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ABSTRACT

Scared Straight? Threat and Assimilation of Refugees in Germany*

This paper studies the effects of threat on convergence to local culture and on economic assimilation of refugees, exploiting plausibly exogenous variation in their allocation across German regions between 2013 and 2016. We combine novel survey data on cultural preferences and economic outcomes of refugees with corresponding information on locals, and construct a threat index that integrates contemporaneous and historical variables. On average, refugees assimilate both culturally and economically. However, while refugees assigned to more hostile regions converge to local culture more quickly, they do not exhibit faster economic assimilation. We provide evidence consistent with the hypothesis that refugees exert more assimilation effort in response to local threat, but fail to successfully integrate because of higher discrimination by locals in more hostile regions.

JEL Classification: F22, J15, Z10

Keywords: migration, refugees, culture, assimilation, identity

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1 Introduction

The increase in international migration flows has put the issue of immigrant assimilation at the forefront of the political debate. Adding to the movement of hundreds of millions of economic migrants, there has been an unprecedented rise in the number of refugees. The recent humanitarian crisis in Afghanistan is likely to further exacerbate these trends.[1] Moreover, it is estimated that as many as 1 billion individuals may be forced to relocate because of climate change (United Nations, 2020). The concern that refugees are not able or willing to assimilate in host societies is a recurring theme within the debate over the refugee crisis.

In recent years, several European countries have introduced integration policies, such as restrictions on dressing habits of Muslim women – a move that is supported by a substantial proportion of citizens.[2] In 2016, Germany passed the *Integration Act*, which prohibited the free movement of refugees for fear of "refugee ghettos". These and similar policies are often motivated by the idea that top-down pressure promotes refugees' successful assimilation. While the effects of government interventions have been extensively evaluated in the academic literature (Abdelgadir & Fouka, 2020; Bandiera et al., 2019; Fouka, 2020; Lleras-Muney & Shertzer, 2015), less is known about the impact of locals' attitudes and behavior on refugees' integration. Yet, assimilation pressure exerted, directly or indirectly, from the bottom-up by citizens at the local level may be at least as important as formal, top-down policies.

In this paper, we study the effects of local threat and hostility on refugees' convergence to regional culture and on their economic assimilation.[3] The relationship between threat and assimilation is *ex-ante* ambiguous. On the one hand, a more friendly environment might make it easier for refugees to integrate by facilitating inter-group interactions. Similarly, lack of openness and forced assimilation may trigger backlash among immigrants, who try to preserve their own cultural norms. On the other hand, natives' opposition to refugees may heighten incentives to signal allegiance to the nation and its values – a process we label "threat hypothesis". The faster cultural convergence triggered by threat may, however, not coincide with successful economic and social integration. For one, out-group members may use cultural convergence as a signaling device, where only more superficial (and observable) social norms are internalized. Moreover, in

[1] See, for instance, the BBC at https://www.bbc.com/news/world-asia-58283177.

[2] For instance, a majority of European voters are in favor of introducing bans on Islamic veils. See: https://www.pewresearch.org/global/2010/07/08/widespread-support-for-banning-full-islamic-veil-in-western-europe/.

[3] We use the term "refugee" for a resident applying for or having received asylum status and "local" as short-hand for a local resident living in the same region, but not applying for or having received asylum status.

areas with higher threat, the majority group may discriminate more against minorities for any level of effort exerted by the latter to assimilate.

We take these ideas to the data in the context of Germany, which received more than 1.6 million refugees between 2013 and 2018. To measure regional cultural convergence, we construct an index of cultural similarity between refugees and locals combining two datasets. First, we use the novel IAB-BAMF-SOEP Survey of Refugees – a longitudinal and nationally representative survey that collects information on socio-demographic characteristics as well as values, habits, and preferences of around 8,000 refugees. Second, we take preferences and values of more than 30,000 locals from the German Socio-Economic Panel (SOEP).

We define cultural similarity in stated preferences at the individual (refugee) level as follows. We select the questions that, in our view, capture cultural preferences and are available in both surveys. Then, for each of these, we compute the distance between the answer provided by a refugee and that given by all locals living in the region at baseline. Finally, we aggregate the question-specific difference using an index of Euclidean distance, which captures the shortest, unweighted distance between two points in the cultural space (Cha, 2007).[4] From the same survey datasets, we also obtain self-reported measures of labor force participation and wages of both refugees and locals, which we use to analyze the economic convergence of refugees, relative to baseline economic outcomes of locals. We validate self-reported measures of economic assimilation using administrative data, linking survey respondents to administrative records that contain daily information on refugees' employment and wages.

Our empirical strategy exploits the quasi-random allocation of refugees that arrived at different points in time between 2013 and 2016 across German NUTS-2 regions. To address the concern that refugees may selectively relocate to regions whose cultural preferences are more similar to theirs, we rely on an Intention to Treat (ITT) approach that measures both refugees' outcomes and the local environment in the region of assignment, rather than that of residence. Using this strategy and controlling for individual characteristics, for district fixed effects, and for interactions between year dummies and baseline district characteristics, we find strong evidence of both economic and cultural convergence.[5] According to our preferred specification, every year, the cultural and eco-

[4]We consider a variety of cultural and socioeconomic preferences, such as attitudes towards risk, importance of leisure, and reciprocity. Results are not sensitive to the exact set of questions included.

[5]Districts in Germany correspond to NUTS-3 regions, and are called *Kreisfreie Städte* and *Landkreise*. There are more than 400 districts in Germany with an average number of 180,000 inhabitants. There are 38 NUTS-2 regions and 16 NUTS-1 regions which correspond to Federal States.

nomic gaps between refugees and locals living in the same region decrease by 3% and 19%, respectively.

Then, we turn to the effects of local hostility on cultural and economic integration. We measure local threat using different proxies for anti-minority sentiments – from historical pogroms to vote share of modern far-right, anti-immigrant parties to ethno-centrism of locals. Since local threat may be endogenous to refugees' inflows, all variables are measured before the outcomes of individuals in our sample are recorded. To express these different components in a single variable, we combine them into a principal component index, which we validate using refugees' self-reported fears about xenophobia.

Consistent with refugees responding to local pressure, cultural convergence is faster in regions with higher threat. Comparing a refugee allocated to a region at the 75th percentile of the distribution of the threat index, such as Hamburg, to one allocated to a region at the 25th percentile, such as Dresden, the former is 70% closer to local culture than the latter, after one year. However, despite the faster cultural convergence, refugees assigned to areas with a higher threat index do not display more rapid economic assimilation. This holds both when measuring refugees' economic outcomes relative to those of locals in the region and when considering them in absolute value.

We provide evidence that our results are not driven either by *ex-ante selection* on the side of authorities or by *ex-post sorting* on the side of refugees. In particular, we show that our findings are unlikely to be influenced by: *i*) changes in the composition of refugees – e.g., with individuals who are more likely to converge towards local culture or economically integrate to move to Germany over time; *ii*) changes in assignment policies over time – e.g., refugees being assigned to places with different cultural and economic characteristics and threat levels; and, *iii*) selective internal migration – e.g., with refugees relocating to areas that are a better cultural or economic match for them or differential out-migration from threat regions.

We also verify that results are: not driven by survey attrition; not sensitive to the definition of cultural similarity; robust to dropping potential outliers and accounting for spatial correlation in the error term; and, not over- or under-stating the effect of threat due to selective out-migration of locals or changes in their cultural preferences over time. Finally, we run a horse-race between threat and other local variables, such as the size of ethnic enclaves, different proxies for local economic structure, and measures of cultural distinctiveness, which may be correlated with local hostility and simultaneously influence refugees' assimilation.

One interpretation for our results is that threat induces refugees to exert more effort to learn and adopt local culture; yet, locals living in areas characterized by higher threat may discriminate more against minorities, hindering the successful (social and economic) assimilation of the latter. This is consistent with assimilation being a two-sided process (Fouka et al., 2021). Out-group members can choose if and how much effort to exert in order to learn local norms and culture. Such effort does not lead to successful assimilation, unless locals (i.e., in-group members) accept refugees into their group. Interpreting self-reported cultural preferences as a measure of assimilation effort, our findings suggest that threat-induced pressure leads out-group members to exert more effort. Yet, the same level of effort is less likely to translate into successful assimilation (proxied for by economic outcomes) in more hostile environments. Despite higher effort, refugees are not more likely to be employed or to have higher wages in areas where the threat environment is stronger. In the second part of the paper, we provide different pieces of evidence consistent with our preferred interpretation.

First, we find that refugees assigned to regions with higher threat are more likely to attend voluntary integration courses, but are not more likely to interact with locals. Second, we document that threat-induced convergence is driven by female refugees, who may be more vulnerable and thus respond more to local pressure and threat. Moreover, threat has a stronger effect on refugees who arrived in Germany with children and those who are less educated. The former may be particularly responsive to threat, since they may be worried about harassment and violence against their offspring. The latter may be exposed to stronger discrimination, and may thus react by learning and adapting to local culture more quickly. Our analysis also reveals that threat induces refugees to converge faster to the preferences of locals who are employed, but has no effect on cultural convergence towards the non-employed. This finding is consistent with threat leading refugees to conform to the norms set by the individuals that are perceived as "resource-holding" within the majority group.

Finally, we provide suggestive evidence on the behavior and attitudes of locals by estimating panel regressions that control for district and survey year fixed effects, and interact the (regional) threat index with the refugee share of the district population. Locals living in areas with a higher threat index are more likely to express xenophobic views against refugees, as the size of the latter increases. This holds in spite of the fact that, as discussed above, refugees assigned to more threatening areas display a faster convergence to local culture. These patterns are mirrored by locals' behavior: refugee inflows lead to more frequent endogamous mating among locals living in areas with a higher threat

index. Using data from Twitter and from the presence of local (pro-refugees) NGOs, we do not find evidence that faster cultural assimilation in high-threat regions stems from integration activities organized by locals (or, non-profit organizations).

It is worth emphasizing that our paper has no normative implications, and that we do not mean to say that refugees should (or should not) assimilate to local or national culture. We simply document patterns that, we hope, can inform the debate about the forces that might hinder or promote the integration of minorities. Our results indicate that, even though hostility may increase the extent to which minorities adopt local culture in the short-run, this does not translate into faster or more successful assimilation. Furthermore, it is unclear that the threat-induced faster cultural convergence is long-lasting. In fact, persistent threat may eventually discourage minorities from exerting effort to assimilate, leading to lower, rather than higher, assimilation in the medium to long-run. Also, and importantly, our analysis does not consider the mental, physical, and social costs suffered by individuals facing higher levels of hostility (Benner et al., 2018; Walther et al., 2020).

Our paper is related to different strands of the literature. First, we contribute to the literature on assimilation and cultural transmission. Several papers have studied the effects of government policies and local pressure on the assimilation of minorities. While some works find that forced assimilation backfires, due to backlash among minorities (Abdelgadir & Fouka, 2020; Fouka, 2020; Glover, 2019), others document that government and social pressure may foster assimilation (Bisin & Tura, 2019; Fouka, 2019; Saavedra, 2021). We complement these works by focusing on refugees in the German context, and by measuring both threat and assimilation at the local – rather than national – level. Moreover, relying on rich survey data allows us to directly measure stated preferences of both minorities and majority group members.

In the context of migration, economists have analyzed immigration-induced changes in preferences of natives (see Alesina & Tabellini, 2020, for a recent review), the influence of emigrants on the cultural dynamics of the origin community (Barsbai et al., 2017; Rapoport et al., 2020), and changes in or the persistence of immigrants' preferences (Abramitzky et al., 2020a; Fernandez & Fogli, 2009).[6] Most closely related to our paper, Abramitzky et al. (2020a) show that both today and in the past, immigrants gradually assimilate culturally in the United States.

Second, our paper is related to the vast and growing literature on the economic

[6]Our work is also related to Boelmann et al. (2021), who study how German reunification, and the ensuing regional migration, changed the working behavior of female migrants who moved between the East and the West of Germany.

integration of refugees in high-income countries, which has recently been summarized in Brell et al. (2020) and Becker & Ferrara (2019) among others. Closest to our paper, Aksoy et al. (2020) show that more favorable labor market conditions and more open attitudes among locals promote the economic and cultural integration of refugees across German regions. As in our work, Aksoy et al. (2020) rely on the novel Survey of Refugees to measure both dimensions of integration. We complement their findings in at least two ways. First, we construct a measure of convergence to local – as opposed to national – culture. Second, we develop a comprehensive measure that aims at capturing immediate threat, rather than generic attitudinal openness, faced by refugees. Both the focus on local cultural convergence and the more comprehensive threat index we develop may explain the difference between our findings and those in Aksoy et al. (2020), for what concerns cultural convergence.[7]

Finally, our work speaks to the literature that leverages the quasi-exogenous allocation of refugees within Germany to assess the effect of local characteristics on a wide range of economic outcomes (Bahar et al., 2019; Battisti et al., 2021). More broadly, we complement the growing literature on the causes and consequences of the post-2015 refugee inflow to Germany and Europe (Battisti et al., 2019; Busch et al., 2020; Deole & Huang, 2020; Gehrsitz & Ungerer, 2017; Giavazzi et al., 2020; Hangartner et al., 2019; Hilbig & Riaz, 2020; Martén et al., 2019).[8]

The remainder of the paper is structured as follows. Section 2 describes the institutional background. Section 3 presents the data and the construction of the measures of economic and cultural assimilation. Section 4 describes the empirical strategy. Section 5 presents the main results, and Section 6 examines the mechanisms. Section 7 concludes.

2 Background: Refugee Migration to Germany

Germany has been one of the main destinations for refugees in Europe. Between 2015 and 2018 alone, a total of 1.6 million asylum applications were filed in Germany, amounting to over 40% of all applications in the European Union during this time (Eurostat, 2021). The surge in asylum applications followed the eruption of the civil war in Syria and the growing threat of the so-called Islamic State in Iraq. Starting in 2011, an increasing

[7] In fact, our findings are likely to capture different nuances of the assimilation process documented in Aksoy et al. (2020). The similarity of results for economic integration in our work and in Aksoy et al. (2020) supports this interpretation.

[8] In related work, Schilling & Stillman (2021) and Graeber & Schikora (2021) examine the effect of right-wing vote share and hate crimes on refugees' well-being and social inclusion in Germany.

number of refugees fled to neighboring countries, moving westward to seek protection in Europe. The movement of hundreds of thousands of refugees from Syria and Iraq through Turkey and the *Balkan Route*, crossing Greece, Serbia, Croatia, or alternatively Hungary, rippled into an even larger and more diverse movement of people, including asylum seekers from Albania and Kosovo.

The number of asylum applications in Germany peaked in late 2015, following Angela Merkel's highly contested decision to admit refugees that were stranded in Hungary (Figure 1). This decision was a deviation from the Dublin Regulation, which assigns the responsibility of administering an asylum request to the country of first-entry. However, the regulation was effectively (though not officially) abandoned before September 2015, as registration and administrative capacities in Italy and Greece ached under the immigration pressure, and most refugees desired to move to Northern Europe. In order to curb the number of refugees, in March 2016, the European Union established a treaty with Turkey that encouraged stricter controls by Turkish authorities at its Western shores. Turkey agreed to take back refugees from Greece, and resettle local refugees in the European Union. The treaty, in combination with the closing of the Southern Hungarian border, led to a steep decline in asylum applications in Germany, which have remained relatively low (at pre-2014 levels) since then.

Despite early warning signs, such as increasing numbers of refugees in Iraq and Syria's neighboring countries and growing refugee inflows across Europe, German authorities remained ill-prepared for the upcoming influx. The accommodation of hundreds of thousands of refugees within a few months proved to be a major challenge for Germany. The main tool for the distribution of refugees across States (*Bundesländer*) was the so-called *Königsteiner Schlüssel*, which allocated refugees according to a State's economic capacity (tax revenues) and population. States themselves could then distribute refugees within their districts, following independent but similar criteria. Focusing on 2016, Figure 2 shows that the local presence of refugees is consistent with the distribution that would have arisen under the the assignment through the *Königsteiner Schlüssel*.

The German government sought to allocate refugees depending on the availability of housing at the local level, taking into account their demographic characteristics (such as age, gender, family status, and country of origin). However, for the most part, the pace of refugee arrivals left no room either for one-on-one conversations with assignment officers or for in-depth analyses of refugees' profiles. Within a short period of time, the available accommodations were filled up and local authorities had to rely on alternative solutions, such as vacant houses, empty hotels, old military barracks, schools, and improvised

container colonies and tents (Baier & Siegert, 2018).

Beyond the initial assignment to accommodations within states, refugees had the ability to self-relocate under certain circumstances. Those who were still in the asylum application process or who had already been rejected were not allowed to move within the first three months of stay in Germany. Many of the rejected asylum applicants receive a special status, by which they are not officially refugees but whose stay in the country is tolerated (*Duldung*). Until August 2016, accepted applicants as well as persons with *Duldung* and pending applications that passed the three month mark were allowed to move freely across Germany.

Economic pull factors and large secondary migration fueled the fear of parallel societies if refugees were to choose their place of residence freely. Consequently, lawmakers passed the *Integration Act* in the summer of 2016, restricting the free movement across states even for asylum seekers with approved status for the first three years. Six out of sixteen states (mainly the wealthiest and most densely populated states, such as Bavaria, Baden-Württemberg, and North Rhine-Westphalia) tightened the law further, prohibiting refugees to move out of the districts they were initially assigned to, unless they could earn their own living.

In general, asylum seekers whose application has not yet been processed have access to the labor market after a waiting period of three months, except if they come from a so-called safe country of origin. The same period applies to persons with tolerated status, i.e., individuals whose asylum application has been rejected but for whom it is currently not possible to leave the country. The work permit is issued only for a specific job after review by the authorities. Instead, persons with approved asylum status can enter the labor market without any restriction.

3 Data and Measures of Threat and Assimilation

3.1 Data Sources

The German Socio-Economic Panel. The German Socio-Economic Panel (SOEP) is a large, nationally representative longitudinal study that surveys around 15,000 households and about 30,000 individuals every year since 1984, mostly in face to face interviews. The SOEP includes rich information on demographics, socio-economic status, and migration background of respondents. The SOEP also reports the state, the region,

and the district of residence of respondents.[9] This allows us to construct a measure of *local* culture that we can match to the answer given by refugees at the same level of aggregation (district, region, and state). In our baseline analysis, we consider all local residents (other than refugees, i.e., respondents of SOEP-Core) between 18 and 66, regardless of their nativity.[10]

The refugee survey. We complement the SOEP with waves 1 to 3 (survey years 2016-2018) of the IAB-BAMF-SOEP Survey of Refugees to measure refugees' preferences over time. This is a longitudinal, representative survey of refugees, asylum seekers, and their family members in Germany (Brücker et al., 2016). The survey is conducted jointly by the Institute for Employment Research (IAB), the Research Center of the Federal Office of Migrants and Refugees (BAMF FZ), and the SOEP at the German Institute for Economic Research (DIW Berlin). The sampling frame of the survey is the Central Register of Foreigners in Germany, where each foreign citizen is registered by her or his legal status. The target population is composed of individuals arrived as asylum seekers in Germany between January 1, 2013, and December 31, 2016, irrespective of their current legal status. The total sample includes about 8,000 adult respondents (18 years and older), who were surveyed up to three times between 2016 and 2018.[11] As for locals, we restrict attention to individuals between 18 and 66, in order to focus on working-age population. Additionally, we exclude from the sample refugees that have been in the country for more than 6 years (less than 1% of the sample) as of the latest survey year in 2018. We impose this restriction because these individuals arrived well before the 2015 refugee crisis, and are thus not comparable to the population of refugees considered in our paper.

The main questionnaire includes more than 400 questions regarding migration, employment and education history, socioeconomic and demographic characteristics, health status, measures of social and political integration, as well as values and attitudes. This data is complemented with a questionnaire conducted at the household level that asks questions about housing, living conditions, and welfare benefits. Crucially for our purposes, the refugee survey is designed to match as closely as possible the questions in the SOEP, and both sample and the interview process are similar between the two surveys. This feature ensures the comparability of the two surveys – a key condition to study

[9] For more details on sampling, fieldwork, data structure, and content of the SOEP, we refer to Goebel et al. (2019).

[10] The age restriction is imposed to focus on working age population. All results are robust to omitting this restriction. Moreover, results are unchanged when restricting attention to German-born locals to define economic and cultural variables.

[11] See Kühne et al. (2019) for more details.

differences in values and attitudes between refugees and locals.

Administrative data on refugees' labor market outcomes. We exploit a novel feature of the refugee survey that allows us to link individual respondents to administrative data on daily employment and wages (Keita & Trübswetter, 2020). We use this data, whose details are presented in Appendix C, to calculate alternative measures of economic assimilation for the record linkage sample. The administrative data reduces concerns about misreporting of employment or wages in the survey sample. We also retrieve the share of foreigners (non-German citizens) working in the company where refugees are employed the day of the survey.

Additional datasets. We complement the datasets described above with additional data sources. First, we obtain total population and the number of refugees at the district level at baseline (December 2012) from the German Federal Statistical Office (Destatis, 2021). Second, we retrieve data on regional unemployment rates across districts and the employment rates and median wages of immigrants at baseline (NUTS-2 and region-of-origin-specific) from the statistics department of the Federal Employment Agency (Bundesagentur für Arbeit, 2020). Third, as additional proxies for locals' attitudes, we collect: *i*) Twitter posts in German from 2013 to 2018 that contain the hashtag #refugeeswelcome; and, *ii*) the number of NGOs in a NUTS-2 region that were active as of 2017. Both datasets are described in detail in Appendix C. Finally, we collect data to construct the local threat index from multiple sources, which we describe when introducing the index in the next section.

3.2 Measurement

Threat environment. The central part of our analysis is based on the presence of threat at the local level, which we define as a NUTS-2 region.[12] We consider several dimensions of threat. First, we collect historical data on pogroms and violence against Jews from Voigtländer & Voth (2012), and the 1933 vote share of the Nazi-party from Falter & Hänisch (1990). Second, we obtain data on political attitudes in more recent times: the 2013 vote share of the far-right, anti-immigrant National Democratic Party (NPD) from the Federal Elections Office (Bundeswahlleiter, 2020), and the frequency of marches organized by the far-right political groups between 2005 and 2012 from Kanol & Knoesel (2021). Third, we use attacks against mosques between 2001 and 2011 from

[12] As we describe below, data limitations prevent us from constructing the dependent variable (in particular, cultural similarity) at a more disaggregated level (e.g., the district). For consistency, we define the threat index at the NUTS-2 region level as well.

Colussi et al. (2021). Finally, we measure ethno-centrism of locals by combining anti-immigrant and anti-diversity attitudes from ALLBUS (pooling the survey years 2008, 2010, and 2012),[13] and an inverse measure for "openness" – a sub-dimension of the Big-5 personality traits associated with ethnocentrism from the SOEP.[14] We describe all index components and their sources in Table A.1.

In order to measure threat in a single index, we calculate the first principal component of each measure just described. We plot the threat index across NUTS-2 regions in Figure 3, both unconditional (left panel) and conditional on state fixed effects (right panel). In Table A.2 we report the correlation between the various components of the index. Both the index and its components display significant regional variation, and the individual dimensions seem to be geographically correlated with each other. Overall, threat levels are most pronounced in Eastern Germany – a pattern especially apparent for the right-wing vote and hate crimes against refugees. This is in line with the literature connecting a history of socialism with right-wing attitudes (Acemoglu et al., 2021; Lange, 2021).

We validate our measure of threat in Figure A.1. In the left panel, we report the residual bin-scatterplot for the relationship between a self-reported measure of fears about xenophobia that ranges from 1 to 3, with higher values reflecting more concerns, expressed by refugees (y-axis) and the threat index (x-axis). The corresponding regression partials out survey year fixed effects, months since arrival, and individual characteristics.[15] There is a positive and statistically significant relationship between the two variables, indicating that refugees assigned to regions with a higher threat index are more likely to report concerns about xenophobia. The right panel confirms these patterns using refugees' answer to the question of whether they feel welcome in Germany (on a 1 to 5 scale, with higher numbers referring to more inclusive feelings).

Cultural assimilation. To measure convergence to local culture, we build on the existing literature (Alesina et al., 2017; Bertrand & Kamenica, 2018; Desmet et al., 2017; Desmet & Wacziarg, 2021), and exploit high frequency attitudinal data from the refugee survey. We construct a measure of cultural proximity between each refugee and locals living in the NUTS-2 region of assignment. We define a measure of refugees' similarity to local, rather than national, culture by taking the average of preferences

[13] ALLBUS (The German General Social Survey) is a survey conducted every two years since 1980 which focuses on insights on attitudes and behavior of residents. A representative part of survey population participates also in face-to-face interviews.

[14] Research in social psychology found a consistent association between openness to experience and ethnocentrism. See, for instance, McCrae (1996), Butler (2000), and Jost (2006).

[15] Individual controls are: gender, age, age squared, kids born before arrival in Germany, country of origin, marital status and location of partner as well as work experience and education upon arrival.

expressed by local residents before the influx of refugees. This measure allows us to examine whether, over time, refugees' preferences become closer to those reported by locals at baseline.

When defining the local context, we face a trade-off between granularity and representativeness. Although we can observe respondents' location at the district level, some districts host fewer than 20 non-refugee respondents. For this reason, we prefer to use a higher aggregation level: the NUTS-2 region.[16] The cultural dimensions used in our analysis arise from the overlapping questions in the refugee survey and in the SOEP. We consider the 8 questions that, in our view, are best positioned to capture cultural preferences and social norms. These are: risk attitudes, negative and positive reciprocity, frequency of different types of leisure activities (sports, movies, restaurants, etc.), interest in politics, locus of control, generalized trust, and views over fairness in society. Table A.3 reports all questions, together with the exact wording and the range of possible answers. Since the traits that define social norms and culture are admittedly subjective, in Appendix B we verify that results are not sensitive to the exact set of questions included in the analysis.[17] As an example, focusing on positive and negative reciprocity, Figure A.2 illustrates the importance of within country (and even within state) cultural heterogeneity prevailing among locals in 2010 across NUTS-2 regions. Similar patterns hold for the other cultural dimensions.

Different statistical measures can be used to capture distance, entropy, or divergence (Cha, 2007). Most of these are derivatives of the Minkowski norm, which is defined as $D_{mink}(X,Y) = \sqrt[p]{\sum_{i=1}^{n} |x_i - y_i|^p}$, where X and Y are two independent probability density functions. The most frequently used measure of cultural distance, at least within economics, is the Euclidean distance, which belongs to the group of geometric distances (Alesina et al., 2017; Bertrand & Kamenica, 2018; Rapoport et al., 2020). Intuitively, it captures the shortest, unweighted distance between two points in the cultural space.[18]

Following the literature, we use the Euclidean distance to capture the cultural proximity between a refugee and a local (non-refugee) resident in the same NUTS-2 region (where the refugee was assigned). For each of the questions in Table A.3, we first calculate the pairwise differences between the refugee and all locals, $x_i - y_i$. Then, we square those differences and take the mean. Finally, we calculate the square root of this term so as to obtain the Euclidean pairwise distance between the individual

[16] Germany has 38 NUTS-2 regions, which gives us a sufficient number of observations per region to reduce measurement error, while also capturing the relevance of local culture.

