



Hochschule für
Wirtschaft und Recht Berlin
Berlin School of Economics and Law

Institute for International Political Economy Berlin

Does Sectoral Diversification Matter? The Impact of Syrian Refugees on Germany's Labor Market

Author: Tugce Kilic

Working Paper, No. 253/2025

Editors:

Sigrid Betzelt, Eckhard Hein, Martina Metzger, Martina Sproll, Christina Teipen, Markus Wissen, Jennifer Pédussel Wu (lead editor), Reingard Zimmer

Does Sectoral Diversification Matter?

The Impact of Syrian Refugees on Germany's Labor Market

Tugce Kilic
Berlin School of Economics and Law

Abstract:

This study investigates how the economic structure of host regions shapes the labor market impacts of refugee inflows, focusing on the case of the Syrian refugee influx into Germany in 2014–2015. Utilizing a fuzzy difference-in-differences approach, the analysis introduces a novel measure of sectoral diversification to assess local absorptive capacity. The results show that sectoral diversification plays a significant role in moderating short-term labor market outcomes. Counties with less diversified employment structures experience greater adverse impacts on non-German workers, while more diversified regions are better able to absorb new arrivals and mitigate unemployment pressures. These results underscore the importance of considering local economic structures in the regional allocation of refugees and the design of integration policies.

Keywords: Immigration, Labor market, Asylum seekers, Syrian refugees, Germany

JEL codes: F22, J21, J61, C21

Corresponding author: TUGCE KILIC, kilic.tugce@outlook.com

Acknowledgements: I am grateful to Jennifer Pédussel Wu for her continuous guidance and valuable insights that shaped the development of this project. I am also thankful to Hasan Tekguc for his essential feedback. Furthermore, I thank Markus Gehrsitz and Martin Ungerer for generously sharing data that was critical to this study. All remaining errors are my own.

1. Introduction

The Syrian civil war, which erupted in 2011, triggered one of the largest forced migrations in recent history, displacing over 6.8 million Syrians who sought asylum in neighboring countries, across Europe, and beyond (UNHCR, 2023). The 2015 European migrant crisis brought the issue of forced migration to the forefront of both political and academic discourse in Europe, with particular attention to its labor market effects. Despite extensive research on the local labor market impacts of refugee arrivals, no clear consensus has emerged regarding their extent and direction. It is broadly recognized, however, that these effects are shaped by a complex interplay of factors, including the skill composition and educational backgrounds of migrants, the degree of substitutability between refugee and native workers, and the structure of local industries (Sarzin, 2021). Sectoral diversification, in particular, has been identified as a key determinant that can either mitigate or exacerbate the labor market shifts triggered by refugee influxes (Verme & Schuettler, 2021). If a broader distribution of economic activity across industries facilitates employment absorption and reduces competition for specific job types, then regions with greater sectoral diversity may be better positioned to integrate refugees more smoothly, yielding benefits for both newcomers and native workers.

Given its significance in theoretical literature, the role of sectoral heterogeneity in shaping labor market outcomes has received relatively little empirical attention. Understanding local economic structures, however, is crucial for optimizing the distribution of refugees across regions and facilitating their labor market integration. To address this limitation, this study examines how the labor market impact of refugee arrivals varies with the level of sectoral diversification in host regions. A fuzzy difference-in-differences methodology at the county level is employed to estimate short-run effects, leveraging the quasi-experimental nature of asylum seeker allocation in Germany. This empirical approach expands on the work of Gehrsitz and Ungerer (2022) by incorporating a Theil index to empirically assess the role of sectoral diversity in shaping employment outcomes.

Germany presents a particularly suitable case for this analysis. As one of the primary European destinations for Syrian refugees, hosting over 800,000 individuals (UNHCR, 2023), it offers a unique setting to study the intersection of refugee integration and labor market structures. The variation in industrial composition across German regions, coupled with the quasi-random allocation of asylum seekers driven by administrative constraints and accommodation availability, provides a compelling empirical framework to identify the labor market effects of forced migration.

The findings underscore the pivotal role of sectoral diversification in mediating the short-term labor market impacts of the Syrian refugee influx. In counties with lower diversification, larger refugee inflows are associated with worsening labor market outcomes for non-German citizens, while the overall population experiences only minor or statistically insignificant effects. As sectoral diversification increases, however, these adverse outcomes for non-Germans diminish, and in highly diversified economies, refugee inflows are linked to improved labor market integration. By demonstrating how local economic structures condition the effects of forced migration, this study provides new empirical insights to support more informed policies on refugee allocation and integration.

The paper is structured as follows: Following this introduction, Section 2 provides background on Syrian refugees in Germany and surveys the literature on labor market effects of forced displacement. Sections 3 and 4 describe the data sources and methodology, respectively.

Section 5 presents the empirical findings, distinguishing effects on the overall and non-German populations, and discusses the broader implications. Finally, Section 6 concludes by summarizing the findings and outlining avenues for future research.

2. Background Information on Syrian Refugees in Germany

The Syrian Civil War, which began in 2011, has led to one of the most significant mass movements of recent decades. Initially, millions of Syrians sought refuge in neighboring countries, mainly Turkey, Jordan, and Lebanon. As the war persisted, many sought stability and safety in other countries that promised better prospects. An increasing number of refugees embarked on the Eastern Mediterranean Route, particularly from 2014 onwards (Seeberg, 2016). This route involved crossing the Mediterranean Sea, often in dangerously inadequate boats, from Turkey to Greece. Once in Greece, they continued their journey through the Balkan states, aspiring to reach Western European countries.

The EU's Dublin Regulation, which mandates that asylum applications be made in the first EU country of arrival, faced unprecedented challenges during this period (Hatton, 2020). In response to the escalating situation and humanitarian concerns, Germany, under the leadership of Chancellor Angela Merkel, chose to step away from strict adherence to this regulation in 2015 by allowing refugees who had passed through other EU nations to apply for asylum in Germany.

Following this pivotal decision, Germany experienced an unprecedented increase in the influx of new arrivals. The figure of newly registered asylum seekers climbed dramatically from 238,676 in 2014 to 1,091,894 in 2015 (Statista, 2022). The following year, a noticeable decline in Aegean Sea crossings occurred, a development primarily linked to the EU-Turkey Deal enacted on March 18, 2016, among other factors (Seeberg, 2016; Dagi, 2020). According to the one-to-one resettlement scheme in the Deal, for each Syrian migrant returned to Turkey after reaching the Greek islands, one migrant would be resettled from Turkey to an EU member state (Icduygu & Toktas, 2016). Additionally, Turkey vowed to enhance its border security measures, both on land and at sea, aiming to limit unauthorized entries into the EU (Dagi, 2020). In return for Turkey's collaboration, the EU allocated a financial package, amounting to 6 billion euros, dedicated to supporting projects in Turkey that catered specifically to the needs of Syrian refugees. Following the agreement, the figure for newly registered refugees in Germany dropped to 321,361 in 2016 (Statista, 2022).

Upon entering Germany, typically near the Austrian border, Syrian refugees were initially processed by the federal police and then accommodated for a few days in short-term facilities. The core of the assignment process was governed by the '*Königsteiner Schlüssel*', a quota system based on each federal state's tax income and population (Hannafi & Marouani, 2023; Gehrsitz & Ungerer, 2022). This system aimed to ensure an equitable distribution of costs on processing asylum claims and provision of accommodation. After their brief stay in initial facilities, refugees were transferred to one of the federal states with free capacities according to this quota. In these states, refugees are placed in reception centers, known as '*Erstaufnahmeeinrichtungen*' (EAEs), which are often large-scale housing facilities providing more private space. Here, more comprehensive information is gathered from the asylum seekers and collected under a federal database (First Distribution of Asylum Seekers, EASY) that distributes asylum seekers across federal states based on the mentioned quota. The EAEs served as the primary location for the initial phase of the asylum application process, including

health and security checks and personal interviews to understand the asylum seeker's background and reasons for seeking asylum.

While their asylum applications are processed by the BAMF, refugees are required to stay in these assigned reception centers. After this period, which typically can take up to six months, asylum seekers are reallocated to subordinate counties, or '*Landkreise*', within the same state. Here, they are often housed in communal facilities, utilizing spaces like repurposed sports halls or vacant military barracks, due to efficiency gains and space limitations. Individuals who received approval on their asylum applications were given unrestricted work authorization, allowing them the same employment rights as German citizens (Hannafi & Marouani, 2023). On the other hand, asylum seekers with pending applications faced limitations in accessing the job market. They could, however, request work permission from the Foreigners Office and the Federal Labor Office, provided they had been in Germany for at least three months and were not residing in an initial reception center. For those required to stay in these initial centers, the opportunity to apply for a work permit was available after six months for those with children and nine months for those without. Furthermore, these permits were not applicable for self-employment and were specific to job offers, for which employers needed to submit detailed information about the position (NdM, 2021).

The demographic figures for asylum seekers are provided by the Federal Office for Migration and Refugees (BAMF), while they include only those asylum applications that have been completely processed. Notably, there exists a significant lag between the number of newly registered asylum seekers in the federal database and the number of applications that have been processed in a given year. While approximately 1.1 million migrants arrived in Germany in 2015, the number of processed applications in that year was considerably lower, totaling only 476,649. This figure saw an increase in 2016, with 745,545 processed applications (BAMF, 2016). According to the figures on processed applications, about 36.2% of asylum seekers were under the age of 18, and a mere 6.4% were above 45 years of age (BAMF, 2016). Approximately 36.9% of the asylum seekers came from Syria, and the majority, around 63.6%, were male. These highlight a predominantly young and male demographic among the asylum seekers in Germany.

