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# First Time Around: Local Conditions and Multi-dimensional Integration of Refugees

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# First Time Around: Local Conditions and Multi-dimensional Integration of Refugees\*

## Abstract

We study the causal effect of local unemployment and attitudes towards immigrants at the time of arrival on refugees' multi-dimensional integration outcomes. We leverage a centralized allocation policy in Germany where refugees were exogenously assigned to live in specific counties. Both high unemployment and negative attitudes hurt refugees' economic and social integration, independently of each other. A one-standard-deviation increase in unemployment or in negative sentiment index based on geo-coded tweets in 2014 predicts five percentage points lower probability of refugees being employed in 2016 to 2018. The estimated negative effects of far-right vote share are qualitatively similar.

JEL Code: F22, J15, J24

Keywords: International migration, refugees, integration, allocation policy, far-right voting, negative sentiment

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# 1 Introduction

Refugees typically arrive in a host country with worse language skills and less locally applicable human capital than economic migrants, and consequently are likely to start at significantly lower levels of wages and employability (Brell et al. 2020; Cortes 2004). Therefore, refugees are often among the most vulnerable immigrant groups, facing the steepest barriers to economic and social integration (Martén et al. 2019). At the same time, initial economic conditions at the time of arrival matter for successful integration and have been shown to have long-lasting effects for refugees and economic migrants (Chiswick and Miller (1999), Åslund and Rooth (2007), Barsbai et al. (2019)).

In this paper, we provide the first systematic evidence on how attitudes towards immigrants shape the multi-dimensional integration of refugees. Given the lack of data on attitudes towards immigrants at the local level in survey data, we measure attitudes towards immigrants in two ways. First, we rely on Twitter data using natural language processing and machine learning techniques to construct county-level attitudes measures. Second, we measure attitudes by county-level electoral vote share of far-right parties. The lack of focus on attitudes towards immigrants as a determinant of refugees' integration outcomes is surprising since attitudes are being recognized as an important driver of public policy (Facchini and Mayda 1999; Matakos et al. 2020) and recent literature shows that immigration also increases anti-migrant sentiment and support for far-right parties (see, for example, Otto and Steinhardt (2014), Halla et al. (2017), Dustmann et al. (2019), Edo et al. (2019), and Hangartner et al. (2019)). An additional motivation to study the effects of attitudes towards immigrants on refugees' integration outcomes comes from Card et al. (2012): they find that concerns related to compositional amenities that natives derive from their neighborhoods, schools, and workplaces are 2-5 times more important in explaining attitudes towards immigration policy than concerns related to labor markets or public finances.

We also consider local economic conditions as an important factor in shaping refugees' integration. Combining this with our analysis on the effects of attitudes allows us to study the relative importance of the two measures (that is, attitudes vs. economic conditions).<sup>1</sup> Moreover, we analyze multi-dimensional (economic, linguistic, navigational, political, psychological, and social) integration of refugees in addition to labor market outcomes. This is important as far less attention has been devoted to non-economic outcomes, despite the fact that they are crucial for encouraging a sense of belonging in the host country. Finally, we analyze integration outcomes and the effects of initial conditions separately by gender.

We focus on refugees who arrived in Germany between 2013 and 2016 and have been subsequently inter-

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<sup>1</sup>It is important to emphasize early on that local attitudes towards immigrants are only weakly correlated with unemployment: the correlation between the Twitter-based county-level attitudes measure and unemployment rate is 0.38 and the correlation between county-level far-right vote share and unemployment rate is only 0.19.

viewed in the IAB-BAMF-SOEP Survey of Refugees, the largest representative survey of refugees in Europe. Refugees are generally eligible to enter the German labor market three months after submitting their asylum request. Our identification relies on the exogenous placement of refugees upon arrival across counties and the fact that they cannot freely choose their place of residence for a period of at least three years. This settlement policy provides an almost ideal exogenous variation to study the causal effect of initial local conditions on refugees' integration (see Section 2.1). Importantly, we address concerns about the identification assumption by directly showing that the county-level unemployment rates and attitudes towards immigrants are uncorrelated with all individual-level characteristics of refugees who were allocated to a given county in all regression specifications: only one out of the 84 coefficients is statistically significant. As previous research has shown that the effects of immigration on anti-immigrant voting depend on the educational level of immigrants (see Edo et al. (2019) for France and Mayda et al. (Forthcoming) for the United States), it is reassuring that we find no link at the county level between far-right vote shares and the educational level of refugees allocated to the county. This alleviates concerns that far-right voting, that is measured in our preferred specification in 2017, would have been influenced by the composition of refugees allocated to the county. In robustness checks, we present the effects of far-right voting also using 2013 vote shares.

We find that both unfavorable attitudes towards immigrants and high local unemployment rates negatively affect refugees' labor market outcomes and their economic and social integration. Both effects are substantial: *ceteris paribus*, working-age refugees who are assigned to counties with one standard deviation more negative sentiment towards immigrants or to counties with one standard deviation higher unemployment rate are five percentage points less likely to be employed a few years later. As one standard deviation of unemployment rate is 0.98 percentage points, our findings suggest that bad initial labor market conditions have five times stronger effect on refugees, which is in line with them being disproportionately often marginal workers. The effects are qualitatively similar but somewhat weaker if negative attitudes are measured with far-right vote share: a one standard deviation increase in far-right vote share, corresponding to 1.07 percentage points of votes, is associated with two percentage points lower probability of refugees being employed, and three percentage points lower probability of refugees being in employment or education. Furthermore, unfavorable attitudes towards immigrants and poor initial labor market conditions have a strong negative impact on refugees' net monthly earnings and the Multi-dimensional Integration Index. Together, these findings help us to understand how conditions at the time of arrival affect refugees' integration. They also have implications for the design of refugee allocation policies, as gains made in the first few years have long-lasting effects (Åslund and Rooth (2007)).

In terms of public finances, our back-of-the-envelope calculations suggest that allocating 100,000 randomly selected working-age refugees to counties with a one standard deviation lower unemployment rate would

generate annual public finance benefits of €46-49 million in terms of reduced spending on welfare benefits and increased tax revenue and social insurance contributions even when savings from housing costs that are paid directly by the government for the recipients of basic unemployment benefits are not taken into account. Allocating 100,000 randomly selected working-age refugees to counties with a one standard deviation more welcoming attitude towards immigrants would generate annual public finance benefits of €48 million if measuring attitudes by the Twitter data and €21 million if measuring attitudes by the far-right vote share.

We also analyzed the effects of initial conditions separately by gender. Local unemployment matters more for males, while local attitudes are somewhat more important for females. We further address potential concerns about omitted variable bias (following Oster (2019)) as well as multiple hypothesis testing (following Young (2019)). In addition, we show that our results are robust to the inclusion of sub-region by year fixed effects (which control for all potentially omitted variables that may vary across sub-regions and years, such as within-state policy changes on the length of the employment ban or the reallocation of funds in areas where the locals have more positive attitudes towards immigrants) as well as different lags of unemployment rates and alternative assumptions about the variance-covariance matrix.

Our paper is closely related to a handful of studies that have examined the effect of initial conditions on refugees' integration outcomes. Åslund and Rooth (2007) examine the long-term effects of labor market conditions encountered upon arrival in Sweden on immigrant earnings and employment. They find that early earnings assimilation depends crucially on a favorable national labor market. Godøy (2017) studies a subset of refugees in Norway, who are subject to a quasi-experimental settlement policy. She finds that assigning refugees to regions with good non-OECD immigrant labor markets increases their later labor market earnings. Martén et al. (2019) study the role of ethnic networks on refugee integration by leveraging the allocation policy in Switzerland, where some refugees are assigned to live in a specific location upon arrival and are not permitted to relocate during the first five years. They find that refugees assigned to locations with many co-nationals are more likely to enter the labor market. We complement these studies by providing new evidence on the effects of local attitudes towards immigrants on refugees' subsequent labor market integration outcomes in Germany.<sup>2</sup> Our findings also complement two recent studies that focused on the impact of employment bans that prevent asylum seekers from entering the local labor market upon arrival. Fasani et al. (2021a) show that exposure to a ban at arrival reduces refugee employment probability in subsequent years by about 15 percent, an impact driven primarily by lower labor market participation. Marbach et al. (2018) leverage a natural experiment in Germany, where a court ruling prompted a reduction in the length of the employment ban. They find that longer employment bans considerably slowed down the economic integration of refugees.

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<sup>2</sup>Keita and Valette (2019) found unemployment durations in Germany to be longer for immigrants from countries towards whose citizens Germans expressed lower levels of trust in Eurobarometer surveys. Most immigrants in their dataset are from Turkey (42 percent), Italy (15 percent), Poland (12 percent), and Russia (9 percent).

We show that adverse initial location can have lasting negative effects even in absence of formal employment bans.

We also contribute to the growing literature on the social integration of refugees. Ager and Strang (2008) develop a conceptual framework that specifies ten core factors (ranging from housing, education, and health to social connection in the community) that affect refugee integration. Harder et al. (2018) also propose a survey-based measure that identifies six dimensions (psychological, economic, political, social, linguistic, and navigational) of immigrant integration. In this paper, we use the definitions provided by Harder et al. (2018) and formally test how initial local conditions shape integration in various dimensions.<sup>3</sup> As for factors that could explain attitudes towards individual refugees, Bansak et al. (2016) conducted a conjoint experiment in which voters in 15 European countries were asked to evaluate hypothetical asylum seekers that randomly varied on nine attributes. They found that applications by asylum seekers who have better employment potential and more credible claim for asylum are more likely to be supported, while applications by Muslims receive lower support, *ceteris paribus*.

Our paper is related to the literature on the factors that affect refugees' labor market integration, reviewed more comprehensively than space allows here by Strang and Ager (2010) and Becker and Ferrara (2019). Several studies (see, for example, Edin et al. (2003), Damm (2009), and Beaman (2012)) have found that living in regions with high concentrations of co-ethnic individuals can improve refugees' labor market outcomes. Arendt et al. (2020) analyze the impact of an expansion of language training for refugees in Denmark. They show that refugees who received more and better language training were more likely to be in employment and had higher earnings, over the subsequent eighteen years. This finding is in line with what Sarvimäki and Hämäläinen (2016) find for Finland: restructuring active labor market programs for unemployed immigrants increased their cumulative earnings by 47 percent over ten years. Battisti et al. (2019) conduct a field experiment to evaluate the impact of job search assistance on the employment of recently arrived refugees in Germany. They find that personalized job search assistance can improve labor market integration of refugees.

There is also a growing body of work on how refugees' labor market outcomes compare to those of other migrant groups and natives in high-income host countries. Brell et al. (2020) find that refugees have substantially lower employment rates than other immigrants, for at least the first decade after arrival. Similarly, using data from 19 European countries, Fasani et al. (2021b) document that labor market outcomes for refugees are consistently worse than those for other comparable migrants. Using data from Germany, Brücker et al. (2020) show that 50 percent of the refugees have a job after five years. Although the labor market integration

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<sup>3</sup>Braun and Dwenger (2020) show that settlement location strongly affected the economic and social integration of millions of Germans who were expelled from Eastern Europe into West Germany after the Second World War, with integration proceeding worse in agrarian regions and in regions with high inflows of migrants. Bauer et al. (2013) show that in 1971, expellees still fared worse economically than other Germans.



of refugees is making slower progress than that of economic migrants in Germany, refugees who have arrived since 2013 fare better than previous refugee cohorts. Refugee integration in the United States has been more successful than in Europe. Cortes (2004) compares wage assimilation between refugees and economic migrants who arrived in the United States between 1975 and 1980. She finds that although refugee immigrants worked and earned less in 1980, their labor market outcomes surpassed those of economic immigrants in 1990.

Previous studies show that unfavorable initial conditions have persistent negative effects on individuals' socio-economic outcomes. For example, a number of studies show that entering the labor market when unemployment rates are high has long-lasting scarring effects on labor market outcomes for years afterwards (see Kahn (2010), Cockx and Ghirelli (2016), Schwandt and Von Wachter (2019) and others). In a similar vein, the longer refugees live in counties with unfavorable conditions, the more severe its consequences are likely to be for them.<sup>4</sup> Our analysis on the short-term integration outcomes is therefore likely to be informative about the long-term integration prospects of refugees. To help the large number of refugees who have arrived in Germany and other European countries, obtaining such early insights is more valuable than waiting until the integration process has run its course. What makes it even more striking is that refugees who arrived in Germany are positively self-selected with respect to human capital (Aksoy and Poutvaara 2021). Our results can also be informative for designing integration policies for other refugee-hosting countries.

Finally, our paper is related to emerging literature that has studied the role of social media in politics and in spreading anti-refugee sentiment. Allcott and Gentzkow (2017) analyze the role of fake news and social media in the US 2016 presidential election, showing that fake news were widely shared and heavily tilted in favor of Donald Trump. Acemoglu et al. (2018) find that general discontent expressed in Twitter predicts protests in Egypt during the Arab Spring. Barbera et al. (2019) analyze tweets by American legislators and the public to study who is leading and who is following. They conclude that legislators are more likely to follow than to lead in setting the political agenda, and tend to be more responsive to their supporters than to the general public. Finally, Müller and Schwarz (2021) investigate the link between social media and hate crimes. Their evidence shows that social media can fan flames of hate, with antirefugee sentiment predicting crimes against refugees. What we add to this literature is showing that public sentiment as expressed in tweets predicts refugees' economic and social integration outcomes a few years later, after controlling for local socio-economic characteristics. Furthermore, we measure public attitudes using two alternative measures: anti-immigrant sentiment as expressed in tweets and far-right vote share in elections. One might expect that far-right vote share would be the more relevant measure, given that only a small minority uses Twitter and that Twitter-users are a highly self-selected group, raising concerns about how representative measure tweet

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<sup>4</sup>See, for example, Edin et al. (2004) for the evaluation of a Swedish immigration policy that featured the dispersion of refugee immigrants as well as a change in the approach to labor market integration.

content is. However, we find that although both tweets and far-right vote share have similar qualitative effects, the predictive power of our Twitter-based measure is higher and statistically more robust.

The remainder of the paper is organized as follows: Section 2 provides information on institutional background and exogenous placement of refugees. Section 3 provides details on the data sources and descriptive statistics. Section 4 describes the empirical strategy. Section 5 presents the results, after which section 6 concludes.

## 2 Institutional Background

### 2.1 Refugee Settlement Policy and Exogenous Placement

The distribution of refugees across Germany follows an established two-step process: (i) the central dispersal of refugees across states based on a pre-defined allocation scheme, the Königstein Key; (ii) the central dispersal of refugees to counties by federal states.

#### *Initial allocation across states and counties*

The Königstein Key determines what share of refugees is received by each state based on the states' tax revenues (accounting for 2/3 of the quota) and population sizes (accounting for 1/3 of the quota), which are calculated on an annual basis. This mechanism aims for an equal sharing of responsibilities and financial burden across states by ensuring a proportional distribution of refugees across Germany. Table 1 illustrates the states' received versus assigned share of asylum seekers based on the Königstein Key between 2013 and 2017. Comparing received and assigned shares suggests that the distribution of asylum seekers has been almost perfectly in line with the quotas. As reported by OECD (2017), the resulting distribution of refugees mirrors states' population share among the total population.

Each refugee is registered upon arrival and subsequently assigned to an initial reception center in one of Germany's 16 federal states, where the refugee may formally apply for political asylum. Asylum seekers can be accommodated in reception facilities for up to six months, or until their application is decided on.<sup>5</sup> To reduce processing time, some regional offices of the Federal Office for Migration and Refugees have specialized on particular countries of origin. While this may cause clustering of refugees from the same country, no single nationality was exclusively assigned into a single state. Importantly, since this procedure applies to all refugees, they are not able to self-select into certain states and, hence, such deviations from

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<sup>5</sup>In case there are several reception centers within the assigned state, the EASY (Initial Distribution of Asylum Seekers) quota system chooses the reception center located nearest to the authority where the registration took place in order to minimize commuting costs. Within each state, asylum seekers are allocated to a particular municipality, usually the place of the initial reception center at first and possibly another municipality when the obligation to live in the initial reception center ends. For further information, please see <https://www.asylumineurope.org/reports/country/germany/overview-legal-framework>, last accessed on November 24, 2020.

the Königstein Key are unlikely to cause threats to our identification strategy. When it comes to allocation of refugees to counties, nine out of 16 federal states follow a pre-defined scheme at the county level that is directly proportional to relative population shares (Geis and Orth 2016). North Rhine-Westphalia considers population density. Bavaria, Bremen, Schleswig-Holstein, and Thuringia employ fixed population-based quotas assigned by decree (Stips and Kis-Katos 2020). Thus, on the county level, employment opportunities and attitudes towards migrants are largely not factored in (OECD 2017).

We formally test this argument in Table 2 (in a yearly sample between 2011 and 2017) and Table 3 (in a pooled sample with year fixed effects). Both tables indeed show that county-level population size is the only statistically significant predictor of the number of asylum seekers assigned per county. Importantly, we find no statistically significant association between local socio-economic characteristics (unemployment rate, population density, GDP per capita, average age, and housing space per capita, which proxies local housing conditions) and the number of asylum seekers at the county level. Additional analysis (see Table 6 and the discussion on the identification assumption) shows that not only the number of refugees but also their socio-demographic characteristics are uncorrelated with county-level conditions.

### ***Mobility of refugees is severely restricted***

Since many refugees are likely to stay in Germany for a long time, the federal government passed the Integration Act in July 2016, which severely restricts refugees' ability to choose their place of residence: unless legal exemption criteria apply, refugees with a temporary or permanent residence permit are obliged to stay in their initial place of residence for at least three years.<sup>6</sup> To enforce this restriction, refugees who do not comply with the regulation lose the entitlement to social benefits (OECD 2017).

