving certificate								0.033 (0.052)		−0.454 (2.425)
No. of refugees									−0.014 ⁺ (0.008)	−0.013 (0.008)
σ^2	0.233 [*] (0.102)	0.188 ⁺ (0.109)	0.157 (0.101)	0.112 (0.084)	0.154 (0.115)	0.183 ⁺ (0.107)	0.180 (0.112)	0.152 (0.107)	0.165 ⁺ (0.096)	0.060 (0.084)
ICC	0.066	0.054	0.046	0.033	0.045	0.053	0.517	0.442	0.048	0.018

Source: IAB-BAMF-SOEP Survey of Refugees (2016–2020). Our own calculations. $N = 11,536$. Imputed data, $m = 12$. ⁺ $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; log. hazard ratios. Cluster robust standard errors in parentheses.

Table A2. Discrete-time multilevel model for the transition of young refugees aged 15 to 30 to vocational education and training (VET) (robustness check 2).

	Model 1 Time	Model 2 Covariates	Model 3 GDP per Capita	Model 4 Unemployment Rate	Model 5 Size of Enterprises	Model 6 No. of Craft Enterprises	Model 7 No. of School Leavers	Model 8 School-Leav. Certificates	Model 9 No. of Refugees	Model 10 Overall Model
Survey year										
2016	−4.085 *** (0.151)	−3.108 *** (0.311)	−3.178 *** (0.312)	−2.447 *** (0.336)	−3.990 *** (0.461)	−3.396 *** (0.400)	−3.414 *** (0.416)	−3.389 *** (0.413)	−2.757 *** (0.348)	−2.121 ** (0.734)
2017	−3.790 *** (0.119)	−2.732 *** (0.295)	−2.800 *** (0.298)	−2.111 *** (0.322)	−3.626 *** (0.461)	−3.013 *** (0.382)	−3.027 *** (0.419)	−2.975 *** (0.415)	−2.356 *** (0.350)	−1.783 * (0.734)
2018	−3.584 *** (0.119)	−2.528 *** (0.289)	−2.598 *** (0.289)	−1.959 *** (0.317)	−3.432 *** (0.461)	−2.809 *** (0.377)	−2.817 *** (0.399)	−2.748 *** (0.393)	−2.126 *** (0.347)	−1.618 * (0.726)
2019	−3.187 *** (0.109)	−2.127 *** (0.289)	−2.200 *** (0.292)	−1.577 *** (0.309)	−3.214 *** (0.478)	−2.408 *** (0.388)	−2.411 *** (0.398)	−2.348 *** (0.400)	−1.704 *** (0.348)	−1.342 + (0.737)
2020	−3.390 *** (0.131)	−2.34 *** (0.263)	−2.406 *** (0.266)	−1.680 *** (0.298)	−3.413 (0.463)	−2.618 *** (0.362)	−2.603 *** (0.372)	−2.586 *** (0.366)	−1.905 *** (0.327)	−1.443 + (0.749)
Gender (ref. male)										
Female		−0.910 *** (0.118)	−0.903 *** (0.118)	−0.910 *** (0.118)	−0.910 *** (0.117)	−0.912 *** (0.118)	−0.906 *** (0.118)	−0.909 *** (0.118)	−0.914 *** (0.118)	−0.901 *** (0.118)
Age at the start of the observation		−0.020 + (0.010)	−0.020 + (0.010)	−0.019 + (0.010)	−0.019 + (0.010)	−0.019 + (0.010)	−0.020 + (0.010)	−0.020 + (0.010)	−0.019 + (0.010)	−0.019 + (0.010)
Period of arrival in Germany (ref. before 2015)										
In 2015		−0.320 ** (0.111)	−0.319 ** (0.111)	−0.315 ** (0.113)	−0.294 ** (0.112)	−0.322 ** (0.112)	−0.315 ** (0.110)	−0.307 ** (0.110)	−0.329 ** (0.113)	−0.296 ** (0.113)
After 2015		−0.670 + (0.166)	−0.673 *** (0.166)	−0.677 *** (0.169)	−0.636 *** (0.168)	−0.670 *** (0.166)	−0.665 *** (0.166)	−0.653 *** (0.166)	−0.675 *** (0.168)	−0.654 *** (0.172)
Country of origin (ref. Syria)										
Afghanistan		0.107 (0.162)	0.106 (0.162)	0.120 (0.161)	0.083 (0.163)	0.100 (0.163)	0.114 (0.162)	0.123 (0.161)	0.094 (0.163)	0.109 (0.160)

Table A2. Cont.