The Central Register of Foreigners does not offer data disaggregated by educational attainment of asylum seekers, necessitating reliance on survey data for insights. The IAB-BAMF-SOEP Refugee Survey conducted in 2016 reveals that nearly half of the Syrian refugees possess secondary education. It further indicates that Syrian refugees generally exhibit a higher educational level compared to the refugee population as a whole. Specifically, only 8% of Syrians lack any formal school education, which is about half the rate observed in the total refugee population. Additionally, the proportion of Syrian refugees with university degrees is modestly above the average, standing at 17%. On the other hand, when compared to the entire adult population in Germany, including foreign residents, the educational attainment of Syrian refugees appears to be lower (Worbs et al., 2020). Moreover, Syrian women typically have a lower average level of education than their male counterparts.

The impact of forced displacement on host populations has historically been a topic at the margins of economic research. One of the few early notable studies in this area is David Card's research on the Mariel boatlift, published in 1990 (Card, 1990). This situation has undergone a significant change following the Syrian civil war in 2011 and the subsequent escalation of the EU's 'migration crisis' in 2015, putting the issue of forced displacement into the forefront

of public and academic attention. Since then, there has been a notable increase in research exploring the effects of forced displacement on host societies (Verme & Schuettler, 2021). This recent academic focus has yielded a deeper and more nuanced understanding of how forced migration influences receiving economies. This section of the thesis delves into this literature, focusing on the impacts of forced displacement on labor markets.

In theoretical terms, the effects of forced displacement on employment in host communities are not very straightforward to predict beforehand. If the labor supply is perfectly inelastic, the arrival of refugees would not impact local employment levels at all. Nevertheless, in more realistic scenarios where both labor demand and supply are flexible, the effect of migration on employment is influenced by several factors (Gehrsitz & Ungerer, 2022). In a closed economy using only one labor type, migration would lower the ratio of capital to labor in the short term, leading to potential employment reductions. In a labor market with diverse skill sets, however, it could stimulate job creation if migrants bring skills that complement those of the local workforce. Conversely, if they have substitutable skills, it might lead to job displacement. Shifting to an open economy with international capital and product flows, the impact is less clear due to the unlikelihood of complete international factor price equalization. In a more feasible scenario, factor price equalization within the country would result in overall wage effects. However, the effect of migration might not be discernible due to the migration of local workers. In the context of Germany, where factors such as substantial unemployment benefits could limit the mobility of the workforce for the short term, this scenario seems less likely.

Although it is challenging to foresee the overall impact due to various intersecting factors, key determinants on how local employment is affected include the degree of substitutability among the native and immigrant workers and whether the influx leads to local residents moving away from these areas (Verme & Schuettler, 2021; Becker & Ferrara, 2019). It's plausible to anticipate that, at least in the short run, local workers who share comparable skills and job types with incoming immigrants might experience displacement. This dynamic is likely to result in a varied impact across different skill levels, potentially benefitting those in higher-skilled, formal employment sectors, while posing challenges for lower-skilled labor segments (Verme & Schuettler, 2021).

A consensus on the refugees' impact on the employment of locals has also not been reached in the empirical literature. Studies reveal varying impacts based on the specific context and time period considered, the characteristics of refugees, the degree to which local and displaced workers can be substituted for one another, the local industry mix, and the flexibility of the labor market (Borjas 2014; Card & Peri 2016).

One recent review provides a comprehensive overview of the outcomes from empirical studies exploring this topic. Verme and Schuettler (2021) examine 59 studies that empirically assess the economic effect of the influx of refugees on hosts. This includes 446 observations related to employment, revealing that a majority (64%) of the outcomes are statistically insignificant, followed by negative (21%) and positive (15%) impacts on employment. Notably, when the effects are significant, the likelihood of them being negative rather than positive stands at a ratio of 1.4. These adverse outcomes are more common in middle-income countries and disproportionately affecting workers who are low-skilled, young, and female, and working informally. Moreover, the review finds that these negative employment effects are more evident in the short run and tend to dissipate over time. This supports the idea that the impacts of refugee influxes may differ in the short- and long run since adjustments to these unexpected

and mass inflows potentially require a considerable amount of time (Sarzin, 2021). Another comprehensive review study also concludes that the influx of forced migrants has limited adverse effects on local employment (Becker & Ferrara, 2019).

In developed country contexts, studies tend to find less adverse impacts of refugee influxes on native employment (Aracı et al., 2022). Accordingly, a majority of studies report only minor or no negative effects on the labor market outcomes of local workers in developed nations, at least in the short run. This is shown by most studies which have (re)examined the impacts of historical migration events such as the Mariel Boatlift from Cuba to the United States in 1980 (Card, 1990; Borjas & Monras, 2017; Clemens & Hunt, 2019; Peri & Yasenov, 2019), the migration of Jews from the Soviet Union to Israel during the 1990s (Friedberg, 2001; Clemens & Hunt, 2019), and the repatriation of people with Jewish and European origin from Algeria to France in 1962 (Hunt, 1992; Borjas & Monras, 2017).

More recently, Labanca (2020) investigated the effects of the temporary influx of refugees from regions impacted by the Arab Spring into Italy in the 2010s, finding statistically insignificant effects in the short term. Using the exogenous allocation of refugees in Denmark from 1986 to 1998, Foged and Peri (2016) find a positive (or null) impact on the employment of unskilled workers. The authors attribute this mostly to the complementarity and increased occupational mobility of less-educated local workers. In the context of immigrant inflows to the UK, Dustmann et al. (2013), and for migration to the EU, Angrist and Kugler (2003) demonstrate that the impact on native employment prospects is negligible.

On the other hand, some studies report more substantial adverse impacts in the short term. These include most studies examining the context of Germany for a previous mass migration influx. In this context, expellees, having been educated in German schools and fluent in German, were almost perfect substitutes for West German workers. For instance, Glitz (2012) examines the impact of the mass inflow of ethnic German migrants from the former Soviet Union to Germany between 1987 and 2001. The author discovers that the influx has notably reduced the employment levels of native workers, while no considerable detrimental impact on their relative wages is observed. This adjustment through employment shifts rather than wage changes is attributed to the strong union presence in Germany, restricting short-term wage flexibility (Glitz, 2012). Exploring the same topic, d'Amuri et al. (2010) find that the impact on native employment is small, but there is a significant negative effect on the employment of earlier immigrants, combined with a little adverse impact on their wages. This difference is attributed to two main factors: higher substitutability between previous and new immigrants and the inflexibility of wages. They also demonstrate through a hypothetical scenario that, in an environment with perfect flexibility of wages and the absence of unemployment insurance, the reduction in wages experienced by older immigrants would be considerably less. Similarly, the mass displacement of ethnic Germans from eastern and central Europe at the close of World War II also negatively impacted local employment of local West Germans in Braun and Mahmoud (2014), but this was primarily observed when the number of migrants surpassed approximately 15% of their population. This indicates that negative displacement effects in the labor market might arise when the number of migrants surpasses the local labor market's capacity to absorb them (Sarzin, 2021).

Regarding the Syrian refugee influx to Germany, while various studies examine impacts on voting behavior, social cohesion, and crime, Gehrsitz and Ungerer (2022) provide one of the few analyses focusing on local labor market effects. The authors use a fuzzy difference-in-

differences methodology at the county level, similar to the methodology employed in this thesis. Accordingly, their research shows no significant impact on native employees. However, they also associate a larger presence of asylum seekers with higher unemployment rates among non-Germans. In addition, their results point out a lack of displacement effect implying that immigrants have faced challenges in securing employment in Germany (Gehrsitz & Ungerer, 2022).

Bevelander and Lundh (2007) explore the factors affecting regional differences in refugee employment in Sweden, suggesting that the local labor market conditions in the receiving region can predict the employment prospects of forced migrants. Additionally, the study indicates that migrants are more likely to secure employment in areas that require lower skills and education. Conversely, in Denmark, Damm (2014) discovered that the overall employment rates and skill levels in a region do not significantly influence the labor market outcomes of forced migrants.

More recently, Aracı et al. (2022) analyzed how the effect of Syrian migrants on the employment outcomes of locals in Turkey depends on the development level of hosting regions. They reveal that the negative effects of the inflow on the employment outcomes of locals tend to diminish with an increase in regional development. In the context of the mass forced migration of ethnic Germans following the Second World War, Braun and Dwenger (2017) find that counties with higher levels of industrialization and lower levels of refugees experienced greater success in integrating refugees into the labor market.

3. Data

The analysis draws on four data sources—covering asylum seeker distribution, unemployment rates, sectoral diversification, and county characteristics—aggregated at the county level. The federal database serves as an important source for monitoring asylum seeker numbers in Germany, yet its accuracy is compromised by shortcomings in the EASY system. This system is often criticized for its inclusion of duplicate records and for counting refugees who did not stay in Germany (Gehrsitz & Ungerer, 2022). As detailed in Chapter 2, the asylum procedure involves two steps: an initial quick assessment by the border police, followed by more detailed registration at reception centers. During this transition, it is possible for refugees to withdraw from the process – for instance, if they leave for another country – while their asylum applications are still in progress. Unfortunately, such instances are not tracked by the EASY system, leading to incomplete records at the federal level.

A more precise depiction of the number of refugees, however, is provided by the administrative data collected by the 16 German states. These detailed records on the distribution of registered asylum seekers across 401 counties were obtained from the federal states and utilized for the first time in Gehrsitz and Ungerer’s 2022 study. The authors generously provided me with access to this data upon request. Consequently, this study relies on the administrative records detailing the allocation of asylum seekers to German counties from January 1, 2014, to December 31, 2015. In addition to these records, this study incorporates data regarding the capacities of large-scale reception centers (EAEs) in each county. This information was also provided to me by the authors as mentioned earlier, who gathered it from the federal state authorities in charge of operating the EAEs.

