



## Article

# Making the Match: The Importance of Local Labor Markets for the Employment Prospects of Refugees

Dorian Tsolak \* and Marvin Bürmann

Faculty of Sociology, Bielefeld University, 33615 Bielefeld, Germany; marvin.buermann@uni-bielefeld.de

\* Correspondence: dorian.tsolak@uni-bielefeld.de

**Abstract:** We examine how local labor markets shape the employment prospects of refugees in Germany, where refugees are assigned to regions through a dispersal policy. While it is known that the characteristics of these regions affect the overall employment probability of refugees, previous studies have not investigated how refugees' chances of regaining their pre-migration occupation are affected by the local opportunities to find employment in these occupations. To address this gap, we use a large survey of refugees in Germany and link local-occupational labor market characteristics to their region of residence and pre-migration occupation. We decompose the effects of these detailed context characteristics by estimating linear probability regressions with and without fixed effects for regions and/or occupations. While our analyses show that the employment probability of refugees is indeed strongly influenced by the general local characteristics of their place of residence and general, nationwide characteristics of their pre-migration occupation, our analyses also show that the chances of refugees being employed in their pre-migration occupation are additionally driven by the local characteristics of their occupation. More specifically, our models reveal that a one standard deviation higher local share of foreigners in refugees' pre-migration occupation increases the average probability of an occupational match by around 25 percent.

**Keywords:** labor markets; refugees; migration; employment; occupations; integration; regional



**Citation:** Tsolak, Dorian, and Marvin Bürmann. 2023. Making the Match: The Importance of Local Labor Markets for the Employment Prospects of Refugees. *Social Sciences* 12: 339. <https://doi.org/10.3390/socsci12060339>

Academic Editor: Peter Hopkins

Received: 28 February 2023

Revised: 11 May 2023

Accepted: 27 May 2023

Published: 8 June 2023



**Copyright:** © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## 1. Introduction

Forceful displacement is an adverse life event associated with a complete physical detachment from one's country of origin. Having fled their home countries, refugees have lost most of their social ties and have had to leave their professional jobs. Difficulties associated with integration into the new labor market in the receiving country manifest along various labor market outcomes. Refugees have later labor market entries, are more often temporarily employed (Salikutluk et al. 2016; Bloch 2004) and have lower average wages compared to other immigrants, such as labor or family immigrants (Damelang and Kosyakova 2021) and the native majority (Bevelander 2011; Brell et al. 2020; Fasani et al. 2022; Hedberg and Tammaru 2013). Even after taking up employment for the first time, they are subject to a higher risk of becoming unemployed again (Liebau and Salikutluk 2016; Ruiz and Vargas-Silva 2017; Lens et al. 2019). These disadvantages are also associated with substantial career declines compared to the pre-migration employment: Immigrants generally suffer a substantial loss of occupational status compared to their pre-migration status (Chiswick et al. 2005) and thereby often end up in jobs for which they are overqualified (Akresh 2006). Among refugees in Canada, only a fraction of those previously employed as professionals manage to again find employment as professionals (Krahn et al. 2000).

Researchers have brought forward three main lines of arguments to explain these unfavorable labor market positions. First, individual characteristics such as intransferable human capital (e.g., education (Kogan and Kalter 2020; Phillimore 2011) and language skills (Chiswick and Miller 2002; Shields and Price 2002)), lower social capital (Kalter and Kogan 2014) and unsecured legal status (Kosyakova and Brenzel 2020) have been found to drive

refugees' labor market outcomes. Second, local characteristics of refugee-receiving regions such as economic deprivation (Azlor et al. 2020) or ethnic concentration (Damm 2009; Edin et al. 2003) are brought forward to explain labor market integration on the regional level. Third, institutional regulations such as the regional dispersion of arrived refugees are found to lower refugees' chances to gain labor market access (Brücker et al. 2020).

In this paper, we investigate the local employment prospects of refugees with a residency restriction in Germany by considering two different labor market outcomes. First, if refugees find employment, and second, if they are employed in the same occupation as their pre-migration occupation. By combining individual survey data on refugees with data on local labor markets in the form of local-occupational characteristics (e.g., the unemployment rate within a certain occupation in a certain region), we can show that while the general local unemployment rate of refugees' place of residence influences the likelihood of both outcomes, the local share of foreigners in refugees' occupations only affects the likelihood that refugees' find employment in their pre-migration occupation.

## 2. Theory and Prior Research

### 2.1. Labor Market Integration

The labor market integration of immigrants has been and is still studied extensively all over the world. It has gained more attention in recent years, especially in the European context, due to the large influx of refugees from Syria, Iraq and Afghanistan (Brücker et al. 2019) and most recently also from Ukraine. Hereby, definitions of successful labor market integration vary across studies. Often any form of employment may be considered successful labor market integration, which is also reflected in the 'work first' policy of some receiving countries (Arendt 2022). On the one hand, this fast integration into the labor market may have positive effects such as better economic livelihoods and self-sufficiency through independence from social benefits by the host society. However, it can be objected that these policies prioritize integration through any type of employment at the expense of leveraging refugees' skills by not taking into account their educational attainment, vocational training or on-the-job skills acquired during pre-migration work experience.

Just any form of labor market integration, therefore, may not always be the best pathway with regards to the professional careers of refugees. As many refugees bring substantial labor market experience from their home country (e.g., Liebau and Salikutluk 2016), labor market integration may instead be considered successful if they can continue in their pre-migration jobs in the receiving country. Eventually, factors which drive general labor market integration may affect more specific outcomes differently. For example, immigrants with a large network of co-ethnics may be more likely to find employment, but at the cost of a reduced quality of employment, i.e., lower wages, education–occupation mismatch (Aleksynska and Tritah 2013; Banerjee et al. 2019; Alaverdyan and Zaharieva 2019) or status downgrades (Alaverdyan and Zaharieva 2019; Aleksynska and Tritah 2013; Chiswick et al. 2005; Chiswick and Miller 2010; Kracke and Klug 2021). Since refugees often aim to re-establish their personal careers to maintain their previously achieved status and to keep their professional identity (Wehrle et al. 2018; Eggenhofer-Rehart et al. 2018), it is a sensible assumption that they carry a strong preference for finding a job in their previous occupation. For refugees, this subjectively better outcome of finding a job in their previous occupation should usually also translate to objectively better outcomes for refugees such as no or smaller occupational status downgrades compared to those who do not find a job in their previous occupation. In addition, the continuation of previous employment can also be considered a positive outcome for the host society, as it allows refugees to better contribute to the economy by utilizing their professional skills and work experience.

### 2.2. Local Labor Markets

Regional mobility to start searching for a job in another region is usually an option to improve one's labor market positioning if the local labor market does not offer suitable employment options. For refugees, however, this is often not feasible since many Euro-

pean countries including Germany (other examples: Denmark, Ireland, Norway, Sweden and Switzerland) have policies that determine the place of residence for newly arrived refugees (Kosyakova and Kogan 2022). Switzerland and Germany are cases where this is comparatively strict because social benefits are tied to not moving away from the region to which refugees have been assigned initially for five or, respectively, three years (Kosyakova and Kogan 2022). Because of this, locality plays an important role in the labor market integration of refugees. In this article, we examine Germany, where refugees are distributed across federal states according to the so-called 'EASY' algorithm that determines how many refugees each federal state should host.<sup>1</sup> This number is based on tax revenue (two-thirds) and population size (one-third). The federal states may then allocate refugees to municipalities using a method of their own choice. Practically, only the population size of the municipalities is usually used for this purpose (Degler and Liebig 2017). After being assigned to a municipality, refugees are generally not allowed to change their place of residency, unless they already have a job offer at a different location. This creates a path dependency for the labor market integration of refugees in Germany because they are strongly tied to their local labor market. Results from Sweden support this by showing that often refugees do not move after the initial placement even if they would be permitted to do so after some time (Vogiazides and Mondani 2021). Therefore, the strict policy in Germany makes it a good case for analyzing the consequences of such initial residency assignments for refugees' labor market integration. Auer (2018) has shown that such random placement leads to significantly worse labor market outcomes than being placed in a region where one's language is spoken. By not taking into account local occupational opportunities (Bernard et al. 2023; Galster and Killen 1995), individuals can end up in a local labor market where it is difficult for them to find any employment and especially one that matches their former occupation and therefore their occupational skills.

### 2.2.1. Local Characteristics

Previous research analyzed different phenomena associated with refugees' integration into local labor markets. Firstly, studies investigate the effect of economic characteristics of local labor markets. Such analyses commonly include measures of the local unemployment rate (c.f. Bevelander and Lundh 2007). As a higher unemployment rate indicates a high local labor supply, and therefore also more competition for vacant positions, it is directly related to the likelihood of finding a job. In the case of refugees, such a high local labor supply may lead to refugees being considered last for hiring, since they do not bring domestic and therefore easy-to-screen qualifications and often have an unsecured legal status. With a given level of local labor supply, the labor demand in the form of open positions may also play a complementary role, as research on the local availability of open positions has shown that these influence immigrants' likelihood of employment even in the long term (Aslund et al. 2010).

Secondly, another strand of research investigates the effects of ethnic enclaves (Damm 2009; Edin et al. 2003) and migrant networks (Martén et al. 2019; Gërxhani and Kosyakova 2022) on the local level. It has been shown that in some cases such ethnic enclaves reduce the likelihood of education–occupation mismatch and lead to improved wages (Damm 2009). They also improve the chances to gain employment through social networks with co-ethnics who can recommend places to find jobs (Eisnecker and Schacht 2016). Additionally, employment opportunities may arise within the local ethnic communities. Nevertheless, the effects of ethnic enclaves also rely on the 'quality' of the enclave (Edin et al. 2003). As such, vertical social capital plays a much more important role than horizontal social capital within the enclave, which may even affect labor market integration negatively (Gericke et al. 2018). In fact, Kalfa and Piracha (2018) have found that a high ethnic concentration increases the likelihood of overeducation, and van Tubergen (2011) found that reliance on ethnic networks for job search decreases refugees' occupational status.

Commonly, analyses that examine local labor market characteristics also control for the economic prosperity of regions by including the gross domestic product per capita as

greater prosperity is assumed to generally increase the chances of successful labor market integration (Kosfeld and Dreger 2006). Similarly, the population density is usually also included as it is assumed that more densely populated areas offer a greater diversity of jobs and therefore ease the entry into the labor market (Bevelander and Lundh 2007).

Eventually, for the case of labor market integration of refugees in general, i.e., finding any employment, we expect a higher local unemployment rate to negatively affect the chance to find employment. In addition, refugees should profit from a higher local labor demand in the form of open positions, and a higher share of foreigners in a region may positively or negatively affect the chances of refugees to find employment, depending on the average 'quality' of the underlying networks.