[17] See Table A.4 for the additional questions considered in Appendix B.

[18] Specifically, the Euclidean Distance is part of the Minkowski family with $p = 2$.

refugee and all individuals living in the same NUTS-2 region for a specific question $D_{Eucl}(X,Y) = \sqrt[2]{\sum_{i=1}^{8}(x_i - y_i)^2}$. We then take the mean Euclidean distance over all refugee-local pairs and all questions, and invert this term to get a cultural similarity measure.

To isolate refugees' convergence to local culture, we fix responses of local residents at baseline. While locals' preferences may change in response to refugee inflows, making our baseline measure less accurate, we want to prevent our proxy for cultural convergence from being influenced by locals moving closer to refugees. Therefore, we take locals' responses to a specific question in the year before the large influx of refugees starting in 2014. When a question was not asked in 2013, we use the closest observation year possible.[19] This guarantees that the index of cultural proximity is constructed using pre-determined preferences of locals. Appendix B verifies that there is no correlation between any of the dimensions we include in the index (for locals) and the inflow of refugees over time, regardless of the level of threat prevailing in the region. It also documents that results are unchanged when measuring locals' preferences at end-line.

We illustrate the average cultural similarity between refugees and locals across regions in Figure A.3.

Economic assimilation. We measure economic assimilation using a strategy similar to that described above for cultural convergence. Specifically, we take the self-reported employment status (either zero or one) of each refugee, and subtract from it the baseline average employment rate of locals in the same NUTS-2 region (taken from administrative data sources of Bundesagentur für Arbeit, 2020). For the sub-sample of individuals who are employed, we replicate this procedure for earnings, taking the absolute value of the difference between the wage earned by the refugee and the median wage of locals in the same NUTS-2 region.[20] For the sub-sample of employed refugees, we can link survey information to administrative employment data, addressing potential biases stemming from misreporting of employment status by refugees. We therefore also construct the very same measures of economic assimilation using these data.

3.3 Descriptive statistics

Table 1 reports the summary statistics for the main variables and the characteristics of refugees (Panel A) and locals (Panel B), for the full sample and separately for regions

[19] All questions were asked before 2014 (in 2013, 2012 or in 2010).

[20] Since, in general, refugees' employment and wages significantly lag those of locals (Brell et al., 2020), results are very similar when focusing on absolute, rather than relative, convergence.

above and below the median value of threat (-.63). On average, the cultural distance between refugees and locals is -1.91, with very similar values and distributions in high and low threat regions. The average refugee in our sample has been in Germany for 29 months; again, this number is similar in high and low threat regions. On average, the employment gap between locals and refugees is 50%, and, among those employed, refugees earn 830 Euros less than locals, with values similar in high and low threat regions.

Table 1 also reports summary statistics for additional variables considered in our analysis, such as attending integration and language courses, time spent with Germans, and wearing a headscarf. Along all dimensions, refugees assigned to low-threat regions tend to report slightly lower values. Consistent with the more formal evidence documented below, refugees seem to integrate in the host region quickly: more than 50% of the individuals in our sample are or have been attending integration courses, and 14% of those who are in a relationship have a partner who was born in Germany at the time of interview. Moreover, according to the assessment of the interviewer, refugees' proficiency in German tends to be intermediate-level.

More than three in four refugees in our sample come from Syria, Afghanistan, or Iraq; Africa and the West Balkans account for another 10% of respondents (not shown). Refugees are more likely to be male and younger than locals, and only about a third of them arrive with a secondary school leaving certificate (as compared to 85% of locals). About 17% of locals have a migration background, with the largest group coming from Poland.[21]

Panel C reports district-level controls used in the main analysis as well as the (regional) threat index. High threat regions are characterized by higher unemployment, lower population density, and a lower share of refugees. Mechanically, the threat index is higher in regions above the median. However, as shown in Table A.5, its components display substantial variation. Somewhat surprisingly, historical variables (1920s pogroms and 1933 NSDAP vote share) are not higher in regions where the index is higher. In fact, pogroms are lower in those regions where the overall threat index is above the median. A similar pattern emerges for 2000-2011 attacks against mosques, implying that the variation behind the threat index does not load onto either historical anti-Semitic attitudes or recent attacks against mosques. This is also consistent with the decomposition results presented below, where we show that neither historical threat

[21] Given the high share of non-native local residents, Appendix B replicates the analysis defining the cultural similarity index by restricting attention to locals born in Germany.

variables nor attacks against mosques have an effect on cultural convergence. Instead, natives' attitudes towards refugees from ALLBUS, the 2013 NPD vote share, and participation in far-right marches are all higher in regions with the threat index above the median.

Table A.6 presents summary statistics for additional variables, including each cultural dimension separately for refugees and locals. Risk aversion is higher among the former, consistent with the literature on risk-taking adjustment after traumatic events (Ceriani & Verme, 2018; El Bialy et al., 2017). Refugees also report lower values of negative reciprocity, but higher values of positive reciprocity, relative to locals. Both groups report intermediate values for locus of control and for views over fairness of society. Refugees are instead less interested in politics, less likely to consume leisure time, and report slightly lower generalized trust than locals. Notably, preferences of refugees and locals are very similar in regions above and below the median of the threat index.

4 Empirical Strategy

4.1 Empirical Specification

To study how local threat influences refugees' cultural and economic assimilation with each extra month spent in a German region, we estimate:

$$\begin{aligned} Y_{idrt} = \gamma_d + \gamma_t + \beta_1 MSA_{it} + \beta_3 MSA_{it} \times Threat_{rt} + \\ \beta_5 X'_{it} + \beta_6 Z'_{dt} + Q_{it} + \epsilon_{idrt} \end{aligned} \tag{1}$$

where Y is either cultural or economic assimilation (relative to the local population in the same NUTS-2 region r) of refugee i in district d and survey year t, and MSA refers to months since arrival of the refugee. The key regressor of interest is the interaction term between MSA and the threat index. The coefficient β_3 captures the differential effect that each additional month has on the assimilation of a refugee when spent in a region with a different level of threat. Positive values of β_3 would indicate that refugees converge faster (economically or culturally) in areas with higher threat.

We control for: i) baseline district level variables (unemployment rate, population density, and share of asylum seekers) interacted with year dummies, Z'_{dt}; ii) individual characteristics (gender, age, age squared, country of origin, and marital status, dummy for children living in the household born before arrival, work experience, and education

upon arrival), X'_{it}; and, *iii*) refugee specific time-varying dummy variables, Q_{it}, to account for compositional changes in the questionnaire and refugees' responses (or missing values). The latter control guarantees that we compare refugees that answered the same set of attitudinal questions over time.

In our preferred specification, we also include district and interview year fixed effects (γ_d and γ_t). District fixed effects absorb any district-specific (time invariant) characteristics. We use the region of assignment – rather than the region of residence – as the location of treatment, thereby implementing an intention to treat (ITT) approach. Standard errors are clustered at the person level to account for the fact that some refugees are surveyed repeatedly, following the sampling-based clustering approach proposed by Abadie et al. (2017).[22]

4.2 Threats to Identification

The key identifying assumption behind our empirical strategy is that the allocation of refugees across German regions did not change over time. This would be violated if the "cultural match" between refugees and locals or the economic opportunities available to refugees were to change over time between regions with different levels of threat. For example, officials may have become better able to match refugees to regions on the basis of their cultural similarity in a way that was correlated with the level of threat prevailing in a region. Alternatively, it is possible that, due to the rising number of asylum seekers, refugees arriving later were assigned to areas with more sluggish labor markets, with worse cultural affinity, and with higher levels of hostility. In any of these scenarios, our estimates would be biased due to *ex-ante* sorting of refugees across regions.

A second threat to the empirical strategy is the possible *ex-post* migration of either locals or refugees. Using an ITT approach addresses the potential relocation decision of refugees (e.g., away from more threatening regions and into more welcoming ones). However, it does not deal with the fact that locals with varying degree of openness may selectively move away from regions that were assigned a higher number of refugees, and that also varied in their level of threat. Even if cultural similarity between refugees and locals is defined using the culture prevailing in the region at baseline, locals' migration patterns may nonetheless change both incentives for refugees to exert effort and their eventual assimilation.

[22]Results are robust to clustering standard errors at the district level, and to use the procedure in Conley (1999) to account for potential spatial correlation in the error term (Appendix B).

In Appendix B, we describe in detail the exercises performed to corroborate the validity of our empirical strategy, but we preview the most important ones here. First, we address concerns about *ex-ante* selection of refugees across regions with different characteristics and with different levels of threat. We document that the pre-entry characteristics of refugees, including baseline cultural similarity, assigned to different regions did not change over time. This holds both when considering the full sample and when focusing on regions above and below the median of the threat index (Tables B.1 and B.2).

Second, we deal with potential *ex-post* sorting in different ways. Even though the ITT design already deals with this concern for refugees, we directly examine the possibility that the latter selectively moved across regions during our sample period. Reassuringly, there is no evidence of either economic or cultural selection on the side of refugees (Figure B.1). Exploiting the residency obligation requirement introduced in the summer of 2016, which restricted a subset of refugees to move freely across Germany, we also verify that our estimates are very similar for movers and stayers (Table B.3). In addition, we check that refugees assigned to regions with higher levels of threat are not more likely to out-migrate (Table B.4, Panel A), that refugee inflows are not associated with differential migration of locals (Table B.4, Panel B), and that there is no selective attrition among refugees (Table B.5).[23]

We summarize additional robustness checks after presenting our main results, in Section 5.4 below.

5 Main Results

5.1 The Cultural and Economic Assimilation of Refugees

Figure 4 plots the relationship between months since arrival and both local Euclidean cultural similarity (blue, solid line) and economic assimilation (green, dashed line) in the raw data, without any control. The two lines suggest that the cultural and the economic distance between locals and refugees shrinks over time. Next, we turn to the formal regression analysis in Table 2, presenting results for cultural convergence and for economic assimilation in Panels A and B respectively.

[23]Refugee out-migration is not sensitive to threat since - even before the residency obligation - logistic and financial restrictions made it hard for refugees to move out of their location of assignment.

Cultural assimilation. In column 1 of Panel A, we regress the cultural similarity index (CSI) against months since arrival (MSA), after partialling out survey-question composition fixed effects and individual controls. The coefficient on MSA is positive and statistically significant, confirming the pattern displayed in Figure 4. In columns 2 to 5, we gradually introduce a more stringent set of controls. In column 2, we interact survey year fixed effects with baseline district controls (unemployment rate, population density, and the refugee share of the population). Columns 3 and 4 further include state and NUTS-2 region fixed effects. Finally, column 5 controls for district fixed effects, thereby comparing local convergence between refugees assigned to the same district in different months. For the remainder of the paper, the controls and fixed effects of column 5 are those included in our preferred specification.

In all cases, the coefficient on MSA is positive and statistically significant, indicating that refugees converge to local culture as they spend more time in a region. Moreover, the point estimate remains virtually unchanged when including additional controls, indicating that the allocation process is unlikely to be influenced by factors that may vary over time and correlate with the assimilation trajectories of refugees.[24] To gauge the magnitudes of our estimates, we ask when the average cultural similarity between a refugee and a local would equal the average cultural similarity between two locals living in the same region. To do so, we calculate the Euclidean CSI between all locals in the same region using the pairwise difference between locals. This is, on average, -1.38: as expected, lower (in absolute value) than the distance between refugees and locals (-1.91). According to our preferred specification, refugees close 3% of this gap in one year. Assuming a linear relationship, refugees would halve their cultural distance from locals in about 18 years.

We have so far focused on average convergence. In Table A.9, we present results separately for the various items included in the CSI.[25] We adjust confidence intervals for multiple hypothesis testing following Clarke et al. (2020), Romano & Wolf (2016), and Romano & Wolf (2005a,b). Refugees converge towards locals' averages for positive reciprocity (column 3), interest in politics (column 7), and leisure activities (column 8), albeit coefficients are statistically significant only for the latter two. Since Table A.9 considers convergence relative to locals, it remains silent about the direction in which refugees' preferences change over time.

In Figure 5, we plot the change in refugees' preferences by arrival cohort, after par-

[24] Table A.7 adds controls more gradually, verifying that also in this case the coefficient on MSA remains stable. Table A.8 reports the coefficients on individual and district level controls.

[25] The number of observations varies by question, since not all items were asked in all years.

tialling out individual controls, interactions between district characteristics and year dummies, and district fixed effects. Over time, refugees consume more leisure and become more interested in politics. These trends are consistent with the convergence results reported in Table A.9, since refugees are, on average, less likely to spend time on leisure and to be interested in politics, relative to locals (Table A.6). Along other dimensions, refugees' preferences seem to change little, except for reciprocity. In the latter case, refugees display a somewhat higher (resp. lower) positive (resp. negative) reciprocity. However, these patterns are noisy, and are not evident among more recent cohorts.

Economic assimilation. In Panel B of Table 2, we turn to economic assimilation, focusing on the most stringent specification (column 5) for brevity.[26] The dependent variable is the difference between an indicator for the employment status reported by a refugee and the average employment rate among locals at baseline. Mirroring results in Panel A, refugees converge to the average employment rate of locals in the region of assignment with each additional month in Germany. According to our estimates, one extra year in the region of assignment raises the probability of employment by 8 percentage points (or, almost 20% relative to the mean). Restricting attention to refugees who are employed, Table A.11 documents that similar patterns hold for wages.

One may be worried that results were influenced by desirability bias or by misreporting of refugees. If this were correlated with time spent in Germany, our estimates would be biased. To address this issue, we exploit the fact that the refugee survey can be linked to administrative data (Record-Linkage), which record both employment and wages except for the civil servants, self-employed, family workers, soldiers, and people in military or alternative service (see Appendix C.1). Table A.12 verifies that results are unchanged when using SOEP-Record-Linkage data. While we cannot repeat this exercise for cultural convergence, these patterns suggest that our estimates are unlikely to suffer from social desirability or other sources of reporting bias.

Overall, findings in Table 2 indicate that refugees converge to local culture and integrate economically as they spend more time in a German region. While cultural convergence may be responsible for the increase in employment and wages of refugees, the opposite relationship might hold, with economic assimilation fostering convergence to local culture. Our goal here is not to identify which force (if any) moves first, possibly triggering the other. Rather, we are interested in separately estimating the reduced

[26] Table A.7 (Panel B) introduces controls more gradually, while Table A.10 reports coefficients on individual and district level controls.

form relationship between months spent in the region of assignment on the one hand and cultural similarity and economic integration on the other.

5.2 Threat and Assimilation

In this section, we examine how threat influences cultural and economic convergence of refugees at the local level. *Ex-ante*, the effects of threat on cultural and economic assimilation are ambiguous. On the one hand, a more open environment might make it easier for refugees to integrate, by facilitating social and economic interactions. Moreover, lack of openness by the host community may inhibit assimilation or even cause backlash, with refugees being more likely to preserve their own cultural norms in the presence of hostile attitudes of locals (Abdelgadir & Fouka, 2020; Fouka, 2020).

On the other hand, local hostility may increase incentives to assimilate among minorities. Refugees assigned to regions with higher threat may feel stronger psychological pressure and might be more worried about their safety or that of their relatives, because of their diversity from locals. As a result, they may be induced to exert more effort to learn about and adopt social norms, abandoning their own culture more quickly (Fouka, 2019; Saavedra, 2021). However, assimilation is not a deterministic process, and locals living in more hostile regions may be more likely to discriminate against out-group members, even when the latter exert higher levels of effort. Hence, a higher desire to assimilate might not translate into successful (economic and social) integration.

We test the ambiguous predictions just discussed in column 6 of Table 2, where we replicate column 5 by interacting MSA with the threat index described in Section 3.2.[27] Focusing on cultural similarity (Panel A), the coefficient on MSA is barely affected, while that on the interaction term between threat and MSA is positive and statistically significant. That is, refugees assigned to more hostile regions converge faster to local culture as they spend more time in Germany.[28] The effects are quantitatively large. When comparing a refugee assigned to a region at the 75th percentile of the threat index with one assigned to a region at the 25th percentile, the CSI of the former would be 70% higher than that of the latter after one year.[29]

Turning to economic assimilation (Panel B), the coefficient on MSA remains, again, positive and statistically significant. However, and contrary to the patterns observed

[27]The main coefficient on threat, which is defined at the regional level, is absorbed by the district fixed effects.

[28]Table A.13 presents results for the specification reported in column 6 of Table 2 adding controls one at the time.

[29]This number is obtained by multiplying the coefficient on the interaction in column 6 (0.075) by the inter-quartile range of the threat index (1.15), and then scaling this by the coefficient on MSA (0.125).

in Panel A, the point estimate on the interaction term is close to zero and not statistically significant. Table A.11 presents similar results focusing on (relative) wages, and Table A.12 verifies that our findings are unchanged when using administrative data.

In Table A.14, we analyze how the different components of the threat index influence the trajectories of refugees' cultural and economic assimilation. Based on principal-component-analyses (Table A.15), we divide the 11 components of the index in three categories with eigenvalue greater than one: a first one loading heavily on contemporary anti-immigrant sentiments; a second one reflecting historical hostility against minorities; and, a third one proxying for contemporaneous openness among locals.

As documented in Panel A, contemporaneous anti-immigrant sentiments (column 1) and the lack of openness among locals in recent surveys (column 3) are both strongly associated with higher cultural convergence. Instead, the coefficient on the interaction between MSA and historical proxies for anti-minority attitudes (column 2) is not statistically significant at conventional levels, even though it is positive. This holds also when including all three sub-components simultaneously (column 4). One explanation for these patterns is that, especially upon arrival, refugees' perceptions and actions may be more strongly influenced by recent attitudes among locals (such as anti-immigrant feelings or the degree of openness) than by historical events. Even though support for the NSDAP and historical pogroms have persistent effects on local culture (Voigtländer & Voth, 2012), when compared to more recent measures of anti-immigrant sentiments, the former may be less noticeable in the eyes of refugees.

Panel B of Table A.14 shows that none of the individual threat categories, when interacted with MSA, has a statistically significant effect on economic assimilation. Moreover, in all cases, the point estimate is quantitatively small.

5.3 Other Mediating Factors

Thus far, we have focused on one specific factor that influences refugees' cultural and economic assimilation: local threat. In this section, we consider additional forces that may influence the assimilation trajectories of minorities. This also allows us to address the potential concern that our findings may be partly driven by the spurious correlation between threat and other forces that might independently affect refugees' integration. We present results for cultural and economic convergence in Panels A and B of Table 3 respectively. We report the interaction between MSA and the threat index in column 1, and standardize all variables introduced in subsequent columns, so that the magnitude

of coefficients can be consistently compared across mediators.[30]

In column 2, we consider the size of the ethnic enclave, measured as the share of individuals born in the same country of origin of the refugee living in the region as of 2012 (relative to total region population). A large literature has studied the effects of group size on labor market outcomes of minorities, finding mixed results. On the one hand, a larger ethnic enclave can help minorities find a job through ethnic networks (Battisti et al., 2021; Edin et al., 2003). The faster economic integration might, in turn, promote cultural assimilation as well. On the other hand, a larger ethnic enclave might lower incentives to exert effort to learn the language or acquire skills (as well as culture) useful in the host country, slowing down economic or cultural assimilation, or both (Abramitzky et al., 2020b; Advani & Reich, 2015; Eriksson, 2020). The interaction term is positive, but imprecisely estimated for cultural convergence, possibly reflecting the ambiguous predictions just described. When focusing on employment, instead, assimilation is lower where the ethnic enclave is larger.[31]

In column 3, we ask whether cultural and economic convergence vary with the employment rate prevailing among individuals from the same group of countries of origin at baseline.[32] A higher employment rate within one's own network might foster economic integration by providing access to jobs in the region, something that might also speed up cultural convergence. It might also proxy for more favorable economic conditions and a more open (social and economic) local environment. As in column 2, the coefficient on the interaction term is close to zero and imprecisely estimated for cultural convergence. Conversely, it is positive and statistically significant for economic convergence. The lack of cultural convergence, despite economic assimilation, is consistent with two, non-mutually exclusive mechanisms. First, refugees may choose to exert lower effort to adopt local culture if they have easier access to the local labor market. Second, a higher employment rate within a minority community might be indicative of a more open (i.e., less threatening) environment. This may reduce incentives to assimilate culturally. At the same time, the negative effects on incentives just described might be offset by the fact that economic integration promotes cultural assimilation and favors inter-group contact.

In columns 4 and 5, we turn to measures of task diversity and skill complexity.[33]

[30]The number of observations is slightly lower than in Table 2, because we restrict the sample to individuals for which all regional mediators can be included. Mediators are all measured before 2013. Table A.16 presents the definition and source of all variables introduced in this section.

[31]In addition to the mechanisms discussed above, a larger enclave might lower prospects for economic integration by increasing labor market competition for newly arrived individuals. We cannot rule out the possibility that refugees living in larger enclaves enter the labor market through the informal sector (and prefer not to disclose this in the survey).

[32]Due to the small sample size by country of origin, we use group of countries rather than countries (Table A.16).

[33]Task diversity is defined as in Dengler et al. (2014): we first assign the task structure from David & Dorn (2013) to

Regions characterized by higher skill complexity or task diversity may offer more opportunities for refugees, because of labor market complementarities with locals (Peri & Sparber, 2009). For cultural convergence, the predictions are *ex-ante* less clear-cut: while economic integration might favor inter-group interactions and, in turn, foster assimilation, a more diverse economy may be correlated with more open social views among locals. Lower threat may then reduce incentives to exert effort to adopt local culture among refugees. Results indicate that, even though task diversity does not influence the speed of either cultural or economic convergence, skill complexity increases refugees' assimilation along both margins.

Finally, in columns 6 and 7, we ask whether refugees' assimilation depends on the distinctiveness (relative to national culture) and on the degree of heterogeneity of local culture prevailing in the region. For both mediators, predictions are ambiguous. A more distinct local culture may make it easier for refugees to understand the core (local) values, favoring their cultural convergence; yet, higher distinctiveness may be the result of locals' weariness towards outsiders – something that would hinder inter-group interactions. Likewise, a more homogeneous local culture may facilitate refugees' learning; however, it might also reflect locals' reluctance to accept diverse ideas. Perhaps reflecting such ambiguity, coefficients on interactions between MSA and both cultural distinctiveness and cultural dispersion are quantitatively small and not statistically significant.

We conclude by conducting a horse-race, which includes simultaneously interactions between MSA and each of the forces analyzed in isolation thus far. To probe the robustness of our key findings, we also add the interaction between MSA and threat. We report results in column 8 of Table 3. Starting from cultural convergence, we observe that, once all factors are simultaneously included, the interactions between MSA and network size, network employment, and task diversity all become quantitatively large (and positive) and statistically significant. The other coefficients are similar to those prevailing when analyzing factors in isolation. When considering economic convergence, the horse-race confirms the patterns prevailing in previous columns, except for cultural dispersion, which becomes statistically significant at the 5% level (but remains negative, as in column 7).

Perhaps most importantly for our purposes, the coefficient on the interaction between MSA and threat remains in line with that in column 1. That is, threat increases

each occupation; then, we average across occupations (over task) within each region, and construct a Herfindahl index. Skill complexity is constructed in a similar way: using 5-digit occupation codes (KldB2010 – very similar to ISCO08), we calculate the skill requirement of each occupation. Defining four broad categories (helper; skilled worker; specialist; and, expert), we calculate the share of employees in each of them, relative to all employed individuals in the region. Finally, as before, we calculate a Herfindahl Index. See also Table A.16.

the pace of cultural convergence, but has no statistically significant effect on economic assimilation. When compared to that of other mediators, the effect of threat on cultural convergence is sizeable, and close to that of the size of ethnic enclaves or the employment rate of their members. The horse-race reported in column 8 also reduces concerns that our findings may be driven by the spurious correlation between the level of hostility prevailing in the region and other forces. While we cannot rule out the possibility that factors other than those considered here may be driving our results, in light of the evidence presented in this and previous sections, this seems unlikely to us.

5.4 Summary of Robustness Checks

In addition to checks on *ex-ante* selection and *ex-post* sorting of refugees and locals (summarized above and presented in Tables B.1 to B.4), we perform a variety of analyses to probe the robustness of our results. These are described in detail in Appendix B.

First, we show that changes in the sample composition – due to either attrition or to changes in the sampling framework – do not drive our results (Table B.5). Specifically, we verify that the likelihood of appearing in the subsequent survey wave does not depend on either the threat index or the level of cultural similarity in the previous wave. We also do not find that refugees with a lower CSI are more likely to drop out of the survey in higher threat regions. Second, we repeat the analysis using different statistical measures of cultural assimilation – including the Canberra and Herfindahl index (Table B.6). Results remain positive but smaller in size for the Canberra index, while they become statistically insignificant for the Herfindahl index. This is to be expected, since the Herfindahl measure captures exact cultural matches, and is thus a very restrictive measure of cultural similarity. Third, we replicate our results by constructing the CSI including additional questions and restricting attention to native-born locals (Table B.7).[34] Fourth, we rule out concerns that results over-state convergence if refugee inflows triggered changes in local preferences included in the CSI, more so in regions with higher threat. Specifically, we replicate the analysis measuring cultural assimilation to locals in the latest survey wave (Table B.8), and verify that individual sub-components of the CSI do not change more in high-threat regions following refugee inflows (Table B.9). Finally, we show that results are robust to: *i*) clustering standard errors at the district level and applying the procedure in Conley (1999) to correct for potential spatial correlation; *ii*) interacting year dummies with a dummy for Eastern Germany and with

[34]The four additional questions included in the CSI are: satisfaction in three domains, worries in three domains, social inclusion, and self attitude. See Table A.4 for the exact wording and range of answers.

dummies for a refugee's country of origin; and, *iii*) dropping potential outliers (Tables B.10 and B.11)

6 Mechanisms

Results in Section 5 are consistent with a framework where refugees exert more effort to adopt local culture in more hostile regions, possibly because of fear. Yet, precisely in these regions, locals might erect higher barriers to the integration of outsiders, requiring a higher level of effort for minorities to be accepted in the in-group. Thus, despite the higher assimilation effort (proxied for by cultural convergence), refugees may not be more likely to experience assimilation success (measured with economic convergence) in regions characterized by higher levels of hostility. In this section, we provide different pieces of evidence consistent with this interpretation.

In Section 6.1, we first document that refugees assimilate along dimensions that require less cooperation by locals, such as the participation in voluntary integration and language courses or employment in immigrant firms. Then, we provide suggestive evidence consistent with the effort-success framework. We do so by examining heterogeneity patterns that depend on refugees' individual characteristics, and by exploring the extent to which local cultural convergence occurs within specific "reference groups", defined by age, gender, or employment status.