Table 1. Distribution of Asylum Seekers and EAE Capacities at the Federal State Level

	Federal quota	County allocations		EAE capacities
	Percent	Total	Percent	Total
Baden-Wuerttemberg	12.8%	105,680	11.5%	26,400
Bavaria	15.5%	106,763	11.6%	22,377
Berlin	5.1%	67,228	7.3%	n/a
Brandenburg	3.1%	30,930	3.4%	5,092
Bremen	1.0%	12,507	1.4%	n/a
Hamburg	2.5%	28,937	3.1%	n/a
Hesse	7.4%	57,575	6.3%	22,047
Mecklenburg Western Pomerania	2.0%	22,614	2.5%	989
Lower Saxony	9.3%	84,475	9.2%	5,028
North Rhine-Westphalia	21.2%	224,589	24.4%	16,245
Rhineland Palatinate	4.8%	34,999	3.8%	10,622
Saarland	1.2%	12,192	1.3%	1,300
Saxony	5.1%	41,423	4.5%	16,845
Saxony-Anhalt	2.8%	27,736	3.0%	6,259
Schleswig-Holstein	3.4%	36,500	4.0%	15,667
Thuringia	2.7%	24,657	2.7%	6,951
Total	100.0%	918,805	100.0%	148,414

Source: Based on Gehrsitz and Ungerer (2022). Note: For the three city states—Berlin, Bremen, and Hamburg—it is not possible to distinguish between refugees housed in county-level and state-level facilities. As a result, the corresponding entries are coded as zero in the administrative data.

Table 1 provides the regional statistics on the federal quota (referred to as ‘*Königsteiner Schlüssel*’), which shows the intended distribution of migrants to various states, and the actual number of asylum seekers distributed by these states to their respective counties, as per administrative records. Accordingly, these allocations generally align with each other at the state level, despite the previously mentioned challenges associated with the EASY system. For instance, under the federal quota, Baden-Wuerttemberg was expected to accommodate 12.8% of the refugees entering the country, then ended up distributing 11.5% to its counties (BAMF, 2016). On the other hand, these two figures are not precisely the same (except for the state of Thuringia), partly because some refugees are accommodated in EAEs as well. For instance, the state of Hesse has a considerably higher amount of EAE capacity at 22,047, while having a somewhat lower distribution at the county level with 6.3%.

Using the administrative data on county allocations, the number of refugees for every 100,000 residents is calculated for 401 counties. As can be seen in Figure 1, there is a pronounced variation in how asylum seekers are distributed across counties, extending even to those within the same state. While certain states manage to distribute refugees more uniformly across their counties, there is still a notable degree of heterogeneity observed. Furthermore, the figure has a considerably high standard deviation of 494 with a mean value of 1,103. Notably, this study utilizes the variation in asylum seeker allocations at the county level to analyze how these influxes have affected the employment outcomes of natives.

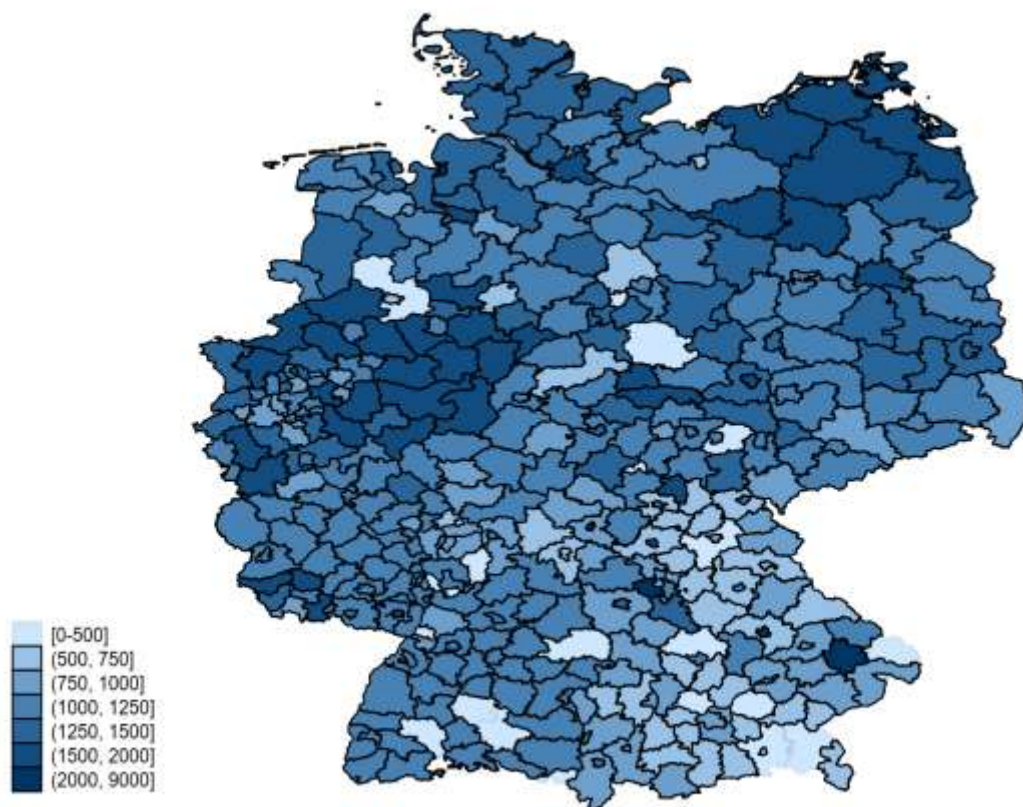


Figure 1. Allocation of asylum seekers (per 100,000 residents).

Source: Based on administrative data acquired from the federal state authorities.

Regarding the outcome variable on the labor market, data on quarterly unemployment rates at the county level were obtained from the Federal Employment Agency. Figure 2 illustrates the differences in unemployment rates between 2013 and 2016 across 401 counties. Overall, a noticeable reduction in unemployment is observed in many counties. An initial visual examination in comparison with the preceding figure suggests little or no correlation between changes in unemployment rates and the influx of refugees. In addition to unemployment rates, the number of employees subject to social security contributions is utilized to conduct robustness checks. This data is derived from the regional database maintained by the Federal and States Statistical Offices.

Another variable of interest is the diversity of employment sectors within each county. Due to the lack of direct data on sectoral diversity, the number of employees in each sector in 2013 is used to construct a sectoral composition index for every county. Particularly, data on the share of employment in each sector relative to total employment across all sectors is provided by the Federal Employment Agency. The employment sectors are divided into 15 categories¹ based

¹ These categories are: 1- Agriculture, forestry and fishing, 2- Mining, energy and water supply, energy industry, 3- Manufacturing industry, 4- Construction industry, 5- Trade, maintenance, repair of motor vehicles, 6- Transportation and storage, 7- Hotels and restaurants, 8- Information and communication, 9- Provision of financial and insurance services, 10- Real estate, freelance scientific and technical services, 11- Other business services (with and without temporary employment)

on the 2008 classification of economic sectors (WZ 2008). Utilizing the share figure, a Theil index of the following form is developed for this study:

$$T = \sum_{i=1}^I p_i \log\left(\frac{p_i}{q_i}\right) \quad (3.1)$$

Where $i = 1 \dots I$ industries or sectors exist. The variable p_i represents the share of the employment in each sector compared to the total employment across all sectors (%). In order to use an absolute measure of heterogeneity, the reference level q_i is taken as $1/I$ (Kublina & Ali, 2021). Hence, the heterogeneity of sectors is calculated by taking the reference point as the equal distribution of employment across all sectors. The Theil index is particularly advantageous for this study due to its decomposability at different levels of industrial classification. The index takes a low value when one or a few sectors dominate, indicating specialization, and a high value when employment is evenly distributed, indicating diversification (Kublina & Ali, 2021).

Using Equation (3.1), a Theil index is calculated for each county and its histogram is provided in Figure 3. The figure reveals a right-skewed distribution, with indices ranging from 0.08 to 0.47. The mean value for all counties is 0.19 with a standard deviation of 0.069. The highest densities concentrate around or below the mean value, suggesting a relatively higher specialization in employment sectors within the majority of counties. Few counties approach the higher end of the index, signifying a more diverse or evenly spread employment across sectors compared to the previous group.

Figure 4 sheds light on the variation in employment sectors for each county, as quantified by the Theil index. A visual comparison with Figure 2 indicates that counties with lower Theil index values, denoting greater specialization, may in general have seen a more pronounced decline in unemployment rates throughout the study period. In contrast, some counties with a broader mix of employment sectors witnessed slight increases in unemployment. This pattern tentatively points to the influence of sectoral composition on unemployment trends across German counties.

Information on county-level characteristics is obtained from the regional statistics database of the Federal and State Statistical Offices. These include demographic composition by age and sex, German/non-German, GDP per capita, and the number of housing benefit recipients in each county.

12- Public administration, defense, social security, external organizations, 13- Education and teaching, 14- Healthcare, homes and social services, 15- Other services, private households.