### 2.2.2. Occupational Characteristics

Labor markets can be described as 'arenas for the matching of persons to jobs' (Sorensen and Kalleberg 1981), where employees with specific skills compete for specific positions and employers are also competing for potential employees. Often, and especially in Germany, this 'arena' is structured along occupations and employers usually search for employees to fill certain occupational positions (Stolzenberg 1975). Competition for them is likely to be particularly strong among employees when many unemployed with the respective target occupation are available, and, conversely, competition among employers is likely to be particularly strong when few applicants are available who have the required qualifications and experience. In the case of refugee integration, those refugees who have, in their home country, worked in an occupation for which there is a lot of competition in Germany may have a harder time finding employment or an occupational match. Conversely, if there is generally much need for their occupation, they may have an easier time realizing both. In addition, as the German labor market is also known to be ethnically segregated across workplaces (Glitz 2014), entering the German labor market with a target occupation in which already many foreigners are employed may also foster labor market integration. This can be expected since employers recruiting for these occupations may have collected experience in the past in assessing foreign qualifications and work experience, which should positively affect refugees' chances to be considered for hiring. This argument is in line with the finding that firms with non-western managers are more likely to hire refugees compared to firms with western managers (Daunfeldt et al. 2019). Moreover, it has been found that firms reporting positive experiences with hiring foreign employees also cause other firms to be more willing to forego the fact that the educational credentials have been earned in a different country (Damelang et al. 2019).

Hence, for the national occupational characteristics (i.e., across all of Germany), we expect the unemployment rate of the occupations refugees have previously worked in to negatively affect their chances to find employment or an occupational match, while the number of open positions may emit a positive effect. Eventually, an overall high share of foreigners in refugees target occupation should also positively impact the likelihood of employment and occupational matches.

### 2.2.3. Local-Occupational Opportunities

In the two previous paragraphs, we described coarse-grained mechanisms which ignored how occupational opportunities, such as the number of vacant positions and available employees for certain occupations, differ within and across localities. For example, while a big city such as Frankfurt will likely have open positions in finance but practically none for farmers, a rural district in Bavaria will have open positions for farmers but practically none in finance. Therefore, finding employment as a farmer in Frankfurt will be difficult and vice versa. We argue that exactly these occupational opportunities, which represent the interplay of the local and occupational opportunity structure (e.g., Bernard et al. 2023), play an important role when studying successful labor market integration of refugees since they are often required to reside in their assigned region and therefore are mainly bound to a certain local labor market with certain occupational opportunities.

For the reasons described above, we expect the local-occupational opportunities to especially influence the occupational match as an indicator of the quality of the found employment. While one could also argue that it should influence the general employment probability, we argue that refugees will most likely also accept an occupational mismatch instead of being unemployed in regions with very few opportunities for an occupational match. Eventually, we expect the likelihood of an occupational match to be driven in the same way by the number of open positions and the unemployment rate as described above. On the one hand, a high number of open positions indicates a high labor demand and therefore means that refugees are more likely to be hired and gain employment in their previous occupation, despite some alleged obstacles in the hiring process. On the other hand, a high unemployment rate on the local-occupational level indicates a higher labor supply and therefore more competition for vacant positions. In direct competition with natives, refugees may be deprioritized because of the higher uncertainty in the hiring process. Eventually, and in a similar vein as for the occupations, a higher share of foreigners on the local-occupational level should be associated with better prospects of an occupational match for refugees. In addition to the argument regarding employers' experience with hiring foreigners, the proportion of foreigners at the local-occupational level may also be more directly related to a higher likelihood of refugees having local intra-ethnic contacts with persons already working in their target occupation. These personal contacts may eventually serve as gatekeepers and refer refugees to employers.

All in all, on the local-occupational level, we expect the unemployment rate to negatively affect the chances of an occupational match. Open positions and a high share of foreigners on the local-occupational level should positively affect the likelihood of a match. It is important to stress that these are expected to be distinct effects on the local-occupational level, which are not due to effects of general characteristics of a locality or general characteristics of refugees' target occupation.

### 3. Data and Methods

This paper combines data from three different data sources for the years 2017 to 2019 to investigate the effects of local-occupational characteristics on refugees' employment and occupational matches. First, we use individual-level data from the German Socio-Economic Panel (abbrev. SOEP; [SOEP 2021](#); [IAB-BAMF-SOEP 2021](#)). This data is linked with information on the local-occupational level from the Federal Employment Agency<sup>2</sup> (BA), from which all independent variables of interest are constructed. Furthermore, we add information on the local level from the Federal Institute for Research on Building, Urban Affairs and Spatial Development<sup>3</sup> (BSSR) to control for very general characteristics of localities. All data sources contain yearly information.

The local-occupational data is linked to the individual level using the information on the place of residency of the survey respondents from the SOEP, their pre-migration occupation and the corresponding survey years. The place of residence is identified by 401 districts of Germany (corresponding to NUTS-3 regions). Information on the occupation is additionally linked using the pre-migration occupation (German classification of occupations 2010 (KldB 2010), [Wiemer et al. 2010](#)) of the respondents. The information on the pre-migration occupation is derived from responses of refugees regarding their occupational titles before migration.

To be able to investigate broad as well as more fine-grained occupational groups, two different aggregation levels are used to link occupations. To ensure that no substantial legal requirements hinder refugees to obtain their previous occupation in Germany, we excluded military occupations (one 2-digit and four 3-digit groups) and occupations, where a licensed educational title is required in Germany (e.g., medical doctor or lawyer, based on [Haupt 2016](#), who identified 20 licensed occupations on the 3-digit level). The ultimately relevant 36 broad (2-digit) and 120 fine-grained occupational groups (3-digit)<sup>4</sup> are used separately to link occupational characteristics<sup>5</sup> on the local level to the individual data.



### 3.1. Local-Occupational Data

On the local-occupational level, we construct three indicators from the data provided by the BA<sup>6</sup>. These are the open positions per 100 potential employees (i.e., employed plus unemployed individuals), the unemployment rate<sup>7</sup> and the share of foreign employees. These three indicators are based on detailed yearly information for each occupation within a specific district. For example, for the district 'Dillingen an der Donau', we know that in 2017, there were 10 open positions as varnishers, which equals 5.3 positions per 100 potential employees. Likewise, 125 persons were already working as varnishers in Dillingen. Of the varnishers working in Dillingen, 26 were foreigners, which equals a share of foreigners of 20.8 percent. Furthermore, 15 individuals were registered as unemployed with the target occupation of varnisher. Additionally, as we know that 179 people who had their place of residence in Dillingen worked as varnishers (some likely also in other districts close by), this shows an unemployment rate of 7.9 percent among varnishers in Dillingen.

The example of Dillingen can be further exploited to illustrate why it is important to consider data on the local-occupational level. When considering the case of a refugee with previous training as a varnisher, coming to Germany and being assigned to live in Dillingen, there is a substantial difference when taking into account local information, occupational information or additionally local-occupational information.

On the one hand, considering only local characteristics, in this example, the assumption would be that such a person enters a local labor market with a less-than-average number of open positions (1.5 in Dillingen, 1.7 nationally), a lower-than-average unemployment (2.2 percent in Dillingen, 6 percent nationally) and a lower-than-average share of foreigners (10.1 percent in Dillingen, 11 percent nationally).

On the other hand, when only considering occupational characteristics (i.e., coming to Germany as a varnisher), the assumption would be that this person enters the occupational labor market for varnishers with above average open positions (4.2 percent varnisher, 1.7 nationally), an above average unemployment rate (15 percent varnisher, 6 percent nationally) and an above average share of foreigners being employed as varnisher (15.2 percent varnisher, 11 percent nationally).

However, considering the local-occupational characteristics, and thus taking a more precise look at the labor market for varnishers in Dillingen, we see that this hypothetical person would enter a labor market with an above-average number of open positions for varnishers (5.3 local-occupational, 1.5 in Dillingen, 4.2 percent varnisher, 1.7 nationally), a way higher than average share of foreigners in this occupation (20.8 local-occupational, 10.1 percent in Dillingen, 15.2 percent varnisher, 11 percent nationally) and an unemployment rate higher than in Germany and Dillingen in general, but lower than that of varnishers in general (7.9 local-occupational, 2.2 in Dillingen, 15 percent varnisher, 6 nationally). Consequently, we would assume good local labor market prospects for refugees according to this information, especially for the case of finding employment in the previously trained occupation as a varnisher.

Table 1 summarizes these local-occupational measurements and two control variables on the local level (summary statistics can be found in Table A1). The two control variables are from the Indicators and Maps for Spatial and Urban Development<sup>8</sup> (INKAR) data. These are available on a yearly basis for 401 districts and are, namely, the population density and the GDP per capita.

**Table 1.** Summary of local-occupational measurements and controls on the local level.

Characteristics	Operationalization
<b>Local-Occupational Level</b>	
Open Positions (BA)	Vacant positions in occupation, per 100 persons employed in this occupation and unemployed within this target occupation (based on regional residents)
Unemployment Rate (BA)	Unemployed persons in occupation, in percent of employed in this occupation and unemployed within this target occupation (based on regional residents)
Share Foreigners (BA)	Employees without German passports in this occupation, in percent of all employed in this occupation (based on employees at regional workplaces)
<b>Controls on Local Level</b>	
Population Density (INKAR)	Residents per square kilometer
Gross Domestic Product (INKAR)	Gross domestic product per capita in 1000 €

Source: own representation.

### 3.2. Individual Data

For the individual level data, we used the IAB-BAMF-SOEP survey of refugees (samples M3 to M5) for the years 2017 to 2019.<sup>9</sup> This survey consists of a household sample of refugees who arrived in Germany between 2013 and 2016. We restricted our sample to individuals with a residency requirement on the local or federal level, information on their last occupation in their country of origin, non-missing information on their place of residency in Germany, those who are non-working or employed (not in education or self-employed), who actually immigrated since 2013 and therefore meet the sampling frame, who emigrated from a country outside the European Union (EU-28 countries) and those who are at least 18 and no more than 65 years of age.

Eventually, we build our **first dependent variable** of ‘employed’ (1 = yes, 0 = no). This variable equals 1 if refugees are employed full-time, part-time or have at least marginal employment and 0 if refugees are unemployed. Employment is found for 17.4 percent of the cases of the relevant subsample. The **second dependent variable** of ‘occupational match’ (1 = yes, 0 = no) is assigned 1 if refugees are employed in the same occupational group in which they were previously employed in their country of origin and 0 if they work in another occupational group (also referred to as ‘horizontal (mis)match’ in the literature). We construct and analyze this variable on occupational matches twice: once for the match of broad occupational groups (2-digit), and once for the match of the more fine-grained occupational groups (3-digit). The more detailed occupational match is found in 14.4 percent of cases and, as one would expect, is less likely to be found than the broad occupational match, which is found in 18 percent of cases. Besides these individual dependent variables, we use additional information on the individual level to control for effects that may be correlated with the variation in local-occupational characteristics. All dependent and control variables on the individual level are summarized in Table 2 (Summary statistics can be found in Table A1).

**Table 2.** Summary of individual measurements.

Characteristics	Operationalization
<b>Individual Level</b>	
Employed (SOEP)	1 = full-time, part-time or marginal employment; 0 = unemployed (Self-employed and in education excluded)
Occupational Match, 2-digit and 3-digit (SOEP)	1 = Employed in the same occupational group (KldB 2010) as before migration; 0 = another occupational group
Controls (SOEP)	Education (3 levels), self-assessed German and English proficiencies (0–4 sum score), sex, age, legal status (4 categories), type of residency restriction (2 categories), years since migration, marital status (3 categories), country of origin (4 categories)

Source: own representation.