Next, in Section 6.2, we explore the response of locals to the influx of refugees in terms of attitudes (anti-immigrant sentiment) and behavior (intermarriage). Since for this analysis we can no longer exploit the (ITT) quasi-random allocation of refugees arrived at a different point in time across NUTS-2 regions, we interpret the resulting evidence with some caution. Partialling out district and year fixed effects, we correlate the district-level refugee share of the population with attitudes and behavior of locals over time. This analysis uncovers a positive, strong relationship between refugee inflows and locals' hostility in regions with higher values of the threat index. That is, despite the faster convergence to local culture in high threat regions, precisely in such areas, refugee inflows are associated with changes in locals' attitudes and behavior in a more hostile direction.

6.1 Refugees' Assimilation Effort vs Success

One-sided vs cooperative assimilation outcomes. Table 4 provides evidence consistent with the hypothesis that in regions with higher threat refugees exert more effort to get acquainted with local culture, but that such effort does not translate into higher social assimilation.[35] We begin from a specific question in the refugee survey, which asks individuals whether they attend or have attended integration or language courses. According to the Residence Act, immigrants with a residence permit are obliged to visit an integration course of the Federal Office for Migrants and Refugees (BAMF) if they cannot communicate at least in a simple way in German. Persons whose asylum application has not yet been decided and who come from a country with good prospects of staying or who have a tolerated status can apply for participation. Refugees also have the option of attending additional courses, offered by local agencies or non-profit organizations. We create two separate dummies equal to one if a refugee is attending (or has attended) a mandatory and a voluntary course, respectively.

If refugees were to exert stronger effort to integrate in more threatening areas, we would expect the interaction between MSA and threat to enter positively for voluntary courses, but not for mandatory ones. This is precisely what we observe in columns 1 and 2 of Table 4. Both for voluntary (column 1) and for BAMF (column 2) courses, the coefficient on MSA is positive and statistically significant. However, the interaction term between MSA and threat is positive and precisely estimated only for the former. Moreover, the size of the coefficient on the interaction term is more than four times larger for voluntary than for BAMF courses.

Next, in column 3, we ask whether refugees' proficiency in German, as assessed by the interviewer, is higher among individuals assigned to regions with a higher threat index. The coefficient on MSA is positive and statistically significant, indicating that refugees become more proficient in German over time. However, the interaction between MSA and threat, albeit positive, is small and noisy. One interpretation is that, even though refugees can exert effort to learn German, locals must be willing to interact with them, for the former to become fluent. In more threatening environments, it may be harder for refugees to interact with locals, either because the former are worried about approaching the latter or because of stronger discrimination and segregation against minorities (or both). Furthermore, the additional effort exerted by refugees in regions with higher threat might be directed to learning region-specific norms, and is thus not

[35] That higher threat is not associated with higher economic convergence is already documented in Table 2, Panel B.

captured in German speaking ability.

Columns 4 to 6 turn to different proxies for inter-group contact. Refugees are more likely to interact with Germans (column 4) and to have a German-born partner (columns 5 and 6) as they spend time in Germany.[36] Yet, despite the faster cultural convergence prevailing in more threatening regions, the interaction between MSA and threat is never statistically significant and is always quantitatively small. That is, in spite of the higher cultural similarity, refugees are not more likely to have close contact with locals in regions with a higher threat index.

In column 7, we focus on women and consider a specific question that asks how often a refugee wears the headscarf.[37] From the perspective of a religious minority member, the decision of not wearing the headscarf may be particularly costly, as it requires giving up one's own deep cultural identity. Moreover, existing evidence suggests that Muslims perceive veiling bans as discriminatory (Abdelgadir & Fouka, 2020; El Karoui, 2016). An individual may thus decide to undertake such an action only if she anticipates tangible rewards, in terms of higher economic or social integration. Since more threatening areas are not more likely to guarantee higher successful assimilation, refugees may decide to wear the headscarf more often here. At the same time, wearing the headscarf might increase the salience of refugee (or, minority) status, triggering stronger hostility among locals. Because in more threatening regions refugees are more worried about harassment and even physical assaults, they may decide to hide their minority status, not wearing the headscarf. The coefficient on MSA is negative, indicating that, as for all other integration outcomes, refugees are more likely to assimilate and to give up their culture as they spend more time in Germany.[38] Instead, the interaction between MSA and the threat index is close to zero and very imprecisely estimated.

Finally, column 8 asks whether refugees in more threatening regions end up working in more ethnically segregated firms, where, arguably, lower levels of cooperation with (or, acceptance from) locals are needed. We use data from Keita & Trübswetter (2020) that links refugees in our survey to administrative data at the firm level to identify the share of immigrant workers in a company. We conjecture that refugees should be more likely to work in firms with a higher percentage of immigrant employees when locals discriminate more. The positive and statistically significant coefficient (p-value of .054)

[36] In column 5 (resp. column 6), the sample is restricted to female (resp. male) respondents.

[37] Results are unchanged when further restricting the sample to refugees from countries where the use of the headscarf is more common.

[38] We find it notable that refugees' assimilation is apparent even along this dimension, given the importance that the headscarf represents for Muslim communities.

on the interaction between MSA and the threat index confirms this hypothesis.

Summing up, Table 4 presents evidence consistent with the hypothesis that higher threat induces refugees to exert effort to learn and adopt local culture more quickly. However, this is not accompanied by more frequent interactions with locals. Moreover, and perhaps due to refugees' backlash triggered by discrimination (Abdelgadir & Fouka, 2020; Fouka, 2020), threat does not make refugees more prone to undertake actions that, from a cultural perspective, might be particularly costly.

Heterogeneity by individual characteristics. Next, we focus on cultural assimilation, and explore heterogeneity in our results by characteristics of respondents. In Table 5, we cut the data along four dimensions: gender, age, presence of children when entering Germany, and education obtained in the country of origin. Since these socio-demographic characteristics may be correlated with many other variables, we interpret the evidence presented here as mostly suggestive. To facilitate comparisons with our baseline results, we report coefficients on MSA and its interaction with threat for the full sample in column 1.

In columns 2 and 3, we report results separately for women and men. Although both groups converge to local culture as they spend more time in a region, only women seem to respond to higher threat. This can be because women may be more vulnerable, and thus more likely to react to threat. Another possibility, not in contrast with the previous one, is that external threat lowers the pressure faced by women from other family members to retain their home-country culture. Next, in columns 4 and 5, we split the sample between younger (18 to 30 years-old) and older individuals. While the coefficient on the interaction between MSA and threat becomes less precisely estimated, its magnitude is almost identical across groups, suggesting that the effect of threat does not vary by age.

If threat increased the pace of cultural convergence by instilling fear among refugees, one might expect a stronger effect for individuals arriving in Germany with children. For instance, parents may be worried about harassment against their offspring; or, they may be concerned that discrimination or even physical violence may impair them from taking care of their children. In columns 6 and 7, we provide evidence consistent with these conjectures by splitting the sample between individuals who arrived in Germany with and without children. The coefficient on the interaction between threat and MSA is more than twice as large for refugees who arrived in Germany with children than for those who did not. Moreover, it is statistically significant for the former, but not for the latter.

Finally, we test whether results differ by the level of education obtained by an individual before leaving the country of origin. In columns 8 and 9, we split the sample between respondents without and with a school-leaving certificate, respectively. Consistent with less educated individuals being more vulnerable to discrimination and harassment, the interaction between threat and MSA is larger for this group than for individuals with higher levels of education, even though the difference is not statistically significant at conventional levels.

Convergence to group-specific local culture. In Table 6, we ask whether local convergence is "global" or if, instead, refugees are more likely to converge to the preferences of locals that belong to similar economic or demographic groups. As before, we report the baseline coefficients in column 1 to ease comparisons. In columns 2 to 5, we create group-specific CSI along two dimensions: gender and age. In column 2 (resp. column 3), the dependent variable is the CSI for an individual and locals of the same (resp. opposite) gender. Both the coefficient on MSA and that on the interaction between threat and MSA are very similar when considering the own and the other group CSI. In columns 4 and 5, we replicate this exercise using age to create one's own and other group. In particular, we calculate CSI to the pool of locals within (outside) a range of minus 5 to plus 5 years around the age of the refugee. Also in this case, convergence to local culture is independent of the reference group considered.

Finally, we test whether refugees converge faster to the preferences of locals who are employed (column 6), relative to those who are not (column 7).[39] The coefficient on MSA is similar when considering the CSI constructed with the preferences of the employed and with those of the non-employed. However, the coefficient on the interaction between threat and MSA is quantitatively larger (and statistically significant) for the employed-related CSI. This is consistent with at least two (non-mutually exclusive) interpretations. First, refugees view employed locals as "role models", and try to converge to the preferences of the group that is perceived as more successful. Second, employment status may be associated with authority: when facing higher threat, refugees may thus try to conform to the norms set by the individuals that they perceive as "resource-holding", or leaders. The latter interpretation is also in line with the effort-success framework, where refugees strategically invest in cultural assimilation effort in order to access economic opportunities.

[39]The sample of non-employed locals includes both unemployed individuals and those who are not in the labor force.

6.2 Refugee Inflows and Locals' Preferences

In this section, we turn to the attitudes and the behavior of locals. We can no longer exploit variation in months spent by refugees in a German region using an ITT design and relying on the quasi-random allocation of refugees over time. Instead, we estimate panel regressions that include district and survey year fixed effects, and correlate locals' self-reported attitudes or behavior with the interaction between the share of refugees in a district-survey year (measured at the end of the year prior to that of the interview) and the regional threat index. All regressions also include the share of refugees, individual controls, and baseline district characteristics interacted with year dummies.[40] Since this analysis is admittedly less cleanly identified than that conducted above, results should be interpreted with caution – as suggestive evidence on locals' response to refugee inflows.

Locals' attitudes. We begin by examining how the views of locals living in regions with different levels of the threat index change in response to refugee inflows, reporting results in Table 7. We consider different measures of attitudes towards refugees, which were asked in survey years 2016 and 2018. In columns 1 to 3, we focus on locals' assessment of the impact of refugees on the economy, cultural life, and Germany as a place to live. In columns 4 and 5, we turn to respondents' opinion on whether refugees represent a risk for the short- and the long-run, respectively. In all columns, higher values refer to more positive views towards refugees.

The coefficient on the refugee share is positive (albeit, never statistically significant); instead, the interaction term is strongly negative and precisely estimated. That is, along all dimensions we consider, following the inflow of asylum seekers, locals living in regions with a higher threat index view refugees more negatively. In light of our findings for refugees' cultural convergence, this pattern is striking: even though refugees converge faster in regions with higher threat, locals' attitudes become more negative following refugee inflows in these regions. The worsening of locals' views may, at least in part, also explain why refugees are unable to enjoy a faster economic or social assimilation in more threatening regions, despite faster cultural convergence.

Locals' behavior. Next, we turn to locals' behavior, examining if the inflow of refugees influences the prevalence of endogamous mating among German-born locals. Inter-marriage, or inter-group mating more generally, is considered the "final stage of assimilation" by sociologists (Gordon, 1964). The increase in refugee population might change the pattern of inter-group mating by altering sex-ratios, since refugees are more

[40] District characteristics are the same as before. Individual controls include: age, age squared, gender, nativity, and education (classified in 4 categories). The main effect of threat is absorbed by the district fixed effects.

likely to be both male and young, relative to locals (Table 1).[41] Mechanically, changes in sex-ratios should increase the probability of inter-group mating for native-born women and reduce it for native men. However, in the presence of highly segmented marriage or mating markets, the direct effect of refugee inflows on sex-ratios would be muted. Since only .2% of the German-born SOEP respondents in our sample report having a relationship with an individual of refugee background, we expect changes in sex-ratios to play a negligible role, if at all, on inter-group mating.

In Table 8, we restrict the sample to German-born individuals who report being in a relationship, and define the dependent variable as a dummy equal to one if the partner was born in Germany. For years 2010 to 2019, we then estimate the same regression described above, where the main regressor of interest is, again, the interaction between the threat index and the district-year refugee share. The coefficient on this term is positive and statistically significant at the 10% level, with a p-value of .062 (column 1). This indicates that refugee inflows increase the prevalence of endogamous mating, but only in areas characterized by a higher threat index. Said differently, the inflow of refugees induces natives in more threatening regions to turn inward, possibly explaining why, in spite of higher cultural similarity, refugees are unable to integrate faster in these areas.

Splitting the sample by gender reveals that results are entirely driven by women (column 2): the coefficient on the interaction term is twice as large as in the full sample and statistically significant at the 1% level. When considering native men (column 3), instead, results are noisy and quantitatively small. One interpretation is that native women in areas with a higher threat index react more than men to the presence of outsiders, and decide to start a new relation with a partner who shares a similar cultural background. Another possibility, not in contrast with the previous one, is that families in regions with a higher threat index exert stronger pressure on women – but not on men – to start a new relationship with a native partner when ethnic diversity is higher, so as to preserve cultural homogeneity.

Locals' counter-mobilization. We have thus far conjectured that the faster cultural convergence of refugees in regions with higher threat was driven by fear and anxiety, instilled by locals' hostility. This is consistent with the negative relationship between refugee inflows and (changes in) locals' attitudes and behavior in more threatening areas documented above. An alternative interpretation is that the stronger hostility prevailing in high-threat regions led some locals and non-profit organizations to coordinate efforts

[41] Sex-ratios are typically defined as the relative number of men and women in the marriage market (Angrist, 2002).

to facilitate the cultural integration of refugees (Vüllers & Hellmeier, 2021).

To test this hypothesis, in columns 4 to 6 of Table 8, we restrict attention to locals and estimate the same regressions described above, using as dependent variable a dummy equal to one if the respondent: *i*) donated to a refugee specific cause (column 4); *ii*) volunteered for a refugee related cause (column 5); *iii*) demonstrated to support refugees (column 6).[42] While higher refugee inflows are associated with fewer donations to refugee causes, there is no differential effect for locals living in regions with a higher threat index. Results for the other two proxies for counter-mobilization are imprecisely estimated.

In Appendix D, we corroborate the (lack of) evidence on counter-mobilization among locals by examining the relationship between refugee inflows and both pro-refugee tweets and the presence of NGOs across regions. While only suggestive, this analysis does not support the idea that refugees' faster cultural convergence in regions with a higher threat index was driven by (pro-refugee) counter-mobilization among locals.

7 Conclusion

In this paper, we study how local hostility influences the convergence to local culture and the economic assimilation of refugees over time. We exploit plausibly exogenous variation in the allocation of refugees across German regions between 2013 and 2016, and rely on novel survey data to measure the preferences of both refugees and locals as well as their economic performance. We find that refugees converge to local culture and assimilate economically as they spend more time in Germany. This process is not uniform, however: cultural convergence is faster among refugees assigned to areas where locals display higher hostility against minorities. Yet, despite the higher cultural convergence, refugees are not more likely to integrate economically in these regions.

These patterns are consistent with a framework where refugees – and more generally, minorities – respond to pressure by exerting more effort to learn and adopt local culture. However, in order for refugees to successfully assimilate (socially and economically), locals must be willing to accept them in the majority group. If discrimination against minorities is higher in regions characterized by higher threat, refugees may not be able to achieve faster integration, even if they exert more effort to learn and adopt local culture. The second part of the paper provides different pieces of evidence consistent

[42] These questions were available only for years 2016 and 2018. In addition to district fixed effects, interactions between year dummies and baseline district controls, and individual characteristics, we include respondents' overall willingness to volunteer in associations and engage politically at baseline in 2010 and 2012, respectively. Results are unchanged when dropping these additional controls.

with this interpretation.

We emphasize that our paper has no normative implications, and our results do not imply that minority groups should (or should not) assimilate to the culture of receiving countries. At the same time, our work casts doubts on the effectiveness of pressure and hostility as tools to promote integration. While minorities may exert more effort to learn and adopt local values and social norms, they may not successfully assimilate in host society if locals discriminate against them and take actions that hinder inter-group interactions. Our findings also open the door to several fascinating questions. Does cultural convergence generated by threat in the short-run persist also in the long-run? Or, does backlash among minorities arise? Do social pressure and threat induce change along deep-rooted preferences? Or, do they lead to cultural change only along observable, but superficial, traits?

As the number of forcibly displaced individuals is projected to rise exponentially in the years to come, answering these questions will be of first order importance.

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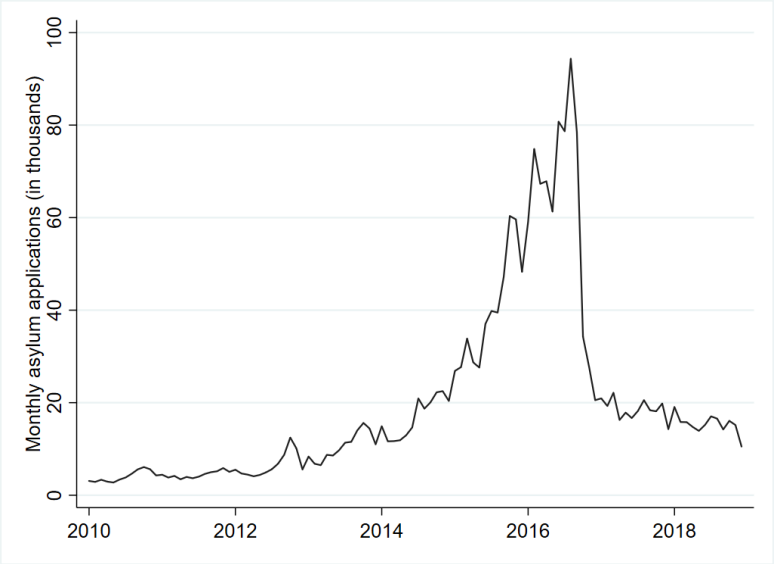
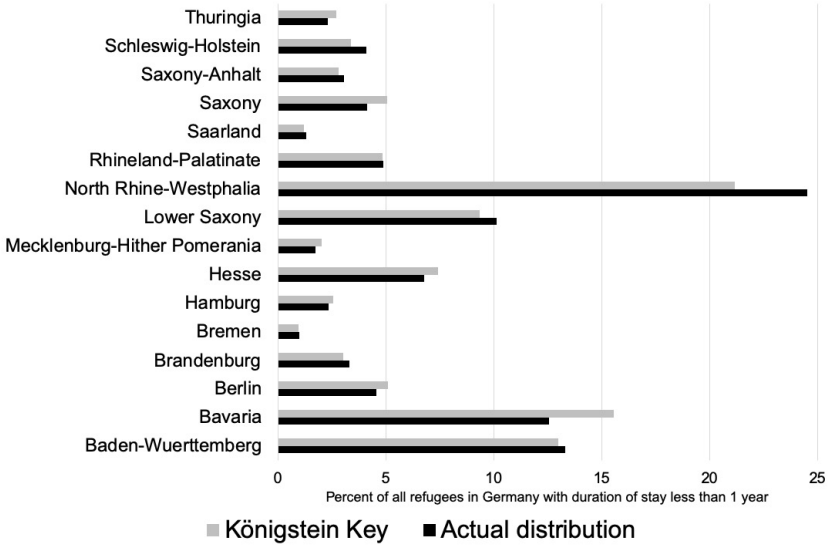
Figure 1. Monthly asylum applications in Germany (in thousands)



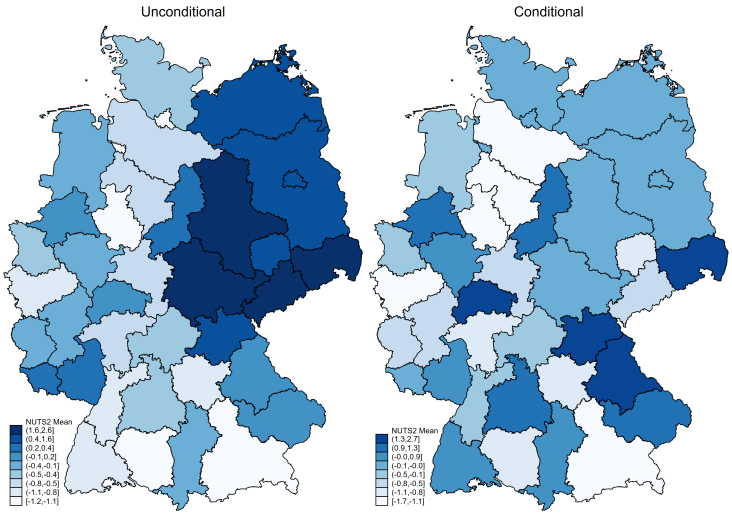
Notes: The graph plots the number of monthly asylum applications in Germany by month. Asylum applicants are adult individuals from outside the EU-28, who may have also applied for asylum in other EU countries. *Source:* Authors' calculation from Eurostat (2021).

Figure 2. Refugee assignment quotas vs actual refugee allocation across German states



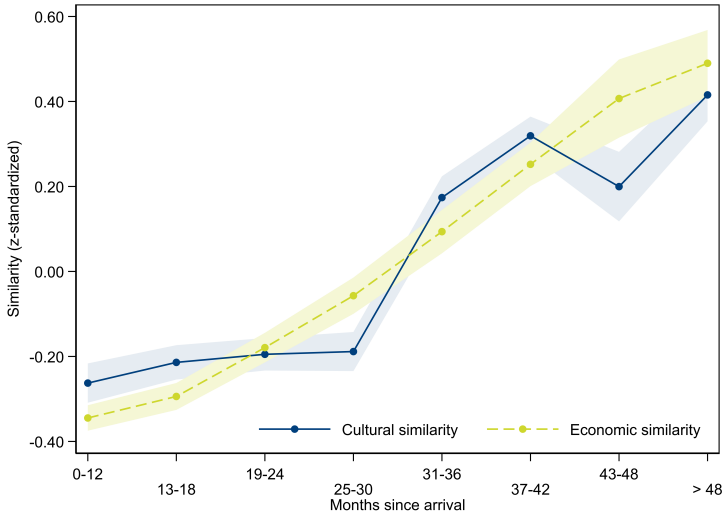
Notes:: The graph plots the assignment quotas (in gray bars) and the actual distribution (in black bars) of refugees for each German state in 2016. *Source:* Author's calculation from Destatis (2021, Tab-12531-0025) and Bundesanzeiger (2016).

Figure 3. Conditional and unconditional threat map across NUTS-2 regions



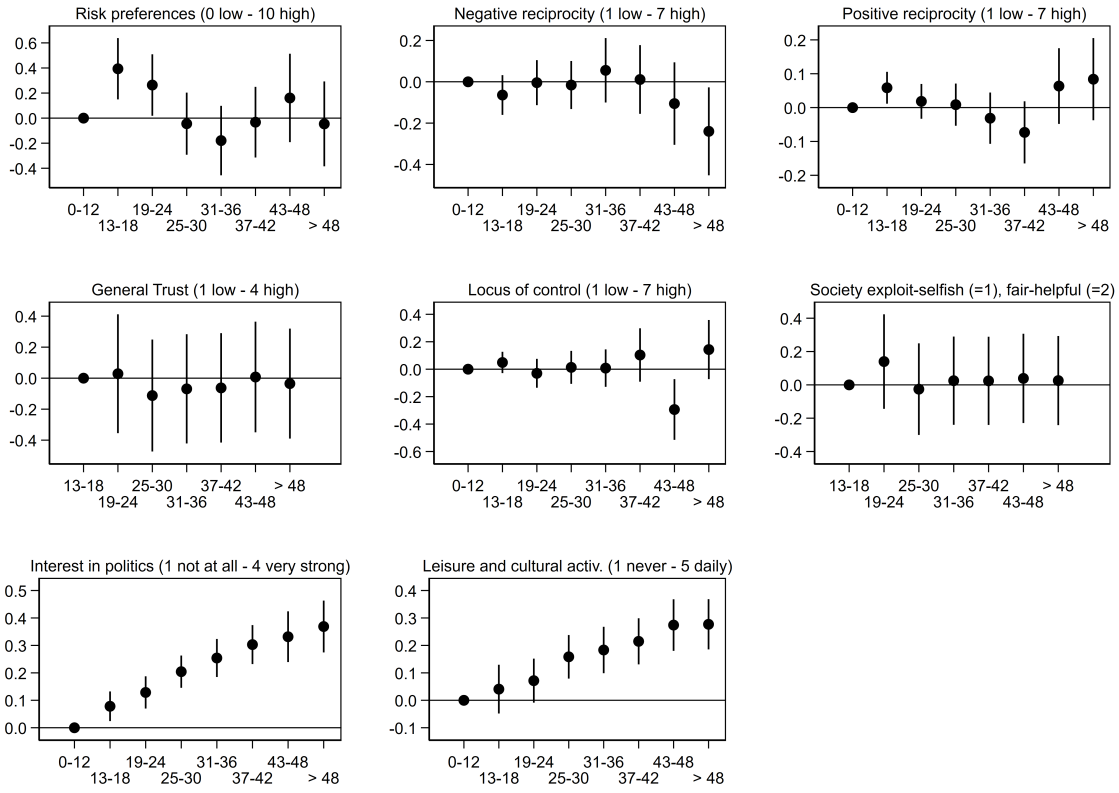
Notes: The maps plot the unconditional (left) and conditional (right) z-standardized threat index described in the text for each of the 38 NUTS-2 regions. Conditional means partial out Federal State fixed effects.

Figure 4. Economic and cultural convergence



Notes: The graph shows the evolution of cultural (in blue solid line) and economic (in green dashed line) similarity between migrants and locals since refugee arrival. Economic and cultural similarity are z-standardized.

Figure 5. Cultural preferences of refugees by question over time



Notes: Each panel plots the change in refugees' preferences by arrival cohort, relative to the 0-12 months cohort, for the issue reported at the top of the panel. The underlying regressions partial out district fixed effects, individual controls (gender, age, age squared, kids born before arrival in Germany living in household, country of origin, marital status and location of partner as well as work experience and education upon arrival) and dummies for survey year interacted with district characteristics (unemployment rate, share of refugees and population density, all measured in December 2012).