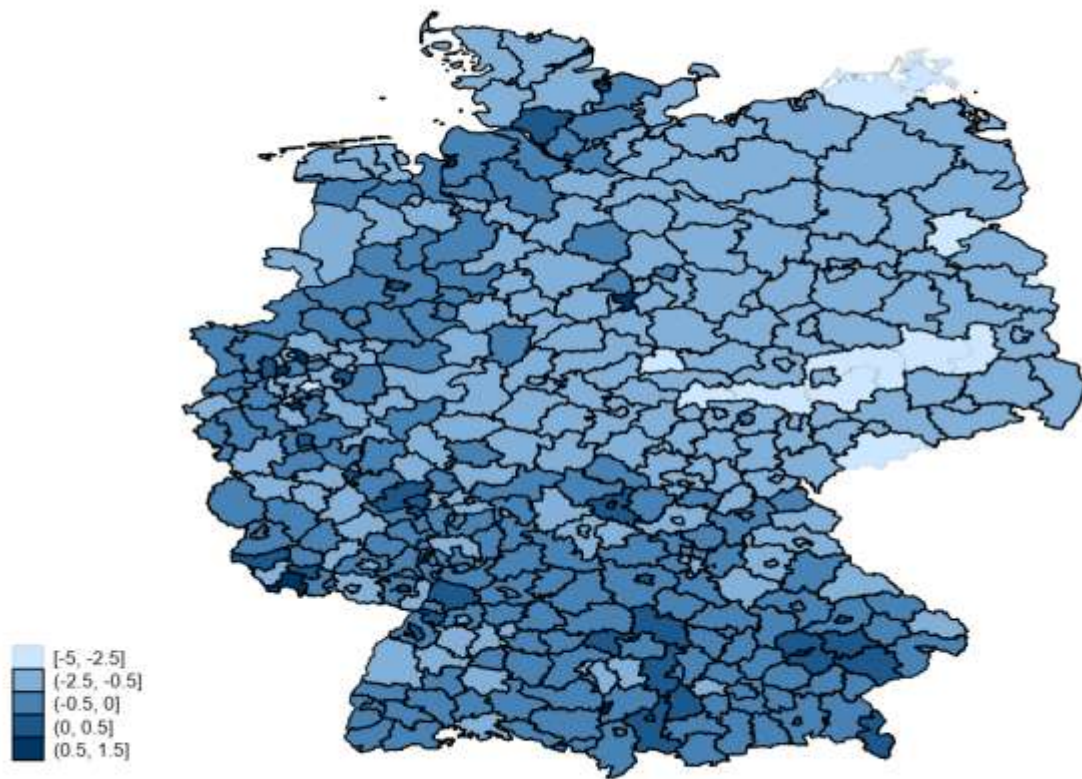


Figure 2. Change in the unemployment rates between the first quarters of 2013 and 2016.
Source: Federal Employment Agency.

The labor market outcomes are examined separately for non-German population to capture the differential effects of the refugee inflow. As will be shown, unemployment rates indicate an existing disparity among the German and non-German populations, making it crucial to assess whether refugee arrivals widen or narrow this gap. Economic theory suggests that new arrivals may either compete with existing workers for jobs (substitution effect) or complement their skills in ways that generate new opportunities. Given that refugees are more likely to share similar skill profiles and employment constraints with non-German workers, the impacts might be felt more acutely within this group.

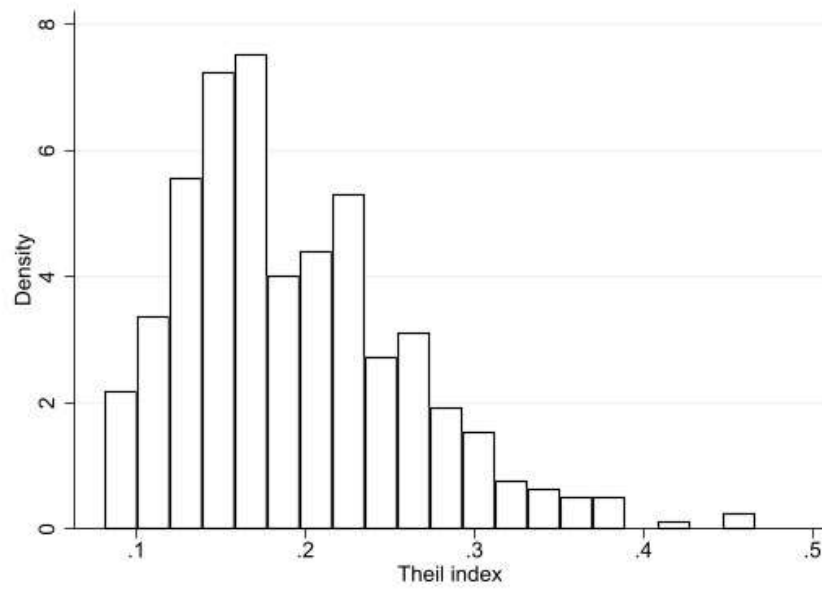


Figure 3. Histogram of Theil Index. Source: Federal Employment Agency.

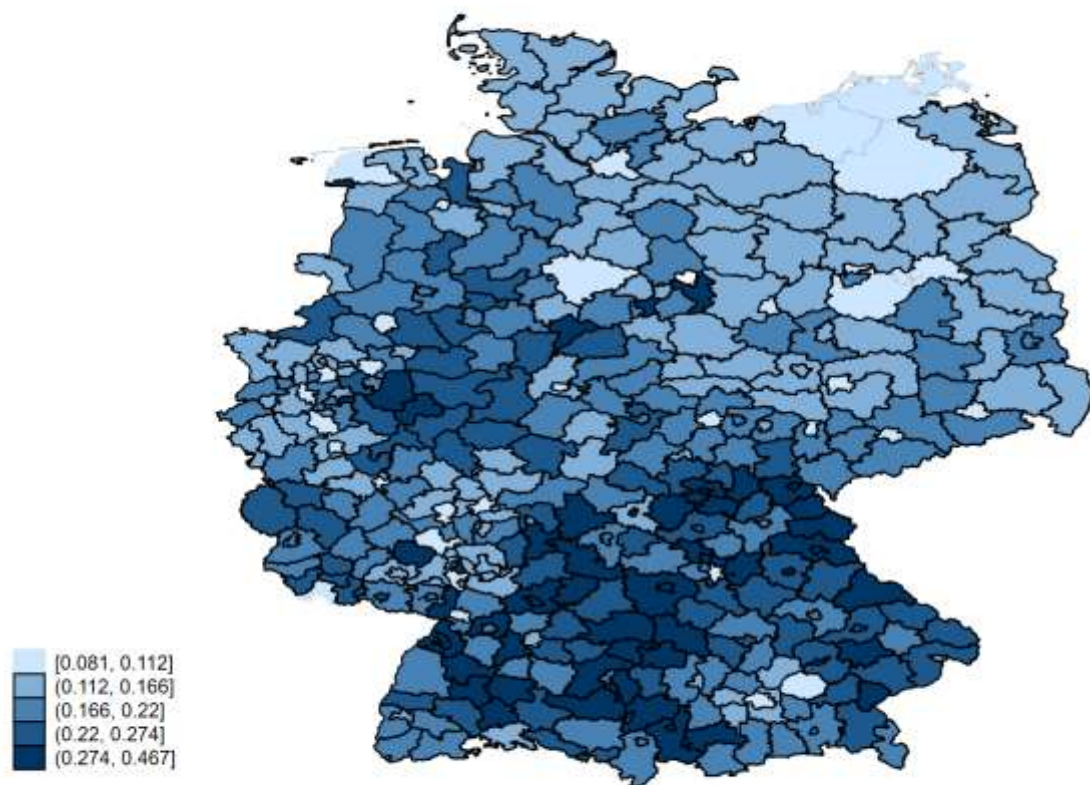


Figure 4. Values for Theil index. The map shows the heterogeneity of employment sectors for 401 German counties based on the Theil index. Source: Federal Employment Agency.

4. Methodology

Fuzzy Difference-in-differences

The study utilizes fuzzy difference-in-differences (DiD) methodology by comparing labor market outcomes at the county level before and after the migration shock in 2014/15. The fuzzy design extends the standard DiD approach by allowing for differential treatment intensity across units, thereby accounting for the varying intensity of refugee inflows across counties (De Chaisemartin & d'Haultfoeuille, 2018). The pre-treatment period is set as the fourth quarter of 2013, preceding the increase in refugee arrivals in 2014 and their peak in 2015. The post-treatment period is taken as either the fourth quarter of 2016 or 2017, so that the analysis first compares labor market outcomes between 2013 and 2016, followed by a comparison between 2013 and 2017 to ensure robustness across different post-treatment periods.

Three models are estimated in first differences. The baseline model, employed by similar studies including Gehrsitz and Ungerer (2022), captures the effect of an additional number of allocated asylum seekers without accounting for sectoral diversification in local labor markets. The model also includes the effect of reception centers (EAEs), measured by the number of available beds. A higher capacity in these centers is potentially linked to labor market outcomes, as it reflects the concentration of a large number of refugees in a specific location. The baseline model is specified as follows:

$$\Delta y_{ct} = \alpha + \theta_1 \text{ref}_c + \theta_2 \text{EAE}_c + \gamma \Delta X_{ct} + \varepsilon_{ct} \quad (4.1)$$

The second and third models introduce the Theil index defined in Equation (3.1). The second model incorporates sectoral diversification as an additional explanatory variable and is estimated in the following form:

$$\Delta y_{ct} = \delta + \lambda_1 \text{ref}_c + \lambda_2 \text{EAE}_c + \lambda_3 \text{theil}_c + \rho \Delta X_{ct} + \eta_{ct} \quad (4.2)$$

In this model, y_{ct} denotes the unemployment rate of a county c in the time period t . The coefficient for ref_c , λ_1 , captures the effect of an additional influx of refugees assigned to a county. It shows the impact of refugees who mostly reside in permanent and relatively smaller accommodation through private housing or facilities managed by county authorities. In contrast to λ_1 , λ_2 shows the effect of relatively larger and temporary facilities, accommodating a few hundred refugees during the mass refugee inflow. Both ref_c and EAE_c variables are calculated per 100,000 inhabitants. The coefficient of theil_c , λ_3 , indicates the effect of the heterogeneity of employment sectors on unemployment rates. Finally, X_{ct} includes key demographic and economic county characteristics, including population, GDP per capita, the share of the male population, the share of the non-German population, the share of housing benefit recipients per 1000 residents, and the share of the working age population (aged between 20 and 64).