### 3.3. Data Structure

The resulting structure of the linked data is presented in Table 3 and briefly discussed in the following. First of all, there are two subsamples used for the analyses, in which single observations in districts and 3-digit occupations are not included. The ‘employment sample’ includes 3727 person-years from 2251 refugees (employed and unemployed). This sample is used to investigate the effects of local-occupational characteristics on the probability of employment. In this sample, 59 percent of all districts (236/401), 94 percent of the relevant 2-digit occupations (34/36) and 71 percent of relevant 3-digit occupations (85/120) are represented in the data. This results in a situation where there are 3054 unique year-specific 3-digit local-occupational characteristics (an example of one such characteristic is the unemployment rate of varnishers in 2017 in the district ‘Dillingen’) for 3727 person-years, which makes these characteristics technically close to individual characteristics (1.22 person-years per unique group combination). The second subsample consists of 605 person-years from 466 refugees, who were employed at the time of the interview. This ‘occupational match’ sample is used to investigate whether refugees found employment in their pre-migration occupation. For this much smaller sample, the coverage is 34 percent for districts (137/401), 92 percent for 2-digit occupations (31/36) and 46 percent for 3-digit occupations (55/120). The occupational information at the local level in this smaller sample is even closer to an individual-level characteristic as there are 583 unique year-specific local occupational characteristics for 605 person-years (1.04 person-years per unique group combination).

### 3.4. Analytical Approach

As we restrict the samples to refugees with residency restrictions on the local and the federal level (roughly 50:50, see Table A1 for detailed shares per sample), we assume the variation in local-occupational characteristics to be adjusted for many influences of endogeneity. This is especially important since it is known that refugees often move into high-unemployment regions after their residency restrictions are lifted (e.g., [Wiedner and Schaeffer 2023](#)). To investigate if local, occupational, and local-occupational characteristics exhibit distinct influences on the employment and match probability for refugees, we make use of the fact that the local-occupational characteristics of the BA data carry variance on the local and the occupational level as well as the combination of both. For example, the data contains the general unemployment rate for each locality (across all occupations), the general unemployment rate for each occupation (across all localities) and how the specific local-occupational situation deviates from these means (e.g., whether a local unemployment rate for varnishers exceeds the general unemployment rate for varnishers). To identify



the influence of each level, we estimate linear probability models (in the following ‘LPM’) with different fixed-effects (in the following ‘FE’) specifications.<sup>10</sup> Albeit the dependent variables are dichotomous, LPMs are chosen because in contrast to non-linear models, their point estimates are better comparable across different model specifications (Mood 2010).

**Table 3.** Empirical data structure.

Employment Sample			
Group	Frequency	Unique Group-Combination	Frequency
Years	3		
Districts	236	District-Years	625
Occupations		District-Occupation-Years	
2-digit	34	2-digit	2795
3-digit	85	3-digit	3054
Persons	2251	Person-Years	3727
Occupational Match Sample			
Group	Frequency	Unique Group-Combination	Frequency
Years	3		
Districts	137	District-Years	315
Occupations		District-Occupation-Years	
2-digit	31	2-digit	569
3-digit	55	3-digit	583
Persons	466	Person-Years	605

Note: The population group frequency is 401 for districts, 36 for 2-digit occupations (non-military) and 120 for 3-digit occupations (non-licensed and non-military). Source: SOEP v36.1, BA data, own calculations.

While the data has a clear hierarchical structure, fitting multilevel models is not a feasible option, because of the small within-group frequencies in our data. For such cases, however, fixed-effect models have been shown to be a suitable alternative (c.f., Huang 2016). To take the complex hierarchical structure of the data into account for the tests on statistical significance, the standard errors for all models are clustered on the individual and the local as well as on the occupational level.

Practically, two sets of LPMs predicting refugees’ employment (M1–M4, Table 5) and two sets predicting occupational matches (M5–M8, Table 6) are estimated. The two sets for each dependent variable estimate effects for broad occupational groups (2-digits, models suffixed ‘\_2’) and finer-grained occupational groups (3-digits, models suffixed ‘\_3’). While only the aggregation level of the local-occupational characteristics varies in the employment models, the dependent variable additionally varies on the individual level in the models investigating matches (2- vs. 3-digit match). All models include the individual and local controls listed above (Tables 1 and 2) and FEs for the survey years under investigation. Despite these similarities, each model within a set estimates the effects of the local-occupational characteristics based on different parts of the variance by introducing different FEs (see e.g., Allison 2009). The first models (M1 and M5) exploit all the variance in the local-occupational characteristics, which does not arise due to differences across time (survey year FEs) or differences in local economic prosperity or population density (local controls). In the second models (M2 and M6), FEs for the occupational level are added. These FEs remove the general differences in characteristics between occupations from the estimates. The remaining effects may result from general differences across localities (e.g., the general local unemployment rate) and local-occupational differences (e.g., the especially high local unemployment rate for varnishers compared to the average varnisher unemployment rate). In the third models (M3 and M7), the occupational FEs are removed and local FEs are included instead. These models remove differences between localities

and as such the effects rely only on differences between occupations (e.g., the general unemployment rate for varnishers) or the local-occupational differences as mentioned above. The last models (M4 and M8) now remove the local and occupational parts of the variance by including FEs for both. The effects estimated in these models are therefore not due to general differences between localities or occupations but are based solely on the variance at the local-occupational level. Due to the yearly nature of the data at hand, the remaining variance in each model includes not only differences between entities, but also changes over time within entities that are not captured by the general FEs for the survey years. All models are estimated with the Stata command 'reghdfe' by Correia (2014) and are based on the already discussed subsamples, which are built based on full information on all independent variables (N(3765) = 4.5% missing information in the 'employment sample'; N(659) = 4.4% missing information in the 'occupational match sample') and by dropping single observations within localities and occupations ('singletons') as suggested by Correia (2015) when using cluster-robust standard errors (N(3727) = 1% singletons in the 'employment sample'; N(605) = 8.2% singletons in the 'occupational match sample').

## 4. Results

### 4.1. Correlations

To obtain first insights regarding the impact of local labor market characteristics on the likelihood of employment and occupational matches, Table 4 displays how the dependent variables on the individual level correlate with local-occupational characteristics. For the likelihood of employment, a higher unemployment rate correlates negatively with refugees' individual employment, indicating a negative effect of a high local labor supply. The labor demand in the form of open positions does also reveal a significant correlation with refugees' employment, but in the opposite direction, which indicates better employment prospects if more jobs are vacant. The share of foreigners does, in contrast, not reveal any correlation with refugees' employment.

**Table 4.** Correlations for individual dependent and local-occupational variables.

Correlations (Pearson's r, Significance Corrected for Clustering <sup>a</sup> )	Individual Level		
	Employed	Occupational Match	
		2-digit	3-digit
<b>Individual Level</b>			
Occupational Match (3-digit)		<b>0.87 ***</b>	
<b>Local-Occupational Level</b> (2-digits)			
Open Positions	<b>0.07 *</b>	<b>0.16 *</b>	-
Unemployment Rate	<b>-0.07 **</b>	-0.08	-
Share Foreigners	0.01	<b>0.11 *</b>	-
<b>Local-Occupational Level</b> (3-digits)			
Open Positions	<b>0.06 *</b>	-	<b>0.17 **</b>
Unemployment Rate	<b>-0.07 **</b>	-	<b>-0.08 *</b>
Share Foreigners	0.01	-	0.12
N	3727	605	605

Notes: <sup>a</sup> Pearson's r correlation coefficients with t-statistics from bivariate regression models with clustered standard errors (multiway clustering in Stata command 'reghdfe') on the individual, local and occupational level; correlation coefficients with  $p < 0.05$  formatted bold; significance levels: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . Source: SOEP v36.1, BA data, own calculations.

The results are quite different when considering not only the general likelihood of refugees finding employment, but whether they found employment in their pre-migration occupation. For both, broad (2-digit) and fine-grained (3-digit) occupational matches, the labor demand does exhibit a much stronger correlation than for the general employment. A higher number of open positions correlates more than twice as strongly with matches

(0.16 and 0.17) than with employment (0.07 and 0.06). Hereby, the correlations are also substantially stronger than those with the unemployment rates, which are below 0.1 for both levels and even insignificant for the 2-digit occupations. Moreover, the share of foreign employees also exhibits a moderate correlation with matches (0.11 and 0.12), which is significant on the 2-digit level. A higher labor demand and share of foreigners in Germany in refugees' previous occupations are therefore the characteristics found to be most strongly correlated with the likelihood that refugees obtain their prior occupations. These overall correlations, however, do not allow us to draw conclusions regarding the contribution of each underlying level. An overall correlation may only be influential on the occupational or the local level, while exhibiting almost no effect on the most fine-grained, local-occupational level. To investigate this, the results of linear probability models with different FE specifications are discussed in the following.

#### 4.2. Fixed Effects Linear Probability Models

The models predicting refugees' likelihood of employment in general (M1–M4 in Section 4.2.1) and if this employment was realized in their pre-migration occupation (M5–M8 in Section 4.2.2) are estimated for broad 2-digit (suffixed '\_2') and fine-grained 3-digit occupations (suffixed '\_3'). Since the results are very similar for both operationalizations of occupations, only the results for the fine-grained 3-digit occupations are presented and discussed primarily in the main text for ease of reporting. Where there are differences between the model sets, these are noted at the end of each chapter and the full regression tables for both operationalizations can be found in Appendix A, Tables A2 and A3.

##### 4.2.1. Employment

Out of the 3727 person-years under investigation for the likelihood of employment between 2017 and 2019, being in employment can be found for 17.4 percent of the cases. Albeit the bivariate correlations presented above indicate significant correlations for local-occupational characteristics with refugees' employment probability, the results of the first model displayed in Table 5 show that no significant effects remain after controlling for individual and general local characteristics as well as FEs for survey years (Model M1\_3). While the unemployment rate and the share of foreigners do not only lack statistical significance but also any substantial effect size in this model, the open positions exhibit quite a strong effect with one additional open position increasing the employment probability of refugees by half a percentage point.

The next model includes FEs for occupational groups (Model M2\_3) and thereby removes the occupational variance and estimates mainly local and local-occupational effects as explained above. The results of this model now show that the effect of open positions is hardly associated with the local variation of open positions, since almost no effect of open positions remains in this model. In contrast, the unemployment rate now exhibits a much stronger and significant ( $p < 0.01$ ) effect for a refugee's employment probability, indicating a 0.35 percentage point lower employment probability for each additional percentage point in the unemployment rate.

By removing the occupational and including the local FEs in the next model (Model M3\_3), effects for the occupational and local-occupational variation are estimated and the local-only variation is absorbed. The results from this model now show that the positive effect of open positions detected in the first model can mainly be traced back to be influential on the occupational level. An additional open position (per 100 potential employees) in refugees' pre-migration occupation significantly ( $p < 0.01$ ) increases their likelihood of employment by 0.73 percentage points, irrespective of the general local characteristics. In contrast to the previous model, the labor supply in the form of the unemployment rate in refugees' pre-migration occupations is no more affecting refugees' employment probability negatively.