Seven states (Baden Württemberg, Bavaria, Hessen, North Rhein-Westphalia, Saarland, Saxony, and Saxony Anhalt) apply the residence rule rigorously by mandating refugees to live in their initial county of residence. Similar geographic immobility rules also apply to the three city states (Berlin, Bremen, Hamburg). The residency rules are less restrictive in the remaining six states where, conditional on the approval of immigration authorities, refugees are allowed to move to a different county within their initially assigned state. Although there is no high quality data available to show how many refugees have applied for moving to another county and how often these requests are not accepted, it has been suggested that acceptance rates are generally low and permits are granted only in exceptional circumstances (ECRE 2017). Furthermore, considering that the vast majority of refugees are still not in employment or education, which in turn implies that exemption criteria are not met, movements within and across states are not likely to be common among

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<sup>6</sup>Exemptions apply, for instance, if the refugee or a close relative (spouse, domestic partner, or child) attends university/vocational training or has taken up employment with a certain number of working hours. For further information, see the Federal Ministry of Justice and Consumer Protection, 2016, Residence Act (Aufenthaltsgesetz) Section 12a, Art. 1.

refugees in Germany. Therefore, despite the fact that procedures vary between states, they share a common feature: allocation is very rarely linked to individual wishes, economic prospects, or cultural proximity (Stips and Kis-Katos 2020).

Table 4 provides descriptive evidence on moving patterns of refugees by showing shares of stayers and movers for the full-sample, restrictive states, and less-restrictive states. We find that only about 8 percent of refugees moved to another state from their initially assigned state. This suggests that geographical mobility of refugees is limited in Germany.

### ***Main features of the settlement policy and implications for our identification strategy***

The main objective of the settlement and mobility restriction policy is a fair distribution of refugees across counties aiming at avoiding tensions between natives and refugees, easing fiscal pressures as well as reducing the spatial co-ethnic concentration of refugees. However, a successful match between the distribution of refugees and local conditions was not the primary criterion (OECD 2017, p.62). Therefore, the policy minimizes concerns related to the endogenous residential sorting of refugees when analyzing the effects of initial local conditions. It also addresses two important potential sources of bias: (i) it is mandatory for states and counties to participate in the allocation program; (ii) it is also mandatory for refugees to participate in the allocation program. All three features (exogenous allocation, mobility restriction, and mandatory participation) of the settlement policy are crucial for our identification strategy as they generate a random allocation of refugees to counties. In other words, we rely on a quasi-natural experiment of exogenous allocation of refugees to identify the causal effect of initial local conditions on their multi-dimensional integration outcomes.

Having said this, we acknowledge the possibility that the institutional setting may fail to create a purely exogenous variation for identifying the causal impact of initial conditions. For example, we cannot certainly guarantee that all refugees spent all of their years in their initial county of residence due to the reasons discussed above or that the assignment of refugees into counties is completely free from political influence. To address this concern, we directly provide statistical evidence supporting the view that the distribution of refugees is exogenous to their characteristics. In particular, Table 6 shows that initial unemployment rates and attitudes towards migrants (that is, our treatment variables) are uncorrelated with refugees' socio-demographic characteristics. In the Robustness Checks, we further test whether our results can be explained by omitted variables bias following the method proposed by Oster (2019). These results suggest that small potential deviations from the settlement policy are unlikely to undermine our identification strategy and bolster the case that our results are not driven by endogeneity of where refugees live or because of some other concurrent social or political changes.

Table 1: Received versus assigned percentage share of asylum seekers per state

	2013		2014		2015		2016		2017	
	Received	Assigned	Received	Assigned	Received	Assigned	Received	Assigned	Received	Assigned
BB	2.8	3.1	2.8	3.1	4.2	3.1	2.5	3.0	2.8	3.0
BE	5.6	5.0	6.0	5.0	7.5	5.0	3.8	5.1	4.7	5.1
BW	12.2	13.0	9.5	13.0	13.0	12.9	11.7	13.0	10.8	13.0
BY	15.2	15.3	14.9	15.3	15.3	15.5	11.4	15.5	12.2	15.6
HB	1.0	0.9	1.3	0.9	1.1	1.0	1.2	1.0	1.3	1.0
HE	7.4	7.3	7.2	7.3	6.2	7.4	9.1	7.4	7.4	7.4
HH	2.9	2.5	3.3	2.5	2.8	2.5	2.4	2.6	2.4	2.6
MV	2.1	2.1	2.6	2.0	4.3	2.0	1.0	2.0	2.0	2.0
NS	9.3	9.4	8.9	9.4	7.8	9.3	11.5	9.3	9.5	9.4
NW	21.6	21.2	23.1	21.2	15.1	21.2	27.2	21.1	26.9	21.1
RP	5.0	4.8	5.0	4.8	4.0	4.8	5.1	4.8	6.5	4.8
SA	2.9	2.9	3.5	2.9	3.7	2.8	2.7	2.8	2.6	2.8
SH	3.4	3.4	4.1	3.4	3.5	3.4	4.0	3.4	3.1	3.4
SL	1.1	1.2	1.5	1.2	2.3	1.2	1.0	1.2	1.6	1.2
SN	4.6	5.1	3.5	5.1	6.2	5.1	3.3	5.1	3.7	5.0
TH	2.5	2.8	2.8	2.7	3.0	2.7	2.1	2.7	2.5	2.7
.	0.2	.	0.1	.	0.0	.	0.0	.	0.1	.

*Note:* Table 1 tabulates the actual share of refugees received by a particular state and the percentage share determined by the Königsstein Key. Abbreviations are as follows: BB – Brandenburg; BE – Berlin; BW – Baden Wurttemberg; BY – Bavaria; HB – Bremen; HE – Hessen; HH – Hamburg; MV – Mecklenburg-West Pomerania; NS - Lower Saxony; NW – North Rhine-Westphalia; RP – Rhineland Palatine; SA – Saxony Anhalt; SH – Schleswig Holstein; SL – Saarland; SN – Saxony; TH – Thuringia. Figures in percent. Source: BAMF (2014-2019).

Table 2: Determinants of refugee inflows at the county level by year

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2011	2012	2013	2014	2015	2016	2017
	b/se	b/se	b/se	b/se	b/se	b/se	b/se
Population size	0.002 (0.000)	0.002 (0.000)	0.003 (0.000)	0.004 (0.000)	0.009 (0.001)	0.009 (0.001)	0.005 (0.001)
Unemployment rate	8.046 (6.566)	14.837 (7.816)	13.756 (8.887)	16.974 (18.344)	-3.403 (64.811)	61.011 (43.755)	24.204 (18.551)
Population density	206.158 (134.749)	139.104 (165.148)	24.435 (174.103)	-237.237 (326.104)	-409.029 (1258.511)	-963.364 (753.145)	-211.751 (440.908)
GDP per capita	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.003 (0.002)	-0.003 (0.006)	0.000 (0.002)	0.001 (0.002)
Average age	9.527 (7.202)	-4.243 (8.877)	1.616 (10.217)	-10.567 (23.623)	-80.756 (87.246)	-32.611 (52.252)	-9.976 (23.842)
Housing space	-0.413 (4.054)	4.925 (4.455)	1.655 (5.064)	4.000 (8.112)	-3.097 (39.340)	6.537 (18.671)	1.104 (11.100)
Share tertiary education	41.808 (134.052)	132.982 (149.202)	190.745 (188.727)	598.335 (358.011)	1911.591 (1327.888)	1393.343 (920.332)	729.118 (393.449)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.955	0.955	0.960	0.937	0.855	0.918	0.930
N	388	398	398	398	398	398	398

*Note:* Ordinary least squares regression estimates are shown. Outcome variable is *number of assigned refugees*. Table 2 displays cross-sectional results for a test of random assignment conditional on the county's population size for the period 2011 - 2017. Population size corresponds to the total population in the respective county. Unemployment rate is the share of all unemployed persons of the labor force. Population density is mid-year population divided by land area (in square kilometers) of the county. The GDP per capita is total county GDP, divided by the population of the respective county. The average age is calculated based on the total population of the respective county. Housing space per capita is the average floor area per person (dweller) in family houses and apartment buildings. Robust standard errors clustered at the state level are in parentheses. Source: Destatis.

Table 3: Determinants of refugee inflows at the county level - pooled sample

	(1) Outcome: Number of assigned refugees b/se
Population size	0.005 (0.001)
Unemployment rate	18.454 (20.568)
Population density	-395.438 (364.452)
GDP per capita	-0.001 (0.002)
Average age	-24.156 (26.980)
Housing space per capita	-9.004 (11.104)
Share tertiary education	629.181 (348.249)
State FE	Yes
Year FE	Yes
R-Squared	0.752
N	2776

*Note:* Ordinary least squares regression estimates are shown. Table 3 displays cross-sectional results for a test of random assignment conditional on the county's population size for the period 2011 - 2017. Population size corresponds to the total population in the respective county. Unemployment rate is the share of all unemployed persons of the labor force. Population density is mid-year population divided by land area (in square kilometers) of the county. The GDP per capita is total county GDP, divided by the population of the respective county. The average age is calculated based on the total population of the respective county. Housing space per capita is the average floor area per person (dweller) in family houses and apartment buildings. Robust standard errors clustered at the state level are in parentheses. Source: Destatis.

Table 4: Moving patterns in Germany

	(1) Total	(2) Less restrictive states	(3) More restrictive states
Stayers	0.920 (0.272)	0.913 (0.282)	0.923 (0.267)
Moved across states	0.080 (0.272)	0.087 (0.282)	0.077 (0.267)
N	6261	2005	4256

*Note:* Means (standard deviations). IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018). Restrictive states are states that apply the residence rule more rigorously (at the county level) and city states. Stayers are refugees who live in their initial state of residence.

## 2.2 Access to Education and the Labor Market

Schooling is compulsory for all children in Germany and children’s right to education is protected by the United Nations (Massumi et al. 2015). This implies that children who have arrived in Germany as asylum seekers have to attend school after three to six months, irrespective of their type of residence permit. Adult refugees’ right to education, on the other hand, is expressed in the Geneva Refugee Convention, whereby refugees should be treated as favorably as possible, and in any event, not less favorably than other foreigners in the same circumstances (UNHCR 2017, Article 22).

Refugees’ access to the German labor market has been greatly facilitated in recent years (Sachverständigenrat deutscher Stiftungen für Integration und Migration 2017). In 2014, the employment ban for asylum seekers was reduced from nine to three months, so that asylum seekers are generally eligible to enter the German labor market three months after submitting their asylum request.<sup>7</sup> This excludes asylum seekers from Germany’s list of “safe countries” (that is, all EU member states, Albania, Bosnia-Herzegovina, Ghana, Kosovo, Montenegro, North Macedonia, Senegal, and Serbia), who are very unlikely to be granted a permanent residence permit. The “priority check” also has been abolished. With the “priority check” in place, asylum seekers in Germany could take up employment only if the Federal Employment Agency concluded that there was no German or EU citizen who would be available for that specific job. Refugees with a permanent residence permit have unrestricted access to the German labor market.

## 3 Data

### 3.1 IAB-BAMF-SOEP Survey of Refugees

We obtain information on refugees’ demographic characteristics and labor market outcomes in Germany from the IAB-BAMF-SOEP Survey of Refugees (the Survey), an annual survey focusing on migrants who are seeking protection from political persecution, war, and conflicts (Brücker et al. (2016) and DIW (2017)). The Survey is collected as part of the German Socio-Economic Panel (SOEP, see Goebel et al. (2019)) and has been carried out on an annual basis since 2016. It is representative of the nationalities and demographic characteristics of refugees who arrived in Germany from 2013 to 2016. The surveys are conducted in different languages and gather information from refugees aged 18 and older.

The Survey provides information on refugees’ location of residence histories, socio-demographic characteristics and integration outcomes in Germany. The first wave, conducted in 2016, covers 4,465 adult refugees

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<sup>7</sup>The period is extended to six months for asylum seekers with minor children and nine months for asylum seekers who are required to live in an initial reception center (<https://www.bmas.de/DE/Themen/Arbeitsmarkt/Infos-fuer-Asylsuchende/arbeitsmarktzugang-asylbewerber-geduldet.html>), last accessed 09.09.2020.

in Germany. The add-on samples added 2,965 observations in the subsequent survey years. The total sample covers 7,430 adult refugees, who have been part of the Survey at least once. We use the latest survey wave available (that is, v35, 2018) and pool information on all three waves. 62 percent of the pooled sample were interviewed in 2018, 22 percent in 2017 and the remainder in 2016.

The Survey is well-suited for our identification strategy as it provides information on refugees' residency at the time of interview and their initial place of residence.<sup>8</sup> This information allows us to exploit the exogenous assignment of refugees across German counties. In particular, we define our estimation sample as follows: (i) we drop respondents who do not provide information on their county of first residence; (ii) we then further limit the sample to refugees whose initial interview was during their first two years of residence in Germany. By doing so, we ensure that our sample only includes refugees who are exogenously allocated to counties and have not sorted themselves into another county for socio-economic reasons (see Section 2.1); (iii) we focus on young adults aged 18 to 49 (making up 91 percent of the refugee population) since this age group is much more likely to be active in terms of participation in the workforce or being in education. In our final sample, we study about 3,000 refugees aged 18 to 49 who have spent at least two years in Germany.

Figures A1 and A2 show the yearly distribution of refugees across the 401 German counties, for all refugees and refugees from main source countries, based on the Survey and administrative data from Destatis, respectively. As the number of refugees per state increases with tax revenues and population size, it is not surprising that western German states receive, on average, higher shares of refugees (Figure A2). A comparison with Figure A3 shows that these are the states with lower levels of unemployment. Yet, the figures emphasize that all German states have received refugees from the main source countries: Syria, Afghanistan, and Iraq. Furthermore, these figures illustrate that the SOEP successfully sampled refugees throughout Germany and that refugees' allocation resembles administrative numbers to a great extent. There are 38 NUTS-2 sub-regions and 401 counties (also known as districts) in Germany. Our representative sample consists of refugees from 259 German counties (about two-thirds of German counties). On average, we observe 60 refugees per county and the median equals 40 refugees.

### 3.2 Multi-dimensional Integration Index

We follow the framework outlined in Harder et al. (2018) to build a Multi-dimensional Integration Index. In particular, Harder et al. (2018) identify six crucial dimensions of integration: psychological, economic, political, social, linguistic, and navigational. The index aims to measure the degree to which immigrants

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<sup>8</sup>In their first SOEP interview, refugees are asked: "Now, please think of the accommodation in which you were housed the longest in Germany before your current accommodation. Where was this accommodation?" While information on the longest place of residence in the first interview should coincide with refugees' first place of residence in most cases, measurement error increases with the number of years in Germany. To circumvent this limitation, we limit the sample to refugees who gave their first SOEP interview in the first two years of residence in Germany.



have the knowledge and capacity to build a successful life in the host society and has two main components: (i) knowledge, which includes factors such as proficiency in the host country's language and ability to navigate the host country's labor market, political system, and social institutions; and (ii) capacity, which refers to the mental, social, and economic resources immigrants have to invest in their futures.

Based on the questions and definitions proposed in Harder et al. (2018), we construct a Multi-dimensional Integration Index, which consists of 12 survey questions scaled from 1 to 5. The final index scores are calculated at the individual record level by taking the sum of responses and dividing it by 12. We then rescale it to range from 0 to 1, with higher values indicating better integration.

In addition, we calculate six sub-indices for each dimension of integration. The respective dimensions are constructed using the following survey items:

1. Psychological integration (aims to capture respondents' feeling of connection with the host country): do you feel welcome in Germany? (1 not at all, 5 totally); how often do you feel like an outsider? (1 very often, 5 never);
2. Economic dimension (aims to capture respondents' economic activity in the host country): what were your gross net earnings last month? (1 lowest quintile, 5 highest quintile); information on work status (1 unemployed, 3 in education or training, 5 in paid work);
3. Political integration (aims to capture understanding of the political issues in the host country): do you think the following things should happen in a democracy or not? The people choose their government in free elections (1 should definitely not happen, 5 should definitely happen); civil rights protect the people from government oppression (1 should definitely not happen, 5 should definitely happen);
4. Social integration (aims to capture social ties and interactions with natives and non-natives in the host country): how often do you spend time with German people (1 never, 5 every day); how often do you spend time with people from other countries (1 never, 5 every day);
5. Linguistic integration (aims to capture respondents' assessment of their ability to read and speak the language of their host country): how well can you speak German (1 not at all, 5 very well); how well can you read German (1 not at all, 5 very well);
6. Navigational integration (aims to capture respondents' ability to manage basic needs in the host country): have you received help to look for employment (1 no, 5 yes); did you receive help to look for health care (1 no, 5 yes).

### 3.3 Administrative Data on County level Variables

Administrative data on additional county-level characteristics stems from the German Federal Statistical Office (Destatis). We use the share of foreigners of Syrian, Afghan, and Iraqi origin in refugees' counties of residence (as a proxy for pre-existing migrant networks) in 2014—before refugees started arriving in large numbers in Germany due to the Syrian Civil War. We use 2014 county-level unemployment rate as a proxy for local economic conditions.

We further utilize county-level far-right vote shares in federal elections to measure negative attitudes towards immigrants, using shares of second votes.<sup>9</sup> In particular, we include the following list of far-right parties: Alternative für Deutschland (AfD), Nationaldemokratische Partei Deutschland (NPD), Die Rechte, Die Republikaner, and pro Deutschland. The main far-right party, Alternative for Germany, was founded in 2013 to oppose Eurozone bailouts, but was gradually—and in particular after the refugee inflow in 2015—taken over by those whose primary focus was opposing immigration. As their takeover was completed with a change in party leadership in 2015, we use far-right vote shares in 2017 federal elections as our preferred measure of negative voter attitudes towards immigrants. In Section 5.6, we show the results are also robust to using county-level vote shares in the 2013 federal election to address any concerns from using a voting measure collected after most refugees had arrived. With respect to other far-right parties, the most notable is the NPD, which received 0.4 percent of votes in 2017.