The last model extends the analysis by incorporating an interaction term between refugee allocation and sectoral diversification, formed as follows:

$$\Delta y_{ct} = \alpha + \beta_1 \text{ref}_c + \beta_2 \text{EAE}_c + \beta_3 \text{theil}_c + \beta_4 \text{ref}_c \times \text{theil}_c + \theta \Delta X_{ct} + \varepsilon_{ct} \quad (4.3)$$

In this specification, the effect of an increase in asylum seekers is reflected by both the coefficient β_1 and the interaction term β_4 . Similarly, the effect of sectoral heterogeneity is assessed using the coefficient on theil_c , β_3 , and interaction term β_4 . The interpretation of other variables remains consistent with those in Equation (4.2).

The second and third models differ in how they account for sectoral diversification. The second model treats the Theil index as an independent factor influencing unemployment rates, thus controlling the level of sectoral heterogeneity in each county prior to refugee influx. The third model examines whether the relationship between refugee inflows and unemployment is conditioned by the level of sectoral diversification. This distinction allows for an assessment of whether counties with a more diverse employment structure are better equipped to absorb refugee inflows compared to those with a specialized labor market. These three models provide a structured approach to examining the complex interplay between the influx of refugees, labor market outcomes, and local economic structures.

Refugee Allocation and Identification

The distribution of Syrian refugees across Germany does not provide a randomized experiment setting, in which certain counties would accommodate a high or low number of refugees irrespective of their characteristics. Indeed, as explained in Chapter 2, ‘*Königsteiner Schlüssel*’ allocated higher quotas for federal states that have higher tax revenues and population. Nonetheless, the unprecedented scale of the influx, coupled with accommodation shortages, seems to have resulted in a degree of exogenous variation in the allocation of refugees among counties within the same state.

In the face of the massive influx of asylum seekers at the German border, state authorities frequently had to allocate refugees to any available accommodation such as sports halls or vacant hotels (Gehrsitz & Ungerer, 2022). Consequently, limitations in housing availability and the need to keep certain groups of asylum seekers together have led to some deviation from the intended federal-state quotas. While the distribution of available accommodation across counties may not have been fully independent, the subsequent asylum seeker allocations are found to be highly uncorrelated with the observable characteristics of these counties, as will be explained below.

Several other factors support the credibility of this quasi-random allocation of refugees across counties (Stips & Kis-Katos, 2020). First, the EASY system is administratively separated from the distribution process to counties, thereby removing the links between an asylum seeker’s initial entry point into Germany from their final residence. Secondly, this separation limits the authorities’ knowledge of an asylum seeker’s background, thus eliminating the possibility of selection based on unobservable traits. Accordingly, the system also ignores the personal

preferences of the applicants, including factors like employment opportunities and cultural similarities (Geis & Orth, 2016; Stips & Kis-Katos, 2020)

Finally, various factors encourage refugees to remain in their assigned counties, thus reducing the likelihood of ex-post sorting based on county attributes or personal preferences (Stips & Kis-Katos, 2020; Gehrsitz & Ungerer, 2022). Asylum seekers receive certain goods and services at their assigned locations and are legally required to stay there until their asylum application is decided. Any violation of this ‘residence obligation’ jeopardizes the success of their asylum applications. The processing time for these claims averages around six months and varies based on the refugees’ country of origin and document types (BAMF, 2016). Furthermore, the asylum application process does not start immediately upon arrival but begins with an interview appointment that often has a waiting period of a few months. Therefore, for a considerable amount of time, refugees are tied to their allocated county and are legally barred from employment until their asylum claim is granted. Overall, these suggest a quasi-random setting where the probability of ex-post sorting is low.

The identification assumption posits that counties with high and low levels of refugee allocations would have followed similar labor market trends in the absence of treatment (refugee inflow). In order to test this common trend assumption, counties are categorized into those with high and low refugee populations, using a threshold that results in equal shares of counties in both groups. Consequently, a county has a high refugee population if at least 1260 refugees are allocated for each 100,000 residents or a reception center (EAE) is present with more than 200 beds.

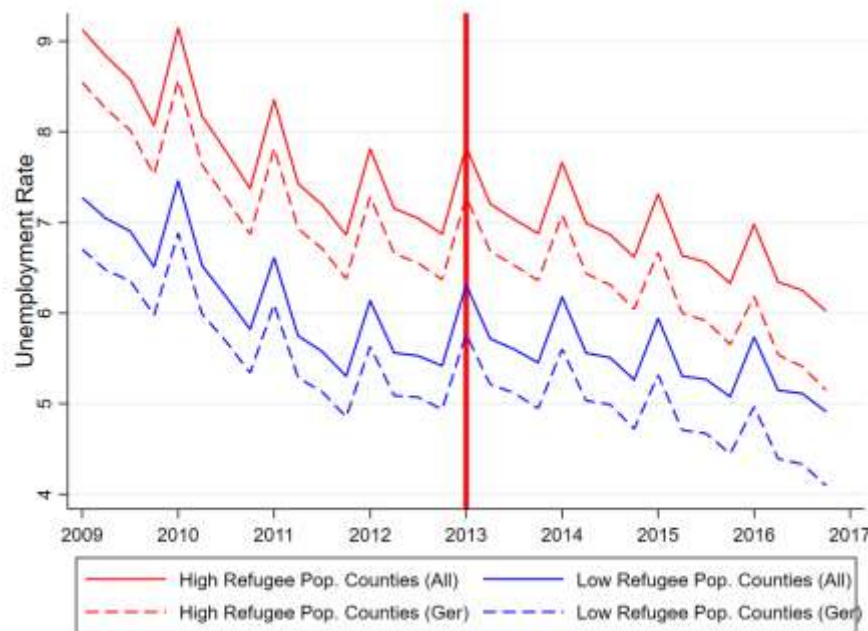


Figure 5. Unemployment rates for total and non-German population over time.
Source: Federal Employment Agency.

Figure 5 plots unemployment rates between 2009 and 2017 to examine pre-treatment patterns in counties with high and low refugee populations. While counties with higher refugee numbers

typically have higher unemployment rates, the difference-in-differences (DiD) method is primarily concerned with the trends of these rates over time, rather than their levels. The pre-treatment period shows parallel trends between counties with high and low refugee populations, lending support to the study's identification assumption. Figure 6 specifically illustrates the differences in unemployment rates between counties with high and low refugee populations during the same timeframe. The line's relative constancy prior to the intervention suggests that any significant post-treatment effects on unemployment are likely attributable to the intervention itself.

The fuzzy DiD setup does not necessitate a random distribution of asylum seekers, however, the reliability of the identification strategy might also be compromised if high and low refugee populations vary in ways that affect the distribution of asylum seekers. A key concern is whether counties selected for asylum seeker placement are also those experiencing economic growth, potentially leading to a false negative correlation between the arrival of asylum seekers and the outcome variable. In this regard, Gehrsitz and Ungerer (2022) demonstrate that the distribution of refugees across counties is not significantly influenced by either GDP per capita or the availability of vacant housing. In their regression analysis, including variables such as per capita GDP, the proportion of vacant housing, recipients of housing benefits, and demographic factors like the percentage of youth, males, and German nationals, they find that after adjusting for state-fixed effects, only the percentage of German citizens significantly predicts refugee allocation. Furthermore, Kassam & Becker (2023) reaffirm that there is no discernible association between the influx of asylum seekers, their socio-demographic characteristics, and the district-level conditions. The fact that the observable characteristics are very rarely tied to the allocation provides additional support to the common trend assumption.

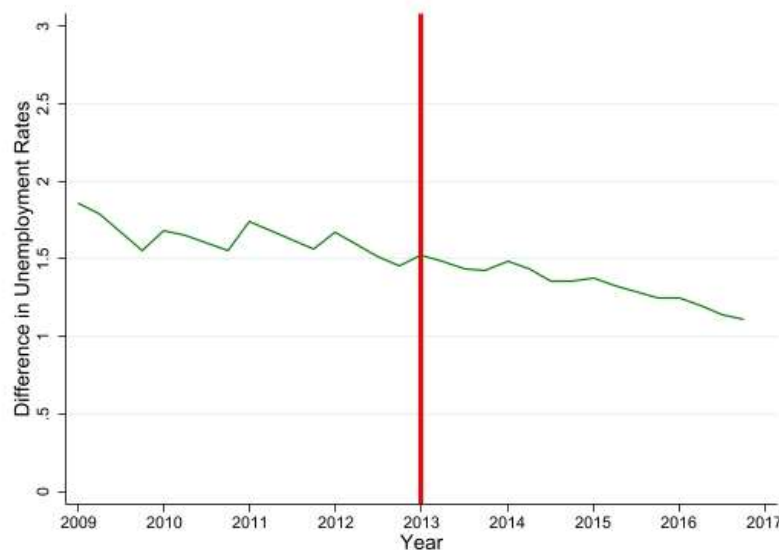


Figure 6. Difference in unemployment rates of high and low refugee population counties.
Source: Federal Employment Agency

5. Results and Discussion

Unlike the standard difference-in-differences (DiD) framework, the fuzzy DiD approach estimates the marginal effect of varying treatment intensities on labor market outcomes. In this context, it allows for assessing whether counties that received higher numbers of asylum seekers experienced more pronounced shifts in unemployment rates during the study period (Gehrsitz & Ungerer, 2022). Column (1) of Table 2 presents estimates for the overall population based on the baseline model, which does not account for sectoral diversification. Confirming earlier findings in Gehrsitz and Ungerer (2022), an additional influx of asylum seekers has a statistically non-significant and minor effect on the overall unemployment rate.