In the last model, FEs for localities and occupations are included (Model M4\_3). These models thereby absorb variation in the characteristics that are due to differences between

localities and between occupations. The remaining variance used for estimation only captures the differences regarding certain occupations in certain localities. For the general employment probability of refugees, this local-occupational variation does not prove to be especially influential. Only the number of open positions shows a noteworthy positive, but insignificant effect. However, since this model does not show pronounced effects for this local-occupational level, this indicates that the significant effects from the previous two models can mainly be traced back to the local and occupational level only.

**Table 5.** Models M1–M4, point estimates for local-occupational variables.

LPMs, DV: Employed	M1_3 β/(SE)	M2_3 β/(SE)	M3_3 β/(SE)	M4_3 β/(SE)
<b>Local-Occupational Variables</b>				
Open Positions	0.52 (0.32)	−0.03 (0.45)	<b>0.73 **</b> <b>(0.25)</b>	0.35 (0.39)
Unemployment Rate	−0.07 (0.10)	<b>−0.35 **</b> <b>(0.11)</b>	0.21 (0.11)	0.12 (0.15)
Share Foreigners	0.03 (0.05)	−0.01 (0.04)	0.01 (0.05)	0.03 (0.06)
<b>Fixed Effects (FEs)</b>				
Local	✗	✗	✓	✓
Occupational	✗	✓	✗	✓
Survey year	✓	✓	✓	✓
<b>Controls</b>				
Local <sup>a</sup>	✓	✓	✓	✓
Individual <sup>b</sup>	✓	✓	✓	✓
R <sup>2</sup>	0.13	0.16	0.22	0.25
adj. R <sup>2</sup>	0.12	0.14	0.16	0.17
within R <sup>2</sup>	0.10	0.09	0.08	0.07
adj. within R <sup>2</sup>	0.09	0.08	0.07	0.06
N (person-years)	3727	3727	3727	3727
n (persons)	2251	2251	2251	2251
n (districts)	236	236	236	236
n (occupations)	85	85	85	85

Notes: LPMs = linear probability models; <sup>a</sup> listed in Table 1; <sup>b</sup> listed in Table 2; point estimates represent the percentage point change in the probability of employment for a one unit increase in shown independent variables; standard errors (SEs) are clustered on the individual, local and occupational level (multiway clustering in Stata command 'reghdfe'); point estimates with  $p < 0.05$  are formatted in bold; ✗ signifies that the corresponding FEs are not included in the model; ✓ signifies that the corresponding FEs/controls are included in the model; the table with point estimates for individual and local controls can be found in Appendix A, Table A2; significance levels: \*\*  $p < 0.01$ . Source: SOEP v36.1, BA and INKAR data, own calculations.

In line with previous research, our results show that refugees' employment probability is significantly influenced by the labor supply at the local level. This indicates that more competition for a certain job reduces refugees' likelihood of finding employment. Given that the average employment probability of refugees in the sample is only 17.4 percent and the standard deviation of the local unemployment rate in the respective model is 5.3 percentage points (see Appendix A, Table A1), a one standard deviation lower local unemployment rate translates into an at least 11 percent increase in the average employment probability  $((17.41 + (5.33 \times 0.35))/17.41 \approx 1.11)$ . The general local labor demand, however, does not exhibit any positive effects on the probability of refugees' employment. The labor demand proves to be mainly influential on the occupational level, indicating that refugees with one standard deviation more open positions in their pre-migration occupation have an on average 9 percent higher probability of finding employment in Germany, irrespective of their place of residence  $((17.41 + (2.10 \times 0.73))/17.41 \approx 1.09)$ .

The results presented above are based on characteristics from 85 occupations on the 3-digit level. By using the 31 populated 2-digit occupations with aggregated characteristics,

the results are very similar. The only noteworthy difference is that the number of open positions for refugees' pre-migration occupations (Model M3\_2) exhibits a much stronger effect of 1.58 percent per additional open position per 100 potential employees. However, the standard deviation of this characteristic is also much lower for the 2-digit occupations, rendering the impact on the average probability of refugees' employment with 13 percentage points  $((17.41 + (1.44 \times 1.58))/17.41 = 1.13)$  comparable to the results from the models presented above.

#### 4.2.2. Occupational Match

Among the person-years where refugees are found to be employed and not the only observation within a locality or pre-migration occupation ( $n = 605$ ), employment in the same 3-digit occupational group as before migration is realized in 14.4 percent of the cases. In the following, it is investigated whether local labor market characteristics affect the chances for these occupational matches. Since this is an analysis of only those who found employment, the statistical power is much lower compared to the analyses for the overall employment probability.

The first model displayed in Table 6 estimates how local-occupational characteristics affect refugees' probability of an occupational match while accounting for individual and local controls as well as for yearly FEs (Model M5\_3). In contrast to the employment models, these models already show significant effects for all three local-occupational characteristics, indicating a positive effect of a higher labor demand, a negative effect of a higher labor supply and a positive effect of a higher share of foreigners. However, as mentioned above, this model uses the full variation of the local-occupational characteristics and does not allow us to draw conclusions on the part of variation driving these effects.

The second model, therefore, again adds occupational FEs to remove the overall differences across occupations from the estimates (Model M6\_3). This model now shows a significant ( $p < 0.001$ ) and even stronger effect on unemployment compared to the previous model. A one percentage point higher unemployment rate is associated with a 0.93 percentage point lower probability that refugees enter employment in their pre-migration occupation, irrespective of the generally higher or lower match probabilities across different occupations. This model also shows that the effects of the labor demand in the form of open positions and for the share of foreigners are substantially reduced and insignificant when controlling for differences across refugees' pre-migration occupations.

In the third model, the occupational FEs are again removed and local FEs are added (Model M7\_3). This model shows, similar to the employment probability model, that the probability of an occupational match is not affected by the labor supply after considering differences between locations. The labor demand exhibits a quite strong but, in this case, insignificant effect on occupational matches. Albeit failing to reach significance, this effect is substantially stronger than the effect in the previous model (both models with comparable SDs for the open positions, see Table A1), indicating that the significant effect in the first model is mainly driven by the variation across occupations. Lastly, a higher share of foreigners in refugees' pre-migration occupations substantially increases the probability of an occupational match, irrespective of the general characteristics of their place of residence such as the overall local share of foreigners.

The last model now again includes FEs for the occupational as well as the local level and only exploits variation on the local-occupational level (Model M8\_3). For the labor demand and supply, this model shows no distinct effects. This supports the interpretation that the effect for local labor supply is mainly driven by differences between localities and not by differences within them. While accepting the caveat of the effect being insignificant in the previous model, a similar interpretation applies for the labor demand, which is mainly influencing the general match probability for refugees with different pre-migration occupations. However, the share of foreigners in refugees' pre-migration occupation still shows a significant ( $p < 0.05$ ) effect on the local-occupational level. This means that even when removing all variation in the share of foreigners that stems from differences



between localities and occupations, a higher local share of foreigners in refugees' pre-migration occupation still exhibits a substantial and significant effect. This effect is even stronger than in the previous model (despite a lower SD in the variable, see Table A1) and indicates a 0.74 percentage point higher probability that refugees find employment in their pre-migration occupation when the local share of foreigners in their occupation is one percentage point higher.

**Table 6.** Models M5–M8, point estimates for local-occupational variables.

LPMs, DV: Occupational Match	M5_3 β/(SE)	M6_3 β/(SE)	M7_3 β/(SE)	M8_3 β/(SE)
<b>Local-Occupational Variables</b>				
Open Positions	<b>2.46 **</b> (0.79)	0.49 (0.98)	1.68 (0.97)	−0.02 (1.51)
Unemployment Rate	<b>−0.49 *</b> (0.24)	<b>−0.93 ***</b> (0.26)	0.04 (0.30)	0.23 (0.56)
Share Foreigners	<b>0.46 **</b> (0.16)	0.24 (0.19)	<b>0.54 **</b> (0.19)	<b>0.74 *</b> (0.35)
<b>Fixed Effects (FEs)</b>				
Local	✗	✗	✓	✓
Occupational	✗	✓	✗	✓
Survey year	✓	✓	✓	✓
<b>Controls</b>				
Local <sup>a</sup>	✓	✓	✓	✓
Individual <sup>b</sup>	✓	✓	✓	✓
R <sup>2</sup>	0.12	0.26	0.40	0.50
adj. R <sup>2</sup>	0.08	0.15	0.18	0.22
within R <sup>2</sup>	0.12	0.08	0.12	0.09
adj. within R <sup>2</sup>	0.08	0.04	0.07	0.04
N (person-years)	605	605	605	605
n (persons)	466	466	466	466
n (districts)	137	137	137	137
n (occupations)	55	55	55	55

Notes: LPMs = linear probability models; <sup>a</sup> listed in Table 1; <sup>b</sup> listed in Table 2; point estimates represent percentage point change in the probability of an occupational match on the respective level (2-digit/3-digit) for a one unit increase in the independent variables shown; standard errors (SEs) are clustered on the individual, local and occupational level (multiway clustering in Stata command 'reghdfe'); point estimates with  $p < 0.05$  formatted bold; ✗ signifies that the corresponding FEs are not included in the model; ✓ signifies that the corresponding FEs/controls are included in the model; table with point estimates for individual controls can be found in Appendix A, Table A3; significance levels: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . Source: SOEP v36.1, BA data, own calculations.

All in all, the results from the models predicting refugees' employment in their pre-migration occupation are similar to those predicting the overall employment probability regarding the effects of labor supply and demand but substantially different with respect to the effects of the share of foreigners. Like in the employment models, especially the differences between localities drive the negative effect of a higher local labor supply. For example, the results indicate that a one standard deviation lower unemployment rate increases refugees' average probability of a 3-digit occupational match by around 27 percent  $((14.38 + (4.10 \times 0.93))/14.38 \approx 1.27)$ , irrespective of the general likelihood of realizing a match in their specific pre-migration occupation. However, while the general employment probability was hardly affected by the share of foreigners, strong and significant effects were identified on the occupational and local-occupational level for the probability that refugees find employment in their pre-migration occupation. For example, the models indicate that a one standard deviation higher local share of foreigners in refugees' target occupation increases the average probability of a 3-digit occupational match by around 25 percent  $((14.38 + (4.92 \times 0.74))/14.38 \approx 1.25)$ , irrespective of the general likelihood to find a match in their place of residence or their target occupation.

Although the effect of the local-occupational share of foreigners cannot be due to general occupational differences, it cannot be ruled out that a genuine occupational effect is still at play in the previous model. This is due to the fact that the variance of the share of foreigners is more than halved in the last model compared to the previous model (see Table A1), which makes the effect in the last model smaller than in the previous model, given the available variance. In light of this, it is still possible that the occupational level contributes its own part to the main effect estimated in the first model, which cannot be identified with the analytical strategy applied, as it aims to identify effects at the local-occupational level.