### 3.4 Twitter Data and County Level Measure on Attitudes towards Immigrants

Given the lack of data on attitudes towards immigrants at the county level in existing survey datasets, we use geo-coded Twitter data in Germany in the pre-migration year 2014 to construct two novel county-level attitudes measures. To do so, we obtained access to the Twitter API, which provides Twitter's real-time and historical public data. We proceed as follows:

1. We first identify geo-located tweets that include words or hashtags related to migrants and migration (See Table A1).
2. Twitter API also provides two geographic measures: the exact coordinates and a geobox area—a square in which the tweet is located. If the exact coordinate is not available, we consider the center of the geobox as the coordinates. We then plot the tweets with a map of Germany and intersect it with each

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<sup>9</sup>German federal elections are used to elect members of the parliament. Voters have two votes: the first vote is used to elect a candidate in the district by first-past-the-post voting, and the second vote is for the party list. The second vote is more important as it determines the share of seats each party receives in the parliament. It is also the preferable measure of county-level party support as it is unaffected by district-specific idiosyncrasies, like direct candidates each party has presented in each district and tactical voting.

county (Figure A4). This results in 165,757 tweets (14,705 originally in English, which we translate them into German).

3. To prepare the tweets for the sentiment analysis, we remove usernames, links, and hashtags, but not the hashtagged words.

### *Constructing County-Level Attitudes Measures*

After matching the location of the tweet, we use python packages to conduct sentiment analysis, which is essentially the process of determining the attitude or the emotion of the tweet. We build two alternative measures: the Sentiment and the Polarity index.

SentimentWortschatz (or SentiWS) is a German dictionary that is trained to give each word a score. The python package SentiWS implements it for all words of a sentence (except for the articles, which do not have any sentiment, e.g., “the”). Using this package, we build an index that consists of the sum of scores of all words divided by the number of words that effectively have a score. It ranges between -1 and 1 (where higher values reflecting more negative attitudes). Overall, the procedure parses and analyzes the syntactic structure of the words and calculates a total sentiment score for the whole text (which can be positive, neutral or negative).

Using the package TextBlobDE for tweets in German, we construct an index of polarity, which accounts for sentence structure and ranges between -1 and 1 (where higher values reflecting more negative attitudes). This index allows us to construct a proxy for attitudes towards immigrants with a positive or negative value.

After classifying each tweet based on its sentiment and polarity and reweighting by the number of likes and retweets it received, we then take average of each measure within each county. Constructed measures are our treatment variables that capture local attitudes towards immigrants.

## **3.5 Descriptive Statistics on Refugees**

Table 5 presents descriptive statistics for our working sample from the IAB-BAMF-SOEP Survey of Refugees (see Section 3.1). For the full sample, we find that a majority of survey respondents are male (about 60 percent). On average, they have been in Germany for about 2.7 years. In terms of human capital, nearly 12 (48) percent of refugees have tertiary (secondary) education as their highest level of education.

When it comes to language skills, respondents were asked to assess their German proficiency (reading, writing, and speaking) on a 5-point likert scale from 1 “not at all” to 5 “very good”. We find that refugees’ average language skill score is about 3. Syrians (about 50 percent), Afghans (about 13 percent), and Iraqis (about 14 percent) are the most common nationalities in our sample. The recent report from the Federal Office of Migration and Refugees reports Syria (43 percent), Afghanistan (17 percent), and Iraq (11 percent)

Table 5: Descriptive statistics from the IAB-BAMF-SOEP Survey of Refugees

	(1) Full sample mean/sd	(2) Males mean/sd	(3) Females mean/sd
Female gender	0.387 (0.487)	0.000 (0.000)	1.000 (0.000)
Age in years	32.163 (8.269)	31.879 (8.371)	32.614 (8.087)
Years of schooling	8.497 (4.387)	8.750 (4.228)	8.096 (4.601)
Secondary education	0.477 (0.500)	0.494 (0.500)	0.450 (0.498)
Tertiary education	0.121 (0.326)	0.120 (0.325)	0.122 (0.328)
Married	0.638 (0.481)	0.562 (0.496)	0.758 (0.428)
Children in household	0.541 (0.498)	0.429 (0.495)	0.719 (0.450)
Worked in home country	0.656 (0.475)	0.838 (0.369)	0.368 (0.483)
Average German proficiency levels	3.105 (0.965)	3.268 (0.926)	2.848 (0.970)
Years since arrival	2.681 (0.719)	2.730 (0.718)	2.604 (0.713)
Year of arrival	2014.901 (0.645)	2014.864 (0.618)	2014.960 (0.681)
In education or employment	0.277 (0.448)	0.380 (0.485)	0.114 (0.318)
Syrian	0.525 (0.499)	0.519 (0.500)	0.535 (0.499)
Afghan	0.130 (0.336)	0.128 (0.334)	0.133 (0.339)
Iraqi	0.136 (0.343)	0.138 (0.345)	0.134 (0.341)
Islamic confession	0.730 (0.444)	0.733 (0.443)	0.725 (0.446)
Christian confession	0.133 (0.339)	0.129 (0.335)	0.138 (0.345)
Other confession	0.077 (0.267)	0.071 (0.257)	0.087 (0.281)
No confession	0.061 (0.239)	0.068 (0.251)	0.050 (0.217)
<i>N</i>	3524	2159	1365

*Note:* Means (standard deviations). Secondary education refers to 9 to 15 years of education and tertiary education refers to completed four years of education beyond “secondary education”. Average German language proficiency levels (speaking, writing, reading) at the time of the interview are measured on a scale from 1 “not at all” to 5 “very good”. Years since arrival is defined as the difference between year of the interview and year of arrival. Being in employment or education is equal to one for IAB-BAMF-SOEP survey respondents in employment or education. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018).

to be the main countries of origin (BAMF 2017), suggesting good representativeness of our sample in terms of nationalities.

Table A2 presents refugees' main activities separately for both genders, and for men and women separately by the number of years since arrival. Similar to Brücker et al. (2020) and Brell et al. (2020), we find that the percentage of refugees not being in employment or training decreases with years of residence in Germany and that after three years of residence in Germany roughly 30 percent of refugees are employed.

There are also major gender differences: less than 7 percent of women are employed full- or part-time, while 28 percent of men are. While men and women are about equally likely to go to school or university, the share of women taking part in vocational training (including apprenticeship) is much lower than among men. Irrespective of the duration of stay in Germany, the share of women who are employed or in education or training is considerably lower than among men. While the share of those employed and the share of those studying or participating in vocational training increase over time, a majority of female refugees remains unemployed even after five years in Germany. Part of this gender gap is related to the presence of children: 72 percent of female refugees report to have a minor child in the household, in contrast to 43 percent of male refugees. However, Table A3 shows that major gender differences remain even if attention is restricted to singles without children.

### **3.6 Descriptive Statistics on County-level Unemployment and Attitudes**

Figure A3 shows graphical evidence on county-level variation in our main explanatory variables: unemployment rates in 2014, the negative sentiment index in 2014, and the share of votes to far-right parties in 2017. Panel A illustrates that unemployment rates vary substantially across counties. In general, unemployment rates tend to be higher in eastern Germany, while being lower in Baden-Wurttemberg and Bavaria. The second map measures negative sentiment towards immigrants at county level in 2014, based on the content analysis of tweets. The third map shows far-right voting at county level in 2017. Comparing the three maps shows that although both unemployment and far-right voting are highest in former East Germany, there are also significant regional differences between the two. For example, unemployment is relatively high and far-right vote share relatively low in big parts of North Rhine-Westphalia, while the reverse is the case in big parts of Baden Wurttemberg and Bavaria.

There is substantial variation in all attitude measures across counties. The unemployment rate in 2014 ranged from 1.5 percent to 17.1 percent, with standard deviation of 0.98 percentage points. The negative sentiment towards immigrants in 2014 ranged from -0.226 to 0.185, on a scale from -1 to 1. The lowest county-level far-right vote share in 2017 was 5.0 percent, and the highest 37.2 percent, with standard deviation of 1.07

percentage points. In 2013, the standard deviation of county-level far-right vote share was 1.05 percentage points.

## 4 Empirical Strategy

We estimate linear probability models for the dichotomous outcomes for ease of interpretation, though logistic regression models returned similar patterns. For continuous outcomes, we rely on ordinary least squared estimations (OLS). In our main specification using attitudes and unemployment measured in 2014, our models take the form:

$$Y_{ict} = \beta_1 UE_{c,2014} + \beta_2 Attitudes_{c,2014} + \gamma X_{it} + \delta X_{ct} + \eta_t + \zeta_{nuts2} + \epsilon_{ict}, \quad (1)$$

where  $Y_{ict}$  is the integration outcome of refugee  $i$  in county  $c$  (at the time of the interview) and interview year  $t$ . We use several measures for refugees' social and economic integration in Germany: (i) being in employment or education; (ii) being in full- or part-time employment; (iii) the net monthly wages; and (iv) the Multi-dimensional Integration Index. Since the wage variable has a few outliers and substantial number of zeros, the natural logarithm is an unsuitable transformation. We, therefore, follow common practice and apply the inverse hyperbolic sine transformation (see, Bellemare and Wichman (2020) and Aksoy et al. (2021)).

We focus on county level for two reasons. First, as most states use a formal allocation rule that determines the allocation of refugees between counties, while leaving the allocation into different municipalities within counties into county administration, we can be more confident on the quasi-randomness of refugee allocation at the county level than, say, at municipal level. A second advantage of focusing on county-level integration outcomes is that counties are, on the one hand, sufficiently numerous so that they allow estimating the effects with a reasonable statistical power, and, on the other hand, sufficiently big so that most of daily interactions take place within the county.

The variable  $UE_{c,2014}$  measures the county-level unemployment rate in 2014 in the initial county of residence to address endogeneity of unemployment in response to mass migration (using lags relative to the survey year or year of arrival gives quantitatively and qualitatively similar patterns as shown in the Robustness Section).  $Attitudes_{c,2014}$  captures attitudes towards migrants in the refugee's initial county of residence, measured in 2014. To be able to compare the point estimates, we report the standardized coefficients throughout the paper. Importantly, raw correlation between initial unemployment rate and negative sentiment towards migrants is low (0.38), suggesting that attitudes do not co-vary with unemployment. This

enables us to estimate the impact of local unemployment on refugee integration, holding attitudes constant and vice versa. The raw correlation between initial unemployment and far-right vote share is even lower (0.19).

In all models, we include year of interview dummies (to capture the impact of country-level shocks that affect all counties simultaneously) and current NUTS-2 sub-region dummies (to control for time-invariant variation in the outcome variables caused by factors that vary across sub-regions).<sup>10</sup> In the robustness section, we also show that our results remain very similar when we include (NUTS-2) sub-region by year fixed effects, which control for all potentially omitted variables that can vary across (NUTS-2) sub-regions and years (such as, a shift in public resources or state-specific integration policies).

$X_{it}$  is a vector of demographic variables that includes: a dummy variable for female gender; a dummy variable for the presence of children in the household (any child aged 15 or below); a dummy variable for being married/living in partnership; a dummy for the German language skills before migration;<sup>11</sup> a dummy variable for having received support from family or friends before migration; a dummy variable for having completed an integration course; a dummy variable indicating a good health status; age group dummies (25-29, 30-34, 35-39, 40-44, 45-49)<sup>12</sup>; education dummies (secondary education, tertiary education; acquired in the country of origin); country of origin dummies (Afghan origin, Iraqi origin, other origin) with Syrian origin as reference category; religion dummies (Christian, No Confession, Other confession) with Muslim as reference category; dummy variables for years of residence in Germany (three years of residence, four years of residence) with two years of residence as reference category.  $X_{ct}$  is a vector of county-level existing migrant networks that includes: the share of Syrians, Afghans, and Iraqis in the current county of residence in 2014 – these covariates control for the existing migrant networks. We cluster robust standard errors,  $\epsilon_{ict}$ , at the level of county to account for the potential correlation existing in the errors within the same county. We show in the Appendix that our results remain virtually the same, when standard errors are calculated using corrections for spatial correlation (Conley 1999)<sup>13</sup> and clustered at the state level.

### ***Identification assumption and balancing tests***

As discussed in Section 2.1, the exogenous allocation of refugees across counties avoids the bias from endogenous sorting due to growing demand for labor (Card 1990) or pre-existing ethnic enclaves (Edin et

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<sup>10</sup>We cannot include county-fixed effects since county-level unemployment rates and attitudes towards migrants are measured in 2014. Instead, we include current NUTS-2 sub-region fixed effects throughout.

<sup>11</sup>The respective survey question separately asks: How well could you read/speak/write German before you moved to Germany? [Not at all; Poorly; Fairly; Good; Very good]. The dummy variable takes a value of one for refugees with at least “good” German skills in all three dimensions and zero otherwise.

<sup>12</sup>For the outcome variable “Full- or part-time employed”, we restrict the age range to refugees aged 25 to 49. Hence, in this case we restrict the age dummies to 30-34, 35-39, 40-44, 44-49.

<sup>13</sup>In particular, we use statistical package, *acreg*, provided by Colella et al. (2019). The cut-off window we use is 100 km, but the results are virtually unchanged for 75 km, 125 km, and 150 km—the results with alternative distance cut-offs are not reported here but available upon request.

Table 6: Evidence on the validity of identification assumption

	(1)	(2)	(3)	(4)	(5)	(6)
	Unem- ployment rate std. (2014) b/se	Unem- ployment rate std. (2014) b/se	Negative sentiment index std. (2014) b/se	Negative sentiment index std. (2014) b/se	Far-right voting vote std. (2017) b/se	Far-right vote share std. (2017) b/se
<i>Panel A - First two years</i>						
Age at migration	0.001 (0.006)	-0.005 (0.003)	-0.003 (0.004)	0.001 (0.001)	-0.001 (0.002)	0.001 (0.001)
Female	-0.092 (0.124)	-0.004 (0.067)	0.018 (0.032)	-0.013 (0.008)	-0.005 (0.026)	-0.021 (0.019)
Secondary education	0.002 (0.095)	0.034 (0.065)	-0.050 (0.038)	-0.015 (0.024)	-0.104 (0.079)	-0.015 (0.021)
Tertiary education	0.069 (0.220)	0.069 (0.150)	-0.027 (0.034)	-0.040 (0.019)	-0.022 (0.043)	-0.008 (0.033)
Speak German before migration	-0.360 (0.458)	-0.374 (0.272)	-0.071 (0.171)	0.048 (0.030)	0.264 (0.276)	0.051 (0.077)
Write German before migration	2.135 (2.391)	1.179 (2.377)	-0.070 (0.281)	-0.231 (0.209)	-0.447 (0.369)	-0.088 (0.154)
Read German before migration	-1.566 (2.409)	-0.610 (2.408)	0.329 (0.239)	0.248 (0.184)	0.164 (0.396)	-0.244 (0.196)
State FE	No	Yes	No	Yes	No	Yes
Year of arrival FE	Yes	Yes	Yes	Yes	Yes	Yes
Country of origin FE	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.016	0.504	0.007	0.926	0.021	0.641
N	2611	2611	2634	2634	2639	2639
<i>Panel B - Full sample</i>						
Age at migration	0.004 (0.005)	-0.002 (0.002)	-0.003 (0.003)	0.000 (0.000)	-0.000 (0.001)	-0.000 (0.001)
Female	-0.003 (0.100)	-0.030 (0.060)	-0.026 (0.016)	0.002 (0.007)	-0.006 (0.026)	-0.017 (0.012)
Secondary education	0.142 (0.113)	0.069 (0.056)	-0.069 (0.056)	-0.005 (0.016)	-0.077 (0.062)	-0.006 (0.017)
Tertiary education	0.185 (0.204)	-0.015 (0.131)	-0.106 (0.077)	-0.035 (0.021)	-0.049 (0.045)	-0.012 (0.038)
Speak German before migration	-0.164 (0.447)	-0.081 (0.357)	0.101 (0.067)	0.021 (0.025)	-0.034 (0.171)	0.016 (0.063)
Write German before migration	0.592 (1.222)	0.318 (0.894)	0.424 (0.464)	-0.039 (0.062)	0.026 (0.245)	-0.037 (0.186)
Read German before migration	0.480 (1.247)	0.401 (0.902)	-0.477 (0.454)	0.025 (0.074)	0.017 (0.306)	-0.110 (0.100)
State FE	No	Yes	No	Yes	No	Yes
Year of arrival FE	Yes	Yes	Yes	Yes	Yes	Yes
Country of origin FE	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.013	0.480	0.005	0.906	0.011	0.627
N	6082	6082	6171	6171	6178	6178

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the state level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. Reference category is primary education. Source: Destatis, IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).



al. 2003). Our key identifying assumption is that the allocation of refugees is independent of county-level unemployment rates in 2014 and attitudes towards migrants (negative sentiment index in 2014 and far-right vote share in 2017). If the distribution of refugees is indeed exogenous to local conditions, unemployment rates and attitudes towards migrants should be uncorrelated with refugees’ individual-level characteristics. To validate this argument, we provide a direct evidence in Table 6 following Barsbai et al. (2019) and Couttenier et al. (2019). Panel A (B) use the sample of refugees who were interviewed in the first two years after arrival (the full-sample). Columns 1 and 2 present results for county-level unemployment rate; Columns 3 and 4 for county-level negative sentiment index; Columns 5 and 6 for county-level far-right vote share in 2017. In line with our identification assumption, for both samples, only one out of the 84 coefficients is statistically significant.<sup>14</sup> Overall, the results presented in Table 6 strongly suggest that the allocation of refugees is an exogenous process. The finding that none of the refugee characteristics predict far-right voting in 2017 is especially notable as one could be concerned, a priori, that voting outcomes in 2017 would have reflected which type of refugees were allocated in the county.