Column (2) incorporates the sectoral composition into the regression as a control variable, as outlined in Equation (4.2). This reconfirms the non-significant effect of refugee inflow on the outcome, although with a slightly larger coefficient. More critically, it shows that the Theil index of sectoral composition is a significant factor that affects the unemployment rates of locals, providing a validation of the Theil index developed for this study. This implies that a relatively high level of heterogeneity in employment sectors is associated with an increase in the overall unemployment rate. An increase of one standard deviation in the Theil index corresponds to a 0.14 percentage point rise in the unemployment rate, representing a 2.1% increase relative to the average rate in 2013 (6.56%).

Table 2. Results on change in unemployment rates for total population

	(1)		(2)		(3)	
	2016	2017	2016	2017	2016	2017
Refugees	-.00002 (.00009)	-.00004 (.00011)	-.00003 (.00007)	-.00006 (.00009)	-.00046*** (.00016)	-.00060*** (.00020)
EAE capacity	-.00002 (.00008)	-.00004 (.00009)	.000002 (.00007)	-.00001 (.00008)	-.00006 (.00008)	-.00009 (.00008)
Theil index			2.0535*** (.41370)	2.0843*** (.47591)	.15532 (.69996)	-.27045 (.83170)
Refugees*Theil					.00165*** (.00052)	.00207*** (.00064)
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.4647	0.5480	0.4987	0.5713	0.5085	0.5816

Standard errors in parentheses.

*, **, or *** indicates significance at the 10%, 5% and 1% levels, respectively.

Finally, Column (3) includes an interaction term between refugee allocation and the Theil index to examine whether the influx of refugees could be influencing the outcome variable through the channel of industrial mix. In this specification, the coefficients of both the refugee inflow variable and interaction variable are statistically significant at the 1% level with larger coefficients. This implies that an additional influx of allocated asylum seekers significantly affects the overall

unemployment rates, and this effect is modulated by the level of sectoral diversification in a county. For instance, at the mean level of Theil index in the sample (0.19), a one standard deviation increase in refugee allocation is associated with a decrease in overall unemployment rate by 0.07 percentage points, or a 1.1% decrease relative to the average unemployment rate in 2013.²

Figure 7 provides a more detailed picture of how the estimated effect of additional refugee influx depends on the sectoral heterogeneity in employment sectors. It plots the unique values of the Theil index in the sample against the percentage point change in unemployment rates, considering a one standard deviation increase in refugee influx. Accordingly, for the values of the Theil index below 0.28, larger inflows of asylum seekers are associated with a slight decrease in unemployment rates for the overall population. The biggest decrease in unemployment rates with 0.16 percentage points, or 2.4% relative to the mean rate in 2013 (6.56%), is observed when the Theil index takes its minimum value in the sample at 0.08. As the Theil index increases above this level (as the sectoral composition gets more diversified), the effect turns into an increase in unemployment, reaching its at most value at the maximum value of the Theil index (0.47) with 0.16 percentage points, or 2.3% relative increase. Overall, the findings indicate that counties with greater sectoral specialization are more likely to experience reductions in unemployment rates in response to increased refugee inflows. These significant impacts persist with marginally stronger effects when the year 2017 is taken as the post-treatment year.

Table 3 provides the regression results for the non-German population, who may have similar skills to recently arrived refugees, constituting a potential substitute group. Column (1) illustrates that an additional number of refugees is positively related to unemployment rates for the non-German population, aligning with Gehrsitz and Ungerer's (2022) findings. A one standard deviation rise in asylum seekers corresponds to a 0.8 percentage point increase in unemployment, approximately a 5.7% relative increase relative to the mean unemployment for non-Germans in 2013 (13.95%).

The regression estimates for the initial two models in Table 3 indicate that the capacities of reception centers (EAEs) correlate significantly and inversely with the unemployment rates among non-German individuals. This does not necessarily contradict the positive and significant coefficients seen with the number of allocated refugees. While asylum seekers distributed across counties may eventually participate in the labor force, those accommodated in EAEs are less likely to do so imminently. The inverse relationship with unemployment may stem from the fact that the reception centers have the potential to generate employment opportunities, such as in security services, which are often filled by non-German residents (Gehrsitz & Ungerer, 2022). Nonetheless, the magnitude of this relationship is relatively modest, with an increase of 200 beds in EAE capacity linked to a minor reduction in unemployment by 0.25 percentage points. These minor or no impacts are plausible considering that a significant proportion of EAE occupants are in the process of having their asylum requests approved, during which time they are generally not permitted to participate in the formal labor market. Furthermore, the significant effect of reception

² Given the related coefficient of ref_i at -0.00046 and its standard deviation at 494.8, the coefficient of the interaction term at 0.00165, and the minimum value of Theil index at 0.08, the change in percentage points is calculated as $[(-0.00046) \times (494.8)] + [(0.00165) \times (494.8) \times (0.19)] = -0.07$. Then, given the mean unemployment rate for overall population in 2013 as 6.56%, this translates into $0.07/6.56 \times 100 = 1.1\%$ relative decrease.

centers vanishes by 2017, suggesting that the initial labor market impact of these centers had diminished as the related employment opportunities were gradually absorbed over time.

When the sectoral diversification is accounted for, Column (2) of Table 3 reaffirms that additional asylum seekers significantly and positively affect non-German unemployment rates. The last specification, Column (3), shows that the coefficients of the refugees, Theil index, and their interaction are statistically significant at the 5% level. This complements the results on the overall population, supporting the idea that the refugees' impact on unemployment outcomes indeed depends on the sectoral composition of local labor markets. At the mean level of the Theil index (0.19), an increase in asylum seeker numbers by one standard deviation increases the non-German unemployment rate by 1.1 percentage points in absolute terms and by 8.3% in relative terms to the mean unemployment rate. Figure 7 shows that only after a relatively very high heterogeneity level (above 0.43), the effect becomes slightly negative. For instance, this is equal to a 0.16 percentage points absolute decrease or 1.2% relative decrease at the maximum value of Theil index in the sample (0.47). Therefore, counties with a higher level of sectoral diversification tend to experience smaller increases, or even decreases, in unemployment rates among non-German citizens when faced with larger inflows of asylum seekers. The results from 2017 also confirm these findings with relatively higher coefficients.

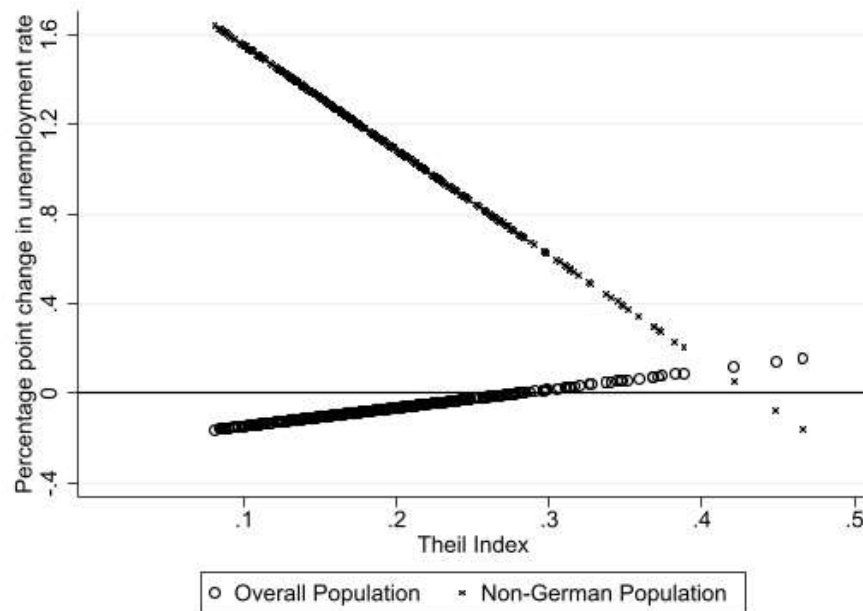


Figure 7. The effect of additional asylum seekers for each value of the Theil Index in the sample (in percentage points). Note: The points for the overall population are based on the formula $[(-0.00046 \times 494.8) + (0.00165 \times 494.8 \times \text{Theil})]$. For the non-German population, it is based on $[(0.00408 \times 494.8) + (-0.00944 \times 494.8 \times \text{Theil})]$

Table 3. Results on change in unemployment rates for non-German population

	(1)		(2)		(3)	
	2016	2017	2016	2017	2016	2017
Refugees	.0162*** (.00046)	.00159*** (.00046)	.00162*** (.00046)	.00159*** (.00045)	.00408** (.00136)	.00451*** (.00158)
EAE capacity	-.00126** (.00061)	-.00070 (.00070)	-.00125** (.00061)	-.00071 (.00069)	-.00092 (.00064)	-.00031 (.00076)
Theil index			.84487 (3.5900)	-.97382 (3.1665)	11.6858** (5.1549)	11.7469** (5.9086)
Refugees*Theil					-.00944** (.00435)	-.01118** (.00520)
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.1227	0.1895	0.1228	0.1896	0.1279	0.1955

Standard errors in parentheses.

*, **, or *** indicates significance at the 10%, 5% and 1% levels, respectively.