Table 1. Descriptive statistics

	All					Below median threat					Above median threat				
	Mean	Std. dev.	Min	Max	N	Mean	Std. dev.	Min	Max	N	Mean	Std. dev.	Min	Max	N
	Panel A. Refugees														
Main variables															
Cultural similarity index	-1.91	0.48	-6	-1	12,334	-1.91	0.46	-5	-1	6,022	-1.90	0.49	-6	-1	6,312
Months since arrival to Germany	28.96	13.12	0	72	12,334	29.42	13.15	0	72	6,022	28.51	13.07	0	72	6,312
Employment similarity	-0.50	0.39	-1	0	12,334	-0.53	0.39	-1	0	6,022	-0.48	0.38	-1	0	6,312
Additional outcomes															
Wage gap (based on survey)	-838.53	957.77	-2,326	12,675	2,201	-918	1,004	-2,326	12,675	1,124	-755.60	899.87	-2,076	8,348	1,077
Wears headscarf (1 never - 4 always)	2.46	1.45	1	4	823	2.48	1.44	1	4	414	2.45	1.45	1	4	409
Mandatory integration course	0.53	0.50	0	1	12,243	0.53	0.50	0	1	5,983	0.54	0.50	0	1	6,260
Voluntary integration course	0.56	0.50	0	1	12,101	0.55	0.50	0	1	5,935	0.56	0.50	0	1	6,166
Time spent with Germans (1 never - 6 daily)	3.72	1.88	1	6	12,302	3.75	1.88	1	6	6,007	3.69	1.88	1	6	6,295
Partner German born	0.14	0.35	0	1	2,171	0.15	0.35	0	1	1,050	0.13	0.34	0	1	1,121
Worried about xenophobia (1 low - 3 high)	1.35	0.60	1	3	12,124	1.33	0.58	1	3	5,921	1.37	0.62	1	3	6,203
Language skills:(1 bad - 5 good, interviewer)	3.01	1.37	1	5	12,334	3.05	1.35	1	5	6,022	2.98	1.39	1	5	6,312
Additional characteristics															
Country of birth: Syria	0.53	0.50	0	1	12,334	0.50	0.50	0	1	6,022	0.56	0.50	0	1	6,312
Afghanistan	0.12	0.32	0	1	12,334	0.13	0.33	0	1	6,022	0.11	0.32	0	1	6,312
Iraq	0.13	0.33	0	1	12,334	0.15	0.35	0	1	6,022	0.11	0.32	0	1	6,312
Other	0.22	0.41	0	1	12,334	0.22	0.42	0	1	6,022	0.21	0.41	0	1	6,312
Gender: female	0.38	0.49	0	1	12,334	0.39	0.49	0	1	6,022	0.38	0.48	0	1	6,312
Age	34.01	10.22	18	66	12,334	33.79	10.29	18	66	6,022	34.22	10.14	18	66	6,312
School certificate:															
None	0.44	0.50	0	1	12,279	0.47	0.50	0	1	5,994	0.42	0.49	0	1	6,285
Compulsory school leaving certificate	0.24	0.43	0	1	12,279	0.22	0.41	0	1	5,994	0.25	0.44	0	1	6,285
Secondary school leaving certificate	0.32	0.47	0	1	12,279	0.31	0.46	0	1	5,994	0.33	0.47	0	1	6,285
	Panel B. Locals														
Cultural similarity index	-1.38	0.46	-6	-1	18,300	-1.38	0.47	-6	-1	9,058	-1.38	0.45	-6	-1	9,242
Additional outcomes															
Gender: female	0.54	0.50	0	1	253,368	0.55	0.50	0	1	129,672	0.54	0.50	0	1	123,696
Age	42.53	13.01	18	66	253,368	42.16	12.85	18	66	129,672	42.92	13.16	18	66	123,696
Country of birth: Germany	0.83	0.38	0	1	253,313	0.79	0.41	0	1	129,643	0.86	0.34	0	1	123,670
Other	0.17	0.37	0	1	253,313	0.20	0.40	0	1	129,643	0.13	0.34	0	1	123,670
Highest education: Lower secondary	0.14	0.35	0	1	220,272	0.15	0.36	0	1	113,384	0.14	0.34	0	1	106,888
Short cycle non-tertiary	0.61	0.49	0	1	220,272	0.59	0.49	0	1	113,384	0.63	0.48	0	1	106,888
Bachelors or higher	0.25	0.43	0	1	220,272	0.26	0.44	0	1	113,384	0.23	0.42	0	1	106,888
School certificate: None	0.14	0.35	0	1	244,252	0.17	0.37	0	1	124,800	0.12	0.32	0	1	119,452
Compulsory school leaving certificate	0.01	0.11	0	1	244,252	0.01	0.11	0	1	124,800	0.01	0.11	0	1	119,452
Secondary school leaving certificate	0.85	0.36	0	1	244,252	0.82	0.38	0	1	124,800	0.87	0.33	0	1	119,452
	Panel C. District-level and NUTS-2-level variables														
Unemployment rate (district, Dec-2012)	6.87	2.98	1	16	12,334	6.07	2.62	1	14	6,022	7.63	3.09	2	16	6,312
Population density (district, Dec-2012)	960.55	1,114	38	4,468	12,334	1,075	1,098	40	4,468	6,022	851.63	1,119	38	3,785	6,312
Share of refugees (district, Dec-2012)	0.75	0.37	0	2	12,334	0.85	0.40	0	2	6,022	0.65	0.30	0	2	6,312
Threat principal component (NUTS-2)	0.00	2.04	-3	6	12,334	-1.55	0.62	-3	-1	6,022	1.48	1.82	-1	6	6,312

Notes: The table reports summary statistics for the refugees (Panel A) and locals (Panel B) for: i) the full sample in columns 1 to 5; and, ii) separately for regions with the threat index above (resp. below) the sample median in columns 6 to 10 (resp. in columns 11 to 15). Panel C reports summary statistics for the main district-level variables used as controls in the analysis. The threat index is defined at the regional level (see Section 3.2). Language skills refer to ability to read, write, speak in German. See A.5 for components of the threat index, and A.6 for descriptive statistics of variables not included here.

Table 2. Assimilation and local threat: Main results

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A. Cultural similarity index (mean: -1.905)					
MSA	0.081	0.076	0.094	0.113	0.118	0.125
	(0.040)	(0.042)	(0.041)	(0.041)	(0.042)	(0.042)
MSA × Threat						0.075
						(0.032)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691	6,691	6,691
R2 adjusted	0.344	0.347	0.368	0.374	0.392	0.392
	Panel B. Refugees' relative employment (mean: -0.504)					
MSA	0.778	0.757	0.760	0.776	0.771	0.772
	(0.029)	(0.042)	(0.041)	(0.041)	(0.042)	(0.042)
MSA × Threat						0.016
						(0.032)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691	6,691	6,691
R2 adjusted	0.155	0.161	0.172	0.181	0.196	0.195
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects						
Federal-State	No	No	Yes	No	No	No
NUTS-2	No	No	No	Yes	No	No
District	No	No	No	No	Yes	Yes
District controls × survey year	No	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of 6,691 refugees for a total of 12,334 refugee-year observations. The dependent variable is the cultural similarity index (resp. refugees' relative employment) in Panel A (resp. Panel B). MSA refers to months since arrival. Threat is the threat index described in the text, and is z-standardized within each model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables and individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival). Column 2 adds interaction between year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Columns 3, 4, and 5 add respectively federal state, NUTS-2 region, and district fixed effects to the specification of column 2. Column 6 includes the interaction between months since arrival and the standardized threat index. Panel A always controls for dummies for the composition of questions included in the cultural similarity index. Standard errors, in parentheses, are clustered at the person-level.

Table 3. Cultural and economic assimilation: Horse race

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A. Cultural similarity index (mean: -1.905)							
MSA	0.111	0.101	0.105	0.103	0.115	0.105	0.106	0.095
	(0.042)	(0.042)	(0.042)	(0.042)	(0.042)	(0.042)	(0.042)	(0.042)
MSA × Threat	0.069							0.093
	(0.032)							(0.040)
MSA × Network size		0.043						0.090
		(0.032)						(0.034)
MSA × Network employment			0.018					0.106
			(0.029)					(0.033)
MSA × Task diversity				0.016				0.085
				(0.028)				(0.033)
MSA × Skill complexity					0.089			0.156
					(0.028)			(0.036)
MSA × Local cultural distinctiveness						-0.017		-0.034
						(0.027)		(0.028)
MSA × Local cultural dispersion							0.008	0.016
							(0.027)	(0.028)
R2 adjusted	0.392	0.392	0.392	0.392	0.392	0.392	0.392	0.393
	Panel B. Refugees' relative employment (mean: -0.504)							
MSA	0.784	0.803	0.775	0.785	0.789	0.784	0.779	0.792
	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)
MSA × Threat	0.014							-0.025
	(0.032)							(0.041)
MSA × Network size		-0.126						-0.103
		(0.033)						(0.036)
MSA × Network employment			0.065					0.090
			(0.031)					(0.036)
MSA × Task diversity				-0.017				0.020
				(0.030)				(0.036)
MSA × Skill complexity					0.059			0.095
					(0.031)			(0.041)
MSA × Local cultural distinctiveness						0.022		0.027
						(0.028)		(0.029)
MSA × Local cultural dispersion							-0.044	-0.061
							(0.029)	(0.031)
R2 adjusted	0.193	0.195	0.194	0.193	0.194	0.193	0.193	0.195
Person-Year observations	12,053	12,053	12,053	12,053	12,053	12,053	12,053	12,053
Person observations	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects								
District	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District controls × survey year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of 6,528 refugees for a total of 12,053 refugee-year observations, restricted to observations for which all mediators are non-missing. The dependent variable is the cultural similarity index (resp. refugees' relative employment) in Panel A (resp. Panel B). MSA refers to months since arrival. Threat is the threat index described in the text. See Table A.16 for the definition of mediators. Threat and mediators are z-standardized within each estimated model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival), district fixed effects, and the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Panel A always controls for dummies for the composition of questions included in the cultural similarity index. Standard errors, in parentheses, are clustered at the person-level.

Table 4. Assimilation outcomes: One-sided vs cooperative

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Voluntary integration course	Mandatory integration course	Language skills (1 bad - 5 good)	Time spent with Germans (1 never - 6 daily)	Partner German born (among females)	Partner German born (among males)	Headscarf (1 never 4 always)	Percentage foreigners in company
MSA	0.507	0.619	3.296	2.291	0.380	0.278	-1.713	10.985
	(0.061)	(0.056)	(0.128)	(0.203)	(0.216)	(0.144)	(0.622)	(12.624)
MSA × Threat	0.090	0.021	0.048	0.041	0.075	-0.079	0.126	20.197
	(0.042)	(0.040)	(0.100)	(0.157)	(0.112)	(0.074)	(0.718)	(10.471)
Person-Year observations	12,101	12,243	12,334	12,302	773	1,398	823	1,143
Person observations	6,605	6,665	6,691	6,683	440	734	823	855
R2 adjusted	0.117	0.211	0.299	0.117	0.498	0.478	0.167	0.136
Dep. var. mean	0.556	0.534	3.012	3.721	0.173	0.121	2.463	33.321
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects								
District	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District controls × survey year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is i) attendance to non-BAMF integration courses (column 1); ii) attendance to BAMF integration courses (column 2); iii) the German level of the interviewee assessed by the interviewer (column 3); iv) the self-reported time spent with Germans (column 4); v) a dummy for having a German born partner for females and males, obtained from the self-declaration of the partner in the survey (columns 5 and 6); vi) the self-reported frequency of wearing a headscarf among women (column 7); and, vii) the percentage of employees who are foreign born in the refugee's company (column 8). MSA refers to months since arrival. Threat is the threat index described in the text, and is z-standardized within each model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival), district fixed effects, and the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Standard errors, in parentheses, are clustered at the person-level.

Table 5. Cultural assimilation: Refugee characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Baseline	Gender		Age		Child in hh		Education abroad	
		Female	Male	18-30	> 30	Yes	No	Non-certified	Certified
MSA	0.125	0.144	0.096	0.123	0.105	0.087	0.149	0.059	0.106
	(0.042)	(0.064)	(0.058)	(0.067)	(0.056)	(0.056)	(0.070)	(0.065)	(0.058)
MSA × Threat	0.075	0.126	0.032	0.076	0.074	0.094	0.046	0.091	0.054
	(0.032)	(0.053)	(0.040)	(0.048)	(0.043)	(0.044)	(0.050)	(0.051)	(0.041)
Person-Year observations	12,334	4,719	7,615	5,175	7,159	7,074	5,007	5,449	6,830
Person observations	6,691	2,663	4,028	3,107	3,830	4,015	2,888	3,026	3,636
R2 adjusted	0.392	0.396	0.389	0.378	0.408	0.391	0.391	0.415	0.376
Dep. var. mean	-1.905	-1.945	-1.880	-1.885	-1.920	-1.929	-1.876	-1.943	-1.875
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects									
District	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District controls × survey year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of 6,691 refugees for a total of 12,334 refugee-year observations. Each column presents the regression on a different subsample. Column 1 presents results for the full sample from the baseline specification (Table 2, column 6). The sample is restricted to refugee respondents that are: i) female and male (columns 2 and 3); ii) below and above the age of 30 (columns 4 and 5); iii) with and without children (columns 6 and 7); and, iv) with and without a certified education degree (columns 8 and 9). The dependent variable is the cultural assimilation index. MSA refers to months since arrival. Threat is the threat index described in the text, and is z-standardized within each model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival), district fixed effects, the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012, and dummies for the composition of questions included in the cultural similarity index. Standard errors, in parentheses, are clustered at the person-level.

Table 6. Group-specific cultural convergence

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Baseline	Gender		Age		Employment of locals	
		Own group	Other group	Own group	Other group	Yes	No
MSA	0.125	0.111	0.138	0.119	0.129	0.130	0.109
	(0.042)	(0.043)	(0.044)	(0.044)	(0.042)	(0.043)	(0.040)
MSA × Threat	0.075	0.076	0.074	0.082	0.072	0.090	0.041
	(0.032)	(0.033)	(0.032)	(0.034)	(0.032)	(0.033)	(0.030)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691	6,691	6,691	6,691
R2 adjusted	0.392	0.376	0.395	0.366	0.394	0.379	0.421
Dep. var. mean	-1.905	-1.900	-1.897	-1.895	-1.906	-1.895	-1.922
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects							
District	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District controls × survey year	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of 6,691 refugees for a total of 12,334 refugee-year observations. The dependent variable is the cultural similarity index between locals and refugees within and outside each specific group. Column 1 presents the results for the full sample from the baseline specification (Table 2, column 6). Columns 2 and 3 (resp. 4 and 5) define cultural distance for own and other gender (resp. age group). Age groups are defined as 10-year windows. Columns 2 and 3 measure distance to locals of the same and opposite gender, respectively. Column 4 (resp. 5) measures the distance to locals of the same (resp. different) age group. Columns 6 and 7 consider cultural similarity between each refugee and preferences of employed and non-employed locals, respectively. MSA refers to months since arrival. Threat is the threat index described in the text, and is z-standardized within each model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival), district fixed effects, the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012, and dummies for the composition of questions included in the cultural similarity index. Standard errors, in parentheses, are clustered at the person-level.

Table 7. Locals' response to refugees: Attitudes towards refugees (survey)

	(1)	(2)	(3)	(4)	(5)
	Impact of refugees on			Refugee risk or chance	
	Economy (1 bad - 11 good)	Cultural life (1 undermine - 11 enrich)	Germany as a place to live (1 worse - 11 better)	Short-run (1 risk - 11 chance)	Long-run (1 risk - 11 chance)
Refugee share	2.308	-4.330	-4.561	0.823	5.156
	(5.070)	(5.062)	(4.569)	(4.702)	(5.114)
Refugee share × Threat	-13.223	-8.023	-11.812	-11.172	-7.499
	(2.933)	(2.974)	(2.774)	(2.823)	(3.063)
Person-Year observations	39,287	39,287	39,287	39,287	39,287
Person observations	25,009	25,009	25,009	25,009	25,009
R2 adjusted	0.114	0.128	0.114	0.059	0.140
Dep. var. mean	5.571	5.580	5.081	3.922	5.403
Individual controls	Yes	Yes	Yes	Yes	Yes
Fixed Effects					
District	Yes	Yes	Yes	Yes	Yes
District controls × survey year	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of 25,009 locals for a total of 39,287 person-year observations for years 2016 and 2018 where all 5 questions used as dependent variables were asked. The dependent variable is locals' opinion about: i) the impact of refugees on: the economy, cultural life and Germany as a place to live (columns 1 to 3); and, ii) refugees representing a risk in the short and in the long run (columns 4 and 5). Refugee share, in percent, is the refugee share in the district population, measured on December 31st of the year prior to the interview. Threat is the threat index described in the text, and is z-standardized. Positive coefficients indicate a more positive view of refugees. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, highest education among 4 categories, and migration background: none, indirect, 5 years ago or less, 6-10 years, more than 10 years), district fixed effects, and the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Standard errors, in parentheses, are clustered at the person-level.

Table 8. Locals' response to refugees: Endogamy and counter-mobilization

	(1)	(2)	(3)	(4)	(5)	(6)
	1[Partner German born]			Donated to refugees	Worked on site with refugees	Demonstrated to support refugees
	All	Female	Male			
Refugee share	0.145	0.231	0.051	-2.270	-0.446	0.519
	(0.182)	(0.258)	(0.367)	(1.052)	(0.669)	(0.602)
Refugee share × Threat	0.316	0.654	-0.018	0.427	0.228	-0.516
	(0.169)	(0.231)	(0.240)	(0.606)	(0.382)	(0.353)
Person-Year observations	92,813	43,409	49,404	25,092	25,035	25,011
Person observations	20,016	9,200	10,816	14,267	14,256	14,251
R2 adjusted	0.041	0.072	0.054	0.144	0.055	0.048
Dep. var. mean	0.944	0.951	0.937	0.291	0.071	0.054
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects						
District	Yes	Yes	Yes	Yes	Yes	Yes
District controls × survey year	Yes	Yes	Yes	Yes	Yes	Yes

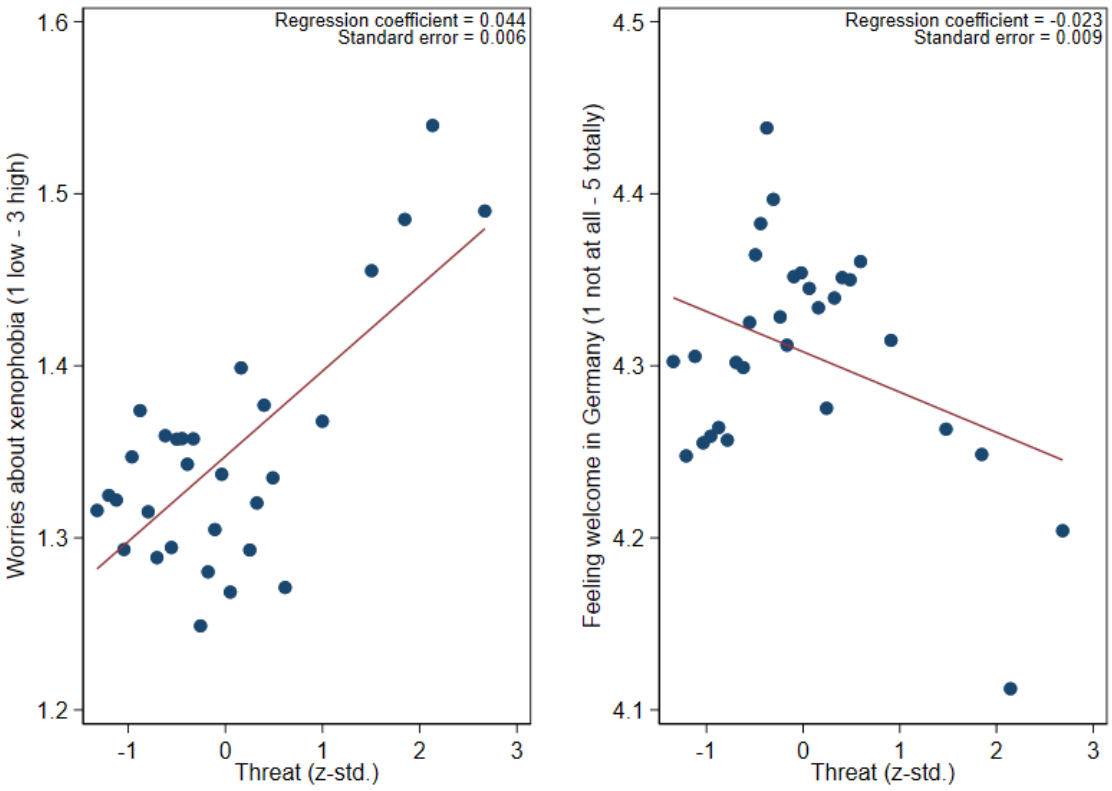
Notes: The dependent variable is a dummy for: i) having a German born partner (columns 1 to 3); ii) donating to support refugees, working on site with refugees, and demonstrating to support refugees the previous year (columns 4, 5, and 6). Refugee share refers to percent share of refugees at district measured on December 31 of the year prior to the interview. Threat is the threat index described in the text, and is z-standardized within each model. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, highest education among 4 categories, and migration background: none, indirect, 5 years ago or less, 6-10 years, more than 10 years), district fixed effects, and the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Standard errors, in parentheses, are clustered at the person-level.

Online Appendix

Contents

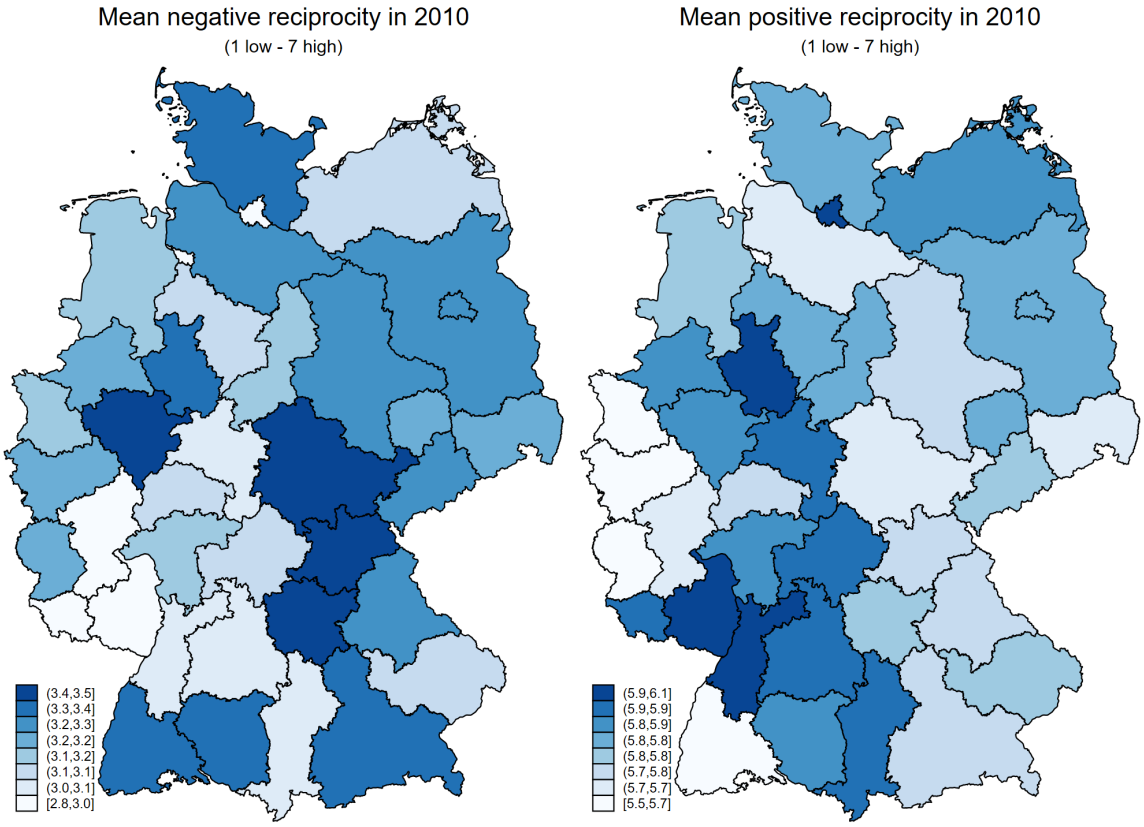
Appendix A: Additional Figures and Tables

Figure A.1. Validation of threat: Worries about xenophobia and feeling welcome



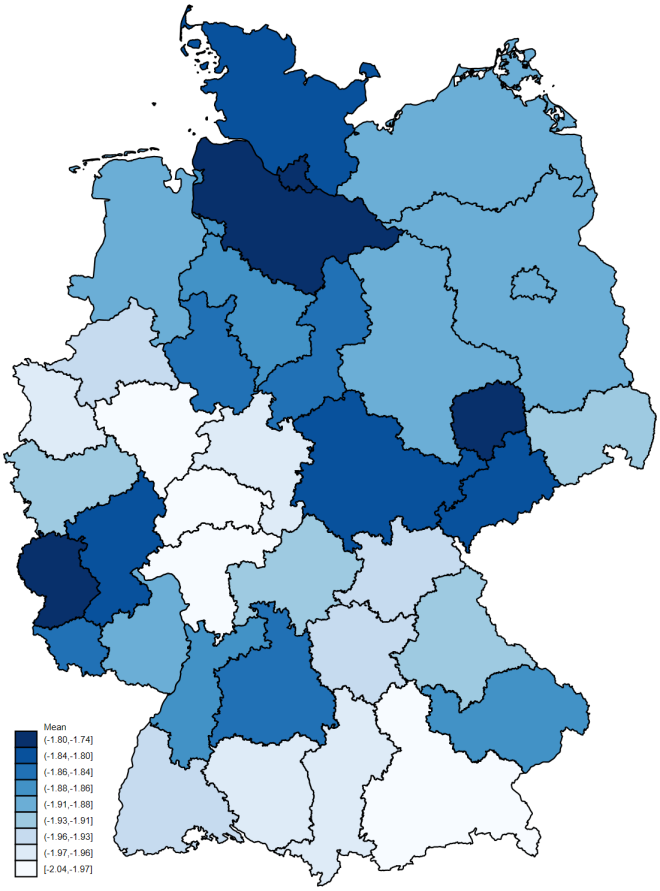
Notes: Binned scatterplot of the relationship between the threat index described in the main text and refugees' self-reported worry about xenophobia (left panel) and feeling welcome in Germany (right panel). Variables on the x- and y-axes represent residual changes, after partialling out months since arrival, survey year dummies, and individual controls (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival).

Figure A.2. Average reciprocities of locals across NUTS-2 regions



Notes: The maps plot the mean negative (left) and positive (right) reciprocity of locals for each of the 38 NUTS-2 regions. See Table A.3 for the list of questions defining negative and positive reciprocity.

Figure A.3. Cultural similarity between refugees and locals



Notes: The map plots the cultural similarity index between refugees and locals for each of the 38 NUTS-2 regions.