## 5 Results

In this section, we analyze how local unemployment and attitudes towards immigrants affect refugees’ labor market and social integration outcomes. Local initial conditions and outcomes are measured at the county level. We measure attitudes towards immigrants in the first subsection by negative sentiment index towards immigrants in Twitter, and in the second subsection, by far-right vote share. We then calculate policy implications of our findings in terms of public finances, unbundle the effects on different components of the Multi-dimensional Integration Index, investigate the heterogeneity in terms of gender, and conclude by presenting various robustness checks.

### 5.1 Unemployment, Negative Sentiment, and Integration Outcomes

We first examine the effects of local conditions at the time of arrival (that is, unemployment rate and negative sentiment index towards immigrants) on the probability of refugees being later in employment or education (Column 1 of Table 7); being in full- or part-time employment (Column 2 of Table 7); their net monthly wages (Column 3 of Table 7); and Multi-dimensional Integration Index (Column 4 of Table 7). We present results for refugees aged 18 to 49 in the year of the interview, apart from Column 2 in which the age restriction is 25 to 49. The sample is restricted to those with a minimum of two years of residence in Germany and

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<sup>14</sup>Tertiary-educated refugees are somewhat more likely to be allocated into counties with less negative sentiment. While this may appear as a problem for identification strategy at the first sight, its effect is alleviated by us always controlling for the level of education.

standardized coefficients are reported throughout.

Table 7 shows that both the county-level unemployment rate and attitudes towards immigrants play a major role: one standard deviation increase in county-level unemployment rate, corresponding to 0.98 percentage points higher unemployment rate, leads to a 5.1 (5.2) percentage points decrease in the likelihood of refugees being in employment or education (full- or part-time employment). The point estimates on negative sentiment index (that is, higher values reflecting more negative attitudes) suggest that a one standard deviation increase in the negative sentiment index leads to a 3.5 (5.1) percentage points decrease in the likelihood of refugees being in employment or education (full- or part-time employment). To put our results in perspective, the introduction of the expanded and improved early language training led to a 4 percentage points higher employment rate among treated refugees in Denmark over 18 years (Arendt et al. (2020)). We find similar effects from refugees being placed in a county with one standard deviation lower unemployment rate or in a county with one standard deviation less negative attitudes towards immigrants already after 2 to 5 years. Sarvimäki and Hämäläinen (2016), in turn, estimate that restructuring active labor market program for unemployed immigrants in Finland increased cumulative earnings of affected immigrants by 47 percent over 10 years. We find an effect of 35 percent on net monthly wages from simply reallocating refugees to a county of a one standard deviation lower unemployment rate or more welcoming attitudes.

We also find that both unemployment rate and negative sentiment index have statistically significant negative effects on net monthly wages (with the effects being quantitatively the same). In Column 4, we find that less favorable attitudes towards immigrants and unemployment rate also negatively affect refugees' multi-dimensional integration. The magnitude of the standardized coefficients suggests that attitudes towards migrants are somewhat more important than the local unemployment rate when it comes to multi-dimensional integration of refugees.

Looking at other covariates, refugees with tertiary education and satisfactory health status consistently exhibit better integration outcomes, while female refugees have consistently worse integration outcomes than male refugees. This gender gap is in line with female refugees' higher unemployment rates both in general (Table A2) and among singles without children (Table A3).

## 5.2 Far-right Voting and Integration Outcomes

In a democratic society, voting can reveal voters' true preferences to politicians and the general public and may be used strategically to punish or reward politicians and parties. To what extent do the local populations' negative attitudes towards immigrants—proxied by their voting for anti-immigration parties—hamper refugees' economic and social integration? To answer this question, we turn to our second measure

Table 7: Determinants of refugees' labor market and social outcomes

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.051 (0.014)	-0.052 (0.013)	-0.345 (0.082)	-0.017 (0.007)
Negative sentiment index std. (2014)	-0.035 (0.028)	-0.051 (0.024)	-0.345 (0.207)	-0.025 (0.011)
Female	-0.226 (0.016)	-0.194 (0.014)	-1.479 (0.097)	-0.082 (0.005)
Secondary education	0.029 (0.015)	0.016 (0.016)	0.071 (0.110)	0.037 (0.007)
Tertiary education	0.069 (0.022)	0.059 (0.022)	0.442 (0.171)	0.061 (0.011)
Married/In partnership	-0.050 (0.021)	0.010 (0.023)	0.017 (0.150)	-0.025 (0.008)
Children in household	-0.074 (0.019)	-0.076 (0.020)	-0.643 (0.141)	0.004 (0.009)
Satisfactory health status	0.070 (0.021)	0.053 (0.018)	0.342 (0.139)	0.045 (0.010)
Participated in integration course	-0.003 (0.018)	-0.009 (0.016)	-0.048 (0.121)	0.041 (0.006)
German skills before emigration	0.063 (0.047)	0.003 (0.042)	0.365 (0.376)	0.068 (0.017)
Support from family & friends before emigration	-0.007 (0.018)	-0.000 (0.019)	-0.146 (0.130)	0.004 (0.007)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.216	0.198	0.213	0.258
N	3030	2329	2878	2280

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable “In employment or education” takes a value of one for refugees who report being in employment or education. Outcome variable “Full- or part-time employed” is one for refugees who report being in full- or part-time employment. Outcome “Net monthly wages” are net monthly wages, in inverse hyperbolic sine transformation. Table 7 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. For the full set of variables, please check Table A5. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

of negative attitudes towards immigrants: far-right vote shares. We focus on county-level electoral results in the 2017 federal election, showing results for the 2013 federal election in the robustness checks.

Table 8 suggests a strong negative effect of far-right vote shares on refugees' subsequent integration outcomes. A one standard deviation increase in far-right vote share, corresponding to a 1.07 percentage point increase in their vote share, is associated with 3.2 percentage points lower probability of refugees being subsequently in employment or education, 2.2 percentage points lower probability of full-time or part-time employment, and 14.4 percentage points lower net monthly wages, on average. Importantly, these effects are present when local unemployment rates are also controlled for.<sup>15</sup>

Our results complement previous research that has shown that immigration has increased the support for far-right parties across Europe (see, for example, Otto and Steinhardt (2014), Halla et al. (2017), Dustmann et al. (2019), Edo et al. (2019), Hangartner et al. (2019)). While these papers have used exogenous or instrumented immigrant residential allocations to estimate the impact of immigration on far-right voting, we estimate to what extent negative attitudes by locals, expressed in their far-right voting, hamper integration outcomes of refugees who have been exogenously allocated to a given location.

### 5.3 Policy Implications

A failure to integrate refugees into the labor market imposes significant costs both on the refugees and on the receiving society. Our estimations using unemployment and negative sentiment index suggest that placing a working-age refugee aged 25 to 49 in a county with a one standard deviation lower county-level unemployment rate increases the probability of them being in full- or part-time employment after two years by 5.2 percentage points, while a one standard deviation lower negative sentiment index towards immigrants at the county level is associated with an employment increase of 5.1 percentage points. Estimations using far-right voting suggest that placing a working-age refugee aged 25 to 49 in a county with a one standard deviation lower county-level unemployment rate increases the probability of them being in full- or part-time employment after two years by 4.9 percentage points, while a one standard deviation lower far-right vote share at the county level is associated with an employment increase of 2.2 percentage points. Clearly, it would not be possible to place all refugees in more desirable locations without general equilibrium effects through higher labor supply which would negate part of the gains. Yet, it is informative to calculate a rough estimate of potential gains for refugees and receiving society from better labor market outcomes associated

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<sup>15</sup>In the first version of this paper, circulated as CESifo Working Paper No. 8747 in 2020, we used AfD vote share at the county level as one attitude measure, and the results were qualitatively similar. More recently, Schilling and Stillman (2021) found similar results with AfD vote shares at the municipal level. We prefer to analyze voting at the county level as refugees are allocated by states to counties, not municipalities, and refugee allocation within counties could respond to municipal-level attitudes towards immigrants. In the current version, we switched to the vote share of all far-right parties as it is a more comprehensive measure than the AfD vote alone.

Table 8: Far-right voting and refugees' labor market and social outcomes

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.047 (0.014)	-0.049 (0.012)	-0.327 (0.084)	-0.016 (0.007)
Far-right vote share std. (2017)	-0.032 (0.013)	-0.022 (0.011)	-0.144 (0.084)	-0.010 (0.005)
Female	-0.227 (0.015)	-0.195 (0.014)	-1.488 (0.097)	-0.083 (0.006)
Secondary education	0.029 (0.015)	0.016 (0.016)	0.074 (0.110)	0.037 (0.007)
Tertiary education	0.069 (0.022)	0.060 (0.022)	0.450 (0.169)	0.061 (0.011)
Married/In partnership	-0.051 (0.021)	0.010 (0.023)	0.018 (0.151)	-0.025 (0.008)
Children in household	-0.073 (0.019)	-0.075 (0.020)	-0.636 (0.141)	0.004 (0.009)
Satisfactory health status	0.069 (0.021)	0.054 (0.018)	0.332 (0.135)	0.045 (0.010)
Participated in integration course	-0.004 (0.018)	-0.010 (0.016)	-0.057 (0.120)	0.040 (0.006)
German skills before emigration	0.066 (0.047)	0.006 (0.042)	0.371 (0.373)	0.069 (0.017)
Support from family & friends before emigration	-0.007 (0.018)	0.000 (0.019)	-0.146 (0.130)	0.003 (0.007)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.217	0.197	0.212	0.257
N	3035	2332	2883	2285

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable “In employment or education” takes a value of one for refugees who report being in employment or education. Outcome variable “Full- or part-time employed” is one for refugees who report being in full- or part-time employment. Outcome “Net monthly wages” are net monthly wages, in inverse hyperbolic sine transformation. Table 8 includes the full set of covariates, as described in Section 4. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Destatis.

with more advantageous placements in the absence of general equilibrium effects.<sup>16</sup>

Refugees with a valid residence status who are not in employment or education are entitled to the same social benefits as natives in Germany (Informationsverbund Asyl und Migration 2020). Since few refugees have been employed for a period of 12 months, this means that refugees who are unemployed receive on average €400 of monthly unemployment benefits (“Hartz IV”), corresponding to €4,800 per year. Yet, this is an underestimate of the actual cost to the state as it excludes government spending on housing and health care, other social benefits, as well as loss of potential tax revenues in the case of refugees’ employment.

In Panel A of Table 8, we use IAB-BAMF-SOEP survey data to calculate gross and net earnings as well as average social benefits received per month separately for refugees who are employed either full-time or part-time and for refugees who are not in employment. To be consistent with our main analysis, we restrict the sample to those aged 25 to 49 who have been in Germany for at least two years. We also restrict the analysis to those who have received a positive asylum decision. This results in a conservative estimate of total savings in social benefits from employment as those whose application is still processed receive also asylum benefits.<sup>17</sup> Panel A shows that employed refugees have annual gross earnings of €19,700 and net earnings of €14,800, compared with about €300 for those who are not in employment at the time of the interview. On the other hand, the amount received in social benefits among unemployed refugees is about €9,600 per year, but only €4,900 for those who are in employment. Therefore, finding employment generates considerable economic gains for refugees and eases the burden on government finances.

In Panel B, we calculate potential gains for the public sector if 100,000 refugees aged 25 to 49 would be reallocated more favorably.<sup>18</sup> Our estimates suggest that the public finance gains from more efficient allocation policies would be substantial: reallocating 100,000 refugees to counties with one standard deviation lower unemployment rate would save the public sector about €46 to €49 million annually in lower welfare spending and higher revenue, with the lower range corresponding to an employment gain of 4,900 and the upper range to an employment gain of 5,200. Reallocation to counties with one standard deviation more

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<sup>16</sup>Bansak et al. (2018) used machine learning to analyze optimal allocation of refugees in Switzerland and the United States. In Switzerland, the third-year employment rate was 15 percent under the actual assignment, while the predicted third-year employment rate would be 26 percent under the optimized assignment. Additional gains could well be reached also in Germany if refugees’ characteristics would be used as an additional matching criterion, as suggested by Bansak et al. (2018).

<sup>17</sup>While average gross and net earnings are calculated on individual basis, social benefits are calculated per adult person in the household per month. This is because social benefits in Germany are determined at the household level. We exclude benefits related to children from these calculations as these can be seen as an investment in the next generation.

<sup>18</sup>In particular, we use the following formulas: Average annual savings in social benefits for an employed refugee = ((average monthly social benefits of refugees not in employment) - (average monthly social benefits of refugees in employment))\*12. Annual tax revenue from a refugee = ((monthly gross earnings) - (monthly net earnings))\*12. Reallocating 100,000 refugees to counties with one standard deviation lower unemployment (counties with one standard deviation more welcoming attitudes towards immigrants) would move 5,200 (5,100) refugees to employment, according to the estimates in column 2 of Table 7 using negative sentiment index to measure local attitudes. If using far-right vote shares to measure local attitudes, reallocating 100,000 refugees to counties with one standard deviation lower unemployment (one standard deviation lower far-right vote share) would move 4,900 (2,200) refugees to employment, according to the estimates in column 2 of Table 8.

Annual gains from the reallocation are the product of the increase in employment and the sum of the additional annual revenue and saving in the benefits when an individual refugee moves to employment, corresponding to €4939 + €4411.

Table 9: Social benefits and policy implications

	(1) Employed full- or part-time	(2) Not in employment
<i>Panel A: Refugees' average monthly earnings and social benefits</i>		
Average social benefits per capita	€ 407.82	€ 775.38
Average gross earnings	€ 1,645.39	€ 27.37
Average net earnings	€ 1,231.13	€ 24.68
<i>N</i>	316	1,338
<i>Panel B: Public finance gains from better allocation of 100,000 refugees</i>		
Annual savings in social benefits for a newly employed refugee	€ 4,411	
Annual additional revenue from a newly employed refugee	€ 4,939	
Annual gains from reallocating to counties with lower unemployment	€ 46 to 49 million	
Annual gains from reallocating to more welcoming counties	€ 21 to 48 million	

*Note:* Panel A displays the average amounts received per capita per month. Panel B displays annual public finance gains from better allocation of refugees, first per capita and then aggregated over 100,000 refugees aged 25 to 49. In the aggregation, the lower bound corresponds to estimates from table 8 and the upper bound to the estimates from table 7. The variable “Average social benefits per capita” measures the average amount of social benefits received per capita per month. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany aged 25 to 49. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018).

welcoming attitudes would save €48 million if attitudes are measured by negative sentiment index, and €21 million if attitudes are measured by far-right vote share. It should be noted that savings from social benefits and additional revenues are an underestimate as housing and utility costs for the recipients of basic unemployment benefits are directly paid for by the state, so they are not included in the reported benefits.

## 5.4 Unbundling the Multi-dimensional Integration Index

This section explores how unemployment rate and the negative sentiment index affect the components of Multi-dimensional Integration Index.

In Table 10, we consider six sub-indices of the Multi-dimensional Integration Index. The outcomes across the columns are as follows: Psychological Integration in Column 1; Linguistic Integration in Column 2; Economic Integration in Column 3; Political Integration in Column 4; Social Integration in Column 5; and Navigational Integration in Column 6.

The results suggest that both the unemployment rate and the negative sentiment index are relevant in explaining social and economic components of the index with similar point estimates. Yet we find no evidence

that the unemployment rate or the negative sentiment index affects psychological, linguistic, political, or navigational integration outcomes.

Although we view this as an exploratory exercise rather than a testing of a specific hypothesis, our results suggest that attitudes towards migrants not only matter for refugees' economic integration but also affect their social integration into the host country. This finding is important as previous literature has not paid much attention to the role of attitudes towards immigrants in refugees' integration.

## 5.5 Gender Differences

As shown already in Table 5, there is a major gender difference in refugees' integration outcomes, with 38 percent of men, but only 11 percent of women, being in education or employment. Therefore, we next analyze the effects of initial conditions on refugees' labor market and social outcomes separately by gender.

Table 11 shows the effects of unemployment rate and the negative sentiment index in Panel A for males and in Panel B for females. The effects of local unemployment are considerably stronger for males. A one standard deviation higher initial local unemployment reduces males' chances of being in employment or education by about 7 percentage points, the effect being almost identical when analyzing full- or part-time employment, and also depresses net monthly wages and values of the Multi-dimensional Integration Index.

The negative sentiment index, in turn, predicts lower earnings and multi-dimensional integration for females. For females, the point estimate of the earnings penalty of a one standard deviation higher negative sentiment index is twice as large as the point estimate of the earnings penalty of a one standard deviation higher local unemployment rate.

## 5.6 Robustness Checks

In this subsection, we provide additional checks on the robustness of the main results.

### *Robustness to alternative measures of attitudes towards immigrants*

We use two alternative variables to measure attitudes towards immigrants at the county level. In particular, we use polarity index (constructed using Twitter data) in Table A6 and vote share of far-right parties in 2013 elections in Table A7. In line with our main results, these alternative measures also suggest that negative attitudes towards immigrants worsen refugees' economic and social integration outcomes.