The analyses predicting the broader 2-digit occupational matches—occurring in 18 percent of the cases—with the respective local-occupational characteristics aggregated to the 2-digit occupations are shown in Table A3 in Appendix A and confirm the results regarding the share of foreigners. In these models, the share of foreigners also exhibits a significant effect on the local-occupational level in the last model (M8\_2). Regarding the unemployment rate for the 2-digit matches, the results show the same pattern with the strongest effect in the second model (Model M6\_2), which barely misses statistical significance at the 5% level. Regarding the labor demand, however, the analyses for the 2-digit occupations do not show that the effect of open positions is much stronger in the third (Model M7\_2) than in the second model (Model M6\_2) but instead show comparable effects. This may to some extent be also due to the fact that 2-digit occupations are too broad to actually remove all the relevant occupational variation from the estimates. The estimates from models with occupational FEs may then still incorporate a variation that is associated with the more fine-grained occupational groups within the broad 2-digit occupations across localities.

## 5. Summary and Discussion

This study examines how the labor market integration of refugees is affected by the characteristics of their place of residence and pre-migration occupation as well as by occupational opportunities within and across localities. The place of residence is particularly important for refugees as they are assigned to a region upon arrival in many host countries, usually without taking into account information such as their labor market experience. Research has already shown that regional characteristics, such as the local unemployment rate and the size of the ethnic community, affect the employment probabilities of refugees. However, as many refugees bring with them considerable labor market experience from their countries of origin (Liebau and Salikutluk 2016), we argue that the match between their previous and realized occupation is an important indicator of the quality of refugees' labor market integration. Finally, we show that in contrast to the general employment, these occupational matches are not only influenced by general local or occupational characteristics but also by local-occupational opportunities in the form of the already present local share of foreigners in refugees' target occupations.

Practically, we link individual survey data to detailed local-occupational data to investigate the effect of local, occupational, and local-occupational opportunities for refugees' employment and occupational match probability. To ensure mainly exogenous variation in the characteristics of local labor markets, we only analyze refugees with a residency restriction and who are therefore not able to self-select freely into certain local labor markets. In line with the literature, we first find that refugees' employment probability is influenced by the general local unemployment rate: the higher the local labor supply, and therefore the potential competition for vacancies, the lower the likelihood of refugees finding employment. The local demand for refugees' pre-migration occupations, in contrast, does not influence the employment probabilities of refugees substantially. Instead, if there are in general more open positions for their occupation in Germany, they are more likely to find employment irrespective of their place of residence. Despite the effects of general local labor supply and occupational labor demand, the results show no noteworthy effects of specific occupational opportunities on the local level for refugees' general likelihood of employment.

While we show that the probability for refugees to achieve employment in their pre-migration occupation is similarly affected by the general local labor supply, these occupational matches are additionally influenced by the local share of foreign employees in refugees' target occupations. In fact, a one standard deviation higher local share of foreigners in refugees' pre-migration occupations increases the average probability of a fine-grained (3-digit) occupational match by around 25 percent. This positive effect is in line with our expectation that employers for occupations with a higher local share of foreigners should have more experience with assessing foreign qualifications and work experience, which eventually should translate into better chances for refugees to access these occupations. However, this effect may additionally be explained by refugees having ties to other foreigners working in their target occupations, which eventually serve as gatekeepers for them to regain their previous occupations. This would also be in line with the findings that especially vertical social capital is beneficial for refugees to find employment (Gericke et al. 2018). Overall, the results show that the general local and occupational opportunities affect refugees' employment prospects, while refugees' chances of realizing their pre-migration occupation are additionally affected by local-occupational opportunities in addition to general local opportunities.

From a theoretical standpoint, our analyses show that only considering the employment status when analyzing refugee integration is not necessarily sufficient. If possible, studies should consider the quality of the found employment when analyzing the labor market integration of refugees. Furthermore, the influence of local labor market characteristics has to be kept in mind for such analyses. In particular, local-occupational characteristics should not be discarded as non-influential as they may be omitted drivers of refugee integration.

Although the IAB-BAMF-SOEP survey of refugees with its large and randomly drawn sample of refugees in Germany made this study possible in the first place, even this large sample reaches its limits when analyzing it in combination with local-occupational indicators. While the analyses of refugees' employment probability relied on 3727 person-years with a coverage of 59 percent for districts and at least 71 percent for occupations, the sample for the investigation of occupational matches only relied on 605 person-years from refugees who found employment. This much smaller sample size of course came with a reduction in coverage to 34 percent for districts and at least 46 percent for occupations. While the focus on refugees with local and federal residency restrictions reduces the possibility of bias through systematic—and most problematically—unfavorable self-selection into certain districts, we do not know if these subsamples of districts and occupations present in our analyses (e.g., through selection criteria and listwise deletion) can be considered as random samples of the districts and occupations in the refugee population in Germany.

Albeit an employment in their pre-migration occupations can on average be assumed to be a positive outcome as it ensures that refugees' may preserve their professional identity and use their previously acquired skills, there may also be circumstances under which these occupational matches may be disadvantageous compared to an occupational change. Especially a very high local share of foreigners in a certain occupation may also be due to a strong local ethnic segregation in lower paid jobs. Although the available data do not allow for further differentiation in this regard due to the low frequencies mentioned above, it would certainly be worthwhile for future research to investigate under which circumstances occupational changes may even be immediately beneficial for refugees. In the same vein, it could be investigated how the employment trajectories and subsequent labor market outcomes differ between refugees with and without an occupational match after arrival in Germany. For example, while some occupational matches could also be an initial disadvantage with respect to certain labor market outcomes (e.g., wages), being employed in one's trained occupation may pay off in the long run by enabling better careers.

On a practical note, the implications of the results are apparent. The current dispersion policy in Germany regionally allocates refugees based on a quota, which does not take into account regional employment prospects for refugees. In contrast, this quota is based

on tax revenues and population sizes of federal states, which only barely reflects the federal or even local labor market situation since even the underlying tax revenues do not reflect the actual economic strength of federal states, as they also include financial equalizations by the state (Schmandt et al. 2023). Although a respective counterfactual analysis is out of scope for this paper, our results point in the direction that the current dispersion policy in Germany leads to refugees often being assigned to regions where they cannot find work, while employers in other regions with a low regional labor supply are more willing to hire refugees. Eventually, refugees as well as both types of regions should profit from a regional dispersion of refugees that takes regional demands into account: low-unemployment regions may benefit by being able to meet workforce needs, and high-unemployment regions may be relieved by not having to accommodate a disproportional number of refugees who have few local employment prospects anyways. For example, based on a machine learning algorithm, it was shown for the U.S. and Switzerland that by optimizing the regional dispersion, refugees' employment prospects could be substantially improved (Bansak et al. 2018). Eventually, no substantial downsides of considering local labor market demands for the regional dispersion of refugees in Germany can be identified by the authors.

**Author Contributions:** Conceptualization, D.T. and M.B.; methodology, D.T. and M.B.; D.T. and M.B.; data curation, D.T. and M.B.; writing—original draft preparation, D.T. and M.B.; writing—review and editing, D.T. and M.B. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research was funded by the Leibniz-ScienceCampus “SOEP RegioHub” (Bielefeld University, SOEP/DIW Berlin, Leibniz Association) and the German Science Foundation (DFG) under the grant agreement number 403158126.

**Data Availability Statement:** Aggregate data for local and local-occupational levels are available in publicly accessible repositories. Restrictions apply to the availability of the individual-level survey data. Data were obtained from the German Socio-Economic Panel and are only available at the German Institute for Economic Research (<https://www.diw.de/en/>; accessed on 20 February 2023). IAB-BAMF-SOEP survey of refugees (M3–M5), data of the years 2016–2019, <https://doi.org/10.5684/soep.iab-bamf-soep-mig.2019> (accessed on 20 February 2023). Nguyen (2023). inkr: local access from R to all INKAR data (v0.1.2). Zenodo. <https://doi.org/10.5281/zenodo.7664375> (accessed on 20 February 2023). Nguyen and Tsolak (2023). badata: Regional Job Market Data from the German Federal Employment Agency (Bundesagentur für Arbeit—BA) (v0.1.3). Zenodo. <https://doi.org/10.5281/zenodo.7664361> (accessed on 20 February 2023). Socio-Economic Panel (SOEP), data for years 1984–2019, SOEP-Core v36, EU Edition, 2021, <https://doi.org/10.5684/soep.core.v36eu> (accessed on 20 February 2023).

**Conflicts of Interest:** The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript or in the decision to publish the results.

## Appendix A

**Table A1.** Descriptive statistics for both model samples.

	Model Sample M1–M4				Model Sample M5–M8			
	Mean	SD	Min	Max	Mean	SD	Min	Max
<b>Dependent Variables</b>								
<i>Individual</i>								
Employed (in %)	17.41	-	0.00	100	-	-	-	-
Occupational Match (in %)								
2-digit	-	-	-	-	18.02	-	0.00	100
3-digit	-	-	-	-	14.38	-	0.00	100

Table A1. Cont.

	Model Sample M1–M4				Model Sample M5–M8			
	Mean	SD	Min	Max	Mean	SD	Min	Max
<b>Independent Variables</b>								
<i>Local-Occupational</i> <sup>a</sup>								
Open Positions								
2-digit, total	2.38	1.70	0.00	16.81	2.65	1.87	0.07	11.99
Variation M1/M5	0.00	1.70	−2.51	14.40	0.00	1.87	−2.64	9.24
Variation M2/M6	0.00	1.26	−3.83	13.07	0.00	1.38	−2.90	9.32
Variation M3/M7	0.00	1.44	−6.67	12.25	0.00	1.30	−4.93	7.29
Variation M4/M8	0.00	0.96	−4.81	11.81	0.00	0.86	−3.36	8.46
3-digit, total	2.52	2.44	0.00	32.81	2.80	2.40	0.00	17.02
Variation M1/M5	0.00	2.44	−2.68	30.40	0.00	2.40	−2.92	14.10
Variation M2/M6	0.00	1.88	−6.59	28.80	0.00	1.80	−5.40	14.19
Variation M3/M7	0.00	2.10	−9.98	28.17	0.00	1.71	−8.70	11.66
Variation M4/M8	0.00	1.52	−7.24	26.13	0.00	1.21	−6.80	11.78
Unemployment Rate								
2-digit, total	7.65	6.28	0.65	79.83	6.67	5.68	0.77	79.83
Variation M1/M5	0.00	6.27	−7.18	72.00	0.00	5.67	−6.19	72.98
Variation M2/M6	0.00	5.26	−11.75	71.18	0.00	4.78	−13.79	61.85
Variation M3/M7	0.00	4.80	−21.20	57.08	0.00	3.77	−22.30	45.36
Variation M4/M8	0.00	3.48	−14.31	56.78	0.00	2.82	−18.82	39.61
3-digit, total	8.01	7.27	0.00	100	6.83	5.99	0.25	33.33
Variation M1/M5	0.00	7.27	−8.13	91.87	0.00	5.99	−6.63	26.45
Variation M2/M6	0.00	5.33	−14.72	54.80	0.00	4.10	−11.39	19.77
Variation M3/M7	0.00	5.83	−22.91	88.46	0.00	4.19	−17.53	22.59
Variation M4/M8	0.00	3.46	−14.47	40.76	0.00	2.25	−11.21	16.18
Share Foreigners								
2-digit, total	13.78	11.09	0.00	70.20	14.08	10.44	0.00	70.20
Variation M1/M5	0.00	11.02	−15.96	55.54	0.00	10.37	−15.34	54.51
Variation M2/M6	0.00	8.63	−24.89	44.36	0.00	7.96	−25.11	41.34
Variation M3/M7	0.00	8.49	−28.48	39.92	0.00	6.66	−19.11	32.82
Variation M4/M8	0.00	5.44	−20.02	37.54	0.00	3.97	−14.19	23.36
3-digit, total	14.23	12.50	0.00	74.37	14.55	11.92	0.00	74.06
Variation M1/M5	0.00	12.44	−16.48	61.09	0.00	11.86	−16.24	57.82
Variation M2/M6	0.00	9.64	−29.68	55.80	0.00	8.51	−28.30	42.59
Variation M3/M7	0.00	10.01	−30.16	59.70	0.00	8.15	−23.09	36.96
Variation M4/M8	0.00	6.82	−27.44	52.90	0.00	4.92	−14.10	22.59
<i>Local</i>								
Population Density	917	1061	39	4777	759	1010	39.13	4777
Gross Domestic Product	40.40	16.57	15.65	133	39.87	15.26	19.76	105
<i>Individual</i>								
Education								
low	0.68	-	0	1	0.65	-	0	1
medium	0.19	-	0	1	0.22	-	0	1
high	0.13	-	0	1	0.14	-	0	1
German proficiency	1.90	0.89	0.00	4.00	2.23	0.84	0.00	4.00
English proficiency	0.97	1.16	0.00	4.00	1.20	1.21	0.00	4.00
Female (0 = male)	0.17	-	0	1	0.06	-	0	1
Age	35.90	9.85	18.00	64.00	33.53	8.34	19.00	61.00
Legal Status								
Decision pending	0.19	-	0	1	0.22	-	0	1
Asylum granted	0.70	-	0	1	0.66	-	0	1
'Duldung'	0.07	-	0	1	0.08	-	0	1
Other	0.04	-	0	1	0.03	-	0	1