Table A.1. Threat index: Description and data sources

Threat component	Description	Source
Voting share of NSDAP in elections 1933	Absolute number of votes for the National Socialist German Workers' Party (NSDAP) over the absolute number of valid votes in the 1933 parliamentary elections; mapped from the level of historical administrative district boundaries to today's NUTS2-regions.	Falter & Hänisch (1990)
Pogroms against Jews in 1920s	Reported pogroms in Germany in the 1920s are aggregated from the level of towns to NUTS-2 regions (based on provided longitude and latitude). According to Voigtländer & Voth (2012), Appendix (p.1): "We define a pogrom as a violent outrage against the Jewish population, involving physical violence against and/or the killings of people. Therefore, political agitation through *Brandreden* (incendiary speeches), attacks on Jewish shows, or the desecration of cemeteries are not coded as pogroms. Only when physical violence against at least one Jewish inhabitant is mentioned in *Alicke* does this variable take the value of unity."	Voigtländer & Voth (2012)
Voting share of far-right party NPD in Federal elections 2013	Results are provided online for download by the Bundeswahlleiter (Federal Returning Officer), which is responsible for supervising the proper organization and conduct of Federal elections in Germany. In the German election system, voters cast two votes: first votes are directly given to local representatives; second votes are decisive for the representation of parties in the parliament. The vote shares of the far-right National Democratic Party of Germany (NPD) are calculated as the share of second votes out of all valid votes.	Bundeswahlleiter (2013)
Offenses against Muslim communities	Insults, threats, attacks against mosques and disturbance of religious practice (2001-2011). Answer of the Federal government to a parliamentry query of the party *Die Linke* (far-left party). Data shared by Colussi et al. (2021). Original source: Federal parliamentary printed matter 17/9523 (2012) Right-wing extremist mobilization in Germany Cumulated number of participants in right-wing extremist demonstration per 100,000 inhabitants. The sample is restricted to events between 2005-2012, and the number of events is scaled by the total regional population at Dec-31-2012.	Colussi et al. (2021)
Right-wing marches	This is a dataset on right-wing extremist demonstrations that took place in Germany between 2005 and 2020. The authors used the German federal government's answers to brief parliamentary questions (*Kleine Anfragen*) tabled by the opposition left-wing party *Die Linke* to create this dataset. The dataset consists of 3290 observations and includes information on the location, date, number of participants, organizing actors, and the mottos of the right-wing extremist demonstrations. For the construction of our index, we limit the time frame to pre-2013.	Kanol & Knoesel (2021)
Understanding for attacks on asylum seekers' homes	Question from Allbus survey 2008. Share of respondents answering 0 or higher to the following question: "I can understand that people carry out attacks on homes for asylum seekers (-2 Do not agree at all - +2 Completely agree)."	German General Social Survey (ALLBUS)
Immigrant adaptation	Allbus survey 2010, 2012 (pooled): Foreigners living in Germany should adapt their way of life a little more closely to the German way of life. (1 completely disagree - 7 completely agree). We calculate the share of respondents responding 6 or higher.	German General Social Survey (ALLBUS)
Labor market competition	Question from Allbus survey 2010, 2012 (pooled). Share of respondents answering 6 or higher to the following question: "When jobs get scarce, the foreigners living in Germany should be sent home again (1 completely disagree - 7 completely agree)."	German General Social Survey (ALLBUS)
Political participation of immigrants	Question from Allbus survey 2010, 2012 (pooled). Share of respondents answering 6 or higher to the following question: "Foreigners living in Germany should be prohibited from taking part in any kind of political activity in Germany (1 completely disagree - 7 completely agree)."	German General Social Survey (ALLBUS)
Social isolation	Question from Allbus survey 2010, 2012 (pooled). Share of respondents answering 6 or higher to the following question: "Foreigners living in Germany should choose to marry people of their own nationality (1 completely disagree - 7 completely agree)."	German General Social Survey (ALLBUS)
"Openness" (Big-5 personality trait)	Average of the Big-5 personality traits dimension "Openness" ac the local population in the NUTS-2 region in the SOEP survey year 2013. In SOEP, each of the Big-5 personality traits is generated from three survey questions (Gerlitz, Schupp 2005). We calculate "Openness" as the average over the agreement to the following items (each scaled from 1 does not apply at all - 7 absolutely): (1) I have a vivid fantasy, imagination, (2) I am original, bring in new ideas, (3) I value artistic, aesthetic experiences.	Own calculations based on SOEP (2019)

Notes: The table lists the name, description, and source of each threat component used to compute the threat index.

Table A.2. Correlation of threat variables

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Vote for NSDAP in 1933	(1)	1.00										
Pogroms in the 1920s	(2)	0.30	1.00									
		(0.00)										
Vote for NPD in 2013	(3)	0.12	0.06	1.00								
		(0.00)	(0.00)									
Mosque attacks	(4)	-0.25	-0.01	-0.32	1.00							
		(0.00)	(0.33)	(0.00)								
Right-wing marches	(5)	0.06	0.04	0.80	-0.28	1.00						
		(0.00)	(0.00)	(0.00)	(0.00)							
Agreement to attacks against immigrants	(6)	-0.06	-0.14	0.51	-0.09	0.36	1.00					
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)						
Immigrant adaptation	(7)	0.08	0.10	0.60	-0.14	0.49	0.12	1.00				
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)					
Labor market competition	(8)	0.18	0.03	0.63	-0.27	0.51	0.35	0.48	1.00			
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)				
Prohibition of political activity	(9)	0.30	-0.05	0.43	-0.14	0.31	0.22	0.48	0.54	1.00		
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
Intermarriage	(10)	0.01	-0.12	0.65	-0.19	0.53	0.49	0.63	0.61	0.62	1.00	
		(0.12)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)		
Big-5 Openness	(11)	-0.19	-0.14	-0.03	-0.17	0.01	0.20	-0.13	-0.11	-0.11	-0.12	1.00
		(0.00)	(0.00)	(0.00)	(0.00)	(0.56)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	

Notes: The table presents the correlation between each pair of threat variables. The correspondence between the top numbers and variables is given by the numbers on the left. Variables are described in Table A.1. Standard errors are in parentheses.

Table A.3. Survey questions used for baseline cultural similarity index

Outcome variables			Survey year	
Category	Question	Scale	Refugees	Locals
Risk	In general, are you someone who is ready to take risks or do you try to avoid risks?	0 - 10	2016-18	2012
Positive reciprocity	If someone does me a favor, I am willing to reciprocate it	1 - 7	2016-18 (Bio)	2010
	I make a particular effort to help someone who has previously helped me.	1 - 7	2016-18 (Bio)	2010
	I am prepared to incur costs myself to help someone who has previously helped me.	1 - 7	2016-18 (Bio)	2010
Negative reciprocity	If someone does me a serious wrong, I will get my own back at any price at the next opportunity.	1 - 7	2016-18 (Bio)	2010
	If somebody puts me in a difficult position, I will do the same to them.	1 - 7	2016-18 (Bio)	2010
	If someone insults me, I will insult them.	1 - 7	2016-18 (Bio)	2010
Leisure activities	How often do you go to eat or drink in a cafe, restaurant or bar?	1 - 5	2017-18	2013
	Artistic and musical activities (painting, music, photography, theater, dance)	1 - 5	2017-18	2013
	Taking part in sports	1 - 5	2017-18	2013
	Going to sporting events	1 - 5	2017-18	2013
	Going to the cinema, pop concerts, dance events, clubs	1 - 5	2017-18	2013
	Going to cultural events such as opera, classical concerts, theater, exhibitions	1 - 5	2017-18	2013
Politics	Once spoken in general terms: How interested are you in politics	1 - 4	2016-18	2012
Locus of control	How my life goes depends on me	1 - 7	2016	2010
	Compared to other people, I have not achieved what I deserve	1 - 7	2016	2010
	What a person achieves in life is above all a question of fate or luck	1 - 7	2016	2010
	If a person is socially or politically active, he/she can have an effect on social conditions	1 - 7	2016	2010
	I frequently have the experience that other people have a controlling influence over my life	1 - 7	2016	2010
	One has to work hard in order to succeed	1 - 7	2016	2010
	If I run up against difficulties in life, I often doubt my own abilities	1 - 7	2016	2010
	The opportunities that I have in life are determined by the social conditions	1 - 7	2016	2010
	Inborn abilities are more important than any efforts one can make	1 - 7	2016	2010
	I have little control over the things that happen in my life	1 - 7	2016	2010
Trust	People can generally be trusted	1 - 4	2018	2013
	Nowadays you can't rely on anyone	1 - 4	2018	2013
	If you are dealing with strangers, it is better to be careful before trusting them	1 - 4	2018	2013
Egoistic society	Do you believe that most people would use you if they had the chance or that they would try to be fair to you?	1 - 2	2018	2013
	Would you say that people usually try to be helpful or that they only pursue their own interests?	1 - 2	2018	2013

Notes: The table lists the survey questions used to construct the main cultural similarity index, their classification in categories, the range of possible answers, and the years they have been asked to refugees and locals. Scales include: Risk, 0 - 10 with 0 risk averse - 10 fully prepared to take risks, Negative reciprocity, positive reciprocity and locus of control 1 - 7 with 1 Absolutely does not apply - 7 Fully applies, leisure activities 1 - 5 with 1 Never - 5 Daily, Politics 1-4 with 1 not at all - 4 very strong, Trust 1 -4 with 1 Not at all - 4 fully agree, egoistic society fairness 1-2 with 1 exploit - 2 fair, and egoistic society helpful with 1 own interest - 2 helpful.

Table A.4. Additional questions included in the 12-component index

Outcome variables			Survey year	
Category	Question	Scale	Refugees	Locals
Satisfaction	How satisfied are you currently with your life in general?	0 - 10	2016-18	2012
	How satisfied are you with your current health?	0 - 10	2016-18	2012
	How satisfied are you in general with your current living arrangements?	0 - 10	2016-18	2012
Worries	Are you worried about your own economic situation?	1 - 3	2016-18	2012
	Are you worried about your health?	1 - 3	2016-18	2012
Social inclusion	How often do you miss the company of other people?	1 - 5	2016-18 (Bio)	2013
	How often do you feel left out?	1 - 5	2016-18 (Bio)	2013
	How often do you feel socially isolated?	1 - 5	2016-18 (Bio)	2013
Self attitude	I have a positive attitude towards myself	1 - 7	2016-18 (Bio)	2010

Notes: The lists the survey questions used, in addition to variables in Table A.3, to construct the 12-component cultural similarity index, their classification in categories, the range of possible answers, and the years they have been asked to refugees and locals. Scales include: Satisfaction 0 - 10 with 0 Completely dissatisfied - 10 Completely satisfied, Worries 1-3 with 1 No, no worry - 3 Yes, big worry, Social inclusion 1-5 with 1 Never - 5 Very often, and Self attitude 1-7 with 1 Absolutely does not apply - 7 Fully applies.

Table A.5. Descriptive statistics: Components of the threat index

	All					Below median threat					Above median threat				
	Mean	Std. dev.	Min	Max	N	Mean	Std. dev.	Min	Max	N	Mean	Std. dev.	Min	Max	N
Historical pogroms	0.55	0.50	0	1	12,334	0.72	0.45	0	1	6,022	0.39	0.49	0	1	6,312
NSDAP vote share, 1933	43.97	7.98	29	60	12,334	43.95	6.91	31	58	6,022	43.99	8.89	29	60	6,312
Attacks against mosques (2001-2011)	2.34	2.13	0	9	12,334	3.16	2.45	0	9	6,022	1.56	1.37	0	4	6,312
Percent locals who agree: ($\geq$ 6 out of 7)															
Foreigners should adapt way of life more	55.34	6.98	43	73	12,334	51.48	5.77	43	62	6,022	59.02	5.98	48	73	6,312
Foreigners go home when jobs are scarce	9.01	4.68	1	21	12,334	5.91	2.47	1	11	6,022	11.97	4.36	3	21	6,312
Foreigners marry same nationality	6.71	3.26	1	17	12,334	4.36	1.59	1	7	6,022	8.94	2.84	5	17	6,312
Foreigners prohibit polit. activ.	11.23	4.41	3	21	12,334	8.29	1.95	4	12	6,022	14.03	4.28	3	21	6,312
Percent locals understanding attacks on asylum-seeker homes ($\geq$ 2 out of 5)	12.96	6.82	2	31	12,334	9.88	4.17	2	20	6,022	15.90	7.53	4	31	6,312
NPD vote share (2013)	1.26	0.71	1	4	12,334	0.89	0.20	1	1	6,022	1.62	0.82	1	4	6,312
Participants in right-wing demonstrations per 100k inhabitants (2005-2012)	238.72	321.93	20	2259	12,334	103.22	56.01	20	228	6,022	367.98	406.58	25	2259	6,312
Big-5 Openness	4.59	0.16	4	5	12,334	4.60	0.14	4	5	6,022	4.58	0.18	4	5	6,312

Notes: The table reports summary statistics for the components of the threat index for: i) the full sample in columns 1 to 5; and, ii) separately for regions with the threat index above (resp. below) the sample median in columns 6 to 10 (resp. in columns 11 to 15). These components are defined in Table A.1.

Table A.6. Detailed variable list: Summary statistics

	All					Below median threat					Above median threat				
	Mean	Std. dev.	Min	Max	N	Mean	Std. dev.	Min	Max	N	Mean	Std. dev.	Min	Max	N
	Panel A. Refugees														
Preferences: Core cultural similarity															
Risk preferences (0 low - 10 high)	3.95	3.42	0	10	11,837	3.90	3.38	0	10	5,795	4.00	3.46	0	10	6,042
Negative reciprocity (1 low - 7 high)	1.77	1.26	1	7	6,263	1.76	1.25	1	7	3,120	1.78	1.28	1	7	3,143
Positive reciprocity (1 low - 7 high)	6.68	0.62	1	7	6,390	6.66	0.64	1	7	3,176	6.70	0.60	1	7	3,214
Locus of control (1 low - 7 high)	4.42	0.78	2	7	2,666	4.36	0.76	2	7	1,275	4.47	0.79	2	7	1,391
Society exploit-selfish (=1), fair-helpful (=2)	1.57	0.43	1	2	2,909	1.57	0.43	1	2	1,427	1.56	0.42	1	2	1,482
Interest in politics (1 not at all - 4 very strong)	1.66	0.87	1	4	12,227	1.66	0.87	1	4	5,976	1.66	0.87	1	4	6,251
Leisure and cultural activ. (1 never - 5 daily)	1.78	0.63	1	4	7,913	1.78	0.63	1	4	3,954	1.77	0.62	1	4	3,959
General trust (1 low - 4 high)	2.17	0.59	1	4	3,259	2.19	0.62	1	4	1,575	2.15	0.56	1	4	1,684
Cultural similarity index (12-components)	-1.74	0.33	-5	-1	12,334	-1.73	0.33	-4	-1	6,022	-1.75	0.34	-5	-1	6,312
Cultural similarity index (to native-born locals)	-1.90	0.48	-6	-1	12,334	-1.90	0.47	-5	-1	6,022	-1.90	0.49	-6	-1	6,312
Percentage foreigners in the company	33.32	29.95	0	100	1,143	35.82	30.47	0	100	533	31.14	29.33	0	100	610
At least 1 child in hh (born before arrival)	0.59	0.49	0	1	12,081	0.58	0.49	0	1	5,881	0.60	0.49	0	1	6,200
Years of work experience before arrival	7.33	9.22	0	48	11,594	7.26	9.12	0	47	5,635	7.39	9.32	0	48	5,959
Partner: None	0.33	0.47	0	1	12,334	0.35	0.48	0	1	6,022	0.32	0.47	0	1	6,312
Lives in household	0.57	0.49	0	1	12,334	0.56	0.50	0	1	6,022	0.59	0.49	0	1	6,312
Lives elsewhere in Germany	0.01	0.11	0	1	12,334	0.01	0.11	0	1	6,022	0.01	0.12	0	1	6,312
Lives not in Germany	0.06	0.24	0	1	12,334	0.06	0.25	0	1	6,022	0.06	0.24	0	1	6,312
Social inclusion (1 incl. - 5 excl.)	2.57	1.08	1	5	6,240	2.55	1.07	1	5	3,098	2.59	1.09	1	5	3,142
Satisfaction with life, health, flat (0 low - 10 high)	7.22	1.84	0	10	12,254	7.20	1.84	0	10	5,984	7.24	1.85	0	10	6,270
Worries: econ., health (1 low - 3 high)	1.83	0.58	1	3	12,187	1.83	0.58	1	3	5,972	1.84	0.58	1	3	6,215
Positive self-attitude (1 disagree - 7 agree)	6.29	1.18	1	7	6,196	6.26	1.18	1	7	3,110	6.33	1.18	1	7	3,086
Employment assimilation (from RecLink, Survey sample)	-0.53	0.37	-1	0	7,618	-0.57	0.36	-1	0	3,620	-0.49	0.37	-1	0	3,998
Employment assimilation (from survey, RecLink sample)	-0.48	0.40	-1	0	7,618	-0.51	0.41	-1	0	3,620	-0.46	0.40	-1	0	3,998
Refugees' rel. gross wage (from RecLink, Survey sample)	-709.11	868.22	-2,219	3,610	1,044	-809.87	903.72	-2,219	3,386	485	-621.69	827.12	-1,968	3,610	559
Refugees' rel. gross wage (from survey, RecLink sample)	-688.92	990.97	-2,241	12,675	1,044	-758.98	1,142.28	-2,241	12,675	485	-628.13	834.16	-1,976	4,292	559
Residency obligation	0.31	0.46	0	1	12,334	0.36	0.48	0	1	6,022	0.26	0.44	0	1	6,312
Missing or residency regulation not applicable	0.41	0.49	0	1	12,334	0.40	0.49	0	1	6,022	0.42	0.49	0	1	6,312
Assigned to East Germany	0.19	0.39	0	1	12,334	0.00	0.00	0	0	6,022	0.38	0.48	0	1	6,312
Does not live in assigned region at interview time	0.25	0.43	0	1	12,334	0.25	0.43	0	1	6,022	0.25	0.43	0	1	6,312
Legal status: Approved	0.69	0.46	0	1	12,149	0.66	0.47	0	1	5,951	0.72	0.45	0	1	6,198
Rejected	0.05	0.22	0	1	12,149	0.06	0.23	0	1	5,951	0.05	0.22	0	1	6,198
In proceedings	0.21	0.41	0	1	12,149	0.23	0.42	0	1	5,951	0.18	0.39	0	1	6,198
Other	0.05	0.22	0	1	12,149	0.05	0.22	0	1	5,951	0.05	0.22	0	1	6,198
	Panel B. Locals														
Preferences: Core cultural similarity															
Risk preferences (0 low - 10 high)	4.99	2.23	0	10	22,612	4.95	2.25	0	10	11,415	5.03	2.22	0	10	11,197
Negative reciprocity (1 low - 7 high)	3.08	1.41	1	7	14,321	3.04	1.38	1	7	6,975	3.13	1.43	1	7	7,346
Positive reciprocity (1 low - 7 high)	5.83	0.90	1	7	14,352	5.85	0.90	1	7	6,989	5.82	0.90	1	7	7,363
Locus of control (1 low - 7 high)	4.63	0.72	1	7	14,045	4.67	0.72	1	7	6,848	4.59	0.71	2	7	7,197
Society exploit-selfish (=1), fair-helpful (=2)	1.49	0.42	1	2	20,160	1.52	0.42	1	2	10,111	1.47	0.42	1	2	10,049
Interest in politics (1 not at all - 4 very strong)	2.30	0.79	1	4	15,639	2.34	0.79	1	4	7,732	2.26	0.80	1	4	7,907
Leisure and cultural activ. (1 never - 5 daily)	2.18	0.61	1	4	20,697	2.25	0.60	1	4	10,374	2.12	0.61	1	4	10,323
General trust (1 low - 4 high)	2.38	0.54	1	4	20,721	2.42	0.53	1	4	10,404	2.33	0.54	1	4	10,317

Table A.6. Continued

School degree: None	0.04	0.20	0	1	246,953	0.05	0.21	0	1	126,320	0.04	0.19	0	1	120,633
Secondary school certificate	0.53	0.50	0	1	246,953	0.48	0.50	0	1	126,320	0.59	0.49	0	1	120,633
Higher education entrance qualification	0.31	0.46	0	1	246,953	0.34	0.47	0	1	126,320	0.28	0.45	0	1	120,633
Other	0.11	0.32	0	1	246,953	0.14	0.34	0	1	126,320	0.09	0.29	0	1	120,633
Locals' attitudes towards refugees:															
Impact refugees on the economy (1 bad - 11 good)	5.57	2.70	1	11	39,769	5.76	2.68	1	11	20,492	5.38	2.70	1	11	19,277
Impact refugees on cultural life (1 undermine - 11 enrich)	5.59	2.79	1	11	39,769	5.83	2.77	1	11	20,492	5.32	2.80	1	11	19,277
Impact refugees on Germany as place to live (1 worse - 11 better)	5.09	2.51	1	11	39,769	5.30	2.47	1	11	20,492	4.86	2.52	1	11	19,277
Refugees risk or chance, short-run (1 risk - 11 chance)	3.93	2.30	1	11	39,769	4.06	2.31	1	11	20,492	3.78	2.28	1	11	19,277
Refugees risk or chance, long-run (1 risk - 11 chance)	5.41	2.89	1	11	39,769	5.67	2.87	1	11	20,492	5.13	2.90	1	11	19,277
Donated last year to support refugees	0.26	0.44	0	1	40,581	0.29	0.45	0	1	20,957	0.23	0.42	0	1	19,624
Worked on site with refugees last year	0.08	0.27	0	1	40,518	0.08	0.28	0	1	20,917	0.07	0.25	0	1	19,601
Demonstrated last year to support refugees	0.05	0.22	0	1	40,481	0.05	0.22	0	1	20,906	0.05	0.22	0	1	19,575
Importance to engage politically, socially (1 not - 4 very important)	2.13	0.77	1	4	45,490	2.16	0.77	1	4	22,931	2.09	0.77	1	4	22,559
Frequency volunteering in associations (1 never - 5 daily)	1.65	1.06	1	5	74,907	1.68	1.09	1	5	37,266	1.61	1.03	1	5	37,641
Cultural similarity index (12-components)	-1.37	0.27	-4	-1	18,302	-1.37	0.28	-4	-1	9,060	-1.37	0.26	-3	-1	9,242
Changed NUTS-2 from previous to current survey year	0.01	0.12	0	1	200,696	0.01	0.12	0	1	101,800	0.01	0.11	0	1	98,896
	Panel C. NUTS-2-level variables														
Share of refugees (NUTS-2)	0.68	0.25	0	1	12,334	0.78	0.23	0	1	6,022	0.59	0.23	0	1	6,312
Immigrants from origin country (NUTS-2)	0.07	0.11	0	3	12,333	0.09	0.14	0	3	6,022	0.06	0.06	0	2	6,311
Immigrants from origin region (NUTS-2)	0.50	0.42	0	3	12,053	0.54	0.28	0	2	5,882	0.47	0.52	0	3	6,171
Local-national cultural distance (NUTS-2)	0.32	0.14	0	1	12,334	0.31	0.08	0	0	6,022	0.33	0.19	0	1	6,312
Local cultural dispersion (NUTS-2)	1.08	0.03	1	1	12,334	1.08	0.03	1	1	6,022	1.09	0.03	1	1	6,312
Employment rate of immigrants from origin region (NUTS-2)	21.51	7.06	4	45	12,053	24.58	6.60	12	41	5,882	18.59	6.20	4	45	6,171
Skill-req. Herfindahl-Index (NUTS-2, 2012)	0.41	0.03	0	0	12,334	0.39	0.02	0	0	6,022	0.42	0.02	0	0	6,312
Task Herfindahl-Index (NUTS-2, 2012)	0.22	0.01	0	0	12,334	0.22	0.01	0	0	6,022	0.22	0.01	0	0	6,312
#RefugeesWelcome tweets: Number (NUTS-2)	875.03	2,224	0	23,031	150,552	826.32	1,465	0	8,953	74,748	923.06	2,775	0	23,031	75,804
#RefugeesWelcome tweets: Per 100,000 people (NUTS-2)	30.47	70.22	0	663.75	150,552	25.07	48.29	0	507.89	74,748	35.79	86.24	0	663.75	75,804
NGO-led initiatives: Number (NUTS-2)	18.17	21.19	0.	94	25,092	22.86	21.59	0	94	12,458	13.54	19.71	0	54	12,634
NGO-led initiatives: Per 100,000 people (NUTS-2)	0.63	0.83	0	5.42	25,092	0.76	1.01	0	5.42	12,458	0.50	0.57	0	1.72	12,634

Notes: The table reports additional summary statistics for the refugees (Panel A) and locals (Panel B) for: i) the full sample in columns 1 to 5; and, ii) separately for regions with the threat index above (resp. below) the sample median in columns 6 to 10 (resp. in columns 11 to 15). Panel C reports summary statistics for additional NUTS2-level variables used in the analysis. Summary statistics on employment assimilation and refugees' relative wages in self-reported survey data, and from linked administrative data (RecLink, see Section C.1) for the subsample where both these sources are available.

Table A.7. Cultural and economic assimilation: Months since arrival

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A. Cultural similarity index (mean: -1.905)						
MSA	0.099	0.102	0.079	0.076	0.094	0.113	0.118
	(0.040)	(0.042)	(0.042)	(0.042)	(0.041)	(0.041)	(0.042)
Person-Year observations	12,410	12,410	12,410	12,410	12,410	12,410	12,410
Person observations	6,723	6,723	6,723	6,723	6,723	6,723	6,723
R2 adjusted	0.329	0.329	0.342	0.345	0.366	0.372	0.390
	Panel B. Refugees' relative employment (mean: -0.504)						
MSA	0.783	0.789	0.746	0.757	0.760	0.776	0.771
	(0.030)	(0.044)	(0.042)	(0.042)	(0.041)	(0.041)	(0.042)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691	6,691	6,691	6,691
R2 adjusted	0.070	0.071	0.155	0.161	0.172	0.181	0.196
Individual controls	No	No	Yes	Yes	Yes	Yes	Yes
Fixed Effects							
Federal-State	No	No	No	No	Yes	No	No
NUTS-2	No	No	No	No	No	Yes	No
District	No	No	No	No	No	No	Yes
Survey year	No	Yes	Yes	Yes	Yes	Yes	Yes
District controls × survey year	No	No	No	Yes	Yes	Yes	Yes

Notes: The sample consists of 6,691 refugees for a total of 12,334 refugee-year observations. The dependent variable is the cultural similarity index (resp. refugees' relative employment) in Panel A (resp. Panel B). MSA refers to months since arrival. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables. Column 2 adds survey year fixed effects. Column 3 adds individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival). Column 4 adds interaction between year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Columns 5, 6, and 7 add respectively federal state, NUTS-2 region, and district fixed effects to the specification of column 4. Panel A always controls for dummies for the composition of questions included in the cultural similarity index. Standard errors, in parentheses, are clustered at the person-level.