### *Robustness to omitted variable bias*

Although we exploit the exogenous variation generated by centralized refugee allocation policy and control for various observable characteristics and fixed effects, one still might be concerned whether our results are



Table 10: Effect of unemployment and negative sentiment index towards immigrants on the dimensions of the Multi-dimensional Integration Index

	(1)	(2)	(3)	(4)	(5)	(6)
	Psychological	Linguistic	Economic	Political	Social	Navigational
	b/se	b/se	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.002 (0.012)	-0.002 (0.009)	-0.040 (0.012)	-0.002 (0.006)	-0.031 (0.015)	-0.011 (0.012)
Negative sentiment index std. (2014)	-0.023 (0.015)	-0.008 (0.014)	-0.057 (0.025)	-0.000 (0.010)	-0.041 (0.022)	0.001 (0.019)
Female	0.009 (0.008)	-0.073 (0.010)	-0.220 (0.013)	-0.008 (0.006)	-0.091 (0.012)	-0.047 (0.012)
Secondary education	-0.011 (0.010)	0.122 (0.010)	0.020 (0.015)	0.007 (0.006)	0.053 (0.013)	-0.002 (0.014)
Tertiary education	-0.036 (0.017)	0.238 (0.014)	0.055 (0.021)	0.014 (0.009)	0.030 (0.019)	0.023 (0.024)
Married/In partnership	-0.001 (0.014)	-0.053 (0.012)	-0.015 (0.020)	0.005 (0.009)	-0.048 (0.019)	-0.015 (0.017)
Children in household	0.049 (0.014)	0.013 (0.011)	-0.069 (0.019)	0.003 (0.009)	0.006 (0.018)	0.018 (0.018)
Satisfactory health status	0.057 (0.017)	0.049 (0.014)	0.060 (0.020)	0.017 (0.013)	0.063 (0.021)	-0.015 (0.019)
Participated in integration course	0.035 (0.010)	0.073 (0.009)	0.113 (0.016)	0.000 (0.006)	0.017 (0.013)	-0.020 (0.013)
German skills before emigration	-0.018 (0.024)	0.113 (0.026)	0.070 (0.042)	0.020 (0.011)	0.100 (0.030)	0.064 (0.043)
Support from family & friends before emigration	0.024 (0.011)	-0.010 (0.010)	-0.002 (0.017)	0.003 (0.006)	-0.011 (0.016)	0.019 (0.014)
Interview year FE	Yes	Yes	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.080	0.357	0.273	0.057	0.155	0.065
N	2280	2280	2280	2280	2280	2280

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Dimensions are set similar to Harder et al. (2018). Table 10 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. Reference categories are as follows: male, primary education, aged 18-24, two years of residence in Germany, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

Table 11: Determinants of refugees' labor market and social outcomes, by gender

	(1) In employment or education	(2) Full or part-time	(3) Net monthly wages	(4) Multi-dimensional Integration Index
<i>Panel A - Males</i>				
Unemployment rate std. (2014)	-0.066 (0.018)	-0.070 (0.020)	-0.442 (0.118)	-0.024 (0.008)
Negative sentiment index std. (2014)	-0.038 (0.038)	-0.055 (0.039)	-0.334 (0.291)	-0.018 (0.014)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.177	0.170	0.196	0.199
N	1846	1369	1713	1402
<i>Panel A - Females</i>				
Unemployment rate std. (2014)	-0.016 (0.018)	-0.020 (0.015)	-0.156 (0.092)	-0.008 (0.009)
Negative sentiment index std. (2014)	-0.025 (0.031)	-0.020 (0.020)	-0.316 (0.170)	-0.033 (0.015)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.148	0.111	0.109	0.262
N	1184	960	1165	878

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable "In employment or education" is one for refugees who report being in employment or education. Outcome variable "Full- or part-time employed" is one for refugees who report being in full- or part-time employment. Outcome "Net monthly wages" are net monthly wages, in inverse hyperbolic sine transformation. Table 11 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

driven by omitted unobservable factors (such as political influence in refugees' allocation across counties). To investigate this concern formally, we perform a rigorous robustness check following the method proposed by Oster (2019).

In both panels of Appendix Table A8, we first reprint the baseline estimates for our main outcomes in the top rows for comparison purposes. The second rows present the estimation bounds where we define  $R_{max}$  upper bound as 1.3 times the R-squared in specifications that control for observables following Oster (2019).<sup>19</sup> The bottom row presents the Oster's delta, which indicates the degree of selection on unobservables relative to observables that would be needed to fully explain our results by omitted variable bias. The results presented point to a very limited movement in coefficients. High delta values also indicate that the unobservables have less effect on our coefficient of interest than the observables. Given the exogenous variation generated by the policy and wide-range of controls we include in our models, it is extremely unlikely that there are unobserved factors that are 5 to 105 times as important as all observables. Therefore, the estimates suggest that our results are unlikely to be driven by omitted-variable bias.

### ***Robustness to NUTS-2 sub-region by year fixed effects***

We also saturate our main specification with NUTS-2 sub-region by year fixed-effects, which helps us to control for all potential omitted variables (such as within-state policy change on the length of the employment ban or reallocation of funds in areas where the locals have more positive attitudes towards immigrants) that can vary across NUTS-2 sub-regions and years. The results presented in Appendix Table A9 show that our results remain robust.

### ***Multiple hypothesis testing***

To rule out any problem related to the simultaneous inference of multiple hypotheses, we re-estimate our main results using the randomization inference technique suggested by Young (2019). This method helps us to establish the robustness of our results both for individual treatment coefficients in separate estimations and also for the null hypothesis that all treatment effects reported together are zero. The results presented in Appendix Table A10 show that our findings remain robust both for the individual coefficients and the joint tests of treatment significance.

### ***Robustness to using alternative lags of unemployment rate at the county level***

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<sup>19</sup>Estimation bounds on the treatment effect range between the coefficient from the main specification and the coefficient estimated under the assumption that observables are as important as unobservables for the level of  $R_{max}$ .  $R_{max}$  specifies the maximum R-squared that can be achieved if all unobservables were included in the regression. Oster (2019) uses a sample of 65 RCT papers to estimate an upper bound of the R-squared such that 90 percent of the results would be robust to omitted variables bias. This estimation strategy yields an upper bound for the R-squared,  $R_{max}$ , that is 1.3 times the R-squared in specifications that control for observables.

To capture the initial local economic conditions, we use county-level unemployment rate in year 2014 in our main analysis. In Appendix Figure A5, we show that our results are robust to using alternative measures of unemployment rate: one or three years before the year of interview, or one, two, or three years before the year of arrival.

#### ***Robustness to analyzing only states with strictest restrictions on residency***

Appendix Table A11 shows that our results remain robust if we restrict our sample to refugees living in states where residency requirement applies at the county-level, unless a refugee finds employment. This strict residency requirement applies in Baden Wurttemberg, Bavaria, Hessen, North Rhein-Westphalia, Saarland, Saxony, and Saxony Anhalt. The results provide additional evidence that initial conditions shape refugees' integration outcomes.

#### ***Robustness to controlling for residence status or receiving help in finding employment***

Table A12 adds a control for residence status, using those with positive asylum decision as baseline category. In addition, Table A13 adds a control for "receiving help finding a job". We find that controlling for residence status or receiving help in finding a job does not affect our main results.

#### ***Robustness to logit models***

In Section 5.1, we estimate linear probability models for the dichotomous outcome variables for ease of interpretation. Appendix Table A14, which reports odd ratios, illustrates that our results are qualitatively similar when we use logistic regression models.

#### ***Robustness to excluding potentially "bad controls"***

We also checked for "bad controls" (Angrist and Pischke, 2008). One might worry that some of the individual characteristics (such as participation in an integration course) are themselves affected by initial local conditions. However, as shown in Appendix Table A15, excluding them completely does not substantively change the point estimates for our variables of interest. We keep these controls in our baseline specification to avoid omitted variable bias.

#### ***Robustness to alternative age band, 18-64***

Table A4 underlines that refugees aged 50+ have substantially lower labor market participation rates. In our main analyses, we therefore restrict the working sample to refugees aged 18 to 49 years old in order to capture refugees most likely to be active in the labor market.<sup>20</sup> The results presented in Appendix Table A16 show that our results remain robust when we include all adults aged 18 to 64.

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<sup>20</sup>We restrict the sample to refugees aged 25 to 49 when we consider being "in full- or part-time employment".

### ***Robustness to excluding counties with very few refugees***

While the representative sampling design of the SOEP maps the distribution of refugees across Germany very closely (see Section 3.1), the number of observations per county is small for some counties. As a robustness check, we calculate the number of refugees per county and exclude the least populated counties from the estimation (lowest decile;  $N < 15$ ). Appendix Table A17 shows that our results are robust to excluding counties with small number of observations. Excluding counties with very few refugees strengthens the estimated effect of both initial unemployment and negative sentiments on the probability of being in employment, net monthly wages, and multidimensional integration outcomes.

### ***Robustness to alternative levels of clustering and correcting for spatial correlation***

In our main specification, we cluster the standard errors at the county level. We establish robustness of our results using alternative assumptions about the variance-covariance matrix: the results are robust to clustering at gender-education-state level (assuming that residuals co-move within these units) (see Appendix Table A18), using Wild Cluster bootstrap procedure (Cameron et al., 2008) with 999 repetitions to account for the small number of clusters (see Appendix Tables A19) as well as correcting for spatial correlation following Conley (1999) (see Appendix Table A20).

### ***Robustness to alternative ways to measure networks***

Table A21 measures networks using the joint share of Syrians, Afghans, and Iraqis. Table A22 restricts the sample to refugees from Syria, Afghanistan, and Iraq and uses an interacted network variable (share of Syrians for Syrian refugees etc.).

## **6 Conclusion**

In this paper, we analyzed how local conditions at the time of refugees' arrival affect their short-term integration outcomes. Leveraging the variation generated by the centralized allocation policy used in Germany, we found that both high local unemployment and negative attitudes towards migrants negatively affect refugees' economic and social integration. A one standard deviation increase in county-level unemployment rate leads to a decrease of 5.1 (5.2) percentage points in refugees' likelihood of being in employment or education (full- or part-time employment), and a one standard deviation increase in the negative sentiment index leads to a 3.5 (5.1) percentage points decrease in refugees' likelihood of being in employment or education (full- or part-time employment). These effects are particularly driven by economic and social components, with effects of psychological, linguistic, political, and navigational components being statistically insignificant. In all cases, the results are stronger for male refugees.

Our results highlight the importance of initial conditions for facilitating refugee integration. They also have implications for the design of refugee allocation policies. Although there is a strong political argument in favor of allocating refugees across the whole country, our results suggest that these policies come at a significant cost for subsequent integration outcomes for those refugees placed in worse performing and less welcoming regions. One possible way to address these concerns, while maintaining the principle of allocating refugees across the country, would be to change the weighting scheme to highlight even more the integration capacity of different states. One possibility for Germany would be to replace the component that is related to state population with a component related to unfilled job vacancies.

Our findings have also implications on refugee policy at the European level. Many EU member states, notably Germany, have called for a system in which asylum seekers would be reallocated across EU member states. Our findings suggest that, in addition to political difficulties (inflaming tensions between EU member states and potentially resulting in a populist backlash in those countries that are unwilling to host a larger number of asylum seekers), such a quota system could result in worse integration outcomes across the EU, as refugees placed in regions with high unemployment and negative attitudes towards immigrants would face a risk of worse subsequent economic and social integration.

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## A Appendix Tables

Table A1: Words or hashtags related to migrants and migration

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Asyl, Asylbewerber, Asylbewerberin, Asylsuchende, Asylsuchender, Auslaender, Auslaenderin, Auslaendern Asylant, Asylanten, Asylrecht, Asylpolitik, Asylschutz, Auslaendisch, Afghane, Afghanin, Afghanistan Einwanderer, Einwanderin, Eingewanderte, Einwanderung, Einwanderungsgesellschaft Fluechtling, Fluechtlinge, Fluechtlingshilfe, Fluechtlingsschutz, Fluechtlingszentrum, Fluechtlingszentrum, Fluechtlingsskise, Fluechtlingsheim, Fluechtlingssrat, Fluechtlingsslager, Fluechtlingstreck, Fluechtmigration, Fluechtbewegung, Fluechtlingsswelle Gefluechtete, Gefluechteten, Gefluechteter Immigrant, Immigrantin, Iraker, Irakerin, Irak Migrant, Migrantin, Migranten, Migrationshintergrund Migrants Pole, Polin Schutzsuchende, Syrer, Syrerin, Syrien Russe, Russin, Russen, Russland Tuerke, Tuerkin, Tuerken, Tuerkei Umsiedler, Umsiedlerin Zuwanderer, Zuwanderin, Zugewanderte, Zugewanderten, Zuwanderung #DerAustausch, #StopRefugees, #Remigration, #PEGIDA, #propegida, #Krimigranten, #Multikultischadet, #Merkelmussweg, #Grenzendicht, #RAPEfugees, #EinProzent, #Wirtschaftsfluechtlinge, #Fluechtlingsskise, #Asylflut, #Asylchaos, #Asylantraege, #NoPegida
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*Note:* Table A1 lists all words or hashtags related to migrants and migration, which have been used to construct the county level measure on attitudes towards immigrants from Twitter data.

Table A2: Main activities by year since arrival in Germany, adults aged 18-49

	(1) Total	(2) 1 year ago	(3) 2 years ago	(4) 3 years ago	(5) 4 years ago	(6) 5 years ago
<i>Panel A - Full sample</i>						
School or university	0.023 (0.151)	0.011 (0.105)	0.023 (0.150)	0.028 (0.166)	0.024 (0.152)	0.021 (0.145)
Vocational training	0.028 (0.164)	0.004 (0.063)	0.015 (0.122)	0.032 (0.175)	0.061 (0.240)	0.073 (0.260)
Employed full-time	0.101 (0.301)	0.015 (0.122)	0.051 (0.220)	0.136 (0.343)	0.195 (0.396)	0.141 (0.349)
Employed part-time	0.096 (0.294)	0.038 (0.192)	0.076 (0.266)	0.109 (0.312)	0.156 (0.363)	0.141 (0.349)
Not in employment or training	0.606 (0.489)	0.732 (0.443)	0.640 (0.480)	0.569 (0.495)	0.498 (0.500)	0.560 (0.497)
Unemployed & integration course	0.147 (0.354)	0.200 (0.400)	0.195 (0.396)	0.125 (0.331)	0.067 (0.250)	0.064 (0.245)
N	6188	996	1652	2587	719	234
<i>Panel B - Males</i>						
School or university	0.024 (0.152)	0.012 (0.110)	0.023 (0.149)	0.028 (0.164)	0.023 (0.149)	0.031 (0.173)
Vocational training	0.040 (0.195)	0.005 (0.073)	0.024 (0.152)	0.043 (0.203)	0.086 (0.281)	0.100 (0.301)
Employed full-time	0.162 (0.369)	0.026 (0.160)	0.085 (0.279)	0.210 (0.407)	0.302 (0.459)	0.238 (0.428)
Employed part-time	0.122 (0.327)	0.053 (0.224)	0.101 (0.302)	0.139 (0.346)	0.177 (0.382)	0.169 (0.376)
Not in employment or training	0.504 (0.500)	0.674 (0.469)	0.557 (0.497)	0.462 (0.499)	0.356 (0.479)	0.423 (0.496)
Unemployed & integration course	0.148 (0.356)	0.229 (0.420)	0.210 (0.408)	0.119 (0.324)	0.057 (0.232)	0.038 (0.193)
N	3692	568	928	1625	441	130
<i>Panel C - Females</i>						
School or university	0.023 (0.149)	0.009 (0.096)	0.023 (0.152)	0.029 (0.168)	0.025 (0.157)	0.010 (0.098)
Vocational training	0.010 (0.102)	0.002 (0.048)	0.004 (0.064)	0.012 (0.111)	0.022 (0.146)	0.038 (0.193)
Employed full-time	0.010 (0.102)	0.000 (0.000)	0.007 (0.083)	0.012 (0.111)	0.025 (0.157)	0.019 (0.138)
Employed part-time	0.056 (0.231)	0.019 (0.136)	0.044 (0.206)	0.058 (0.234)	0.122 (0.328)	0.106 (0.309)
Not in employment or training	0.756 (0.430)	0.808 (0.394)	0.746 (0.436)	0.752 (0.432)	0.723 (0.448)	0.731 (0.446)
Unemployed & integration course	0.144 (0.351)	0.161 (0.368)	0.175 (0.381)	0.136 (0.343)	0.083 (0.276)	0.096 (0.296)
N	2496	428	724	962	278	104

Note: Means (standard deviations). Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018).

Table A3: Main activities by year since arrival in Germany, single refugees without children aged 18-49

	(1)	(2)	(3)	(4)	(5)	(6)
	Total	1 year ago	2 years ago	3 years ago	4 years ago	5 years ago
<i>Panel A - Males</i>						
School or university	0.048	0.023	0.048	0.057	0.051	0.077
	(0.215)	(0.149)	(0.213)	(0.232)	(0.220)	(0.269)
Vocational training	0.068	0.010	0.041	0.077	0.169	0.154
	(0.251)	(0.098)	(0.198)	(0.267)	(0.376)	(0.364)
Employed full-time	0.164	0.016	0.084	0.235	0.311	0.231
	(0.370)	(0.127)	(0.277)	(0.424)	(0.464)	(0.425)
Employed part-time	0.124	0.055	0.117	0.156	0.136	0.135
	(0.330)	(0.229)	(0.322)	(0.363)	(0.343)	(0.345)
Not in employment or training	0.491	0.672	0.575	0.415	0.299	0.404
	(0.500)	(0.470)	(0.495)	(0.493)	(0.459)	(0.495)
Unemployed & integration course	0.105	0.224	0.136	0.060	0.034	0.000
	(0.307)	(0.418)	(0.343)	(0.238)	(0.181)	(0.000)
N	1655	308	419	699	177	52
<i>Panel B - Females</i>						
School or university	0.097	0.038	0.105	0.141	0.057	0.000
	(0.296)	(0.192)	(0.307)	(0.349)	(0.233)	(0.000)
Vocational training	0.033	0.013	0.007	0.031	0.075	0.267
	(0.179)	(0.113)	(0.084)	(0.173)	(0.267)	(0.458)
Employed full-time	0.026	0.000	0.000	0.049	0.057	0.067
	(0.161)	(0.000)	(0.000)	(0.217)	(0.233)	(0.258)
Employed part-time	0.099	0.051	0.063	0.110	0.226	0.133
	(0.299)	(0.221)	(0.244)	(0.314)	(0.423)	(0.352)
Not in employment or training	0.618	0.633	0.671	0.595	0.547	0.533
	(0.486)	(0.485)	(0.471)	(0.492)	(0.503)	(0.516)
Unemployed & integration course	0.126	0.266	0.154	0.074	0.038	0.000
	(0.332)	(0.445)	(0.362)	(0.262)	(0.192)	(0.000)
N	453	79	143	163	53	15

*Note:* Means (standard deviations). Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018).