Table A1. Cont.

	Model Sample M1–M4				Model Sample M5–M8			
	Mean	SD	Min	Max	Mean	SD	Min	Max
<b>Residency Restriction</b>								
Local restriction	0.53	-	0	1	0.49	-	0	1
Federal restriction	0.47	-	0	1	0.51	-	0	1
<b>Years Since Migration</b>	2.71	1.06	0.00	6.00	3.24	1.05	1.00	6.00
<b>Marital Status</b>								
married	0.63	-	0	1	0.50	-	0	1
single, widow., divorced	0.30	-	0	1	0.42	-	0	1
wife/husband abroad	0.07	-	0	1	0.08	-	0	1
<b>Main Country of Origin</b>								
Syria	0.49	-	0	1	0.46	-	0	1
Iraque	0.14	-	0	1	0.10	-	0	1
Afghanistan	0.14	-	0	1	0.13	-	0	1
Other	0.23	-	0	1	0.31	-	0	1
<b>Survey Year Dummies</b>								
2017	0.50	-	0	1	0.32	-	0	1
2018	0.29	-	0	1	0.34	-	0	1
2019	0.21	-	0	1	0.35	-	0	1
<b>N</b>	3727				605			

Note: <sup>a</sup> original variables and predicted residuals from regression models with the FEs included in the respective models without including any independent variables; values  $\geq 100$  without decimal places. Source: SOEP v36.1, BA and INKAR data, own calculations.

Table A2. Full table for linear probability models M1–M4.

LPMs, DV: Employed	2-Digit				3-Digit			
	M1_2 $\beta/(SE)$	M2_2 $\beta/(SE)$	M3_2 $\beta/(SE)$	M4_2 $\beta/(SE)$	M1_3 $\beta/(SE)$	M2_3 $\beta/(SE)$	M3_3 $\beta/(SE)$	M4_3 $\beta/(SE)$
<b>Local-Occupational</b>								
Open Positions	1.19 (0.61)	0.51 (0.65)	1.58 ** (0.45)	0.92 (0.60)	0.52 (0.32)	-0.03 (0.45)	0.73 ** (0.25)	0.35 (0.39)
Unemployment Rate	-0.20 (0.10)	-0.44 * (0.17)	0.19 (0.12)	0.10 (0.18)	-0.07 (0.10)	-0.35 ** (0.11)	0.21 (0.11)	0.12 (0.15)
Share Foreigners	0.05 (0.06)	-0.03 (0.07)	0.01 (0.07)	0.03 (0.10)	0.03 (0.05)	-0.01 (0.04)	0.01 (0.05)	0.03 (0.06)
<b>Local</b>								
Population Density	-0.00 ** (0.00)	-0.00 (0.00)	-0.02 (0.05)	-0.02 (0.05)	-0.00 ** (0.00)	-0.00 (0.00)	-0.02 (0.04)	-0.02 (0.04)
Gross Domestic Product	0.01 (0.04)	0.02 (0.05)	-1.27 (1.23)	-1.26 (1.25)	0.03 (0.05)	0.01 (0.05)	-1.24 (1.22)	-1.30 (1.23)
<b>Individual</b>								
Education								
low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
medium	0.99 (2.11)	2.05 (1.97)	2.09 (1.91)	2.28 (1.87)	1.08 (2.24)	1.37 (2.21)	2.05 (2.06)	1.54 (2.11)
high	-1.74 (2.34)	0.03 (2.49)	-0.60 (2.38)	0.22 (2.68)	-1.69 (2.69)	-0.80 (2.96)	-0.95 (2.52)	-0.18 (2.87)



Table A2. Cont.

LPMs, DV: Employed	2-Digit				3-Digit			
	M1_2 β/(SE)	M2_2 β/(SE)	M3_2 β/(SE)	M4_2 β/(SE)	M1_3 β/(SE)	M2_3 β/(SE)	M3_3 β/(SE)	M4_3 β/(SE)
R <sup>2</sup>	0.13	0.14	0.22	0.23	0.12	0.16	0.22	0.25
adj. R <sup>2</sup>	0.12	0.13	0.16	0.16	0.12	0.14	0.16	0.17
within R <sup>2</sup>	0.10	0.09	0.08	0.07	0.10	0.09	0.08	0.07
adj. within R <sup>2</sup>	0.09	0.09	0.08	0.07	0.09	0.08	0.07	0.06
N (person-years)	3727	3727	3727	3727	3727	3727	3727	3727
n (persons)	2251	2251	2251	2251	2251	2251	2251	2251
n (districts)	236	236	236	236	236	236	236	236
n (occupations)	34	34	34	34	85	85	85	85

Notes: LPMs = linear probability models; point estimates represent percentage point changes change in the probability of employment; standard errors (SEs) are clustered on the individual, local and occupational level (multiway clustering in Stata command 'reghdfe'); ✕ signifies that the corresponding FEs are not included in the model; ✓ signifies that the corresponding FEs are included in the model; significance levels: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . Source: SOEP v36.1, BA and INKAR data, own calculations.

Table A3. Full table for linear probability models M5–M8.

LPMs, DV: Occ. Match	2-Digit				3-Digit			
	M5_2 β/(SE)	M6_2 β/(SE)	M7_2 β/(SE)	M8_2 β/(SE)	M5_3 β/(SE)	M6_3 β/(SE)	M7_3 β/(SE)	M8_3 β/(SE)
<b>Local-Occupational</b>								
Open Positions	3.30 *	2.46	2.38	1.66	2.46 **	0.49	1.68	−0.02
	(1.38)	(1.85)	(1.43)	(2.28)	(0.79)	(0.98)	(0.97)	(1.51)
Unemployment Rate	−0.51	−0.64	−0.16	−0.36	−0.49 *	−0.93 ***	0.04	0.23
	(0.32)	(0.32)	(0.44)	(0.56)	(0.24)	(0.26)	(0.30)	(0.56)
Share Foreigners	0.58 **	0.35	0.86 **	1.03 *	0.46 **	0.24	0.54 **	0.74 *
	(0.16)	(0.21)	(0.28)	(0.39)	(0.16)	(0.19)	(0.19)	(0.35)
<b>Local</b>								
Population Density	−0.00	−0.00	0.02	−0.06	−0.00	0.00	−0.02	−0.11
	(0.00)	(0.00)	(0.20)	(0.26)	(0.00)	(0.00)	(0.22)	(0.24)
Gross Domestic Product	−0.14	−0.17	−4.19	−4.66	−0.12	−0.11	−4.28	−3.82
	(0.12)	(0.11)	(2.40)	(2.52)	(0.11)	(0.13)	(2.35)	(2.92)
<b>Individual</b>								
Education								
low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
medium	3.96	1.38	2.59	−1.41	0.14	−2.57	−0.80	−3.99
	(6.72)	(7.40)	(5.95)	(5.22)	(7.03)	(7.41)	(4.97)	(4.06)
high	−6.17	−3.72	−7.38	−9.27	−7.29	−1.87	−4.81	−3.09
	(7.63)	(8.20)	(6.09)	(6.15)	(6.16)	(7.36)	(5.27)	(4.72)
German proficiency	−0.30	−0.60	−1.44	−1.24	1.01	0.47	0.50	0.39
	(1.90)	(1.88)	(2.72)	(2.68)	(1.84)	(1.98)	(2.56)	(2.51)
English proficiency	2.12	2.88	3.48	3.50	0.88	1.92	1.20	1.70
	(1.36)	(1.70)	(2.20)	(2.24)	(1.46)	(1.86)	(1.78)	(1.88)
Female (0 = male)	−5.99	−8.81	−12.23	−13.83	−8.40 *	−12.32 *	−15.01	−16.12
	(6.34)	(8.90)	(8.42)	(10.88)	(3.79)	(5.20)	(8.21)	(11.27)

Table A3. Cont.