Table A.8. Cultural convergence and local threat: All coefficients

	(1)	(2)	(3)	(4)	(5)	(6)
	Cultural similarity index (mean: -1.905)					
MSA	0.081	0.076	0.094	0.113	0.118	0.125
	(0.040)	(0.042)	(0.041)	(0.041)	(0.042)	(0.042)
MSA × Threat						0.075
						(0.032)
Female	-5.113	-5.149	-5.286	-5.169	-5.500	-5.461
	(0.908)	(0.908)	(0.878)	(0.868)	(0.864)	(0.864)
At least 1 child in HH	1.304	1.274	0.727	0.672	0.968	0.968
(born before arrival of hh head)	(0.952)	(0.951)	(0.929)	(0.928)	(0.924)	(0.924)
Age	-0.395	-0.404	-0.264	-0.305	-0.275	-0.271
	(0.262)	(0.262)	(0.254)	(0.252)	(0.253)	(0.253)
Age squared	0.002	0.002	0.000	0.001	0.001	0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Partner lives in:						
Household	-3.067	-3.037	-2.314	-2.333	-2.616	-2.670
	(1.104)	(1.103)	(1.071)	(1.066)	(1.076)	(1.077)
Elsewhere in Germany	-0.300	0.043	-0.112	0.073	1.173	1.096
	(3.111)	(3.101)	(3.134)	(3.141)	(3.212)	(3.202)
Not in Germany	-2.929	-2.959	-2.329	-2.355	-2.321	-2.285
	(1.805)	(1.800)	(1.737)	(1.721)	(1.721)	(1.719)
Missing	-3.344	-3.443	-4.017	-3.861	-4.002	-4.002
	(2.884)	(2.882)	(2.814)	(2.825)	(2.710)	(2.713)
Work Exp bef. leaving home country	0.037	0.031	0.020	0.020	-0.022	-0.022
	(0.062)	(0.061)	(0.060)	(0.059)	(0.059)	(0.059)
Compulsory school leaving certificate	5.429	5.468	4.894	4.795	4.517	4.520
	(0.994)	(0.991)	(0.962)	(0.955)	(0.963)	(0.963)
Secondary school leaving certificate	7.127	7.246	7.687	7.785	7.854	7.852
	(0.922)	(0.920)	(0.891)	(0.885)	(0.882)	(0.881)
Country of birth:						
Afghanistan	4.321	4.249	3.616	4.096	3.629	3.709
	(1.221)	(1.218)	(1.195)	(1.207)	(1.223)	(1.223)
Iraq	-0.226	-0.169	0.275	0.113	-0.030	-0.068
	(1.169)	(1.163)	(1.153)	(1.155)	(1.174)	(1.174)
Iran	12.027	11.720	12.221	12.253	12.627	12.577
	(2.443)	(2.452)	(2.351)	(2.317)	(2.277)	(2.282)
Africa	2.532	3.031	4.393	4.849	5.066	5.068
	(1.815)	(1.832)	(1.781)	(1.772)	(1.802)	(1.801)
West Balkan	3.611	3.367	4.768	4.614	4.136	3.958
	(2.121)	(2.138)	(2.160)	(2.152)	(2.200)	(2.198)
Former USSR	6.218	6.615	7.535	6.856	7.125	6.868
	(2.569)	(2.547)	(2.426)	(2.401)	(2.430)	(2.429)
Eritrea	2.606	2.426	2.632	3.287	1.986	1.766
	(2.207)	(2.196)	(2.085)	(2.088)	(2.082)	(2.083)
Other	-0.708	-0.615	1.075	1.052	1.157	1.145
	(2.199)	(2.207)	(2.181)	(2.170)	(2.136)	(2.132)

Table A.8. Continued

Refugee answered:						
Risk	-77.285	-77.477	-77.379	-77.902	-77.051	-77.054
	(1.658)	(1.659)	(1.684)	(1.682)	(1.729)	(1.727)
Neg. recipr.	-7.737	-7.628	-6.464	-6.599	-6.518	-6.507
	(2.573)	(2.559)	(2.584)	(2.584)	(2.627)	(2.628)
Pos. recipr.	18.800	18.356	18.354	18.467	18.426	18.380
	(2.665)	(2.656)	(2.681)	(2.675)	(2.722)	(2.723)
Activities	30.578	34.440	34.996	35.372	34.436	34.384
	(1.348)	(4.034)	(4.040)	(4.026)	(4.018)	(4.012)
Interest politics	37.720	37.721	37.925	38.415	39.096	39.110
	(8.150)	(8.183)	(8.151)	(8.200)	(8.391)	(8.404)
Locus of control	31.476	31.471	31.587	31.085	30.838	30.811
	(1.285)	(1.450)	(1.446)	(1.444)	(1.466)	(1.466)
Trust	27.658	23.885	23.639	23.355	24.812	24.566
	(2.000)	(4.089)	(4.073)	(4.037)	(4.052)	(4.053)
Evaluation of society	26.043	25.437	26.423	26.414	26.593	26.700
	(1.850)	(1.886)	(1.875)	(1.863)	(1.909)	(1.910)
Survey year = 2017		-2.380	-3.690	-4.637	-5.055	-4.842
		(5.127)	(5.134)	(5.135)	(5.239)	(5.230)
Survey year = 2018		-2.118	-3.722	-4.477	-6.100	-5.596
		(3.562)	(3.545)	(3.565)	(3.641)	(3.643)
UE-rate 1st-district (Dec-2012)		0.287	-0.073	-0.281	4.214	-9.829
		(0.237)	(0.317)	(0.346)	(3.543)	(8.859)
Survey year = 2017		0.075	0.155	0.115	0.299	0.129
× UE-rate 1st-district		(0.319)	(0.318)	(0.319)	(0.333)	(0.343)
Survey year = 2018		0.949	0.972	0.928	1.037	0.698
× UE-rate 1st-district		(0.303)	(0.303)	(0.303)	(0.311)	(0.354)
Population density per sqkm (Dec-2012)		-0.004	-0.004	-0.002	0.006	0.664
		(0.001)	(0.001)	(0.001)	(0.023)	(0.397)
Survey year = 2017		0.003	0.003	0.003	0.002	0.002
× Population density per sqkm		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Survey year = 2018		0.001	0.000	0.000	-0.000	0.000
× Population density per sqkm		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Refugees' share district pop (Dec-2012)		10.409	12.031	8.942	-65.926	8.151
		(2.297)	(2.634)	(2.782)	(82.221)	(87.548)
Survey year = 2017		-7.635	-4.844	-4.672	-4.445	-3.548
× Refugees' share district pop		(3.125)	(3.140)	(3.155)	(3.229)	(3.262)
Survey year = 2018		-6.991	-4.024	-3.803	-3.061	-1.016
× Refugees' share district pop		(3.015)	(3.030)	(3.030)	(3.077)	(3.230)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691	6,691	6,691
R2 adjusted	0.344	0.347	0.368	0.374	0.392	0.392
Fixed Effects						
Federal-State	No	No	Yes	No	No	No
NUTS-2	No	No	No	Yes	No	No
District	No	No	No	No	Yes	Yes

Notes: The dependent variable is the cultural similarity index. MSA refers to months since arrival. Threat is the threat index described in the text, and is z-standardized within each model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival), and dummies for the composition of questions included in the cultural similarity index. The reference value for country of birth is Syria. Column 2 adds interactions between year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Columns 3, 4, and 5 add respectively federal state, NUTS-2 region, and district fixed effects to the specification of column 2. Column 6 includes the interaction between months since arrival and the standardized threat index. Standard errors, in parentheses, are clustered at the person-level.

Table A.9. Cultural convergence by question

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Risk preference	Negative reciprocity	Positive reciprocity	Trust	Locus of control	Egoistic-altr. society	Politics interest	Leisure, cultural activity
MSA	0.051	0.070	0.078	-0.077	-0.099	-0.013	0.139	0.255
	(0.138)	(0.068)	(0.035)	(0.060)	(0.079)	(0.025)	(0.036)	(0.035)
	[0.891]	[0.683]	[0.139]	[0.683]	[0.683]	[0.891]	[0.010]	[0.010]
Person-Year observations	11,837	6,263	6,390	3,259	2,666	2,909	12,227	7,913
Person observations	6,552	6,263	6,390	3,259	2,666	2,909	6,666	5,094
R2 adjusted	0.087	0.114	0.238	0.102	0.050	0.060	0.084	0.149
Dep. var. mean	-3.994	-2.330	-1.385	-0.764	-1.021	-0.595	-1.288	-0.940
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects								
District	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District controls × survey year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variables are the components of the cultural similarity index detailed in Table A.3. MSA refers to months since arrival. Threat is the threat index described in the text, and is z-standardized within each model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival), district fixed effects, the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. P-values, shown in brackets, are adjusted for multiple hypotheses testing by controlling the familywise error rate (FWER) using the Romano-Wolf procedure (Clarke et al., 2020; Romano & Wolf, 2016, 2005a,b). Standard errors, in parentheses, are clustered at the person-level.

Table A.10. Economic assimilation and local threat: All coefficients

	(1)	(2)	(3)	(4)	(5)	(6)
	Refugees' relative employment (mean: -0.504)					
MSA	0.778	0.757	0.760	0.776	0.771	0.772
	(0.029)	(0.042)	(0.041)	(0.041)	(0.042)	(0.042)
MSA × Threat						0.016
						(0.032)
Female	-17.168	-17.077	-16.690	-16.630	-16.635	-16.626
	(0.847)	(0.843)	(0.833)	(0.822)	(0.837)	(0.837)
At least 1 child in HH	-4.129	-4.136	-4.106	-4.237	-3.984	-3.983
(born before arrival of hh head)	(0.936)	(0.933)	(0.928)	(0.917)	(0.923)	(0.923)
Age	1.637	1.584	1.552	1.573	1.502	1.503
	(0.229)	(0.227)	(0.224)	(0.222)	(0.225)	(0.225)
Age squared	-0.024	-0.024	-0.023	-0.023	-0.023	-0.023
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Partner lives in:						
Household	-5.456	-5.704	-5.796	-5.730	-6.408	-6.420
	(1.037)	(1.028)	(1.021)	(1.009)	(1.023)	(1.023)
Elsewhere in Germany	-3.155	-3.797	-4.913	-4.665	-5.136	-5.154
	(2.669)	(2.678)	(2.636)	(2.635)	(2.611)	(2.608)
Not in Germany	1.167	0.970	0.817	1.215	1.152	1.160
	(1.730)	(1.732)	(1.705)	(1.705)	(1.721)	(1.721)
Missing	-2.879	-3.217	-3.109	-2.630	-3.001	-3.001
	(2.768)	(2.739)	(2.697)	(2.681)	(2.625)	(2.624)
Work Exp bef. leaving home country	-0.104	-0.099	-0.082	-0.078	-0.082	-0.082
	(0.055)	(0.055)	(0.055)	(0.055)	(0.054)	(0.054)
Compulsory school leaving certificate	4.459	4.413	4.299	4.055	4.206	4.207
	(0.965)	(0.959)	(0.951)	(0.940)	(0.933)	(0.934)
Secondary school leaving certificate	6.800	6.613	6.281	6.260	6.196	6.195
	(0.919)	(0.912)	(0.906)	(0.899)	(0.895)	(0.895)
Country of birth:						
Afghanistan	-1.661	-1.262	-1.042	-0.599	-0.416	-0.399
	(1.160)	(1.152)	(1.151)	(1.141)	(1.152)	(1.152)
Iraq	-4.053	-3.607	-3.350	-3.391	-2.532	-2.540
	(1.055)	(1.051)	(1.061)	(1.071)	(1.101)	(1.101)
Iran	-3.617	-3.669	-3.549	-3.602	-4.611	-4.623
	(2.240)	(2.251)	(2.301)	(2.243)	(2.332)	(2.332)
Africa	-0.104	0.364	0.646	1.511	1.645	1.646
	(1.988)	(1.974)	(1.964)	(1.945)	(1.988)	(1.988)
West Balkan	6.955	7.543	9.294	8.987	8.852	8.815
	(2.837)	(2.855)	(2.844)	(2.799)	(2.867)	(2.867)
Former USSR	-0.300	-0.843	-0.841	-1.324	-1.458	-1.513
	(2.540)	(2.584)	(2.543)	(2.595)	(2.568)	(2.574)
Eritrea	-0.152	0.195	0.190	0.884	1.066	1.021
	(1.924)	(1.926)	(1.909)	(1.907)	(1.950)	(1.952)
Other	1.375	1.394	1.771	1.662	1.461	1.458
	(2.171)	(2.159)	(2.137)	(2.116)	(2.113)	(2.114)

Table A.10. Continued

Survey year = 2017		1.966	1.150	0.860	2.600	2.643
		(2.167)	(2.173)	(2.189)	(2.340)	(2.340)
Survey year = 2018		2.106	1.103	0.355	1.734	1.813
		(2.917)	(2.909)	(2.916)	(3.007)	(3.011)
UE-rate 1st-district (Dec-2012)		0.393	-0.537	-0.583	2.645	8.352
		(0.179)	(0.273)	(0.298)	(1.669)	(1.785)
Survey year = 2017		-0.568	-0.418	-0.452	-0.550	-0.587
× UE-rate 1st-district		(0.239)	(0.241)	(0.242)	(0.254)	(0.262)
Survey year = 2018		-0.711	-0.495	-0.502	-0.592	-0.665
× UE-rate 1st-district		(0.302)	(0.303)	(0.304)	(0.313)	(0.341)
Population density per sqkm		0.001	0.000	0.002	0.024	-0.239
		(0.001)	(0.001)	(0.001)	(0.019)	(0.085)
Survey year = 2017		-0.001	-0.001	-0.001	-0.001	-0.001
× Population density per sqkm		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Survey year = 2018		-0.001	-0.001	-0.001	-0.001	-0.001
× Population density per sqkm		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Refugees' share district pop		-11.611	-4.081	-5.733	-25.558	-47.927
		(1.712)	(2.027)	(2.216)	(76.814)	(79.488)
Survey year = 2017		3.907	3.920	3.642	2.514	2.704
× Refugees' share district pop		(2.347)	(2.338)	(2.362)	(2.462)	(2.493)
Survey year = 2018		7.278	6.762	6.668	5.616	6.056
× Refugees' share district pop		(2.858)	(2.857)	(2.863)	(2.923)	(3.052)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691	6,691	6,691
R2 adjusted	0.155	0.161	0.172	0.181	0.196	0.195
Fixed Effects						
Federal-State	No	No	Yes	No	No	No
NUTS-2	No	No	No	Yes	No	No
District	No	No	No	No	Yes	Yes

Notes: The sample consists of 6,691 refugees for a total of 12,334 refugee-year observations. The dependent variable is refugees' relative employment. MSA refers to months since arrival. Threat is the threat index described in the text, and is z-standardized within each model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables and individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival). The reference value for country of birth is Syria. Column 2 adds interaction between year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Columns 3, 4, and 5 add respectively federal state, NUTS-2 region, and district fixed effects to the specification of column 2. Column 6 includes the interaction between months since arrival and the standardized threat index. Standard errors, in parentheses, are clustered at the person-level.

Table A.11. Economic assimilation: Self-reported wages

	(1)	(2)	(3)	(4)	(5)	(6)
	Refugees' relative log gross wage (mean: -0.877)					
MSA	1.224	0.801	0.792	0.845	0.778	0.785
	(0.190)	(0.247)	(0.246)	(0.244)	(0.279)	(0.279)
MSA × Threat						0.107
						(0.238)
Person-Year observations	2,097	2,097	2,097	2,097	2,097	2,097
Person observations	1,570	1,570	1,570	1,570	1,570	1,570
R2 adjusted	0.091	0.107	0.106	0.117	0.142	0.141
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects						
Federal-State	No	No	Yes	No	No	No
NUTS-2	No	No	No	Yes	No	No
District	No	No	No	No	Yes	Yes
District controls × survey year	No	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of 1,570 employed refugees for a total of 2,097 refugee-year observations. The dependent variable is refugees' relative self-reported wages. MSA refers to months since arrival. Threat is the threat index described in the text, and is z-standardized within each model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival), district fixed effects, and the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Standard errors, in parentheses, are clustered at the person-level.

Table A.12. Economic assimilation: Survey and administrative information (record linkage)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Refugees' relative employment				Refugees' relative log wage			
Source:	Reclink		Survey		Reclink		Survey	
MSA	0.746	0.755	0.937	0.943	0.684	0.675	0.869	0.858
	(0.057)	(0.057)	(0.059)	(0.058)	(0.380)	(0.381)	(0.355)	(0.355)
MSA × Threat		0.077		0.053		-0.120		-0.158
		(0.042)		(0.043)		(0.328)		(0.305)
Person-Year observations	7,618	7,618	7,618	7,618	1,028	1,028	1,028	1,028
Person observations	3,914	3,914	3,914	3,914	781	781	781	781
R2 adjusted	0.174	0.174	0.217	0.217	0.179	0.178	0.163	0.162
Dep. var. mean	-0.528		-0.483		-0.758		-0.718	
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects								
District	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District controls × survey year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of 3,914 refugees for a total of 7,618 refugee-year observations that were matched to their administrative data through record linkage (see Section C.1). Columns 5 to 8 are restricted to employed refugees (sample: 1028 refugees). The dependent variable is i) refugees' relative wages, from administrative records (columns 1 and 2) and self-reported (columns 3 and 4); and, ii) refugees' relative log wages, from administrative records (columns 5 and 6) and self-reported (columns 7 and 8). MSA refers to months since arrival. Threat is the threat index described in the text, and is z-standardized within each model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival), district fixed effects, and the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Standard errors, in parentheses, are clustered at the person-level.

Table A.13. Assimilation and local threat: Gradually including controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A. Cultural similarity index (mean: -1.905)						
MSA	0.119	0.121	0.099	0.091	0.101	0.120	0.125
	(0.040)	(0.041)	(0.042)	(0.042)	(0.041)	(0.041)	(0.042)
MSA × Threat	0.112	0.113	0.111	0.083	0.088	0.080	0.075
	(0.027)	(0.027)	(0.027)	(0.032)	(0.031)	(0.031)	(0.032)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691	6,691	6,691	6,691
R2 adjusted	0.332	0.332	0.346	0.348	0.369	0.374	0.392
	Panel B. Refugees' relative employment (mean: -0.504)						
MSA	0.791	0.799	0.757	0.766	0.762	0.777	0.772
	(0.030)	(0.044)	(0.042)	(0.041)	(0.041)	(0.041)	(0.042)
MSA × Threat	-0.013	-0.011	-0.021	0.016	0.014	0.010	0.016
	(0.030)	(0.030)	(0.028)	(0.032)	(0.031)	(0.031)	(0.032)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691	6,691	6,691	6,691
R2 adjusted	0.075	0.075	0.159	0.163	0.173	0.181	0.195
Individual controls	No	No	Yes	Yes	Yes	Yes	Yes
Fixed Effects							
Federal-State	No	No	No	No	Yes	No	No
NUTS-2	No	No	No	No	No	Yes	No
District	No	No	No	No	No	No	Yes
Survey year	No	Yes	Yes	Yes	Yes	Yes	Yes
District controls × survey year	No	No	No	Yes	Yes	Yes	Yes

Notes: The sample consists of 6,691 refugees for a total of 12,334 refugee-year observations. The dependent variable is the cultural similarity index (resp. refugees' relative employment) in Panel A (resp. Panel B). MSA refers to months since arrival. Threat is the threat index described in the text, and is z-standardized within each model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables. Column 2 adds survey year fixed effects. Column 3 adds individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival). Column 4 adds interaction between year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Columns 5, 6, and 7 add respectively federal state, NUTS-2 region, and district fixed effects to the specification of column 4. Panel A always controls for dummies for the composition of questions included in the cultural similarity index. Standard errors, in parentheses, are clustered at the person-level.

Table A.14. Cultural and economic assimilation: Disaggregation of threat

	(1)	(2)	(3)	(4)
	Panel A. Cultural similarity index (mean: -1.905)			
MSA	0.125	0.117	0.120	0.126
	(0.042)	(0.042)	(0.042)	(0.042)
MSA × PC 1: Contemporary anti-immigrant sentiments	0.075			0.072
	(0.032)			(0.032)
MSA × PC 2: Historical anti-immigrant sentiments		0.045		0.044
		(0.028)		(0.028)
MSA × PC 3: Contemporary openness			-0.077	-0.074
			(0.026)	(0.026)
Person-Year observations	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691
R2 adjusted	0.392	0.392	0.392	0.393
	Panel B. Refugees' relative employment (mean: -0.504)			
MSA	0.772	0.770	0.771	0.772
	(0.042)	(0.042)	(0.042)	(0.042)
MSA × PC 1: Contemporary anti-immigrant sentiments	0.016			0.017
	(0.032)			(0.032)
MSA × PC 2: Historical anti-immigrant sentiments		0.031		0.031
		(0.030)		(0.030)
MSA × PC 3: Contemporary openness			0.024	0.025
			(0.028)	(0.028)
Person-Year observations	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691
R2 adjusted	0.195	0.195	0.196	0.196
Individual controls	Yes	Yes	Yes	Yes
Regional controls	Yes	Yes	Yes	Yes
Fixed Effects				
District	Yes	Yes	Yes	Yes
District controls × survey year	Yes	Yes	Yes	Yes

Notes: The sample consists of 6,691 refugees for a total of 12,334 refugee-year observations. The dependent variable is the cultural similarity index (resp. refugees' relative employment) in Panel A (resp. Panel B). MSA refers to months since arrival. PC 1, PC 2 and PC 3 measure respectively contemporary and historical anti-immigrant sentiments, and contemporary openness among locals, and are z-standardized within each estimated model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival), district fixed effects, and the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Panel A always controls for dummies for the composition of questions included in the cultural similarity index. Standard errors, in parentheses, are clustered at the person-level.

Table A.15. Principal component analyses: Factor loadings

	(1)	(2)	(3)	(4)
	Eigenvalue	Difference	Proportion	Cumulative
PC 1	4.167	2.580	0.379	0.379
PC 2	1.587	0.380	0.144	0.523
PC 3	1.207	0.257	0.110	0.633
PC 4	0.950	0.156	0.086	0.719
PC 5	0.794	0.104	0.072	0.791
PC 6	0.690	0.196	0.063	0.854
PC 7	0.494	0.063	0.045	0.899
PC 8	0.431	0.096	0.039	0.938
PC 9	0.335	0.127	0.031	0.969
PC 10	0.209	0.072	0.019	0.988
PC 11	0.136	0.000	0.012	1.000
	(1)	(2)	(3)	(4)
	PC 1	PC 2	PC 3	PC 4
Vote for NPD in 2013	0.434	-0.060	0.092	0.254
Vote for NSDAP in 1933	0.102	0.550	0.324	-0.338
Mosque attacks	-0.180	-0.031	-0.654	0.251
Big-5 Openness	-0.040	-0.471	0.508	-0.029
Pogroms in the 1920s	0.008	0.507	0.223	0.592
Right-wing marches	0.376	-0.080	0.129	0.353
Agreement to attacks against immigrants	0.256	-0.396	0.069	0.076
Immigrant adaptation	0.355	0.126	-0.206	0.148
Labor market competition	0.389	0.061	-0.022	-0.099
Prohibition of political activity	0.332	0.143	-0.180	-0.485
Intermarriage	0.416	-0.103	-0.232	-0.100

Notes: The top panel indicates for each principal component: i) its eigenvalue (column 1); ii) the difference to the next principal component (column 2); and iii) the proportion and cumulative proportion of the sum of eigenvalues represented by this principal component (columns 3 and 4). The bottom panel indicates the weight of each threat variable in the first four principal components.

Table A.16. Description of mediators

Variable	Definition	Source
Network size	Share of individuals born in the same country of origin as the refugee living in the region as of 2012, relative to total region population.	German Federal Statistical Office
Network employment	Employment rate among individuals from the same region of origin at baseline. We use region instead of country of origin due to small samples in the data. Origin regions include: MENA, Afghanistan, sub-Saharan Africa, West Balkans and former USSR.	Federal Employment Agency (Bundesagentur für Arbeit, 2020)
Task diversity	Defined as in Dengler et al. (2014): we first assign the task structure from David & Dorn (2013) to each occupation; then, we average across occupations (over task) within each region, and construct a Herfindahl index.	Federal Employment Agency (Bundesagentur für Arbeit, 2020)
Skill complexity	Using 5-digit occupation codes (KldB2010 – very similar to ISCO08), we calculate the skill requirement of each occupation. Defining four broad categories (helper; skilled worker; specialist; and, expert), we calculate the share of employees in each of them, relative to all employed individuals in the region. Finally, as before, we calculate a Herfindahl Index.	German Socio-Economic Panel (SOEP)
Local cultural distinctiveness	Euclidean distance between the vector of the averages of cultural dimensions over locals and the averages over all Germany.	German Socio-Economic Panel (SOEP)
Local cultural dispersion	On local individual, we calculate the mean over all 8 cultural variables of the distance to locals, then take the standard deviation over the NUTS-2 region.	German Socio-Economic Panel (SOEP)

Notes: The table lists the definition and source of the mediators used in the regressions presented in Table 3.

Appendix B: Robustness Checks

B.1 Testing for *Ex-ante* Sorting

In Table B.1, we examine whether there is evidence of *ex-ante* selection of refugees with different characteristics across different types of regions. We begin with three regional characteristics: unemployment rate below or above the sample median (Panel A), continuous unemployment rate (Panel B), and urban-rural status (Panel C).[43] Next, in Table B.2, we consider: the threat index above or below the sample median (Panel A); and, the continuous threat index (Panel B). In columns 1 to 4, refugees' individual characteristics are: a dummy equal to one for female respondent; age; years of work experience before migration; and, a dummy for reporting Syria as the origin country. To test whether the assignment probability based on pre-entry characteristics changed over time, we interact the latter with arrival year, using 2015 as the reference year. Given that refugee flows were very low prior to 2015, we combine arrival years 2013 and 2014 to obtain enough observations per cell.[44] Reassuringly, there is no evidence that the allocation of refugees with different characteristics across different regions changed over time.

In columns 5 to 7, we investigate the possibility of *ex-ante* cultural selection on the side of refugees. Since we cannot observe preferences of refugees before their arrival, this exercise can be conducted only for recently arrived refugees, under the assumption that they had less time to converge to local culture. We experiment with different definitions of "recent refugees", considering those arrived less than 8, 10 or 12 months prior to the interview, respectively.[45] Since the survey only started in 2016, we cannot observe recent arrivals for years 2013 and 2014. We thus restrict attention to changes in the cultural composition of recent arrivals between 2015 (omitted category) and 2016. Also in this case, we find no evidence that the cultural composition of refugees changed over time (and that this was correlated with the region of assignment).

Overall, while the exercise in Tables B.1 and B.2 could only be performed along a subset of observable characteristics (of regions and refugees), we find it reassuring that

[43] Unemployment rate is measured in December 2012 (at the NUTS-2 region level). Urban status is measured in 2018, but the classification is virtually constant over time because status is changed only if there is a foreseeable permanent under- or over-run of the thresholds used. Because defining an entire region as rural or urban would lead to high degree of imprecision within the region, we focus on districts. To classify districts into urban or rural, we use the following criteria, as in BBSR (2018): the population share in large and medium-sized cities, the population density of the district region, and the population density of the district region without taking into account the large and medium-sized cities.

[44] Results are unchanged if we consider the two years separately.