Table A4: Main activities by year since arrival in Germany for different age groups

	(1) Total	(2) 1 year ago	(3) 2 years ago	(4) 3 years ago	(5) 4 years ago	(6) 5 years ago
<i>Panel A - Aged 18-24</i>						
School or university	0.070 (0.255)	0.028 (0.164)	0.070 (0.256)	0.091 (0.288)	0.070 (0.256)	0.100 (0.304)
Vocational training	0.059 (0.235)	0.009 (0.096)	0.031 (0.173)	0.071 (0.257)	0.154 (0.362)	0.275 (0.452)
Employed full-time	0.085 (0.278)	0.015 (0.123)	0.041 (0.199)	0.137 (0.345)	0.168 (0.375)	0.075 (0.267)
Employed part-time	0.099 (0.299)	0.034 (0.181)	0.085 (0.279)	0.134 (0.341)	0.140 (0.348)	0.125 (0.335)
Not in employment or training	0.576 (0.494)	0.715 (0.452)	0.626 (0.484)	0.508 (0.500)	0.420 (0.495)	0.425 (0.501)
Unemployed & integration course	0.111 (0.315)	0.199 (0.400)	0.147 (0.354)	0.058 (0.234)	0.049 (0.217)	0.000 (0.000)
N	1597	326	484	604	143	40
<i>Panel B - Aged 25-49</i>						
School or university	0.007 (0.083)	0.003 (0.055)	0.003 (0.058)	0.009 (0.095)	0.012 (0.110)	0.005 (0.072)
Vocational training	0.017 (0.129)	0.001 (0.039)	0.009 (0.092)	0.020 (0.139)	0.038 (0.192)	0.031 (0.174)
Employed full-time	0.107 (0.309)	0.015 (0.121)	0.055 (0.228)	0.136 (0.343)	0.201 (0.401)	0.155 (0.362)
Employed part-time	0.094 (0.292)	0.040 (0.197)	0.073 (0.260)	0.101 (0.302)	0.160 (0.367)	0.144 (0.352)
Not in employment or training	0.616 (0.486)	0.740 (0.439)	0.646 (0.479)	0.588 (0.492)	0.517 (0.500)	0.588 (0.494)
Unemployed & integration course	0.159 (0.366)	0.200 (0.400)	0.215 (0.411)	0.146 (0.353)	0.071 (0.257)	0.077 (0.268)
N	4591	670	1168	1983	576	194
<i>Panel C - Aged 50+</i>						
School or university	0.002 (0.041)	0.000 (0.000)	0.000 (0.000)	0.004 (0.063)	0.000 (0.000)	0.000 (0.000)
Vocational training	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Employed full-time	0.022 (0.145)	0.011 (0.104)	0.007 (0.082)	0.016 (0.125)	0.071 (0.259)	0.038 (0.196)
Employed part-time	0.065 (0.246)	0.011 (0.104)	0.027 (0.163)	0.063 (0.243)	0.119 (0.326)	0.308 (0.471)
Not in employment or training	0.733 (0.443)	0.761 (0.429)	0.755 (0.431)	0.740 (0.439)	0.690 (0.465)	0.577 (0.504)
Unemployed & integration course	0.179 (0.384)	0.217 (0.415)	0.211 (0.409)	0.177 (0.383)	0.119 (0.326)	0.077 (0.272)
N	603	92	147	254	84	26

Note: Means (standard deviations). Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018).

Table A5: Determinants of refugees' labor market and social outcomes, including a full set of covariates

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.051 (0.014)	-0.052 (0.013)	-0.345 (0.082)	-0.017 (0.007)
Negative sentiment index std. (2014)	-0.035 (0.028)	-0.051 (0.024)	-0.345 (0.207)	-0.025 (0.011)
Female	-0.226 (0.016)	-0.194 (0.014)	-1.479 (0.097)	-0.082 (0.005)
Secondary education	0.029 (0.015)	0.016 (0.016)	0.071 (0.110)	0.037 (0.007)
Tertiary education	0.069 (0.022)	0.059 (0.022)	0.442 (0.171)	0.061 (0.011)
Married/In partnership	-0.050 (0.021)	0.010 (0.023)	0.017 (0.150)	-0.025 (0.008)
Children in household	-0.074 (0.019)	-0.076 (0.020)	-0.643 (0.141)	0.004 (0.009)
Satisfactory health status	0.070 (0.021)	0.053 (0.018)	0.342 (0.139)	0.045 (0.010)
Participated in integration course	-0.003 (0.018)	-0.009 (0.016)	-0.048 (0.121)	0.041 (0.006)
German skills before emigration	0.063 (0.047)	0.003 (0.042)	0.365 (0.376)	0.068 (0.017)
Support from family & friends before emigration	-0.007 (0.018)	-0.000 (0.019)	-0.146 (0.130)	0.004 (0.007)
Afghan origin	-0.006 (0.022)	-0.009 (0.023)	-0.233 (0.153)	-0.004 (0.010)
Iraqi origin	-0.106 (0.024)	-0.077 (0.022)	-0.579 (0.154)	-0.022 (0.010)
Other origin	0.005 (0.023)	0.002 (0.020)	0.193 (0.177)	-0.017 (0.011)
3 years of residence in Germany	0.124 (0.019)	0.100 (0.018)	0.837 (0.134)	0.037 (0.008)
4 years of residence in Germany	0.251 (0.027)	0.189 (0.027)	1.687 (0.202)	0.073 (0.011)
Share of Syrians	-7.572 (13.667)	4.751 (12.437)	-75.408 (83.597)	-6.584 (6.772)
Share of Afghans	6.976 (22.325)	34.469 (18.801)	300.794 (127.442)	29.602 (11.453)
Share of Iraqis	7.596 (8.588)	3.251 (8.375)	-2.811 (54.069)	-0.618 (4.628)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
Age group FE	Yes	Yes	Yes	Yes
Religion FE	Yes	Yes	Yes	Yes
R-Squared	0.216	0.198	0.213	0.258
N	3030	2329	2878	2280

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable “In employment or education” takes a value of one for refugees who report being in employment or education. Outcome variable “Full- or part-time employed” is one for refugees who report being in full- or part-time employment. Outcome “Net monthly wages” are net monthly wages, in inverse hyperbolic sine transformation. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).



Table A6: Determinants of refugees' labor market and social outcomes

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.051 (0.014)	-0.052 (0.013)	-0.347 (0.085)	-0.018 (0.007)
Polarity index weighted std.	-0.007 (0.010)	-0.014 (0.008)	-0.129 (0.062)	-0.006 (0.003)
Female	-0.226 (0.015)	-0.194 (0.014)	-1.477 (0.097)	-0.082 (0.006)
Secondary education	0.030 (0.015)	0.017 (0.016)	0.073 (0.110)	0.037 (0.007)
Tertiary education	0.070 (0.022)	0.060 (0.022)	0.448 (0.169)	0.061 (0.011)
Married/In partnership	-0.050 (0.021)	0.012 (0.024)	0.029 (0.152)	-0.024 (0.008)
Children in household	-0.074 (0.019)	-0.077 (0.020)	-0.650 (0.143)	0.004 (0.009)
Satisfactory health status	0.070 (0.021)	0.054 (0.018)	0.342 (0.136)	0.044 (0.010)
Participated in integration course	-0.003 (0.018)	-0.009 (0.017)	-0.045 (0.121)	0.041 (0.006)
German skills before emigration	0.064 (0.047)	0.003 (0.042)	0.376 (0.374)	0.068 (0.017)
Support from family & friends before emigration	-0.007 (0.018)	0.000 (0.019)	-0.146 (0.130)	0.004 (0.007)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.215	0.197	0.213	0.257
N	3030	2329	2878	2280

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable “In employment or education” takes a value of one for refugees who report being in employment or education. Outcome variable “Full- or part-time employed” is one for refugees who report being in full- or part-time employment. Outcome “Net monthly wages” are net monthly wages, in inverse hyperbolic sine transformation. Table A6 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

Table A7: Determinants of refugees' labor market and social outcomes

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.048 (0.014)	-0.051 (0.012)	-0.337 (0.085)	-0.016 (0.007)
Far-right vote share std. (2013)	-0.028 (0.012)	-0.013 (0.010)	-0.091 (0.076)	-0.009 (0.004)
Female	-0.228 (0.015)	-0.195 (0.014)	-1.489 (0.097)	-0.083 (0.006)
Secondary education	0.030 (0.015)	0.016 (0.016)	0.077 (0.110)	0.037 (0.007)
Tertiary education	0.071 (0.022)	0.061 (0.022)	0.457 (0.169)	0.061 (0.011)
Married/In partnership	-0.051 (0.021)	0.010 (0.023)	0.018 (0.151)	-0.025 (0.008)
Children in household	-0.072 (0.019)	-0.075 (0.020)	-0.635 (0.141)	0.004 (0.009)
Satisfactory health status	0.070 (0.021)	0.054 (0.018)	0.336 (0.135)	0.046 (0.010)
Participated in integration course	-0.005 (0.018)	-0.010 (0.017)	-0.058 (0.120)	0.040 (0.006)
German skills before emigration	0.065 (0.047)	0.004 (0.042)	0.363 (0.375)	0.069 (0.017)
Support from family & friends before emigration	-0.008 (0.018)	-0.000 (0.019)	-0.151 (0.130)	0.003 (0.007)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.216	0.197	0.212	0.257
N	3035	2332	2883	2285

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable “In employment or education” takes a value of one for refugees who report being in employment or education. Outcome variable “Full- or part-time employed” is one for refugees who report being in full- or part-time employment. Outcome “Net monthly wages” are net monthly wages, in inverse hyperbolic sine transformation. Table A7 includes the full set of covariates, as described in Section 4. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Destatis.

Table A8: Robustness to omitted variable bias, Oster test

	(1)	(2)	(3)	(4)
	In employment or education	Full- or part- time employed	Log net wages	Multi-dimensional Integration Index
Unemployment rate std. (2014)	-0.051 (0.014)	-0.052 (0.013)	-0.345 (0.082)	-0.017 (0.007)
Bounds on the treatment effect	(-0.038,-0.051)	(-0.038,-0.054)	(-0.271,-0.346)	(-0.009, -0.173)
Treatment excludes 0	Yes	Yes	Yes	Yes
Delta (Rmax = 1.3*R)	9.186	42.160	5.999	-5.432
Negative sentiment index std. (2014)	-0.035 (0.028)	-0.051 (0.024)	-0.345 (0.207)	-0.025 (0.011)
Bounds on the treatment effect	(-0.029,-0.035)	(-0.047,-0.050)	(-0.336,-0.345)	(-0.026,-0.025)
Treatment excludes 0	Yes	Yes	Yes	Yes
Delta (Rmax = 1.3*R)	-5.884	33.497	105.670	14.550

*Note:* The standard levels are clustered on the state level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. We merge natives' mean values on attitudes towards immigrants based on refugees' year of arrival and first state of residence in Germany. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

Table A9: Determinants of refugees' labor market and social outcomes, including NUTS-2 by year fixed effects

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.057 (0.014)	-0.058 (0.013)	-0.401 (0.086)	-0.019 (0.007)
Negative sentiment index std. (2014)	-0.031 (0.029)	-0.047 (0.026)	-0.320 (0.214)	-0.026 (0.010)
Female	-0.227 (0.016)	-0.199 (0.015)	-1.484 (0.099)	-0.084 (0.006)
Secondary education	0.029 (0.016)	0.015 (0.016)	0.065 (0.114)	0.037 (0.007)
Tertiary education	0.073 (0.024)	0.060 (0.022)	0.463 (0.173)	0.063 (0.012)
Married/In partnership	-0.053 (0.022)	0.010 (0.024)	-0.010 (0.154)	-0.026 (0.008)
Children in household	-0.068 (0.020)	-0.075 (0.020)	-0.602 (0.145)	0.006 (0.010)
Satisfactory health status	0.072 (0.022)	0.049 (0.019)	0.326 (0.145)	0.042 (0.011)
Participated in integration course	-0.007 (0.019)	-0.011 (0.017)	-0.079 (0.123)	0.039 (0.006)
German skills before emigration	0.067 (0.047)	0.002 (0.044)	0.314 (0.378)	0.066 (0.018)
Support from family & friends before emigration	-0.011 (0.018)	-0.004 (0.019)	-0.178 (0.133)	0.001 (0.007)
Nuts-2 by year FE	Yes	Yes	Yes	Yes
R-Squared	0.235	0.218	0.232	0.282
N	3030	2329	2878	2280

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable “In employment or education” is one for refugees who report being in employment or education. Outcome variable “Full- or part-time employed” is one for refugees who report being in full- or part-time employment. Outcome “Net monthly wages” are net monthly wages, in inverse hyperbolic sine transformation. Table A9 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

Table A10: Multiple hypothesis testing - Main results

	(1)	(2)	(3)	(4)
	In employment or education	Full- or part- time employed	Net monthly wages	Multi-dimensional Integration Index
Unemployment rate std. (2014)	-0.051 (0.014)	-0.052 (0.013)	-0.345 (0.082)	-0.017 (0.007)
N	3,030	2,329	2,878	2,280
Randomization-t p-values	0.002	0.002	0.002	0.018
Randomization-t p-values				
Westfall-Young multiple testing of treatment significance				0.002
Negative sentiment index std. (2014)	-0.035 (0.028)	-0.051 (0.024)	0.034 (0.207)	0.025 (0.011)
N	3,030	2,329	2,878	2,280
Randomization-t p-values	0.213	0.042	0.104	0.034
Randomization-t p-values				
Westfall-Young multiple testing of treatment significance				0.098

*Note:* The standard levels are clustered on the county and year of interview level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Reference categories are as follows: male, primary education, aged 18-24, two years of residence in Germany, Syrian refugee. Information on attitudes stems from the European Social Survey. We merge natives' mean values on attitudes towards immigrants based on refugees' first state of residence in Germany. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

Table A11: Determinants of refugees' labor market outcomes in states with strict residency requirements

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.043 (0.019)	-0.073 (0.017)	-0.232 (0.106)	-0.010 (0.008)
Negative sentiment index std. (2014)	-0.016 (0.038)	-0.076 (0.037)	-0.338 (0.253)	-0.024 (0.013)
Female	-0.243 (0.020)	-0.214 (0.019)	-1.576 (0.122)	-0.088 (0.007)
Secondary education	0.028 (0.019)	0.023 (0.019)	0.007 (0.137)	0.033 (0.009)
Tertiary education	0.045 (0.027)	0.041 (0.028)	0.144 (0.207)	0.039 (0.014)
Married/In partnership	-0.070 (0.030)	-0.019 (0.029)	-0.170 (0.212)	-0.037 (0.013)
Children in household	-0.068 (0.026)	-0.091 (0.027)	-0.766 (0.184)	0.004 (0.012)
Satisfactory health status	0.073 (0.031)	0.068 (0.027)	0.426 (0.198)	0.035 (0.015)
Participated in integration course	-0.025 (0.024)	-0.026 (0.023)	-0.130 (0.169)	0.040 (0.008)
German skills before emigration	0.176 (0.070)	0.062 (0.062)	1.027 (0.586)	0.066 (0.026)
Support from family & friends before emigration	0.004 (0.025)	0.020 (0.023)	-0.076 (0.172)	0.010 (0.009)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.219	0.220	0.218	0.248
N	1782	1394	1691	1360

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable “In employment or education” is one for refugees who report being in employment or education. Outcome variable “Full- or part-time employed” is one for refugees who report being in full- or part-time employment. Outcome “Net monthly wages” are net monthly wages, in inverse hyperbolic sine transformation. Table A11 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, positive asylum decision, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

Table A12: Determinants of refugees' labor market outcomes, including control variables for type of residence status

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.054 (0.014)	-0.052 (0.013)	-0.356 (0.084)	-0.017 (0.007)
Negative sentiment index std. (2014)	-0.036 (0.028)	-0.054 (0.024)	-0.351 (0.208)	-0.025 (0.011)
Female	-0.231 (0.016)	-0.198 (0.015)	-1.506 (0.098)	-0.085 (0.005)
Secondary education	0.028 (0.016)	0.014 (0.016)	0.064 (0.112)	0.036 (0.007)
Tertiary education	0.066 (0.023)	0.054 (0.023)	0.419 (0.174)	0.058 (0.011)
Married/In partnership	-0.046 (0.022)	0.014 (0.023)	0.045 (0.152)	-0.024 (0.009)
Children in household	-0.073 (0.019)	-0.077 (0.019)	-0.650 (0.141)	0.003 (0.009)
Satisfactory health status	0.064 (0.021)	0.048 (0.017)	0.296 (0.137)	0.042 (0.010)
Participated in integration course	-0.003 (0.019)	-0.010 (0.016)	-0.057 (0.121)	0.038 (0.006)
German skills before emigration	0.072 (0.048)	0.009 (0.043)	0.407 (0.380)	0.069 (0.018)
Support from family & friends before emigration	-0.001 (0.018)	0.003 (0.019)	-0.114 (0.130)	0.005 (0.007)
Asylum seeker	-0.033 (0.022)	-0.031 (0.022)	-0.186 (0.160)	-0.013 (0.009)
Tolerated foreigner	-0.048 (0.033)	-0.082 (0.032)	-0.525 (0.224)	-0.045 (0.017)
Other residence status	-0.021 (0.024)	-0.017 (0.025)	-0.099 (0.179)	-0.019 (0.011)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.219	0.201	0.217	0.262
N	2981	2294	2831	2250