In order to provide further insights into the labor market effects, employment figures for the overall and non-German population are employed as the dependent variable, and the results are presented in Tables 4 and 5. The number of employees subject to social insurance contributions per 100,000 population is calculated using data provided in the Federal and States Statistical Offices' regional database. Notably, this figure uses the population in the pre-treatment year (2013), rather than the post-treatment year, in order to provide estimates which are not affected by the additional number of refugees included in the population after the treatment (Cengiz & Tekguc, 2022).

In contrast to insignificant results on unemployment rates, Column (1) and (2) in Table 4 shows that a higher number of asylum seekers is associated with a significant and negative effect on overall employment numbers. Nevertheless, after the introduction of the interaction term, this negative effect of the additional influx becomes insignificant and small. Furthermore, the insignificant results in Column (3) indicate that the role of sectoral composition in navigating the effect of refugees on labor markets does not apply to employment numbers for the overall population. At the same time, Column (2) affirms that sectoral heterogeneity is a significant factor affecting labor market outcomes for the total population. The results for non-German employment in Table 5 mirror the main results from unemployment rates for the same population group. The first two specifications show that independent of the sectoral composition, an additional number of refugees slightly decreases the employment of the non-native population. Column (3) further affirms that effects on labor market outcomes for the non-German population depend on the diversification of the local economy. At the mean value of the Theil index (0.19), the effect on employment is negative. As the sectoral diversification increases, an additional number of refugees is associated with a small increase in the employment rate of non-Germans.

Table 4. Results on change in employment numbers for total population

	(1)		(2)		(3)	
	2016	2017	2016	2017	2016	2017
Refugees	-.37105*** (.12938)	-.64016*** (.19032)	-.35745*** (.11211)	-.61818*** (.16747)	-.11188 (.44536)	-.07608 (.59005)
EAE capacity	. 6070 (.14704)	.08187 (.13444)	.17664 (.12821)	.12786 (.14492)	.20951 (.15290)	.19985 (.16367)
Theil index			-2261.71** (967.825)	-2968.98** (1318.60)	1180.93 (1898.93)	-604.507 (2440.30)
Refugees*Theil					-.94103 (1.4548)	-2.0786 (1.9968)
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.2963	0.2824	0.3102	0.2960	0.3113	0.2990

Standard errors in parentheses.

*, **, or *** indicates significance at the 10%, 5% and 1% levels, respectively.

Table 5. Regression results on change in employment numbers for non-German population

	(1)		(2)		(3)	
	2016	2017	2016	2017	2016	2017
Refugees	-.20819*** (.07562)	-.30655*** (.09333)	-.20731*** (.07633)	-.30563*** (.09307)	-.64302*** (.21620)	-.81925*** (.26779)
EAE capacity	. 2005 (.06370)	-.01577 (.06439)	.01871 (.05431)	-.01714 (.0781368)	-.03961 (.07048)	-.08535 (.08144)
Theil index			-145.90 (466.04)	-124.19 (640.79)	-2063.4** (925.17)	-2364.47** (916.13)
Refugees*Theil					1.6696*** (.67672)	1.9694*** (.84873)
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.2908	0.3807	0.2911	0.3808	0.3067	0.3940

Standard errors in parentheses.

*, **, or *** indicates significance at the 10%, 5% and 1% levels, respectively.

Combining the results on employment numbers and unemployment rates, the evidence points to worsening labor market outcomes for non-German citizens in most counties with lower sectoral diversification. Two mechanisms could explain this pattern. First, newly arrived refugees may have displaced existing non-German workers, potentially through informal labor markets given legal barriers to formal employment. Alternatively, the influx of refugees could be directly contributing to unemployment figures by expanding the job-seeking population. This would imply challenges in integrating new job seekers, indicating that the labor market's capacity to absorb newcomers may not be keeping pace with the rate of refugee arrivals. The findings presented in this paper suggest that displacement effects are unlikely to be the primary mechanism. In highly diversified counties, refugee inflows are associated with improved labor market outcomes for non-Germans, indicating that broader economic opportunities may facilitate faster absorption. Moreover, at moderate levels of diversification, unemployment rates increase for both the overall and non-German populations, which is inconsistent with displacement targeting only substitutable groups. Rather, integration challenges likely play a larger role, and high sectoral diversification appears to mitigate these frictions. Nevertheless, disentangling these dynamics conclusively would require disaggregated data distinguishing between newly arrived refugees and pre-existing migrant populations.

The navigation of diversification level of employment sectors works in the opposite directions for the overall and non-German population: In the latter case, a higher level of diversification is linked to better outcomes in the labor market. For the overall population, the unemployment outcomes of get slightly worse, while employment outcomes are not affected. Considering that majority of counties have relatively less diversified employment sectors based on the Theil index, an additional influx of migrants has a small adverse effect on employment and unemployment of the non-native population.

The results indicate that the effects on the labor market for the total population are relatively negligible compared to those for non-German citizens. For example, at the average Theil index value, the change in allocated numbers by one standard deviation equals 0.07 percentage points for the overall population as opposed to 1.1 for the non-German population. These translate into 1.1% and 8.3%, respectively, when compared to their respective mean values. This discrepancy partly reflects the smaller share of non-Germans within the total population, whereby substantial impacts on a minority group translate into only modest aggregate effects. It also highlights the importance of considering group-specific labor market vulnerabilities when assessing the overall impact of refugee inflows.

6. Conclusion

Forced migration remains a central topic of debate within the European Union, driven by ongoing geopolitical conflicts and the rise of populist movements. Understanding its labor market consequences for host-country residents is essential for designing informed and effective policy responses. This paper examines the short-term labor market effects of the Syrian refugee influx to Germany and analyzes how these effects vary with the degree of sectoral diversification across 401 counties.

A key contribution lies in providing new empirical evidence on the role of local economic structures in shaping labor market outcomes following large-scale refugee inflows. By developing a Theil index designed to measure sectoral diversification across German counties, the study introduces a novel framework for capturing the absorptive capacity of local economies. The analysis shows that the heterogeneity of employment sectors plays a pivotal role in moderating the labor market effects. Most previous studies find no significant effects of refugee inflows on the labor market outcomes of host-country residents (Verme & Schuettler, 2021; Gehrsitz & Ungerer, 2022). However, when sectoral diversification is explicitly accounted for, this paper identifies significant, albeit modest, changes in overall unemployment rates. These findings highlight the importance of considering local labor market structures when assessing the impacts of forced migration, supporting broader arguments made by Bevelander and Lundh (2007), Braun and Dwenger (2017), and Aracı et al. (2022).

The findings reveal that refugee inflows have heterogeneous impacts that vary sharply both by population subgroup and by local economic structure. In counties with lower levels of sectoral diversification, additional asylum seeker arrivals are associated with rising unemployment rates and declining employment numbers among non-German citizens, indicating strong adverse labor market impacts. By contrast, for the overall population, asylum seeker inflows correspond to a slight decrease in unemployment rates and no significant change in employment numbers, suggesting a degree of labor market resilience among natives. However, as sectoral diversification increases, these patterns shift. The adverse effects on non-German populations become less pronounced, and in counties with the highest levels of diversification, asylum seeker inflows are associated with improved labor market outcomes. This suggests that highly diversified local economies possess a greater absorptive capacity, facilitating more effective labor market integration. At the same time, for the overall population, further inflows lead to minor increases in unemployment rates, likely reflecting a temporary mismatch as labor force participation expands more rapidly than employment opportunities.

A further implication of the findings is that displacement effects are unlikely to be the primary mechanism behind the adverse labor market outcomes observed for non-German workers in less diversified regions. Instead, the evidence points toward integration challenges, as newly arrived asylum seekers expand the pool of job seekers but often face barriers to timely labor market entry. These results offer a cautionary note against restrictive migration policies driven by concerns over native job displacement and instead emphasize the need for measures that enhance labor market flexibility (Gehrsitz & Ungerer, 2022; Bofinger et al. 2015). Facilitating faster integration through more adaptable labor markets can help reduce transitional pressures without undermining economic resilience. In particular, targeted policies are needed to address the vulnerabilities of non-German populations in less diversified areas, which may include sector-specific job matching programs, skills development initiatives, and early language acquisition support. Recognizing that even highly diversified economies may experience short-term adjustment frictions, workforce development strategies should also prioritize enhancing natives' sectoral mobility, retraining, and upskilling to mitigate potential unemployment risks associated with refugee inflows.

Beyond immediate labor market outcomes, the findings underscore the potential for improving refugee allocation policies through better use of pre-existing economic data. In emergency contexts, where refugee systems face overwhelming pressures, leveraging measures such as a

Theil-like index to assess the sectoral diversity of host counties could support more strategic placement decisions. Mapping economic structures in advance would enable policymakers to identify regions with greater absorptive capacity, helping to minimize negative labor market impacts and support faster integration. This approach calls for a shift toward anticipatory planning and data-driven decision-making in refugee policy. It highlights that successful integration is shaped not only by the characteristics and qualifications of refugees but also by the economic structures of receiving communities. To strengthen such efforts, it is essential to improve data collection on the labor market trajectories of newly arrived asylum seekers and pre-existing migrant populations, as well as to systematically gather information on migrants' skills and qualifications.

While this study offers new insights into the labor market effects of the Syrian refugee influx in Germany, it is subject to several limitations that also suggest avenues for future research. First, legal restrictions on asylum seekers' participation in formal employment complicate the interpretation of their immediate labor market impacts. The administrative dataset employed does not differentiate between asylum seekers with pending versus approved applications, meaning only a subset of the asylum-seeking population could influence local labor markets during the study period. Second, although the analysis captures effects on the non-German population overall, it does not distinguish between recent arrivals and pre-existing immigrant populations. This limitation constrains the ability to fully assess potential displacement dynamics within the non-German labor force—a distinction that future studies could address with disaggregated data. Furthermore, the use of a self-constructed Theil index to measure sectoral diversification, while offering a novel contribution, may influence the results depending on methodological choices. Exploring alternative measures of economic heterogeneity could further validate and extend the findings presented here.