LPMs, DV: Occ. Match	2-Digit				3-Digit			
	M5_2 β/(SE)	M6_2 β/(SE)	M7_2 β/(SE)	M8_2 β/(SE)	M5_3 β/(SE)	M6_3 β/(SE)	M7_3 β/(SE)	M8_3 β/(SE)
Age	0.47 (0.33)	0.37 (0.35)	0.47 (0.37)	0.37 (0.39)	0.65 * (0.29)	0.50 (0.28)	0.60 (0.37)	0.50 (0.36)
Legal Status								
Decision pending Asylum granted	Ref. (5.10)	Ref. (5.57)	Ref. (5.68)	Ref. (6.38)	Ref. (4.75)	Ref. (4.01)	Ref. (5.29)	Ref. (5.13)
'Duldung'	3.22 (7.06)	5.61 (7.01)	2.21 (7.43)	6.55 (6.56)	-5.44 (4.67)	-1.26 (4.59)	-6.03 (5.12)	-0.32 (4.99)
Other	6.28 (9.69)	6.84 (10.45)	5.31 (7.97)	4.20 (9.49)	6.81 (10.03)	10.25 (9.89)	4.95 (8.36)	5.18 (8.30)
Residency Restriction								
Local restriction	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Federal restriction	1.88 (2.85)	0.84 (2.54)	3.70 (3.12)	2.25 (3.12)	2.59 (2.52)	1.22 (2.58)	3.26 (2.65)	1.42 (2.89)
Years Since Migration	0.47 (2.26)	0.99 (2.42)	-0.14 (2.90)	1.31 (3.41)	0.68 (1.78)	0.11 (1.98)	0.40 (2.49)	1.08 (2.74)
Marital Status								
married	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
single, widow, divorced	-4.93 (4.44)	-6.23 (4.29)	-0.76 (5.64)	-2.15 (5.15)	-0.09 (2.82)	-1.55 (2.86)	0.53 (4.82)	0.18 (4.38)
wife/husband abroad	0.86 (4.85)	0.99 (5.16)	-1.92 (7.99)	-3.48 (9.04)	2.02 (4.79)	4.27 (5.11)	-5.19 (5.64)	-4.64 (6.13)
Main Country of Origin								
Syria	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Iraqe	-8.94 (6.21)	-9.89 (6.74)	-9.40 (7.14)	-11.49 (8.02)	-5.28 (6.01)	-8.21 (6.29)	-4.70 (6.82)	-11.10 (6.49)
Afghanistan	-14.63 * (5.54)	-15.82 ** (5.44)	-20.14 * (7.48)	-17.96 * (7.28)	-12.69 * (5.97)	-15.38 * (5.78)	-19.90 * (7.58)	-19.24 ** (7.07)
Other	-13.35 *** (3.57)	-12.72 ** (4.14)	-14.31 * (5.67)	-10.43 (5.75)	** (3.93)	-11.43 ** (4.00)	-13.08 * (4.93)	-10.73 * (4.92)
Fixed Effects (FEs)								
Local	✗	✗	✓	✓	✗	✗	✓	✓
Occupational	✗	✓	✗	✓	✗	✓	✗	✓
Survey year	✓	✓	✓	✓	✓	✓	✓	✓
R <sup>2</sup>	0.10	0.18	0.37	0.45	0.12	0.26	0.40	0.50
adj. R <sup>2</sup>	0.07	0.09	0.15	0.20	0.08	0.15	0.18	0.22
within R <sup>2</sup>	0.10	0.07	0.10	0.08	0.12	0.08	0.12	0.09
adj. within R <sup>2</sup>	0.07	0.04	0.06	0.03	0.08	0.04	0.07	0.04
N (person-years)	605	605	605	605	605	605	605	605
n (persons)	466	466	466	466	466	466	466	466
n (districts)	137	137	137	137	137	137	137	137
n (occupations)	31	31	31	31	55	55	55	55

Notes: LPMs = linear probability models; point estimates represent percentage point changes change in the probability of an occupational match; standard errors (SEs) are clustered on the individual, local and occupational level (multiway clustering in Stata command 'reghdfe'); ✗ signifies that the corresponding FEs are not included in the model; ✓ signifies that the corresponding FEs are included in the model; significance levels: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . Source: SOEP v36.1, BA and INKAR data, own calculations.

**Table A4.** Full correlation matrix for local-occupational variables, model sample M1–M4.

Pearson $r$ , Significances Not Shown <sup>a</sup>	(1)	(2)	(3)	(4)	(5)	(6)
<b>Local-Occupational Level</b>						
<b>2-digits</b>						
(1) Open Positions	1.00					
(2) Unemployment Rate	−0.04	1.00				
(3) Share Foreigners	0.03	0.10	1.00			
<b>3-digits</b>						
(4) Open Positions	0.76	−0.04	0.02	1.00		
(5) Unemployment Rate	−0.03	0.77	0.06	−0.02	1.00	
(6) Share Foreigners	0.02	0.11	0.88	−0.02	0.08	1.00

Notes: <sup>a</sup> Correlations without accounting for hierarchical structure of the data. Source: SOEP v36.1, BA data, own calculations.

**Table A5.** Full correlation matrix for local-occupational variables, model sample M5–M8.

Pearson $r$ , Significances Not Shown <sup>a</sup>	(1)	(2)	(3)	(4)	(5)	(6)
<b>Local-Occupational Level</b>						
<b>2-digits</b>						
(1) Open Positions	1.00					
(2) Unemployment Rate	−0.02	1.00				
(3) Share Foreigners	−0.05	0.09	1.00			
<b>3-digits</b>						
(4) Open Positions	0.78	0.04	−0.11	1.00		
(5) Unemployment Rate	−0.02	0.78	0.07	0.03	1.00	
(6) Share Foreigners	−0.05	0.10	0.92	−0.10	0.08	1.00

Notes: <sup>a</sup> Correlations without accounting for hierarchical structure of the data. Source: SOEP v36.1, BA data, own calculations.

## Notes

- <sup>1</sup> Based on the so-called ‘Königstein Key’ (German: ‘Königsteiner Schlüssel’), see <https://www.bamf.de/EN/Themen/AsylFluechtlingschutz/AblaufAsylverfahrens/Erstverteilung/erstverteilung-node.html> (accessed on 27 February 2023).
- <sup>2</sup> <https://www.arbeitsagentur.de/en> (accessed on 27 February 2023).
- <sup>3</sup> [https://www.bbsr.bund.de/BBSR/startseite/\\_node.html](https://www.bbsr.bund.de/BBSR/startseite/_node.html) (accessed on 27 February 2023).
- <sup>4</sup> The more fine-grained 3-digit version covers 144 occupational groups while the 2-digit version covers only 37 broad occupational groups in total.
- <sup>5</sup> Practically, the 2-digit local-occupational characteristics consist of aggregated information of the local 3-digit occupational characteristics to the respective local 2-digit level.
- <sup>6</sup> Data access via: <https://github.com/RegioHub/badata> (accessed on 27 February 2023).
- <sup>7</sup> While one could argue that there should be a high correlation between the unemployment rate and open positions, the correlations are empirically very low not only on the local but also on the local-occupational level (see Tables A4 and A5 in Appendix A for correlation matrices containing all local and local-occupational variables). Practically, this shows that labor demand and labor supply can be analyzed simultaneously without worrying about high collinearity.
- <sup>8</sup> <https://www.inkar.de/> (accessed on 27 February 2023); Data access via: <https://github.com/RegioHub/inkr> (accessed on 27 February 2023).
- <sup>9</sup> Because residency requirements have not been surveyed in 2016, we do not use the first wave of the samples M3 and M4 in 2016 and only include refugees who have been surveyed between 2017 and 2019.
- <sup>10</sup> The dichotomous dependent variables are multiplied by 100 so that the point estimates of the LPs can directly be interpreted as changes in percentage points.

## References

- Akresh, Ilana Redstone. 2006. Occupational Mobility among Legal Immigrants to the United States. *International Migration Review* 40: 854–84. [CrossRef]
- Alaverdyan, Sevak, and Anna Zaharieva. 2019. Immigration, Social Networks and Occupational Mismatch. *SSRN Electronic Journal*. [CrossRef]



- Aleksynska, Mariya, and Ahmed Tritah. 2013. Occupation–Education Mismatch of Immigrant Workers in Europe: Context and Policies. *Economics of Education Review* 36: 229–44. [\[CrossRef\]](#)
- Allison, Paul David. 2009. Fixed Effects Regression Models. In *Quantitative Applications in the Social Sciences* 160. Los Angeles: SAGE.
- Arendt, Jacob Nielsen. 2022. Labor Market Effects of a Work-First Policy for Refugees. *Journal of Population Economics* 35: 169–96. [\[CrossRef\]](#)
- Aslund, Olof, John Östh, and Yves Zenou. 2010. How Important Is Access to Jobs? Old Question—Improved Answer. *Journal of Economic Geography* 10: 389–422. [\[CrossRef\]](#)
- Auer, Daniel. 2018. Language Roulette—The Effect of Random Placement on Refugees' Labour Market Integration. *Journal of Ethnic and Migration Studies* 44: 341–62. [\[CrossRef\]](#)
- Azlor, Luz, Anna Piil Damm, and Marie Louise Schultz-Nielsen. 2020. Local Labour Demand and Immigrant Employment. *Labour Economics* 63: 101808. [\[CrossRef\]](#)
- Banerjee, Rupa, Anil Verma, and Tingting Zhang. 2019. Brain Gain or Brain Waste? Horizontal, Vertical, and Full Job-Education Mismatch and Wage Progression among Skilled Immigrant Men in Canada. *International Migration Review* 53: 646–70. [\[CrossRef\]](#)
- Bansak, Kirk, Jeremy Ferwerda, Jens Hainmueller, Andrea Dillon, Dominik Hangartner, Duncan Lawrence, and Jeremy Weinstein. 2018. Improving Refugee Integration through Data-Driven Algorithmic Assignment. *Science* 359: 325–29. [\[CrossRef\]](#)
- Bernard, Josef, Annett Steinführer, Andreas Klärner, and Sylvia Keim-Klärner. 2023. Regional Opportunity Structures: A Research Agenda to Link Spatial and Social Inequalities in Rural Areas. *Progress in Human Geography* 47: 103–23. [\[CrossRef\]](#)
- Bevelander, Pieter. 2011. The Employment Integration of Resettled Refugees, Asylum Claimants, and Family Reunion Migrants in Sweden. *Refugee Survey Quarterly* 30: 22–43. [\[CrossRef\]](#)
- Bevelander, Pieter, and Christer Lundh. 2007. Employment Integration of Refugees: The Influence of Local Factors on Refugee Job Opportunities in Sweden. *SSRN Electronic Journal*. [\[CrossRef\]](#)
- Bloch, Alice. 2004. Labour Market Participation and Conditions of Employment: A Comparison of Minority Ethnic Groups and Refugees in Britain. *Sociological Research Online* 9: 16–34. [\[CrossRef\]](#)
- Brell, Courtney, Christian Dustmann, and Ian Preston. 2020. The Labor Market Integration of Refugee Migrants in High-Income Countries. *Journal of Economic Perspectives* 34: 94–121. [\[CrossRef\]](#)
- Brücker, Herbert, Andreas Hauptmann, and Philipp Jaschke. 2020. *Beschränkungen der Wohnortwahl für anerkannte Geflüchtete: Wohnsitzauflagen reduzieren die Chancen auf Arbeitsmarktintegration*. Nürnberg: IAB-Kurzbericht.
- Brücker, Herbert, Philipp Jaschke, and Yuliya Kosyakova. 2019. Refugee Migration to Germany Revisited: Some Lessons on the Integration of Asylum Seekers. Paper presented at XXI European Conference of the FRDB on How to Manage the Refugee Crisis, Reggio Calabria, Italy, June 15.
- Chiswick, Barry R., and Paul W. Miller. 2002. Immigrant Earnings: Language Skills, Linguistic Concentrations and the Business Cycle. *Journal of Population Economics* 15: 31–57. [\[CrossRef\]](#)
- Chiswick, Barry R., and Paul W. Miller. 2010. The Effects of Educational–Occupational Mismatch on Immigrant Earnings in Australia, with International Comparisons. *International Migration Review* 44: 869–98. [\[CrossRef\]](#)
- Chiswick, Barry R., Yew Liang Lee, and Paul W. Miller. 2005. A Longitudinal Analysis of Immigrant Occupational Mobility: A Test of the Immigrant Assimilation Hypothesis. *International Migration Review* 39: 332–53. [\[CrossRef\]](#)
- Correia, Sergio. 2014. *REGHDFE: Stata Module to Perform Linear or Instrumental-Variable Regression Absorbing Any Number of High-Dimensional Fixed Effects*. Statistical Software Components S457874. Boston: Boston College Department of Economics.
- Correia, Sergio. 2015. *Singletons, Cluster-Robust Standard Errors and Fixed Effects: A Bad Mix*. Technical Note. Durham: Duke University, pp. 1–7.
- Damelang, Andreas, and Yuliya Kosyakova. 2021. To Work or to Study? Postmigration Educational Investments of Adult Refugees in Germany—Evidence from a Choice Experiment. *Research in Social Stratification and Mobility* 73: 100610. [\[CrossRef\]](#)
- Damelang, Andreas, Martin Abraham, Sabine Ebensperger, and Felix Stumpf. 2019. The Hiring Prospects of Foreign-Educated Immigrants: A Factorial Survey among German Employers. *Work, Employment & Society* 33: 1–20.
- Damm, Anna Piil. 2009. Ethnic Enclaves and Immigrant Labor Market Outcomes: Quasi-Experimental Evidence. *Journal of Labor Economics* 27: 281–314. [\[CrossRef\]](#)
- Daunfeldt, Sven-Olov, Dan Johansson, and Hans Seerar Westerberg. 2019. Which Firms Provide Jobs for Unemployed Non-Western Immigrants? *The Service Industries Journal* 39: 762–78. [\[CrossRef\]](#)
- Degler, Eva, and Thomas Liebig. 2017. *Finding Their Way—Labour Market Integration of Refugees in Germany*. Paris: OECD—International Migration Division.
- Edin, Per-Anders, Peter Fredriksson, and Olof Åslund. 2003. Ethnic Enclaves and the Economic Success of Immigrants—Evidence from a Natural Experiment. *The Quarterly Journal of Economics* 118: 329–57. [\[CrossRef\]](#)
- Eggenhofer-Rehart, Petra M., Markus Latzke, Katharina Pernkopf, Dominik Zellhofer, Wolfgang Mayrhofer, and Johannes Steyrer. 2018. Refugees' Career Capital Welcome? Afghan and Syrian Refugee Job Seekers in Austria. *Journal of Vocational Behavior* 105: 31–45. [\[CrossRef\]](#)
- Eisnecker, Von Philipp, and Diana Schacht. 2016. Die Hälfte der Geflüchteten in Deutschland fand ihre erste Stelle über soziale Kontakte. *DIW Wochenbericht* 35: 9.
- Fasani, Francesco, Tommaso Frattini, and Luigi Minale. 2022. (The Struggle for) Refugee Integration into the Labour Market: Evidence from Europe. *Journal of Economic Geography* 22: 351–93. [\[CrossRef\]](#)