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable “In employment or education” is one for refugees who report being in employment or education. Outcome variable “Full- or part-time employed” is one for refugees who report being in full- or part-time employment. Outcome “Net monthly wages” are net monthly wages, in inverse hyperbolic sine transformation. Table A12 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, positive asylum decision, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

Table A13: Determinants of refugees' labor market outcomes, including an indicator variable for having received help in finding employment

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.051 (0.014)	-0.052 (0.012)	-0.327 (0.084)	-0.017 (0.007)
Negative sentiment index std. (2014)	-0.034 (0.027)	-0.050 (0.024)	-0.340 (0.194)	-0.025 (0.011)
Female	-0.207 (0.016)	-0.181 (0.014)	-1.340 (0.096)	-0.082 (0.005)
Secondary education	0.032 (0.016)	0.020 (0.016)	0.077 (0.112)	0.037 (0.007)
Tertiary education	0.058 (0.022)	0.050 (0.022)	0.352 (0.165)	0.061 (0.011)
Married/In partnership	-0.045 (0.022)	0.015 (0.024)	0.053 (0.158)	-0.025 (0.008)
Children in household	-0.069 (0.020)	-0.075 (0.019)	-0.614 (0.144)	0.004 (0.009)
Satisfactory health status	0.065 (0.022)	0.050 (0.018)	0.305 (0.141)	0.045 (0.010)
Participated in integration course	-0.007 (0.019)	-0.012 (0.017)	-0.070 (0.121)	0.041 (0.006)
German skills before emigration	0.041 (0.047)	-0.013 (0.042)	0.185 (0.375)	0.068 (0.017)
Support from family & friends before emigration	-0.016 (0.019)	-0.012 (0.019)	-0.220 (0.132)	0.004 (0.007)
Help finding a job	0.166 (0.023)	0.120 (0.023)	1.261 (0.180)	
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.233	0.213	0.235	0.258
N	2929	2247	2780	2280

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable “In employment or education” is one for refugees who report being in employment or education. Outcome variable “Full- or part-time employed” is one for refugees who report being in full- or part-time employment. Outcome “Net monthly wages” are net monthly wages, in inverse hyperbolic sine transformation. Table A13 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, positive asylum decision, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).



Table A14: Logistic regression: Determinants of refugees' labor market outcomes

	(1) In employment or education b/se	(2) Full or part-time b/se
Unemployment rate std. (2014)	-0.341 (0.088)	-0.502 (0.120)
Negative sentiment index std. (2014)	-0.212 (0.174)	-0.379 (0.219)
Female	-1.572 (0.123)	-2.216 (0.209)
Secondary education	0.194 (0.097)	0.142 (0.139)
Tertiary education	0.444 (0.137)	0.511 (0.176)
Married/In partnership	-0.243 (0.134)	0.188 (0.214)
Children in household	-0.445 (0.121)	-0.564 (0.160)
Satisfactory health status	0.791 (0.227)	1.107 (0.325)
Participated in integration course	0.031 (0.114)	0.050 (0.147)
German skills before emigration	0.396 (0.247)	0.052 (0.311)
Support from family & friends before emigration	-0.029 (0.121)	0.076 (0.182)
Interview year FE	Yes	Yes
Nuts-2 FE	Yes	Yes
R-Squared		
N	3030	2329

*Note:* Logistic regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable “In employment or education” is one for refugees who report being in employment or education. Outcome variable “Full- or part-time employed” is one for refugees who report being in full- or part-time employment. Estimates are reported as odd ratios. Table A14 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

Table A15: Determinants of refugees' labor market outcomes, dropping potentially "bad controls"

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.048 (0.014)	-0.050 (0.012)	-0.337 (0.083)	-0.016 (0.006)
Negative sentiment index std. (2014)	-0.041 (0.027)	-0.058 (0.025)	-0.409 (0.187)	-0.024 (0.010)
Female	-0.240 (0.015)	-0.211 (0.015)	-1.608 (0.092)	-0.087 (0.005)
Secondary education	0.033 (0.015)	0.013 (0.016)	0.090 (0.109)	0.044 (0.007)
Tertiary education	0.080 (0.022)	0.067 (0.022)	0.525 (0.174)	0.071 (0.011)
Married/In partnership	-0.087 (0.019)	-0.028 (0.020)	-0.303 (0.131)	-0.021 (0.008)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.204	0.186	0.199	0.227
N	3105	2385	2951	2327

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Table A15 includes a minimum of control variables, including information on gender, education, country of origin, age, years of residence in Germany, and family status. Outcome variable "In employment or education" is one for refugees who report being in employment or education. Outcome variable "Full- or part-time employed" is one for refugees who report being in full- or part-time employment. Outcome "Net monthly wages" are net monthly wages, in inverse hyperbolic sine transformation. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

Table A16: Determinants of refugees' labor market and social outcomes, adults aged 18-64

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.045 (0.013)	-0.045 (0.012)	-0.307 (0.076)	-0.018 (0.006)
Negative sentiment index std. (2014)	-0.033 (0.026)	-0.041 (0.021)	-0.308 (0.194)	-0.024 (0.010)
Female	-0.210 (0.014)	-0.177 (0.013)	-1.377 (0.087)	-0.077 (0.005)
Secondary education	0.031 (0.014)	0.018 (0.014)	0.074 (0.103)	0.037 (0.007)
Tertiary education	0.068 (0.019)	0.053 (0.019)	0.391 (0.146)	0.061 (0.010)
Married/In partnership	-0.056 (0.019)	-0.002 (0.021)	-0.049 (0.137)	-0.026 (0.008)
Children in household	-0.073 (0.017)	-0.071 (0.017)	-0.611 (0.126)	0.004 (0.008)
Satisfactory health status	0.065 (0.019)	0.050 (0.015)	0.312 (0.116)	0.046 (0.009)
Participated in integration course	-0.002 (0.017)	-0.010 (0.015)	-0.077 (0.112)	0.039 (0.006)
German skills before emigration	0.035 (0.043)	-0.012 (0.037)	0.208 (0.335)	0.065 (0.016)
Support from family & friends before emigration	-0.008 (0.016)	-0.004 (0.017)	-0.147 (0.120)	0.004 (0.006)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.218	0.192	0.211	0.264
N	3323	2622	3160	2510

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable “In employment or education” is one for refugees who report being in employment or education. Outcome variable “Full- or part-time employed” is one for refugees who report being in full- or part-time employment. Outcome “Net monthly wages” are net monthly wages, in inverse hyperbolic sine transformation. Table A16 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

Table A17: Determinants of refugees' labor market and social outcomes, robustness to excluding counties with very few refugees

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.059 (0.013)	-0.063 (0.014)	-0.428 (0.081)	-0.029 (0.007)
Negative sentiment index std. (2014)	-0.054 (0.026)	-0.060 (0.026)	-0.437 (0.220)	-0.034 (0.012)
Female	-0.225 (0.016)	-0.194 (0.015)	-1.450 (0.100)	-0.082 (0.006)
Secondary education	0.021 (0.016)	0.010 (0.016)	0.058 (0.116)	0.036 (0.008)
Tertiary education	0.051 (0.023)	0.048 (0.023)	0.367 (0.178)	0.056 (0.012)
Married/In partnership	-0.047 (0.023)	0.008 (0.025)	0.012 (0.161)	-0.025 (0.009)
Children in household	-0.080 (0.020)	-0.080 (0.020)	-0.649 (0.146)	0.004 (0.010)
Satisfactory health status	0.058 (0.022)	0.035 (0.018)	0.218 (0.142)	0.041 (0.011)
Participated in integration course	-0.015 (0.020)	-0.017 (0.017)	-0.131 (0.129)	0.041 (0.007)
German skills before emigration	0.057 (0.049)	-0.002 (0.044)	0.267 (0.394)	0.058 (0.018)
Support from family & friends before emigration	-0.000 (0.019)	0.003 (0.020)	-0.114 (0.136)	0.006 (0.007)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.216	0.203	0.218	0.255
N	2701	2064	2567	2027

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable “In employment or education” is one for refugees who report being in employment or education. Outcome variable “Full- or part-time employed” is one for refugees who report being in full- or part-time employment. Outcome “Net monthly wages” are net monthly wages, in inverse hyperbolic sine transformation. Table A17 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

Table A18: Determinants of refugees' labor market and social outcomes, clustering standard errors on the gender, education, and state level

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.051 (0.015)	-0.052 (0.014)	-0.345 (0.101)	-0.017 (0.006)
Negative sentiment index std. (2014)	-0.035 (0.024)	-0.051 (0.022)	-0.345 (0.165)	-0.025 (0.011)
Female	-0.226 (0.016)	-0.194 (0.016)	-1.479 (0.121)	-0.082 (0.007)
Secondary education	0.029 (0.009)	0.016 (0.008)	0.071 (0.095)	0.037 (0.006)
Tertiary education	0.069 (0.021)	0.059 (0.016)	0.442 (0.193)	0.061 (0.014)
Married/In partnership	-0.050 (0.023)	0.010 (0.018)	0.017 (0.148)	-0.025 (0.010)
Children in household	-0.074 (0.021)	-0.076 (0.019)	-0.643 (0.148)	0.004 (0.009)
Satisfactory health status	0.070 (0.016)	0.053 (0.014)	0.342 (0.124)	0.045 (0.009)
Participated in integration course	-0.003 (0.022)	-0.009 (0.020)	-0.048 (0.163)	0.041 (0.008)
German skills before emigration	0.063 (0.055)	0.003 (0.055)	0.365 (0.439)	0.068 (0.019)
Support from family & friends before emigration	-0.007 (0.012)	-0.000 (0.015)	-0.146 (0.097)	0.004 (0.006)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.216	0.198	0.213	0.258
N	3030	2329	2878	2280

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the gender, education, and state level ( $G=96$  clusters) and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable "In employment or education" is one for refugees who report being in employment or education. Outcome variable "Full- or part-time employed" is one for refugees who report being in full- or part-time employment. Outcome "Net monthly wages" are net monthly wages, in inverse hyperbolic sine transformation. Table A18 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

Table A19: Determinants of refugees' labor market and social outcomes, bootstrapped standard errors at the state level (wild cluster bootstrap)

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.051 (0.018)	-0.054 (0.017)	-0.345 (0.111)	-0.017 (0.008)
Negative sentiment index std. (2014)	-0.035 (0.029)	-0.050 (0.026)	-0.345 (0.242)	-0.025 (0.013)
Female	-0.226 (0.073)	-0.179 (0.058)	-1.479 (0.478)	-0.082 (0.027)
Secondary education	0.029 (0.015)	-0.001 (0.015)	0.071 (0.103)	0.037 (0.000)
Tertiary education	0.069 (0.022)	0.058 (0.021)	0.442 (0.161)	0.061 (0.000)
Married/In partnership	-0.050 (0.022)	0.029 (0.018)	0.017 (0.116)	-0.025 (0.009)
Children in household	-0.074 (0.024)	-0.069 (0.022)	-0.643 (0.208)	0.004 (0.009)
Satisfactory health status	0.070 (0.000)	0.049 (0.020)	0.342 (0.142)	0.045 (0.000)
Participated in integration course	-0.003 (0.016)	0.002 (0.024)	-0.048 (0.115)	0.041 (0.000)
German skills before emigration	0.063 (0.047)	0.034 (0.038)	0.365 (0.381)	0.068 (0.000)
Support from family & friends before emigration	-0.007 (0.020)	-0.010 (0.014)	-0.146 (0.130)	0.004 (0.007)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.216	0.177	0.213	0.258
N	3030	3030	2878	2280

*Note:* Ordinary least squares regression estimates are shown. The standard errors are bootstrapped following Wild Cluster bootstrap procedure with 999 repetitions to account for the small number of clusters (Cameron et al., 2008) and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable "In employment or education" is one for refugees who report being in employment or education. Outcome variable "Full- or part-time employed" is one for refugees who report being in full- or part-time employment. Outcome "Net monthly wages" are net monthly wages, in inverse hyperbolic sine transformation. Table A19 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

Table A20: Determinants of refugees' labor market and social outcomes, Conley standard errors

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.051 (0.012)	-0.052 (0.013)	-0.345 (0.080)	-0.017 (0.009)
Negative sentiment index std. (2014)	-0.035 (0.023)	-0.051 (0.009)	-0.345 (0.195)	-0.025 (0.009)
Female	-0.226 (0.018)	-0.194 (0.011)	-1.479 (0.107)	-0.082 (0.007)
Secondary education	0.029 (0.013)	0.016 (0.013)	0.071 (0.135)	0.037 (0.006)
Tertiary education	0.069 (0.022)	0.059 (0.016)	0.442 (0.175)	0.061 (0.013)
Married/In partnership	-0.050 (0.023)	0.010 (0.021)	0.017 (0.125)	-0.025 (0.009)
Children in household	-0.074 (0.015)	-0.076 (0.015)	-0.643 (0.111)	0.004 (0.009)
Satisfactory health status	0.070 (0.013)	0.053 (0.016)	0.342 (0.116)	0.045 (0.011)
Participated in integration course	-0.003 (0.017)	-0.009 (0.018)	-0.048 (0.138)	0.041 (0.006)
German skills before emigration	0.063 (0.063)	0.003 (0.042)	0.365 (0.511)	0.068 (0.018)
Support from family & friends before emigration	-0.007 (0.016)	-0.000 (0.016)	-0.146 (0.127)	0.004 (0.005)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.216	0.198	0.213	0.258
N	3030	2329	2878	2280

*Note:* Ordinary least squares regression estimates are shown. The standard errors are corrected for arbitrary cluster correlation in spatial settings (acreg) and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable "In employment or education" is one for refugees who report being in employment or education. Outcome variable "Full- or part-time employed" is one for refugees who report being in full- or part-time employment. Outcome "Net monthly wages" are net monthly wages, in inverse hyperbolic sine transformation. Table A20 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

Table A21: Determinants of refugees' labor market outcomes, controlling for the joint share of Syrian, Afghan, and Iraqi refugees

	(1) In employment or education b/se	(2) Full or part-time b/se	(3) Net monthly wages b/se	(4) Multi-dimensional Integration Index b/se
Unemployment rate std. (2014)	-0.051 (0.014)	-0.053 (0.013)	-0.358 (0.082)	-0.019 (0.007)
Negative sentiment index std. (2014)	-0.036 (0.028)	-0.053 (0.024)	-0.365 (0.207)	-0.027 (0.011)
Female	-0.226 (0.015)	-0.194 (0.014)	-1.480 (0.097)	-0.082 (0.005)
Secondary education	0.029 (0.015)	0.015 (0.015)	0.066 (0.111)	0.036 (0.007)
Tertiary education	0.069 (0.022)	0.059 (0.022)	0.447 (0.170)	0.061 (0.011)
Married/In partnership	-0.051 (0.021)	0.011 (0.023)	0.019 (0.150)	-0.026 (0.008)
Children in household	-0.074 (0.019)	-0.076 (0.019)	-0.646 (0.141)	0.004 (0.009)
Satisfactory health status	0.070 (0.021)	0.053 (0.018)	0.336 (0.140)	0.044 (0.010)
Participated in integration course	-0.003 (0.018)	-0.009 (0.016)	-0.045 (0.121)	0.041 (0.006)
German skills before emigration	0.064 (0.047)	0.002 (0.042)	0.364 (0.376)	0.068 (0.017)
Support from family & friends before emigration	-0.007 (0.018)	0.000 (0.019)	-0.146 (0.131)	0.004 (0.007)
Joint share of Syrians, Afghans, and Iraqis (2014)	3.802 (6.342)	8.614 (6.021)	28.457 (42.439)	2.926 (2.864)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.215	0.197	0.211	0.254
N	3030	2329	2878	2280

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable “In employment or education” is one for refugees who report being in employment or education. Outcome variable “Full- or part-time employed” is one for refugees who report being in full- or part-time employment. Outcome “Net monthly wages” are net monthly wages, in inverse hyperbolic sine transformation. Table A21 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, positive asylum decision, and Syrian origin. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).