Building on these findings, future research could deepen the analysis by examining heterogeneity across different types of employment. Sector-specific analyses could provide deeper insight into which industries are most affected by refugee arrivals, highlighting patterns of labor reallocation that aggregate measures cannot capture. Finally, while this paper focuses on short-term labor market effects, investigating the longer-run dynamics of refugee integration is essential. A longitudinal perspective would offer critical insights into whether initial disruptions diminish, persist, or evolve over time, informing the design of more effective and sustainable integration policies.

References

- Aksu, E., Erzan, R., & Kırdar, M. G. (2022). The impact of mass migration of Syrians on the Turkish labor market. *Labour Economics*, 76, 102183.
- Angrist, J. D., & Kugler, A. D. (2003). Protective or counter-productive? labour market institutions and the effect of immigration on EU natives. *The Economic Journal*, 113, F302–F331.
- Aracı, D. T., Demirci, M., & Kırdar, M. G. (2022). Development level of hosting areas and the impact of refugees on natives' labor market outcomes in Turkey. *European Economic Review*, 145, 104132.
- BAMF (2016). *Das Bundesamt in Zahlen 2015—Modul Asyl*. Technical Report, Federal Office for Migration and Refugees (BAMF).
- Bansak, K., Ferwerda, J., Hainmueller, J., Dillon, A., Hangartner, D., Lawrence, D., & Weinstein, J. (2018). Improving refugee integration through data-driven algorithmic assignment. *Science*, 359(6373), 325-329.
- Becker, S. O., & Ferrara, A. (2019). Consequences of forced migration: A survey of recent findings. *Labour Economics*, 59, 1-16.
- Becker, S. O., & Ferrara, A. (2019). Consequences of forced migration: A survey of recent findings. *Labour Economics*, 59, 1-16.
- Bevelander P, Lundh C (2007) Employment integration of refugees: The influence of local factors on refugee job opportunities in sweden. IZA Discussion Papers 2551, Institute of Labor Economics (IZA)
- Borjas, G. J. (2014). *Immigration Economics*. Cambridge, MA: Harvard University Press.
- Borjas, G. J., & Monras, J. (2017). The labour market consequences of refugee supply shocks. *Economic Policy*, 32 (91), 361–413.
- Braun, S., & Dwenger, N. (2017). *The local environment shapes refugee integration: Evidence from post-war Germany* (No. 10-2017). Hohenheim Discussion Papers in Business, Economics and Social Sciences.
- Braun, S., & Mahmoud, T. O. (2014). The Employment Effects of Immigration: Evidence from the Mass Arrival of German Expellees in Postwar Germany. *The Journal of Economic History*, 74 (1), 69-108.

- Card, D. , 1990. The impact of the Mariel boatlift on the Miami labor market. *Ind. Labor. Relat. Rev.* 43 (2), 245–257.
- Card, D. and Peri, G. (2016). *Immigration Economics* by George J. Borjas: a review essay. *Journal of Economic Literature*, 54(4), 1333–49.
- Cengiz, D., & Tekguc, H. (2022). Is it merely a labor supply shock? Impacts of Syrian migrants on local economies in Turkey. *ILR Review*, 75(3), 741-768.
- Clemens, M. A., & Hunt, J. (2019). The Labor Market Effects of Refugee Waves: Reconciling Conflicting Results. *ILR Review* , 72 (4), 818–857.
- Dagi, D. (2020). The EU–Turkey Migration Deal: Performance and Prospects. *European Foreign Affairs Review*, 25(2).
- Damm AP (2014) Neighborhood quality and labor market outcomes: Evidence from quasi-random neighborhood assignment of immigrants. *Journal of Urban Economics* 79:139–166
- d’Amuri, F., Ottaviano, G. I., & Peri, G. (2010). The labor market impact of immigration in Western Germany in the 1990s. *European Economic Review*, 54(4), 550-570.
- De Chaisemartin, C., & d’Haultfoeuille, X. (2018). Fuzzy differences-in-differences. *The Review of Economic Studies*, 85(2), 999-1028.
- Dustmann, C., Frattini, T., & Preston, I. P. (2013). The effect of immigration along the distribution of wages. *Review of Economic Studies*, 80(1), 145-173.
- Dustmann, C., Schonberg, U., & Stuhler, J. (2016). The Impact of Immigration: Why Do Studies Reach Such Different Results? 30 (4), 31–56.
- Erol, I., & Unal, U. (2022). Employment effects of immigration to Germany in the period of migration policy liberalization, 2005–2018. *Eurasian Economic Review*, 12(3), 531-565.
- Foged, M., Peri, G. (2016). Immigrants’ effect on native workers: new analysis on longitudinal data. *Am. Econ. J. Appl. Econ.* 8 (2), 1–34.
- Friedberg, R. M. (2001). The impact of mass migration on the Israeli labor market. *Quarterly Journal of Economics* , 116 (4), 1373–1408.
- Gehrsitz, M., & Ungerer, M. (2022). Jobs, Crime and Votes: A Short-run Evaluation of the Refugee Crisis in Germany. *Economica*, 89(355), 592-626.
- Geis, W., & Orth, A. K. (2016). Flüchtlinge regional besser verteilen. Ausgangslage und Ansatzpunkte für einen neuen Verteilungsmechanismus. *Gutachten für die Robert Bosch Stiftung, Köln*.

- Glitz, A. (2012). The Labor Market Impact of Immigration: A Quasi-Experiment Exploiting Immigrant Location Rules in Germany. *Journal of Labor Economics* , 30 (1), 175-213.
- Godøy, A. (2017). Local labor markets and earnings of refugee immigrants. *Empirical Economics*, 52(1), 31-58.
- Hannafi, C., & Marouani, M. A. (2023). Social integration of Syrian refugees and their intention to stay in Germany. *Journal of Population Economics*, 36(2), 581-607.
- Hatton, T. (2020). European asylum policy before and after the migration crisis. IZA World of Labor.
- Hunt, J. (1992). The impact of the 1962 repatriates from Algeria on the French labor market. *Industrial and Labor Relations Review* , 45 (3), 556-572.
- Icduygu, A., & Toktas, Ş. (2016). After the EU-Turkey refugee deal: a perspective from Turkey. Clingendael, Netherlands Institute of International Relations.
- Karaarslan, C. (2020). *Growth, Wages and Unemployment-The Economic Impact of Refugee Migration on Europe: A Synthetic Control Analysis* (No. 51). Arbeitspapiere für Marketing und Management.
- Kassam, K., & Becker, M. (2023). Syrians of today, Germans of tomorrow: the effect of initial placement on the political interest of Syrian refugees in Germany. *Frontiers in Political Science*, 5, 1100446.
- Kublina, S., & Ali, M. (2021). Evolution of industrial diversification and its determinants in West Germany: Evidence from population data of enterprises. *Plos one*, 16(11), e0259352.
- Labanca, C. (2020). The Effects of a Temporary Migration Shock: Evidence from the Arab Spring Migration through Italy. *Labour Economics*.
- NdM. (2021). Work permit for refugees. Retrieved from <https://handbookgermany.de/en/work-permit>.
- Palan, N. (2010). *Measurement of specialization the choice of indices* (No. 62). FIW working paper.
- Peri, G., & Yassenov, V. (2019). The Labor Market Effects of a Refugee Wave: Synthetic Control Method Meets the Mariel Boatlift. *Journal of Human Resources* , 54 (2), 267-309.
- Sarzin, Z. (2021). The impact of forced migration on the labor market outcomes and welfare of host communities. In *World Bank. Reference Paper for the 70th Anniversary of the 1951 Refugee Convention*.

- Schwenken, H. (2021). Differential inclusion: The labour market integration of asylum-seekers and refugees in Germany. *Betwixt and Between: Integrating Refugees into the EU Labour Market*. ETUI-REHS Research Department.
- Seeberg, P. (2016). The EU-Turkey March 2016 Agreement As a Model: New Refugee Regimes and Practices in the Arab Mediterranean and the Case of Libya. *Global Turkey in Europe*, 16.
- Statista. (2022). Number of newly registered refugees in Germany from 2014 to 2018. Retrieved from <https://www.statista.com/statistics/911484/number-newly-registered-refugees-germany/>
- Stips, F., & Kis-Katos, K. (2020). The impact of co-national networks on asylum seekers' employment: Quasi-experimental evidence from Germany. *PloS one*, 15(8).
- UNHCR. (2023). Syria refugee crisis explained. Retrieved January 25, 2024, from <https://www.unrefugees.org/news/syria-refugee-crisis-explained/>
- Worbs, S., Rother, N., & Kreienbrink, A. (2020). Demographic profile of Syrians in Germany and aspects of integration. *Comparative Demography of the Syrian Diaspora: European and Middle Eastern Destinations*, 197-235.
- Verme, P., & Schuettler, K. (2021). The impact of forced displacement on host communities: A review of the empirical literature in economics. *Journal of Development Economics*, 150, 102606.

Imprint

Editors:

Sigrid Betzelt, Eckhard Hein, Martina Metzger, Martina Sproll, Christina Teipen, Markus Wissen, Jennifer Pédussel Wu (lead editor), Reingard Zimmer

ISSN 1869-6406

Printed by
HWR Berlin

Berlin, May 2025