- Galster, George C., and Sean P. Killen. 1995. The Geography of Metropolitan Opportunity: A Reconnaissance and Conceptual Framework. *Housing Policy Debate* 6: 7–43. [\[CrossRef\]](#)
- Gericke, Dina, Anne Burmeister, Jil Löwe, Jürgen Deller, and Leena Pundt. 2018. How Do Refugees Use Their Social Capital for Successful Labor Market Integration? An Exploratory Analysis in Germany. *Journal of Vocational Behavior* 105: 46–61. [\[CrossRef\]](#)
- Gërxhani, Klarita, and Yuliya Kosyakova. 2022. The Effect of Co-Ethnic Social Capital on Immigrants' Labor Market Integration: A Natural Experiment. *Comparative Migration Studies* 10: 15. [\[CrossRef\]](#)
- Glitz, Albrecht. 2014. Ethnic Segregation in Germany. *Labour Economics* 29: 28–40. [\[CrossRef\]](#)
- Haupt, Andreas. 2016. Erhöhen Berufliche Lizenzen Verdienste Und Die Verdienstungleichheit? *Zeitschrift Für Soziologie* 45: 39–56. [\[CrossRef\]](#)
- Hedberg, Charlotta, and Tiit Tammaru. 2013. 'Neighbourhood Effects' and 'City Effects': The Entry of Newly Arrived Immigrants into the Labour Market. *Urban Studies* 50: 1165–82. [\[CrossRef\]](#)
- Huang, Francis L. 2016. Alternatives to Multilevel Modeling for the Analysis of Clustered Data. *The Journal of Experimental Education* 84: 175–96. [\[CrossRef\]](#)
- IAB-BAMF-SOEP. 2021. *Survey of Refugees, Data 2016–2019*. Berlin: Deutsches Institut für Wirtschaftsforschung e.V. [\[CrossRef\]](#)
- Kalfa, Eleni, and Matloob Piracha. 2018. Social Networks and the Labour Market Mismatch. *Journal of Population Economics* 31: 877–914. [\[CrossRef\]](#)
- Kalter, Frank, and Irena Kogan. 2014. Migrant Networks and Labor Market Integration of Immigrants from the Former Soviet Union in Germany. *Social Forces* 92: 1435–56. [\[CrossRef\]](#)
- Kogan, Irena, and Frank Kalter. 2020. An Empirical–Analytical Approach to the Study of Recent Refugee Migrants in Germany. *Soziale Welt* 71: 3–23. [\[CrossRef\]](#)
- Kosfeld, Reinhold, and Christian Dreger. 2006. Thresholds for Employment and Unemployment: A Spatial Analysis of German Regional Labour Markets, 1992–2000. *Papers in Regional Science* 85: 523–42. [\[CrossRef\]](#)
- Kosyakova, Yuliya, and Hanna Brenzel. 2020. The Role of Length of Asylum Procedure and Legal Status in the Labour Market Integration of Refugees in Germany. *Soziale Welt* 71: 123–59. [\[CrossRef\]](#)
- Kosyakova, Yuliya, and Irena Kogan. 2022. Labor Market Situation of Refugees in Europe: The Role of Individual and Contextual Factors. *Frontiers in Political Science* 4: 977764. [\[CrossRef\]](#)
- Kracke, Nancy, and Christina Klug. 2021. Social Capital and Its Effect on Labour Market (Mis)Match: Migrants' Overqualification in Germany. *Journal of International Migration and Integration* 22: 1573–98. [\[CrossRef\]](#)
- Krahn, Harvey, Tracey Derwing, Marlene Mulder, and Lori Wilkinson. 2000. Educated and Underemployed: Refugee Integration into the Canadian Labour Market. *Journal of International Migration and Integration/Revue de l'integration et de La Migration Internationale* 1: 59–84. [\[CrossRef\]](#)
- Lens, Dries, Ive Marx, and Sunčica Vujić. 2019. Double Jeopardy: How Refugees Fare in One European Labor Market. *IZA Journal of Development and Migration* 10: 1–29. [\[CrossRef\]](#)
- Liebau, Elisabeth, and Zerrin Salikutluk. 2016. Viele Geflüchtete Brachten Berufserfahrung Mit, Aber Nur Ein Teil Einen Berufsabschluss. *DIW-Wochenbericht* 83: 732–40.
- Martén, Linna, Jens Hainmueller, and Dominik Hangartner. 2019. Ethnic Networks Can Foster the Economic Integration of Refugees. *Proceedings of the National Academy of Sciences* 116: 16280–85. [\[CrossRef\]](#) [\[PubMed\]](#)
- Mood, Carina. 2010. Logistic Regression: Why We Cannot Do What We Think We Can Do, and What We Can Do About It. *European Sociological Review* 26: 67–82. [\[CrossRef\]](#)
- Nguyen, H. Long. 2023. inkr: Local Access from R to All INKAR Data (v0.1.2). *Zenodo*. [\[CrossRef\]](#)
- Nguyen, H. Long, and Dorian Tsolak. 2023. badata: Regional Job Market Data from the German Federal Employment Agency (Bundesagentur für Arbeit—BA) (v0.1.3). *Zenodo*. [\[CrossRef\]](#)
- Phillimore, Jenny. 2011. Refugees, Acculturation Strategies, Stress and Integration. *Journal of Social Policy* 40: 575–93. [\[CrossRef\]](#)
- Ruiz, Isabel, and Carlos Vargas-Silva. 2017. Are Refugees' Labour Market Outcomes Different from Those of Other Migrants? Evidence from the United Kingdom in the 2005–2007 Period: Refugees and Other Migrants Labour Market Outcomes: Evidence from the UK. *Population, Space and Place* 23: e2049. [\[CrossRef\]](#)
- Salikutluk, Zerrin, Johannes Giesecke, and Martin Kroh. 2016. Geflüchtete Nahmen in Deutschland Später Eine Erwerbstätigkeit Auf Als Andere MigrantInnen. *DIW-Wochenbericht* 83: 749–56.
- Schmandt, Marco, Constantin Tielkes, and Felix Weinhardt. 2023. Königsteiner Schlüssel verteilt Gelder und Aufgaben zwischen Bundesländern kaum nach Wirtschaftskraft. *DIW-Wochenbericht* 18: 203–9. [\[CrossRef\]](#)
- Shields, Michael A, and Stephen Wheatley Price. 2002. The English Language Fluency and Occupational Success of Ethnic Minority Immigrant Men Living in English Metropolitan Areas. *Population Economics* 15: 137–60. [\[CrossRef\]](#)
- Socio-Economic Panel (SOEP). 2021. *Data for Years 1984–2019*. SOEP-Core v36, EU Edition. Berlin: German Institute for Economic Research (DIW Berlin). [\[CrossRef\]](#)
- Sorensen, Aage B., and Arne L. Kalleberg. 1981. An Outline of a Theory of Matching Persons to Jobs. In *Sociological Perspectives on Labor Markets*. New York: Academic Press.
- Stolzenberg, Ross M. 1975. Occupations, Labor Markets and the Process of Wage Attainment. *American Sociological Review* 40: 645. [\[CrossRef\]](#)

- Van Tubergen, Frank. 2011. Job Search Methods of Refugees in the Netherlands: Determinants and Consequences. *Journal of Immigrant & Refugee Studies* 9: 179–95. [[CrossRef](#)]
- Vogiazides, Louisa, and Hernan Mondani. 2021. Geographical Trajectories of Refugees in Sweden: Uncovering Patterns and Drivers of Inter-Regional (Im)Mobility. *Journal of Refugee Studies* 34: 3065–90. [[CrossRef](#)]
- Wehrle, Katja, Ute-Christine Klehe, Mari Kira, and Jelena Zikic. 2018. Can I Come as I Am? Refugees' Vocational Identity Threats, Coping, and Growth. *Journal of Vocational Behavior* 105: 83–101. [[CrossRef](#)]
- Wiedner, Jonas, and Merlin Schaeffer. 2023. The Refugee Mobility Puzzle: Why Do Refugees Move to Cities with High Unemployment Rates Once Residence Restrictions Are Lifted? *SocArXiv*. [[CrossRef](#)]
- Wiemer, Silke, Kim Reimer, and Julia Lewerenz. 2010. *Einführung der KldB 2010*. Nürnberg: Bundesagentur für Arbeit.

**Disclaimer/Publisher's Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.