[45] The exact threshold used to define recent refugees does not change any of our results.

no systematic pattern is detected in the data.

B.2 Ruling out *Ex-post* Migration

A key concern when interpreting our results may be that, despite the initial allocation, refugees might have moved from regions where they had a low cultural match towards those with a better fit – and that the degree of cultural fit were correlated with local threat. As explained in the main text, we implement an ITT strategy, using the region of assignment (rather than of residence) to measure both threat and refugees' outcomes. This deals with the potential concern of refugees' *ex-post* sorting.

To more directly inspect the potential for *ex-post* sorting, in Table B.3, we measure threat in the region of assignment, but consider outcomes relative to the region of residence for different sub-samples of refugees. Column 2 reports the coefficient from our baseline specification to ease comparisons. In column 4, we zoom in on a sub-group of refugees that were granted asylum in Germany after the introduction of the Federal Integration act in August 2016. Depending on the Federal state of assignment, these refugees were not allowed to move out of their district of assignment even after asylum approval, at least as long as they were not able to make their own living. This restriction reduces the sample by 75%, and, not surprisingly, the estimates become very noisy. However, and reassuringly, the coefficient on both MSA and on the interaction term remains close to that reported in column 2.

Next, in columns 6 and 8, we split the sample between refugees who remained in the region of assignment (about 75% of our sample) and those that moved out of their region of assignment to conduct a placebo exercise. One would expect threat in the region of assignment to influence assimilation only for those refugees that remained in the region. In other words, threat in the region of assignment should not impact outcomes for refugees who moved. Columns 6 and 8 confirm our conjecture: the interaction between threat and MSA is larger in magnitude and more precisely estimated for stayers (column 6), while it is close to zero and not statistically significant for movers (column 8).

In Panel A of Table B.4, we go one step further, and re-estimate our baseline equation (including additional controls from column 1 to column 5) defining the dependent variable as a dummy for moving from one German region to another. For brevity, we focus on column 5, which reports our preferred specification. The coefficient on MSA is positive and statistically significant. This is to be expected: as refugees spend more time in Germany, they become better able to relocate. However, and importantly, the

coefficient on the interaction between MSA and the threat index is small and statistically insignificant. This indicates that there is no evidence of internal migration of refugees over time between more or less threatening areas. Note that, even if such relocation process were to take place, our ITT approach would take care of it. However, we find it even more reassuring for our design that no differential migration patterns are detected between regions with different levels of threat.

While the ITT design addresses the potential relocation of refugees, it does not deal with the possibility that locals moved away from a region, following the inflow of refugees (a process often referred to as "white flight"; see Boustan, 2010, among others). If such migration response were also correlated with the characteristics of locals who were moving, this may change the composition of locals interacting with refugees. Even though we fix preferences of locals at baseline, this may nonetheless influence the process of (economic and cultural) assimilation of refugees.

To address the concern that our findings may be driven by (selective) white flight, in Panel B of Table B.4, we restrict attention to locals, and define the dependent variable as a dummy equal to one for moving between a given survey and the next survey in which the respondent participated (between 2013 and 2018).[46] We estimate regressions that control for gender, age, age squared, highest education (4 categories), migration background (no, indirect, 5 years ago or less, 6-10 years, more than 10 years). All regressions also include interactions between year dummies and district baseline (2012) characteristics: unemployment rate, population density, and refugee share. The main regressors are the refugee share in the district of residence of the respondent at the end of the year before the interview and its interaction with the threat index of the corresponding region.

Reassuringly, the point estimates on both regressors in column 1 are small and not statistically significant. Next, in columns 2 to 4, we augment the previous specification by also including the triple interaction between the refugee share, the threat index and respondents' attitudes towards refugees.[47] Importantly, the coefficient on the triple interaction is always close to zero and never statistically significant.[48]

[46]The SOEP has information on the respondents' place of residence at the time of the interview.

[47]All regressions are fully saturated, but we do not report coefficients on lower order terms to save space.

[48]Specifically, we measure attitudes towards refugees as the assessment of their impact on: the economy (column 2), cultural life (column 3), and, the overall quality of life (column 4). Higher values indicate a more positive perception of refugees.

B.3 Ruling out Selective Attrition

In Table B.5, we address the possibility that changes in the sample composition may be driving our results through selective attrition. In particular, one may be concerned that less assimilated refugees drop out of the survey over time, leaving us with a more culturally similar (and economically integrated) pool. This would be problematic for our design if selective attrition were more (or less) likely to occur in regions with higher levels of threat.

To address this concern, we exploit the fact that some refugees were interviewed multiple times, and define the dependent variable as the probability of disappearing from the subsequent survey wave. That is, we create a dummy variable equal to one if a refugee present in one wave did not appear in the following one. In column 1, we regress this indicator against MSA, separately controlling for individual characteristics and interactions between survey year fixed effects and baseline district characteristics. As expected, the probability of attrition increases with time spent in Germany.

In column 2, we include the cultural similarity index and its interaction with MSA, to verify that refugees that are culturally more similar are not more likely to drop out of the survey at different points in time. Reassuringly, the coefficient on the interaction term is close to zero and not statistically significant, suggesting that there is no selective attrition (by cultural similarity) of refugees over time. In column 3, we examine whether refugees assigned to regions with a higher threat index are more likely to drop out of the sample over time. Reassuringly, also in this case, the interaction term between MSA and threat is small and not statistically significant.[49]

In column 4, we simultaneously include the cultural similarity and the threat index, as well as their interactions with MSA. Once again, there is no evidence of selective attrition along either dimension. Finally, in column 5, we estimate a specification that also includes the triple interaction between MSA, threat, and cultural similarity. The point estimate is very close to zero and not statistically significant. This weighs against the possibility that less assimilated refugees drop out at differential rates in regions characterized by different levels of threat.

Taken together, the evidence in Table B.5 indicates that selective attrition of refugees is unlikely to drive our results.

[49] Note that the threat index is absorbed by district fixed effects.

B.4 Alternative Measures of Cultural Similarity

As an additional robustness exercise, we replicate our main estimation table (Table 2 in the main text), using different statistical measures for our cultural assimilation outcome. In Panel A of Table B.6, we replace the Euclidean cultural similarity index with the Canberra index – another entropy measure of the Minkowski family, which standardizes each sub-component of the index by the maximum distance observed in the data. This measure captures whether cultural convergence comes from the combination of questions rather than a specific sub-set of questions.[50] As shown in Table A.9, cultural assimilation in our baseline estimation stems from questions on reciprocity, type of leisure activities, and interest in politics. Not surprisingly, given the feature of the Canberra index, coefficients become quantitatively smaller but remain precisely estimated.

In Panel B, we focus on the most restrictive measure of cultural similarity, namely the Herfindahl index. This index captures *exact* preference matches between refugees and locals. In contrast to the Minkowski distances (Euclidean and Canberra), the Herfindahl index measures the likelihood that a refugee and a randomly drawn local give the exact same response to a specific attitudinal question. If refugees became culturally close, but not exactly the same as locals, this would not be captured by the Herfindahl index. Under this strict cultural similarity definition, we do not find that refugees assimilate to locals. This is consistent with our main findings, which document partial (and not complete) convergence over time.[51]

In addition, we document that results are not driven by the exact set of questions considered to define cultural preferences. As described in Section 3, the baseline cultural similarity index includes questions that are available for both refugees and locals and adhere to a strict definition of culture in the form of stated beliefs and preferences. By relaxing the definition of "culture", we can use the full set of overlapping variables (Table A.4), and expand the cultural similarity index to 12 dimensions, including feelings of social inclusion, self-attitudes, and worries. Results are reported in Table B.7 (Panel A), where we document that coefficients become slightly smaller in size, but more precisely estimated.

Finally, we verify that results are robust to restricting attention to native-born re-

[50] Formally, the Canberra index can be written as $D_{Ca} = \sum_{i=1}^{d} \frac{|P_i - Q_i|}{P_i + Q_i}$, with P_i and Q_i representing two probability density functions. In comparison to the Euclidean distance, the Canberra distance decreases the weight of outliers. In other words, if refugees converge to locals only along one cultural dimension, this would be captured in the Euclidean index, and would be discounted in the Canberra index.

[51] It is possible that over longer periods (recall that average MSA lies at 29 months), we would observe convergence even along the Herfindahl index.

spondents when defining the baseline local culture. Since 17% of respondents in the SOEP are not born in Germany (Table 1), one may be worried that cultural convergence may be over-stated, if immigrants and refugees have more similar preferences than refugees and the average native-born local. Reassuringly, results are unchanged when the cultural similarity index is constructed restricting the sample of locals to those born in Germany (Table B.7, Panel B).

B.5 Addressing Potential Endogeneity of Local Culture

It is possible that refugee inflows led to broader changes in locals' ideology. Since in our main analysis we fixed local culture at baseline, one may be worried that our results over-state convergence if refugee inflows triggered changes in local preferences, more so in regions with higher levels of threat. We tackle this concern in different ways.

First, we replicate the analysis conducted in Panel A of Table 2 by constructing the CSI using locals' preferences measured at endline, rather than baseline. Specifically, we use the latest available survey year for locals for each of the questions included in the index. Results are reported in Panel B of Table B.8, which also presents those from the preferred specification to ease comparisons in Panel A. Reassuringly, coefficients on both MSA and the interaction between MSA and threat are close to – if anything larger than – those obtained when measuring CSI at baseline. This indicates that fixing locals' preferences before the inflow of refugees does not lead us to over-state refugees' cultural convergence.

Second, we directly inspect the relationship between locals' preferences and refugee inflows for each of the eight cultural traits used to construct the CSI. This analysis mirrors that conducted in Table A.9 for refugees, with two differences. First, the sample of respondents is now composed of locals. Second, instead of MSA, the main regressor is the refugee share in the district of residence of the respondent at the end of the year before the survey was conducted. All regressions control for district and survey year fixed effects, for individual characteristics, and for interaction between district baseline variables and year dummies. As for Table A.9, we adjust confidence intervals for multiple hypothesis testing.

Panel A of Table B.9 reports results obtained when only including the refugee share in the district. Coefficients are never statistically significant. Moreover, no clear pattern emerges. Panel B augments this specification by also interacting the refugee share with the threat index prevailing in the region. Again, once confidence intervals are adjusted

for multiple hypothesis testing, none of the coefficients on either the refugee share or its interaction with threat is statistically significant at conventional levels. Also in this case, there is no systematic trend.

Taken together, results in Tables B.8 and B.9 suggest that refugees' inflows did not significantly alter locals' preferences, and that our results are unlikely to be over- or understated due to endogenous changes in local culture.

B.6 Adjusting Standard Errors for Spatial Correlation

As explained in the main text, following Abadie et al. (2017), we cluster standard errors at the person level. In Table B.10, we verify that our estimates remain statistically significant when adjusting standard errors for potential spatial correlation in the error term. First, in column 2, we cluster standard errors at the district level. The coefficient on the main effect of MSA remains statistically significant at the 5% level both for cultural (Panel A) and for economic (Panel B) assimilation. Turning to the interaction term, the coefficient in Panel A becomes statistically significant at the 10%, with a p-value of .093.

Next, in columns 3 to 6, we adjust standard errors using the Conley (1999) procedure, which we implement using the code by Colella et al. (2019), applying different geographic lags. In columns 3 and 4, we use as distance parameter: the median distance between centroids of adjacent districts in Germany (33.15 km); and twice this distance (66.3 km).[52] In column 5, we allow correlation across adjacent districts. In column 6, we extend this to neighbors of neighbors. Reassuringly, while standard errors are slightly larger than in the baseline specification (column 1), the point estimate on the interaction between threat and MSA in Panel A is always statistically significant at the 10% level.

B.7 Additional Robustness Checks

Finally, we conduct additional robustness checks in Table B.11. To ease comparison, in column 1, we report results from our baseline specification for cultural and economic assimilation in Panels A and B, respectively. In column 2, we interact year dummies with a dummy for regions belonging to East Germany.[53] Since substantial cultural and political differences between former Eastern and Western Germany – including support

[52]This guarantees that neighboring districts are considered correlated, but also handles cases where districts are separated by a small district.

[53]East Germany includes former GDR states Brandenburg, Mecklenburg-Western Pomerania, Saxony, Saxony-Anhalt, Thuringia and Berlin. The data does not allow to distinguish East and West Berlin.

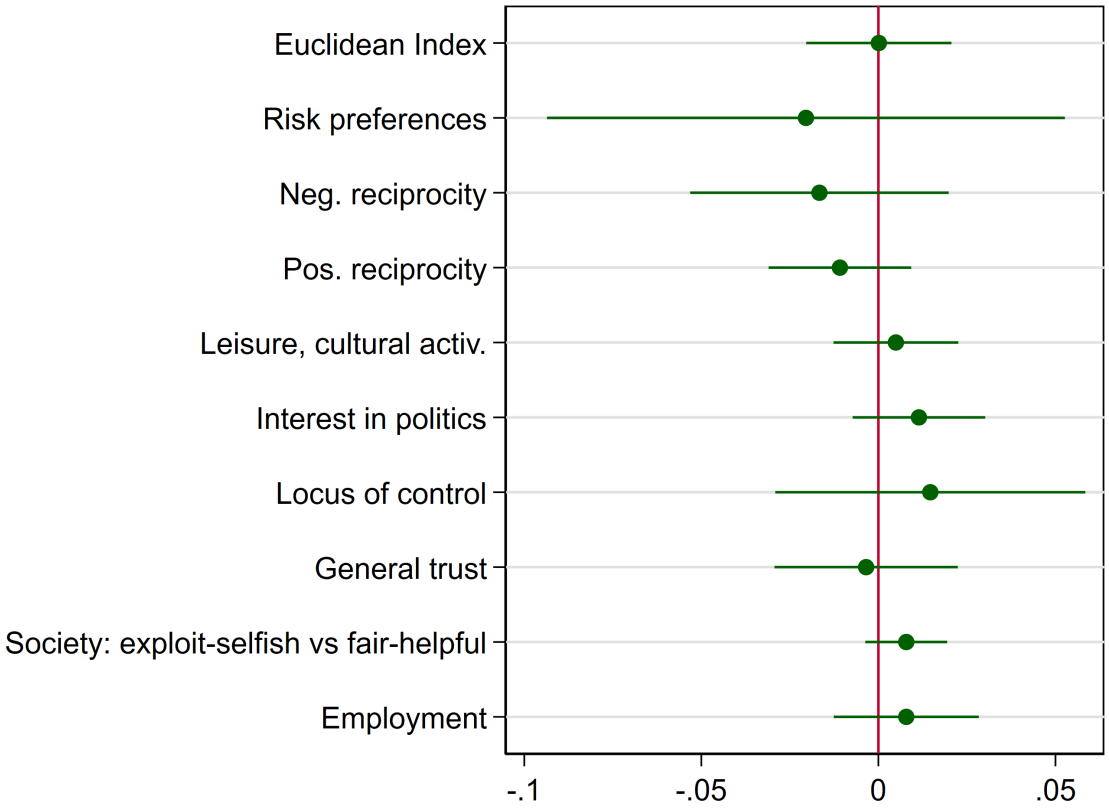
for right-wing parties, attitudes towards immigration and preferences for redistribution (Lange, 2021) – still persist until today, it is important to verify that such differences do not drive our results. The interaction between the East Germany and the year dummies make sure that differential responses to the refugee influx of 2015 are accounted for.

In columns 3 and 4, we consider the possibility that refugees from different regions of origin were differentially assigned across German areas and had a differential propensity to assimilate to local culture. To do so, we interact year dummies with, respectively, origin country dummies and the distance (in km) from the closest border of the refugees' origin countries to the centroid of the NUTS-2-region of assignment.[54] Finally, in column 5 we check that results are robust to trimming the sample, dropping individuals with cultural similarity and relative employment at the top (resp. bottom) 1st (resp. 99th) percentile.

Reassuringly, in all cases, results remain precisely estimated and quantitatively close to those reported in column 1.

[54]We consider distance from country of origin and German NUTS-2-region because this variable may influence the probability of assignment of a refugee to a given local area.

Figure B.1. Convergence of movers (by question)



Notes: The graph plots the coefficient (with corresponding 95% confidence intervals) of a dummy variable for *movers* (refugees living out of the region of assignment at the time of the interview) in a regression with dependent variable i) the cultural similarity index (first line); ii) the different dimensions of the similarity index; and, iii) employment relative to locals (last line). The underlying regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival), district fixed effects, and the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. The regression for the first line includes controls for dummies for the composition of questions included in the cultural similarity index. Standard errors are clustered at the person-level.

Table B.1. Probability of assignment to region type by pre-entry characteristic

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Characteristic:	Gender	Age	Work exp.	Origin Syria	CSI 8 months	CSI 10 months	CSI 12 months
	Panel A. Above (=1) vs. below (=0) unemployment (NUTS-2, Dec-2012)						
Variable	-3.732	0.078	-0.218	3.781	-2.939	-0.951	2.578
	(1.590)	(0.099)	(0.110)	(2.036)	(6.050)	(2.713)	(1.754)
Arrival year: 2013, 2014 × variable	-0.436	0.070	0.106	-3.795			
	(2.434)	(0.140)	(0.154)	(3.504)			
2016 × variable	3.019	0.096	0.130	-1.675	6.514	-0.392	-3.370
	(3.084)	(0.164)	(0.187)	(4.277)	(7.167)	(4.693)	(3.506)
Observations	6,522	6,522	6,111	6,522	202	607	1,292
Household observations	4,367	4,367	4,133	4,367	174	500	1,021
R2 adjusted	0.069	0.069	0.071	0.064	0.130	0.133	0.123
Dep. var. mean	0.485	0.485	0.484	0.485	0.500	0.484	0.475
	Panel B. Unemployment rate in percent (NUTS-2, Dec-2012)						
Variable	-11.784	0.703	-0.423	6.001	-63.815	-22.956	-6.580
	(7.989)	(0.490)	(0.560)	(10.042)	(33.830)	(14.597)	(9.491)
Arrival year: 2013, 2014 × variable	-4.787	-0.446	-0.064	-5.484			
	(12.178)	(0.714)	(0.825)	(18.084)			
2016 × variable	16.996	0.857	0.681	12.144	47.584	-2.048	-6.708
	(15.437)	(0.809)	(0.937)	(21.364)	(39.635)	(22.977)	(18.051)
Person observations	6,522	6,522	6,111	6,522	202	607	1,292
Household observations	4,367	4,367	4,133	4,367	174	500	1,021
R2 adjusted	0.109	0.109	0.107	0.103	0.220	0.217	0.176
Dep. var. mean	7.395	7.395	7.366	7.395	8.087	7.734	7.728
	Panel C. Urban (=1) vs. rural (=0) district						
Variable	2.274	0.081	-0.015	0.348	2.776	0.053	-1.459
	(1.323)	(0.079)	(0.090)	(1.626)	(4.984)	(2.393)	(1.542)
Arrival year: 2013, 2014 × variable	-1.437	-0.021	-0.074	-1.803			
	(2.008)	(0.114)	(0.125)	(2.841)			
2016 × variable	-1.681	-0.166	0.031	-1.779	0.976	0.740	1.084
	(2.625)	(0.136)	(0.161)	(3.472)	(6.025)	(3.811)	(2.755)
Person observations	6,522	6,522	6,111	6,522	202	607	1,292
Household observations	4,367	4,367	4,133	4,367	174	500	1,021
R2 adjusted	0.270	0.270	0.267	0.267	0.214	0.280	0.294
Dep. var. mean	0.692	0.692	0.691	0.692	0.693	0.674	0.659

Notes: The sample consists of the earliest observation of 6,522 refugees arriving between 2013 and 2016. Columns 5 to 7 restrict the sample to refugees that arrived less than 8, 10, and 12 months before the interview. The dependent variable is a characteristic of the location of assignment of the refugee, measured in December 2012: i) whether the NUTS-2 region is above median employment (Panel A); ii) the unemployment rate of the NUTS-2 region (Panel B); iii) whether the district is urban (Panel C, based on BBSR 2018). Median values are measured within each sample. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival, except the characteristic of interest in columns 1 to 4), and the interaction of arrival year categories and district controls (unemployment rate except for Panel A and B, share of refugees and population density except for Panel C), all measured in December 2012. Columns 5 to 7 additionally control for dummies for the composition of questions included in the cultural similarity index. Standard errors, in parentheses, are clustered at the household-level.

Table B.2. Probability of assignment to region type by pre-entry characteristic: Threat

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Characteristic:	Gender	Age	Work exp.	Origin Syria	CSI 8 months	CSI 10 months	CSI 12 months
	Panel A. Threat index above (=1) vs. below (=0) median (NUTS-2)						
Variable	-0.439	0.086	-0.083	4.060	-15.113	-6.182	-1.912
	(1.456)	(0.091)	(0.100)	(1.886)	(7.541)	(2.372)	(1.602)
Arrival year: 2013, 2014 × variable	-2.918	-0.140	-0.129	-2.164			
	(2.303)	(0.130)	(0.141)	(3.291)			
2016 × variable	-0.540	0.018	-0.045	3.926	13.952	2.747	-0.679
	(2.879)	(0.160)	(0.183)	(4.027)	(8.814)	(4.049)	(2.937)
Person observations	6,522	6,522	6,111	6,522	202	607	1,292
Household observations	4,367	4,367	4,133	4,367	174	500	1,021
R2 adjusted	0.197	0.197	0.194	0.195	0.293	0.303	0.303
Dep. var. mean	0.507	0.507	0.509	0.507	0.485	0.491	0.483
	Panel B. Continuous threat measure (NUTS-2)						
Variable	1.499	-0.111	0.120	3.002	-26.114	-6.193	1.892
	(2.482)	(0.146)	(0.167)	(3.143)	(12.569)	(3.690)	(2.492)
Arrival year: 2013, 2014 × variable	-7.604	0.002	0.084	-0.027			
	(3.739)	(0.218)	(0.241)	(5.346)			
2016 × variable	0.720	0.010	-0.127	8.431	19.818	4.767	-1.920
	(4.589)	(0.237)	(0.275)	(6.267)	(14.755)	(6.352)	(4.716)
Person observations	6,522	6,522	6,111	6,522	202	607	1,292
Household observations	4,367	4,367	4,133	4,367	174	500	1,021
R2 adjusted	0.450	0.450	0.453	0.443	0.423	0.508	0.539
Dep. var. mean	0.000	0.000	-0.004	0.000	0.000	0.000	-0.000

Notes: The sample consists of the earliest observation of 6,522 refugees arriving between 2013 and 2016. Columns 5 to 7 restrict the sample to refugees that arrived less than 8, 10, and 12 months before the interview. The dependent variable is a characteristic of the location of assignment of the refugee, measured in December 2012: i) whether the NUTS-2 region has above median threat index (Panel A); and, ii) the threat index of the NUTS-2 (Panel B). Threat is the threat index described in the text, and is z-standardized within each sample. Median values are measured within each sample. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival, except the characteristic of interest in columns 1 to 4), and the interaction of arrival year categories and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Columns 5 to 7 additionally control for dummies for the composition of questions included in the cultural similarity index. Standard errors, in parentheses, are clustered at the household-level.

Table B.3. Cultural assimilation, economic assimilation, and mobility

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample:	All		Residency obligation		Stayers		Movers	
	Panel A. Cultural similarity index							
MSA	0.118	0.125	0.095	0.094	0.096	0.109	0.080	0.080
	(0.042)	(0.042)	(0.085)	(0.085)	(0.046)	(0.047)	(0.096)	(0.096)
MSA × Threat		0.075		0.098		0.101		0.005
		(0.032)		(0.066)		(0.036)		(0.071)
Person-Year observations	12,334	12,334	3,767	3,767	9,225	9,225	3,109	3,109
Person observations	6,691	6,691	2,813	2,813	5,091	5,091	1,728	1,728
R2 adjusted	0.392	0.392	0.416	0.416	0.398	0.399	0.399	0.398
Dep. var. mean	-1.905	-1.905	-1.877	-1.877	-1.916	-1.916	-1.881	-1.881
	Panel B. Refugees' relative employment							
MSA	0.771	0.772	0.499	0.500	0.774	0.781	0.602	0.602
	(0.042)	(0.042)	(0.086)	(0.086)	(0.050)	(0.050)	(0.103)	(0.102)
MSA × Threat		0.016		-0.080		0.053		-0.084
		(0.032)		(0.068)		(0.037)		(0.068)
Person-Year observations	12,334	12,334	3,767	3,767	9,225	9,225	3,109	3,109
Person observations	6,691	6,691	2,813	2,813	5,091	5,091	1,728	1,728
R2 adjusted	0.196	0.195	0.187	0.187	0.198	0.198	0.197	0.197
Dep. var. mean	-0.504	-0.504	-0.529	-0.529	-0.507	-0.507	-0.494	-0.494
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects								
District	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District controls × survey year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of 6,691 refugees for a total of 12,334 refugee-year observations. Columns 3-4 restrict attention to refugees arrived after the Federal Integration Act became effective in 2016, who were prevented from moving out of the region of assignment. Columns 5-6 (resp. 7-8) consider only refugees who remained in (resp. moved out of) the region of assignment. The dependent variable is the cultural similarity index (resp. refugees' relative employment) in Panel A (resp. Panel B), measured in the region of assignment. MSA refers to months since arrival. Threat is the threat index described in the text, measured in the region of assignment, and is z-standardized within each estimated model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival), district fixed effects, and the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Panel A always controls for dummies for the composition of questions included in the cultural similarity index. Standard errors, in parentheses, are clustered at the person-level.