	Model 1 Time	Model 2 Covariates	Model 3 GDP per Capita	Model 4 Unemployment Rate	Model 5 Size of Enterprises	Model 6 No. of Craft Enterprises	Model 7 No. of School Leavers	Model 8 School-Leav. Certificates	Model 9 No. of Refugees	Model 10 Overall Model
Iraq		−0.248 (0.175)	−0.239 (0.174)	−0.253 (0.172)	−0.262 (0.173)	−0.244 (0.175)	−0.248 (0.174)	−0.258 (0.176)	−0.241 (0.173)	−0.258 (0.172)
Somalia/Eritrea		0.064 (0.203)	0.063 (0.204)	0.048 (0.205)	0.052 (0.205)	0.048 (0.207)	0.069 (0.203)	0.066 (0.205)	0.037 (0.206)	0.054 (0.207)
Other		0.206 (0.168)	0.215 (0.169)	0.231 (0.166)	0.207 (0.170)	0.202 (0.168)	0.215 (0.168)	0.218 (0.167)	0.200 (0.167)	0.243 (0.166)
Residence title (ref. temporary residence permit)										
Temporary suspension of deportation		−0.155 (0.254)	−0.155 (0.255)	−0.133 (0.255)	−0.148 (0.255)	−0.152 (0.255)	−0.154 (0.255)	−0.144 (0.254)	−0.153 (0.254)	−0.134 (0.255)
Permanent residence permit		−0.023 (0.160)	−0.029 (0.160)	−0.003 (0.161)	−0.025 (0.159)	−0.020 (0.160)	−0.025 (0.160)	−0.017 (0.159)	−0.015 (0.160)	−0.012 (0.160)
Collective accommodation		−0.072 (0.140)	−0.068 (0.140)	−0.132 (0.137)	−0.107 (0.144)	−0.078 (0.139)	−0.073 (0.140)	−0.096 (0.138)	−0.093 (0.140)	−0.151 (0.142)
GDP			0.344 * (0.165)							0.291 (0.285)
Unemployment rate				−0.110 * (0.025)						−0.106 * (0.416)
No. of micro enterprises (0–9 employees)					0.004 (0.012)					−0.005 (0.012)
No. of small enterprises (10–49 employees)					0.359 * (0.153)					0.231 (0.153)
No. of medium-sized enterprises (50–249 employees)					−1.125 + (0.573)					−0.864 + (0.505)
No. of large enterprises (>250 employees)					1.768 (1.494)					2.082 (1.464)

Table A2. Cont.

	Model 1 Time	Model 2 Covariates	Model 3 GDP per Capita	Model 4 Unemployment Rate	Model 5 Size of Enterprises	Model 6 No. of Craft Enterprises	Model 7 No. of School Leavers	Model 8 School-Leav. Certificates	Model 9 No. of Refugees	Model 10 Overall Model
Density of craft enterprises						0.043 (0.039)				−0.066 (0.060)
No. of school leavers							0.029 (0.029)			0.191 (2.194)
No. of school leavers with no school-leaving certificate								−0.485 ⁺ (0.277)		−0.225 (2.203)
No. of school leavers with a lower secondary school-leaving certificate								0.042 (0.135)		−0.247 (2.206)
No. of school leavers with an intermediate secondary school-leaving certificate								0.090 (0.064)		−0.199 (2.204)
No. of school leavers with an upper secondary school-leaving certificate								0.028 (0.057)		−0.152 (2.187)
No. of refugees									−0.017* (0.007)	−0.012 (0.008)
σ^2	0.244 ** (0.088)	0.228 ** (0.083)	0.214 ** (0.080)	0.136 * (0.063)	0.194 * (0.085)	0.219 ** (0.083)	0.223 ** (0.085)	0.191 * (0.085)	0.191 * (0.078)	0.099 (0.064)
ICC	0.069	0.065	0.061	0.040	0.056	0.062	0.063	0.055	0.055	0.029