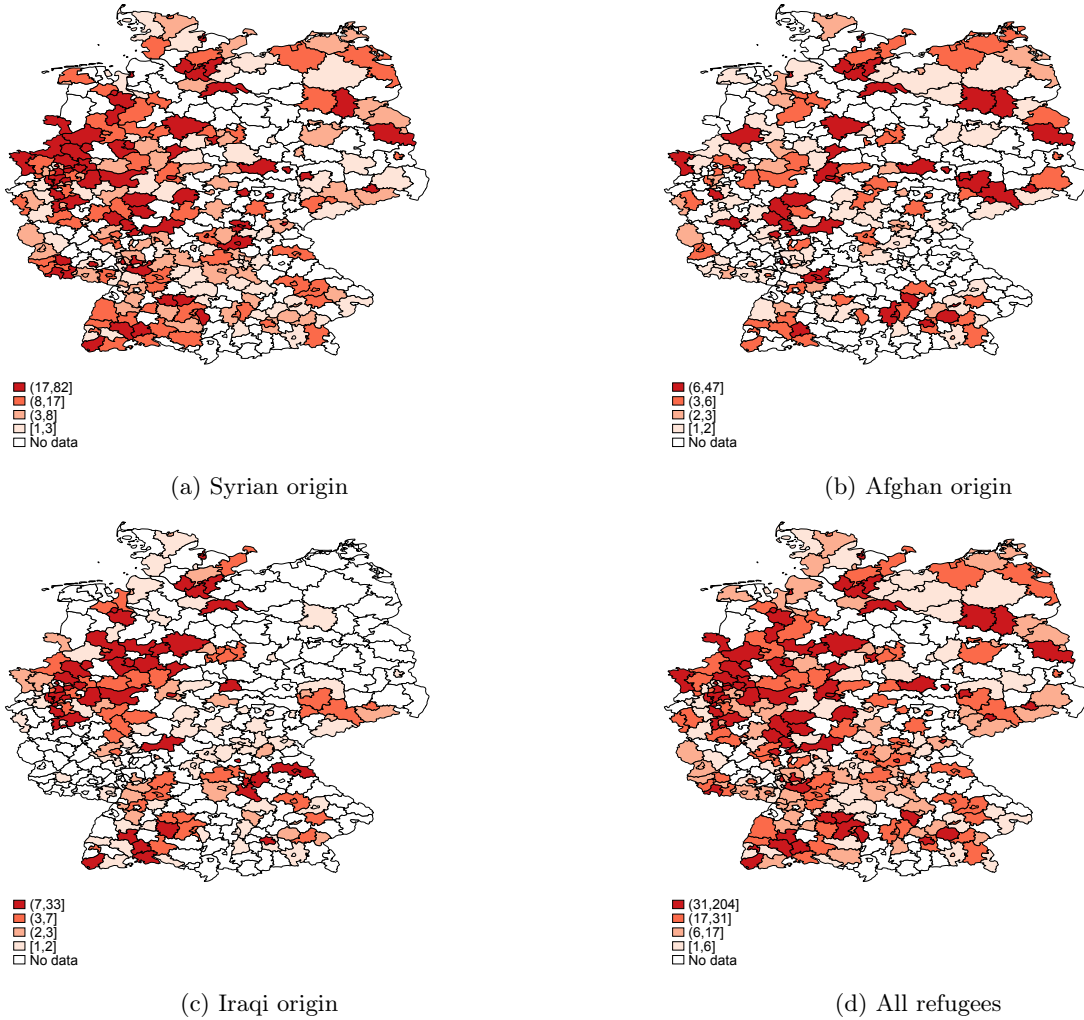
Table A22: Determinants of refugees' labor market outcomes, controlling for the share of refugees with the "same" nationality

	(1)	(2)	(3)	(4)
	In employment or education	Full or part-time	Net monthly wages	Multi-dimensional Integration Index
	b/se	b/se	b/se	b/se
Unemployment rate std. (2014)	-0.040 (0.015)	-0.031 (0.015)	-0.291 (0.088)	-0.012 (0.007)
Negative sentiment index std. (2014)	-0.059 (0.029)	-0.050 (0.027)	-0.489 (0.240)	-0.029 (0.013)
Female	-0.210 (0.017)	-0.181 (0.015)	-1.312 (0.100)	-0.076 (0.006)
Secondary education	0.019 (0.017)	0.017 (0.017)	0.045 (0.121)	0.039 (0.008)
Tertiary education	0.084 (0.025)	0.079 (0.023)	0.537 (0.192)	0.063 (0.012)
Married/In partnership	-0.077 (0.027)	-0.004 (0.026)	-0.204 (0.187)	-0.036 (0.011)
Children in household	-0.068 (0.022)	-0.065 (0.021)	-0.582 (0.156)	0.001 (0.011)
Satisfactory health status	0.084 (0.022)	0.066 (0.016)	0.433 (0.130)	0.047 (0.012)
Participated in integration course	-0.016 (0.020)	-0.027 (0.018)	-0.154 (0.134)	0.031 (0.007)
German skills before emigration	0.032 (0.044)	0.025 (0.053)	0.347 (0.397)	0.068 (0.019)
Support from family & friends before emigration	-0.006 (0.021)	0.013 (0.020)	-0.109 (0.141)	0.002 (0.008)
Compatriot network (2014)	8.831 (8.867)	-15.594 (11.714)	14.028 (49.616)	-2.041 (3.925)
Interview year FE	Yes	Yes	Yes	Yes
Nuts-2 FE	Yes	Yes	Yes	Yes
R-Squared	0.221	0.209	0.208	0.266
N	2390	1846	2262	1846

*Note:* Ordinary least squares regression estimates are shown. The standard errors are clustered on the county level and are displayed in parentheses. We pool observations from survey years 2016 to 2018 keeping only the most recent survey information. The sample is restricted to individuals with a minimum of two years of residence in Germany. Outcome variable "In employment or education" is one for refugees who report being in employment or education. Outcome variable "Full- or part-time employed" is one for refugees who report being in full- or part-time employment. Outcome "Net monthly wages" are net monthly wages, in inverse hyperbolic sine transformation. Table A22 includes the full set of covariates, as described in Section 4. For illustrative purposes, some control variables are not shown. Reference categories are as follows: male, primary education, aged 18-24 (aged 25-29 for full- or part-time employment), two years of residence in Germany, positive asylum decision, and Syrian origin. The sample is restricted to Syrian, Afghan, and Iraqi refugees. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018) and Twitter data (2014).

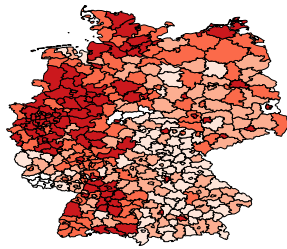
## B Appendix Figures

Figure A1: Number of refugees per county, disaggregated by country of origin

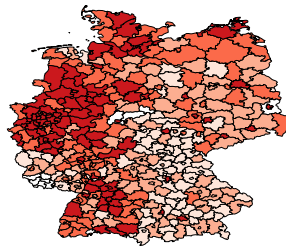


*Note:* Figures A1a to A1d display the number of refugees per county, disaggregated by country of origin. Similarly to our main analysis, we pool observations over years to increase the sample size. Source: IAB-BAMF-SOEP Survey of Refugees, v35 (2016-2018).

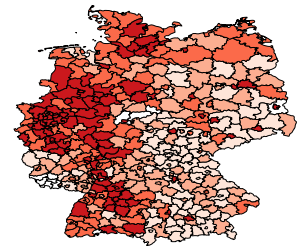
Figure A2: Number of refugees per county, disaggregated by country of origin



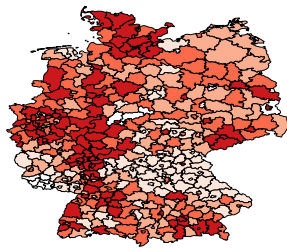
(a) Syrian origin, 2016



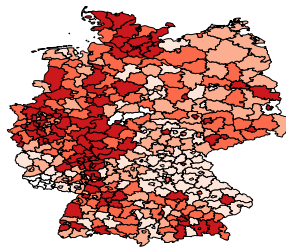
(b) Syrian origin, 2017



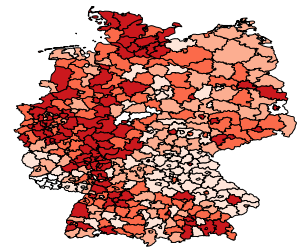
(c) Syrian origin, 2018



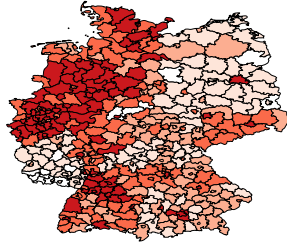
(d) Afghan origin, 2016



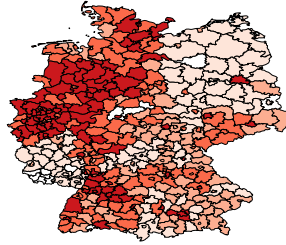
(e) Afghan origin, 2017



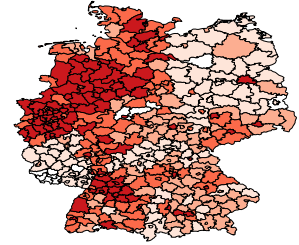
(f) Afghan origin, 2018



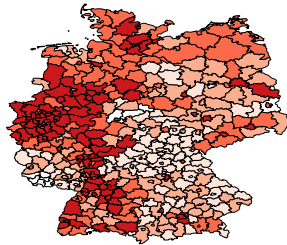
(g) Iraqi origin, 2016



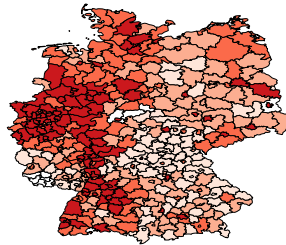
(h) Iraqi origin, 2017



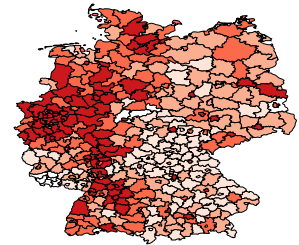
(i) Iraqi origin, 2018



(j) In need of protection, 2016



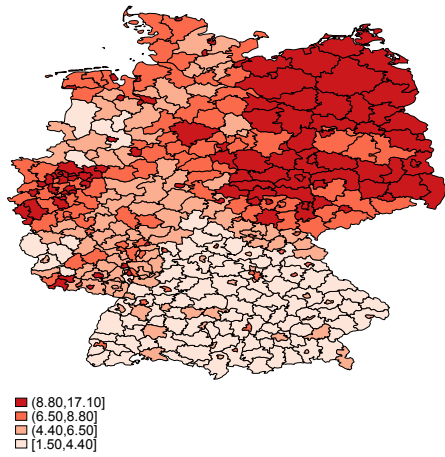
(k) In need of protection, 2017



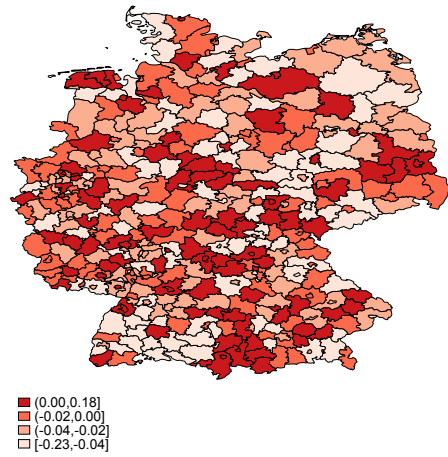
(l) In need of protection, 2018

Note: Figures A2a to A2i display the number of refugees per county, disaggregated by country of origin and year. Some counties do not publish the number of people in protection. These are classified as “No data”. Source: Destatis (2016-2018).

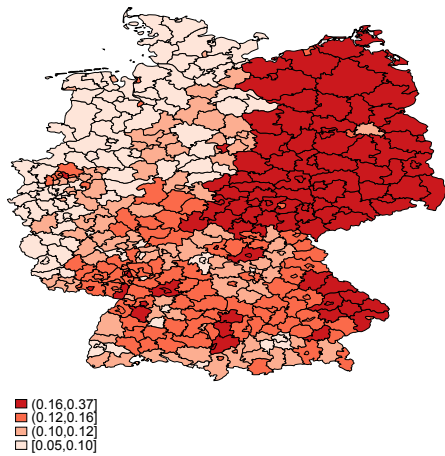
Figure A3: County-level treatment variables



(a) Unemployment rate (2014)



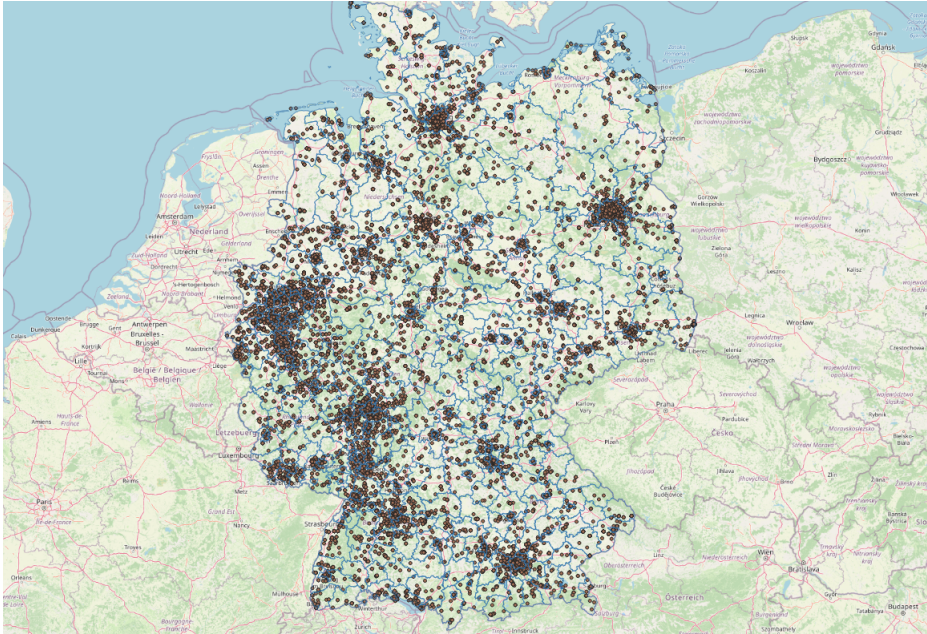
(b) Negative sentiment index (2014)



(c) Far-right vote share (2017)

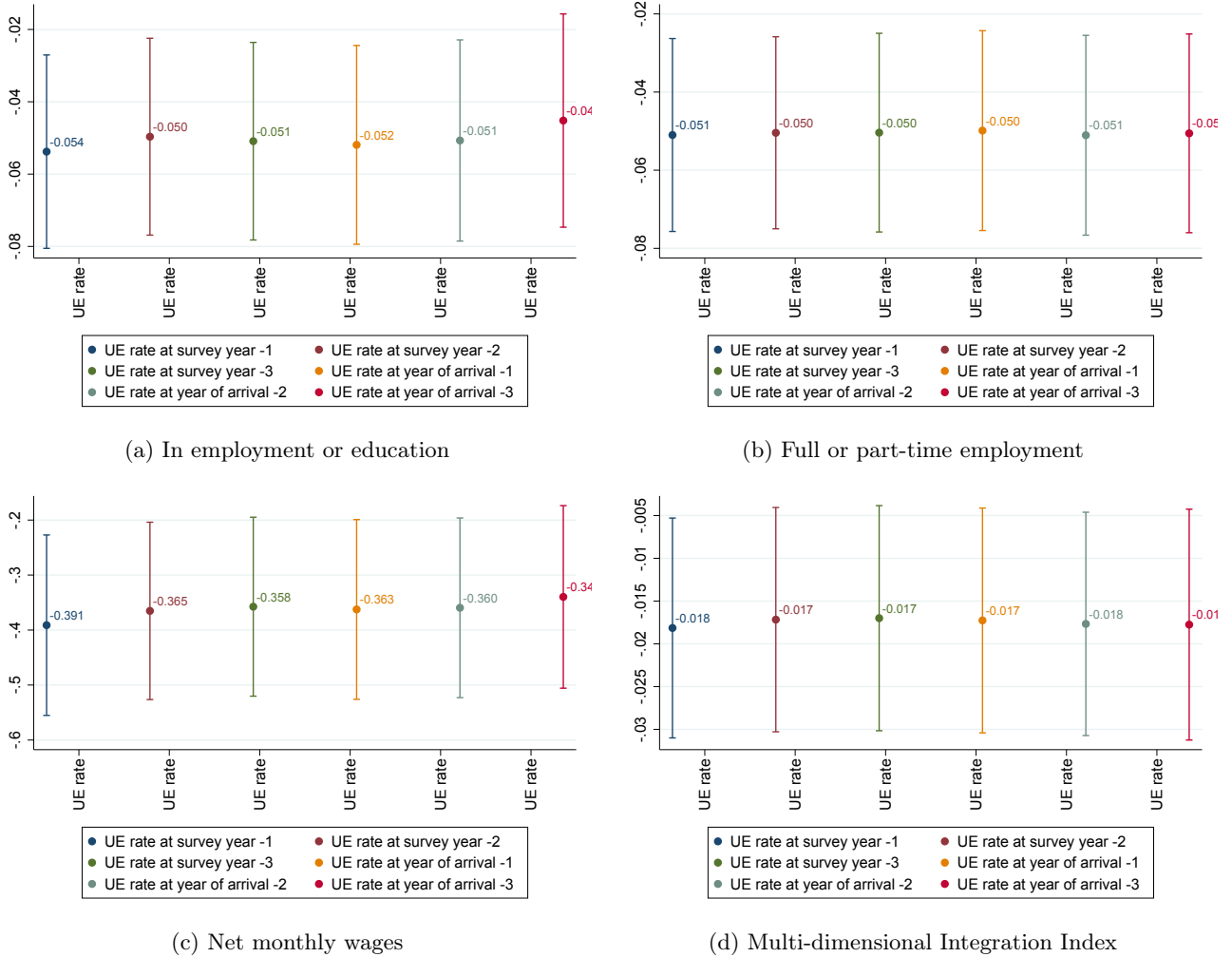
Note: Figures A3a to A3c display the county-level treatment variables. Source: Destatis (2014, 2017) and Twitter data (2014).

Figure A4: Geolocation of Tweets



Note: Figure A4 shows the distribution of geolocated tweets. Source: Twitter (2014) and authors' calculations.

Figure A5: Robustness of alternative lags of unemployment



Note: Figures A5a to A5d display the robustness of our estimation results to alternative lags of unemployment. Ordinary least squares regression estimates are shown. Source: SOEP v35 and Twitter data (2014).