Table B.4. Probability of ex-post sorting: Refugees and locals

	(1)	(2)	(3)	(4)	(5)
	Probability of moving out				
	Panel A. Refugees moving out from assignment region (mean: 0.252)				
MSA	0.100	0.093	0.109	0.100	0.184
	(0.056)	(0.056)	(0.054)	(0.052)	(0.050)
MSA × Threat	0.078	0.043	0.022	0.004	-0.010
	(0.032)	(0.039)	(0.039)	(0.037)	(0.035)
Person-Year observations	12,334	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691	6,691
R2 adjusted	0.009	0.012	0.074	0.156	0.355
Individual controls	Yes	Yes	Yes	Yes	Yes
Fixed Effects					
Federal-State	No	No	Yes	No	No
NUTS-2	No	No	No	Yes	No
District	No	No	No	No	Yes
Survey year	Yes	Yes	Yes	Yes	Yes
District controls × survey year	No	Yes	Yes	Yes	Yes
	Panel B. Locals moving between survey years (mean: 0.012)				
Refugee share	0.024	-0.383	-0.260	-0.285	
	(0.113)	(0.296)	(0.296)	(0.294)	
Refugee share × Threat	0.036	-0.079	-0.086	0.006	
	(0.072)	(0.203)	(0.193)	(0.203)	
Refugee share × Threat		0.020			
× Impact refugees on economy		(0.028)			
Refugee share × Threat			0.020		
× Impact refugees on cultural life			(0.025)		
Refugee share × Threat				0.005	
× Impact refugees on Germany as place to live				(0.030)	
Person-Year observations	113,711	33,234	33,234	33,234	
Person observations	30,073	21,266	21,266	21,266	
R2 adjusted	0.017	0.023	0.023	0.023	
Individual controls	Yes	Yes	Yes	Yes	
Fixed Effects					
District	Yes	Yes	Yes	Yes	
District controls × survey year	Yes	Yes	Yes	Yes	

Notes: In Panel A, the sample consists of 6,691 refugees for a total of 12,334 refugee-year observations. The dependent variable is a dummy indicating whether the respondent lives at the time of the interview in a region different from the region of assignment. In Panel B, the sample consists of 30,073 locals for a total of 113,711 local-year observations for years 2013-2018. The dependent variable is a dummy indicating whether the respondent moved out of the region the year following the observation. MSA refers to months since arrival. Refugee share, in percent, is the refugee share in the district population, measured on December of the year prior to the interview. Threat is the threat index described in the text, and is z-standardized within each model. Locals' assessment of refugees measured in survey years 2016 and 2018. In Panel A, all regressions include dummies for missing control variables and survey year, and individual controls (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival). Column 2 adds the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Columns 3, 4 and 5 add federal state, NUTS-2 region, and district fixed effects. In Panel B, all regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, highest education among 4 categories, and migration background: none, indirect, 5 years ago or less, 6-10 years, more than 10 years), district fixed effects, and the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Standard errors, in parentheses, are clustered at the person-level.

Table B.5. Probability of panel attrition: Threat and cultural similarity (CS)

	(1)	(2)	(3)	(4)	(5)
	Probability of attrition (mean: 0.347)				
MSA	0.151	0.149	0.156	0.155	0.156
	(0.061)	(0.061)	(0.061)	(0.061)	(0.061)
CS		1.007		1.006	1.077
		(1.321)		(1.321)	(1.320)
MSA × CS		-0.006		-0.006	-0.007
		(0.046)		(0.046)	(0.045)
MSA × Threat			0.057	0.055	0.057
			(0.054)	(0.054)	(0.054)
Threat × CS					-0.188
					(1.308)
MSA × Threat × CS					-0.015
					(0.047)
Person-Year observations	8,643	8,643	8,643	8,643	8,643
Person observations	6,331	6,331	6,331	6,331	6,331
R2 adjusted	0.073	0.074	0.074	0.074	0.073
Individual controls	Yes	Yes	Yes	Yes	Yes
Fixed Effects					
District	Yes	Yes	Yes	Yes	Yes
District controls × survey year	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of 6,331 refugees for a total of 8,643 refugee-year observations. The dependent variable is a dummy equal to one if the refugee dropped out of the survey in the next year. MSA refers to months since arrival. CS is the cultural similarity index. Threat is the threat index described in the text. See Table A.16 for the definition of mediators. Threat and cultural similarity are z-standardized within each estimated model. The table presents: i) the effect of months since arrival alone on attrition (column 1); ii) the effect of its interactions with cultural similarity index and threat index, separately and together (columns 2, 3, and 4); and iii) the triple interaction of months since arrival, threat index and cultural similarity index (column 5). All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival), district fixed effects, and the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Columns 2, 5 and 5 control for dummies for the composition of questions included in the cultural similarity index. Standard errors, in parentheses, are clustered at the person-level.

Table B.6. Cultural assimilation: Alternative index

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Euclidean Canberra index (mean: -0.352)					
MSA	0.023	0.024	0.027	0.029	0.028	0.029
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
MSA × Threat						0.008
						(0.005)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691	6,691	6,691
R2 adjusted	0.205	0.211	0.239	0.244	0.264	0.264
	Panel B: Herfindahl index (mean: 0.704)					
MSA	-0.007	-0.010	-0.008	-0.006	-0.008	-0.007
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
MSA × Threat						0.007
						(0.005)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691	6,691	6,691
R2 adjusted	0.272	0.278	0.296	0.310	0.314	0.315
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects						
Federal-State	No	No	Yes	No	No	No
NUTS-2	No	No	No	Yes	No	No
District	No	No	No	No	Yes	Yes
District controls × survey year	No	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of 6,691 refugees for a total of 12,334 refugee-year observations. The dependent variable is the Canberra (resp. Herfindahl) cultural similarity index in Panel A (resp. Panel B). MSA refers to months since arrival. Threat is the threat index described in the text, and is z-standardized within each model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, for the composition of questions included in the cultural similarity index, and individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival). Column 2 adds interaction between year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Columns 3, 4, and 5 add respectively federal state, NUTS-2 region, and district fixed effects to the specification of column 2. Column 6 includes the interaction between months since arrival and the standardized threat index. Standard errors, in parentheses, are clustered at the person-level.

Table B.7. Cultural assimilation: Alternative definitions

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A. Cultural similarity index, 12-components (mean: -1.740)					
MSA	0.103	0.098	0.099	0.109	0.113	0.118
	(0.030)	(0.032)	(0.031)	(0.030)	(0.031)	(0.031)
MSA × Threat						0.059
						(0.023)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691	6,691	6,691
R2 adjusted	0.229	0.234	0.259	0.265	0.288	0.288
	Panel B. Cultural similarity index, native-born only (mean: -1.900)					
MSA	0.085	0.081	0.101	0.120	0.127	0.135
	(0.041)	(0.043)	(0.042)	(0.041)	(0.042)	(0.042)
MSA × Threat						0.078
						(0.032)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691	6,691	6,691
R2 adjusted	0.336	0.339	0.360	0.365	0.384	0.384
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects						
Federal-State	No	No	Yes	No	No	No
NUTS-2	No	No	No	Yes	No	No
District	No	No	No	No	Yes	Yes
District controls × survey year	No	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of 6,691 refugees for a total of 12,334 refugee-year observations. The dependent variable is the 12-component cultural similarity index (resp. the cultural similarity index to native-born Germans only) in Panel A (resp. Panel B). MSA refers to months since arrival. Threat is the threat index described in the text, and is z-standardized within each model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, for the composition of questions included in the cultural similarity index, and individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival). Column 2 adds interaction between year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Columns 3, 4, and 5 add respectively federal state, NUTS-2 region, and district fixed effects to the specification of column 2. Column 6 includes the interaction between months since arrival and the standardized threat index. Standard errors, in parentheses, are clustered at the person-level.

Table B.8. Cultural assimilation: Measuring locals' preference at endline

	(1)	(2)	(3)	(4)	(5)	(6)
	Cultural similarity index					
	Panel A. Local culture measured at baseline (mean: -1.905)					
MSA	0.081	0.076	0.094	0.113	0.118	0.125
	(0.040)	(0.042)	(0.041)	(0.041)	(0.042)	(0.042)
MSA × Threat						0.075
						(0.032)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691	6,691	6,691
R2 adjusted	0.344	0.347	0.368	0.374	0.392	0.392
	Panel B. Local culture measured at endline (mean: -1.892)					
MSA	0.101	0.096	0.110	0.126	0.125	0.135
	(0.038)	(0.039)	(0.038)	(0.038)	(0.039)	(0.039)
MSA × Threat						0.111
						(0.029)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334
Person observations	6,691	6,691	6,691	6,691	6,691	6,691
R2 adjusted	0.367	0.369	0.387	0.392	0.410	0.410
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects						
Federal-State	No	No	Yes	No	No	No
NUTS-2	No	No	No	Yes	No	No
District	No	No	No	No	Yes	Yes
District controls × survey year	No	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of 6,691 refugees for a total of 12,334 refugee-year observations. The dependent variable is the cultural similarity index, where local culture is measured at baseline in Panel A (identical to the main specification), and at endline in Panel B. MSA refers to months since arrival. Threat is the threat index described in the text, and is z-standardized within each model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, for the composition of questions included in the cultural similarity index, and individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival). Column 2 adds interaction between year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Columns 3, 4, and 5 add respectively federal state, NUTS-2 region, and district fixed effects to the specification of column 2. Column 6 includes the interaction between months since arrival and the standardized threat index. Standard errors, in parentheses, are clustered at the person-level.

Table B.9. Refugee inflows and changes in local culture

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Risk preference	Negative reciprocity	Positive reciprocity	Leisure, Cultural activity	Politics interest	Locus of control	Trust	Egoistic-altr. society
	Panel A. Refugee share only							
Refugee share	-0.300	-4.244	-6.864	2.010	1.314	0.801	-1.015	-1.256
	(0.545)	(5.293)	(5.889)	(1.116)	(0.467)	(5.450)	(1.273)	(1.433)
	[0.990]	[0.990]	[0.960]	[0.911]	[0.564]	[0.990]	[0.990]	[0.990]
Person-Year observations	205,833	36,197	36,229	40,437	198,992	34,894	40,980	39,832
Person observations	48,860	28,950	28,954	30,453	48,378	27,964	29,521	28,944
R2 overall	0.011	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	Panel B. Refugee share and interaction with threat							
Refugee share	0.116	-4.219	-6.877	1.672	1.421	0.801	-1.094	-1.897
	(0.558)	(5.292)	(5.889)	(1.145)	(0.479)	(5.450)	(1.299)	(1.459)
	[0.990]	[0.980]	[0.980]	[0.970]	[0.584]	[0.990]	[0.980]	[0.970]
Refugee share × Threat	-1.180	5.604	-4.381	0.861	-0.292	3.504	0.236	2.014
	(0.339)	(3.659)	(4.069)	(0.658)	(0.289)	(3.742)	(0.774)	(0.863)
	[0.465]	[0.970]	[0.980]	[0.97]	[0.980]	[0.980]	[0.980]	[0.841]
Person-Year observations	205,833	36,197	36,229	40,437	198,992	34,894	40,980	39,832
Person observations	48,860	28,950	28,954	30,453	48,378	27,964	29,521	28,944
R2 overall	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects								
District	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District controls × survey year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of 48,860 locals for a total of 205,833 local-year observations. The dependent variables are the dimensions of the cultural similarity index detailed in Table A.3, and are z-standardized within each model. Refugee share refers to percent share of refugees at district level measured on December 31 of they year prior to the interview. Threat is the threat index described in the text, and is z-standardized within each model. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, highest education among 4 categories, and migration background: none, indirect, 5 years ago or less, 6-10 years, more than 10 years), district fixed effects, and the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. P-values, shown in brackets, are adjusted for multiple hypotheses testing by controlling the familywise error rate (FWER) using the Romano-Wolf procedure (Clarke et al., 2020; Romano & Wolf, 2016, 2005a,b). Standard errors, in parentheses, are clustered at the person-level.

Table B.10. Robustness checks: Conley standard errors and further checks

	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline	Cluster district	Conley standard errors			
			Spatial: distance 33.15 km	Spatial: distance 66.30 km	Network: direct neighbor	Network: neighbor of neighbor
	Panel A. Cultural similarity index (mean: -1.905)					
MSA	0.125	0.125	0.125	0.125	0.125	0.125
	(0.042)	(0.050)	(0.047)	(0.042)	(0.048)	(0.047)
MSA × Threat	0.075	0.075	0.075	0.075	0.075	0.075
	(0.032)	(0.045)	(0.043)	(0.040)	(0.041)	(0.044)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334
Person observations (clusters)	6,691	354	6,691	6,691	6,691	6,691
R2 adjusted	0.392	0.392	0.412	0.412	0.412	0.412
	Panel B. Refugees' relative employment (mean: -0.504)					
MSA	0.772	0.772	0.818	0.818	0.818	0.818
	(0.042)	(0.044)	(0.046)	(0.045)	(0.046)	(0.048)
MSA × Threat	0.016	0.016	0.016	0.016	0.016	0.016
	(0.032)	(0.039)	(0.038)	(0.040)	(0.033)	(0.036)
Person-Year observations	12,334	12,334	12,334	12,334	12,334	12,334
Person observations (clusters)	6,691	354	6,691	6,691	6,691	6,691
R2 adjusted	0.195	0.195	0.221	0.221	0.221	0.221
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects						
District	Yes	Yes	Yes	Yes	Yes	Yes
District controls X survey year	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of 6,691 refugees for a total of 12,334 refugee-year observations. The dependent variable is the cultural similarity index (resp. refugees' relative employment) in Panel A (resp. Panel B). MSA refers to months since arrival. Threat is the threat index described in the text. See Table A.16 for the definition of mediators. Threat and mediators are z-standardized within each estimated model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival), district fixed effects, and the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Panel A always controls for dummies for the composition of questions included in the cultural similarity index. Standard errors, in parentheses, are: i) clustered at the person-level (column 1); ii) clustered at the district-level (column 2); iii) Conley standard errors allowing correlation between districts whose border are less than 33.15 km (resp. 66.30 km) away (column 3, resp. column 4); and iv) Conley standard errors allowing correlation with neighboring districts (resp. neighboring districts and neighbors of neighbors) in column 5 (resp. column 6).

Table B.11. Additional robustness checks

	(1)	(2)	(3)	(4)	(5)
Robustness check	Baseline	East Germany × survey year	Origin country group × survey year	Origin country distance × survey year	Exclude outliers (1-99 pctile)
	Panel A. Cultural similarity index (mean: -1.905)				
MSA	0.125	0.126	0.134	0.128	0.083
	(0.042)	(0.042)	(0.042)	(0.042)	(0.040)
MSA × Threat	0.075	0.083	0.072	0.073	0.074
	(0.032)	(0.035)	(0.032)	(0.032)	(0.030)
Person-Year observations	12,334	12,334	12,334	12,333	11,991
Person observations (clusters)	6,691	6,691	6,691	6,690	6,613
R2 adjusted	0.392	0.392	0.393	0.392	0.354
	Panel B. Refugees' relative employment (mean: -0.504)				
MSA	0.772	0.772	0.772	0.775	0.761
	(0.042)	(0.042)	(0.042)	(0.042)	(0.042)
MSA × Threat	0.016	0.008	0.012	0.015	-0.009
	(0.032)	(0.035)	(0.032)	(0.032)	(0.032)
Person-Year observations	12,334	12,334	12,334	12,333	11,991
Person observations (clusters)	6,691	6,691	6,691	6,690	6,613
R2 adjusted	0.195	0.195	0.197	0.195	0.190
Individual controls	Yes	Yes	Yes	Yes	Yes
Fixed Effects					
District	Yes	Yes	Yes	Yes	Yes
District controls × survey year	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of 6,691 refugees for a total of 12,334 refugee-year observations. The dependent variable is the cultural similarity index (resp. refugees' relative employment) in Panel A (resp. Panel B). MSA refers to months since arrival. Threat is the threat index described in the text. See Table A.16 for the definition of mediators. Threat and mediators are z-standardized within each estimated model. Positive coefficients indicate a reduction in distance to locals. Coefficients and standard errors are multiplied by 100 for presentation. All regressions include dummies for missing control variables, individual characteristics (gender, age, age squared, kids born before arrival in Germany living in the household, country of origin, marital status and location of partner as well as work experience and education upon arrival), district fixed effects, and the interaction of year dummies and district controls (unemployment rate, share of refugees and population density), all measured in December 2012. Panel A always controls for dummies for the composition of questions included in the cultural similarity index. Column 1 presents the baseline regression (column 6 of Table 2). Column 2 clusters standard errors at the district level. Columns 3, 4, and 5 add interactions between year dummies and, respectively: East Germany; origin country groups (Syria, Afghanistan, Iraq, Iran, Africa, Western Balkans, former USSR, Eritrea and other) and the distance between the origin country and the district. Column 5 excludes outliers, defined as observations where either the cultural similarity index or the relative employment is within the top or bottom 1%. Standard errors, in parentheses, are clustered at the person-level.

Appendix C: Additional Datasets

C.1 Administrative Data

As explained in the main text, we take advantage of a novel feature of the refugee survey, which allows us to link individual respondents to administrative data on daily employment and wages (Keita & Trübswetter, 2020). If informed consent for record linkage is obtained from respondents, the person-survey-ID is connected to social security records as part of the Integrated Employment Biographies (IEB) dataset of the Institute for Employment Research (IAB). The IEB are daily accurate spell data on employment (marginal and subject to social security), receipt of social benefits, registered job search, and participation in training measures (all through the Federal Employment Agency).[55] We can only link refugees that are dependently employed and not public servants. According to the official IAB data report by Keita & Trübswetter (2020), 84% of all respondents gave their consent to data linkage and about 60% (over 70% of those who had consented) could be linked. In our data, we end up with a linked sample of 7,618 refugee-year observations from 3,914 refugees (87% of individuals that were linked by Keita & Trübswetter, 2020).

This dataset is used to compute alternative measures of economic assimilation (relative employment and relative wages to local population) for the record linkage sample. These measures help us address potential concerns about misreporting of employment or wages in the survey sample. We also retrieve the share of foreigners (non-German citizens) working in the company where refugees are employed the day of the survey.[56]

C.2 Twitter Data

To measure the possible pro-refugee attitudes prevailing among locals, we rely on Twitter data. We scrape the universe of German-language tweets and retweets containing the hashtag *#refugeeswelcome* (the most common pro-refugee hashtag on Twitter in Germany) posted between January 2013 and December 2018.[57] Following the existing literature (Hatte et al., 2021; Fujiwara et al., 2021; Müller & Schwarz, 2020), we use the location indicated by users in their profile (when available) to map tweets to NUTS-2

[55]The IEB includes employees that are compulsorily registered for health, pension and statutory nursing care insurance. Also included are trainees and interns. Civil servants, self-employed persons, family workers, and soldiers and people in military or alternative service are excluded.

[56]The share of foreigners in the firm refers to June-30 of the survey year. This information is provided by Keita & Trübswetter (2020) in a separate enterprise file that can be merged based on the identifier of the company.

[57]The data were downloaded from https://developer.twitter.com/en/products/twitter-api/academic-research.

regions. More precisely, we compare the location to a large dataset of existing locations provided by the website Openstreetmap.org to obtain coordinates for the location.[58] We then exclude tweets: 1) whose users do not provide a valid location (e.g., "Narnia"); 2) that map to a location outside Germany; and, 3) that map to an area larger than a NUTS-2 region. We then assign each tweet to a NUTS-2 region, collecting a total of 387,000 tweets. We could localize 182,000 (47%) of them in a NUTS-2 region.

Since scraping was conducted in September 2021, our dataset may differ from the one that would have been obtained by scraping the tweets during the period of interest. This can be for at least two reasons. First, we are only able to obtain tweets from users with active accounts, implying that we cannot measure tweets of users that deleted their account. Second, users may have changed their location between the time they tweeted about refugees and the time we scraped the data. In this case, we would locate the tweet at the new location of the user.[59]

In order to account for local Twitter penetration, we additionally collect a measure of Twitter usage for each NUTS-2 region in each year from 2013 to 2018. We sample 2 million tweets by selecting 20,000 random instants during this period and by collecting 100 tweets and retweets in German at each instant.[60] We locate tweets using the geographic information provided by the users. This gives us an estimate of the rate of tweets posted at each instant from each region (expressed as tweets per second), which is then aggregated at the region-year level. To proxy for the number of Twitter users in a NUTS-2 region, we instead rely on the number of users observed in the sample of tweets we collected at random instants.

In Appendix D, we use these data to define as dependent variable the number of tweets and retweets containing the hashtag *#refugeeswelcome* in a NUTS-2 region in each year: *i*) in levels; *ii*) scaled by 100,000 residents.[61] In addition, we define the number of tweets and retweets containing the hashtag *#refugeeswelcome* in a NUTS-2 region in each year both as a share of all tweets and scaled by the number of users.[62]

[58] This step was performed using the geocoding engine https://nominatim.org/.

[59] Similarly, users may have changed their profile or their stated (previously accurate) location to an invalid location.

[60] Since the Twitter API does not allow to search directly for all tweets in German, we search for tweets containing the 100 most frequent words in German, as listed by Sharoff (2006) on the website http://corpus.leeds.ac.uk/frqc/.

[61] See Table A.6 (Panel C) for the summary statistics.

[62] In a placebo exercise, we also use the number of tweets and the number of users separately.

C.3 NGO Dataset

To the best of our knowledge, no exhaustive dataset with information about the presence of NGOs across German NUTS-2 regions over time exists. We instead use the website *Refugeeswelcomemap.de* to collect the (time-invariant) number of NGOs in a region.[63] Importantly, the NGOs listed there include only organizations that offer assistance services to refugees. Since postal codes determine the relevant NUTS code, we scrape the website and use geo-coordinates of NGOs to allocate the latter across German NUTS-2 regions. Using this approach, we compiled a list of 1,000 NGOs located in Germany, which offered a variety of services (or, initiatives).

For each NGO, we could retrieve the following information: geographic location, contact information, and a two-level classification system for the type of services offered. The first level of such classification has four categories, which broadly group assistance services of the NGO into: *i*) Bureau/agency, public institution; *ii*) organizations for refugee aid or integration; *iii*) topic; and, *iv*) other. Each category is further divided in more detailed groups, in a second layer of classification. We do not cut the data across categories since, especially for initiatives in the second layer, definitions are often too specific to be considered separately. Instead, we count the number of initiatives (or, services) offered by each NGO. In total, our dataset includes 4,356 initiatives (or, about 4.3 initiatives per NGO, on average).

According to the website, the list of initiatives refers to the year 2017. We thus take it as an approximate snapshot of the presence and activity of pro-refugee NGOs in a NUTS-2 region as of 2017. The dataset does not include the date of establishment, and we acknowledge that the list we were able to obtain is probably non-exhaustive. Nevertheless, we use this dataset in Appendix D to complement the survey analysis presented in the main paper and the results obtained from Twitter data (also presented in Appendix D).

In particular, we define as dependent variable the number of NGO-led initiatives, and the number of NGO-led initiatives per 100,000 residents in a NUTS-2 region. Summary statistics for both variables are presented in Panel C of Table A.6.

[63] The exact link used is: http://refugeeswelcomemap.de/deutschland/. The data was last accessed in September 2021.

Appendix D: Additional Results

D.1 Additional Evidence on Counter-mobilization

As explained in the main text, it is possible that the stronger hostility prevailing in high-threat regions led some locals and non-profit organizations to coordinate efforts to facilitate the cultural integration of refugees. We already documented that no evidence emerges for such hypothesis from survey data (Table 8, columns 4 to 6). We now provide additional, suggestive evidence against pro-refugee activism in regions with higher threat.

In Table D.1, we estimate region-level regressions that include region fixed effects, interactions between year dummies and 2012 regional controls (unemployment rate, population density, and refugee share of the population), the refugee share of the population, and its interaction with the threat index.

In columns 1 and 2, the dependent variable is the number of #refugeeswecolme tweets and the number of #refugeeswecolme tweets per 100,000 residents defined in Appendix C. Refugee inflows are positively correlated with the frequency of pro-refugee tweets. However, the coefficient on the interaction term is negative and, in column 2, marginally significant, indicating that, if anything, refugee inflows are associated with fewer pro-refugee tweets in regions characterized by a higher threat index. Columns 3 and 4 replicate the analysis scaling the number of #refugeeswecolme tweets and re-tweets by the number of tweets and the number of users in a region-year, respectively. Also in this case, results are noisy and the coefficient on the interaction term is negative. In columns 5 and 6, we conduct a placebo check and show that the inflow of refugees is not associated with more (or less) Twitter activity or users in more threatening regions.[64]

We corroborate this evidence by estimating simple cross-sectional regressions that correlate the number of NGO-led initiatives (column 7) and the number of NGO-led initiatives per 100,000 residents (column 8) in a region with the share of refugees and its interaction with the threat index.[65] The coefficient on the refugee share is negative but not statistically significant for the total number of NGO-led initiatives. The coefficient on the interaction is also negative and, again, imprecisely estimated. In column 8, there is no correlation between the refugee share and the number of NGO-led initiatives per 100,000. However, as for tweets, the coefficient on the interaction term is negative. Moreover, it is also quantitatively large and precisely estimated. Given the cross-sectional nature of

[64] In unreported analysis, we also verified that results were similar when considering the overall number of tweets per user.

[65] Regressions also include the uninteracted threat index and control for the 2012 unemployment rate, population density, and refugee share of the population.

this analysis, we interpret results as merely suggestive.

Overall, despite its suggestive nature, the evidence provided in this section does not indicate any pattern of stronger pro-refugee activism among locals living in regions with a higher threat index.[66]

[66]Note, however, that we cannot rule out the possibility that such activism might have emerged through channels other than those measured here.

Table D.1. Locals' counter-mobilization: Twitter and NGO presence

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	#RefugeesWelcome tweets and retweets				Total number	Number of	NGO-led initiatives	
	Number	Per 100,000 people	Per tweets in NUTS-2 region	Per user	of tweets	Twitter users	Number	Per 100,000 people
Refugee share	285.244	3.712	-0.001	-0.058	-173,950	-141.879	-5.977	0.119
	(303.214)	(6.601)	(0.008)	(0.172)	(153,905)	(115.599)	(7.829)	(0.315)
Refugee share × Threat	-19.958	-2.969	-0.002	-0.047	-33,681	-28.439	-2.108	-0.304
	(36.047)	(1.640)	(0.001)	(0.029)	(31,081)	(23.206)	(2.441)	(0.125)
NUTS-2-Year observations	150,552	150,552	150,552	150,552	150,552	150,552		
NUTS-2 observations	38	38	38	38	38	38	38	38
R2 adjusted	0.930	0.917	0.885	0.901	0.996	0.996	0.724	0.691
Dep. var. mean	677.649	28.954	0.031	0.699	1.89e+06	876.022	14.974	0.679
Fixed Effects								
NUTS-2	Yes	Yes	Yes	Yes	Yes	Yes	No	No
NUTS-2 controls × survey year	Yes	Yes	Yes	Yes	No	No	No	No

Notes: The sample consists of i) NUTS-2-year observations for years 2013 to 2018 (columns 1 and 2), and ii) NUTS-2 observations (columns 3 and 4). Column 1 (resp. column 2) presents the number of tweets and retweets in German (resp. per 100 000 people) posted that year by users located in the NUTS-2 region and containing the hashtag #RefugeesWelcome. Column 3 (resp. column 4) presents the share of tweets and retweets containing "#RefugeesWelcome" among all tweets and retweets in a NUTS-2 region (resp. divided by a proxy for the number of Twitter users in the region). Column 5 (resp. column 6) present the total number of all tweets (resp. a proxy for distinct users) in a NUTS-2 region. Column 7 (resp. column 8 presents the number of NGOs assisting refugees (resp. per 100 000 people). The construction of these variables is detailed in Appendix C. Refugee share refers to percent share of refugees at district level measured on December 31 of they year prior to the interview. Threat is the threat index described in the text, and is z-standardized within each model. Columns 1 to 4 include NUTS-2 fixed effects, and the interaction of survey year dummies and NUTS-2 controls (unemployment rate, share of refugees and population density), all measured in December 2012. Columns 5 and 6 only control for threat level. Standard errors, in parentheses, clustered at at the NUTS-2 region-level.