Source: IAB-BAMF-SOEP Survey of Refugees (2016–2020). Our own calculations. $N = 15,050$ Imputed data, $m = 12$. ⁺ $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; log. hazard ratios. Cluster robust standard errors in parentheses.

Notes

- 1 In the legal sense, the term *refugee* is reserved for persons who have undergone the asylum procedure and have subsequently been granted international protection status according to the 1951 UN Convention relating to the Status of Refugees (UNHCR 1951, Art. 1(A)(2)). Throughout this article, however, the term *refugee* refers to all persons who have at some point applied for asylum in a foreign country. This consequently includes individuals whose asylum procedure has not yet been completed, those whose application has been rejected, those who have been assigned a subsidiary protection status as well as those who have been granted official refugee status.
- 2 This system is based on the so-called *Königssteiner Schlüssel*, which determines the distribution quota according to the tax revenue (two-thirds) and the population size (one-third) of the federal states (BAMF 2021).
- 3 A residence requirement (*Residenzpflicht*) applies according to which refugees must reside in the region assigned to them for the first three months after applying for asylum (§§ 56 ff AsylG). Moreover, persons with a refugee background who receive social benefits to secure their livelihood are subject to a so-called settlement restriction (*Wohnsitzauflage*). Pursuant to this, they must remain resident in that specific federal state—and in some cases, even the administrative district or municipality—in which a decision on their asylum application is made. Since 2016, this regulation also applies to persons granted protection status for a period of three years after the completion of their asylum procedure (§ 60 AsylG; § 12a AufenthG).
- 4 In Germany, the following countries are currently considered safe countries of origin: the member states of the European Union, Albania, Bosnia and Herzegovina, Ghana, Kosovo, Montenegro, North Macedonia, Senegal and Serbia (BAMF 2019). Asylum seekers from these countries are generally barred from accessing the dual VET system for lack of a work permit (Braun and Lex 2016).
- 5 According to Friedberg (2000), educational experiences gained abroad are generally valued less than those gained domestically. Therefore, even if refugees have attended school in their country of origin without interruption, they must still be considered to have less human capital than individuals who have acquired their education in Germany.
- 6 Another 9.6% were trained in the transition sector, 11% were enrolled an integration course, 14.5% took up a job and 8.5% remained unemployed.
- 7 Control variables that we could not include in this sample are the *level of education* (ISCED), *participation in an integration course by BAMF*, *an occupation-specific language course by the German Employment Agency or ESF-BAMF*, *or other German language courses during the year in question*, *self-assessed German writing skills*, *contact with Germans*, *contact with co-ethnics*, *the number of children under 14 years of age* and *current health*. Moreover, we did not have a sufficient number of cases to estimate robustness checks only for those refugees who finished school in the German general education system or the German transitional system and whose observation period would start after leaving school or the transitional system (regardless of whether they have obtained a school-leaving certificate there).
- 8 Accordingly, the IAB-BAMF-SOEP data collection for the refugee sample took place between August 2020 and February of 2021, whereby all starting points of VET were captured (Rathje and Glemser 2021, p. 100).
- 9 In Stata, a test for the proportionality assumption (e.g., Schoenfeld residuals) is not implemented for multiply imputed multilevel survival data with a discrete scale. To check if our estimations are robust, we also estimated piecewise-constant exponential models with four dummy variables for each observation year (2016 being the intercept). This led to the same effect estimates (available upon request from the authors).
- 10 To test for a possible nonlinear relationship, we further ran models adding the squared terms of the regional variables. This test found no significant effects.

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