

THE SOCIAL INTEGRATION OF INTERNATIONAL MIGRANTS: EVIDENCE FROM THE NETWORKS OF SYRIANS IN GERMANY *

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Abstract

We use Facebook data to study Syrian migrants' social integration in Germany, establishing five findings: (1) Migrants' social integration varies across regions, driven by causal, place-based effects. (2) This spatial variation reflects both how frequently Germans befriend neighbors and how likely they are to befriend migrants versus other Germans. Using a mover's design, we show that both factors are shaped more by local institutions and policies than by persistent native characteristics. (3) Integration courses boost inter-group friending rates. (4) Migrants receive help from Germans, such as finding jobs or housing. (5) Germans quasi-randomly exposed to migrants in high school are likelier to befriend migrants later.

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In 2019, there were 272 million international migrants, comprising 3.5% of the world's population (United Nations, 2019). The challenge of fostering communities that successfully integrate new arrivals with natives has therefore become of increasing importance to policymakers around the globe (e.g., European Commission, 2020; Bundesregierung, 2021). Yet, because of difficulties with measuring social networks using traditional data sources, researchers have long struggled to understand the determinants of the social integration of migrants in their host communities.

In this paper, we use privacy-protected data from Facebook, a global online social networking service, to study the social integration of newly arriving migrants. We focus on individuals who recently migrated from Syria to Germany. Following the start of the Syrian Civil War, millions of Syrians fled their home country, with about 800,000 of them settling in Germany since 2014. The social and economic integration of these migrants has been a dominant political issue in Germany in the years since, with policymakers attempting to facilitate this integration through a variety of programs. In 2018 alone, for example, the German government spent €2bn on integration courses that teach migrants the German language and provide information on the country's culture and legal system.

While prior work studies the *economic* integration of Syrians in Germany—with a special focus on assessing attempts to bring them into the labor force—data challenges have hindered empirical studies of the *social* integration of these migrants. How common are social interactions between Syrian migrants and Germans?¹ How does this frequency differ across demographics and locations? Which Germans form social ties with Syrians? Can local policies affect this? And does social integration affect migrants' economic outcomes? Our unique data and research design allow us to answer these questions.

We begin by identifying Syrian migrants as Facebook users who currently live in Germany, but who specified a hometown or high school in Syria in their Facebook profiles, or who previously had a predicted home region in Syria.² This methodology generates spatial variation in Syrian migrant population shares across German counties (*Kreise*) that closely resembles German administrative data. We also construct a group of users we call “German natives” based on self-reported profile information, home region predictions,

¹While there is no single definition of social integration, the concept is often defined by the frequency of interactions of individuals of different groups (e.g., Phillips et al., 2019). This conceptualization of “social integration” is distinct from that of *assimilation* (Berry, 1997), which is defined in terms of cultural identity, and is not the focus of our work.

²Estimated home region is determined by a person's information on Facebook, including the stated city on their Facebook profile, and device and connection information (see also Herdagdelen et al., 2016; Chi et al., 2019).

and German language usage.³ We use these data to measure Syrian migrants' social integration along three key dimensions: (i) friendships between migrants and German natives; (ii) migrants' German language usage; and (iii) migrants' participation in local social groups.

Syrian migrant users have five local German native friends on average, and 30% of them produce German-language content such as posts or comments on Facebook. Controlling for Facebook usage patterns, younger and male migrants have higher levels of social integration than others. Our measures of social interactions in the Facebook data strongly correlate with individual responses to a recent Facebook survey asking Syrian migrants about their interactions with German natives, suggesting that they do, in fact, represent real-world integration outcomes.

We structure our results around five key lessons from this migration episode. We next briefly describe each lesson and our empirical evidence. In the paper, we provide further details.

Lesson I: *Places differ in their propensities to integrate migrants. The substantial spatial variation in Syrian migrant integration outcomes in Germany largely reflects causal place-based effects.*

We document sizable spatial heterogeneity in Syrian migrants' social integration across the 401 German counties: an average Syrian migrant living in a 90th percentile county has more than twice as many native German friends as an average Syrian migrant living in a 10th percentile county. These spatial patterns are highly correlated across our three measures of social integration. We show that these measures pick up true differences in integration levels rather than sampling variation or differences in Facebook usage across space; for example, we show that average observed integration outcomes align with external survey measures of integration available at higher levels of geographic aggregation (complementing our own individual-level survey evidence described above).

The German government assigns migrants to locations to ensure dispersion throughout the country, suggesting the observed spatial differences might at least be partly driven by causal place-based effects rather than primarily being the result of migrants with higher integration propensities selecting to live in certain regions. We further test this hypothesis with a mover research design that follows the (relatively few) Syrian migrants who move across German counties. We find that these movers' social integration patterns quickly adjust from those of their origin counties toward those of their destination

³We describe these criteria in detail in Appendix 2. When constructing both the "Syrian migrant" and "German native" samples, we define the sample of users on the basis of past location and language usage. Broadly speaking, our sample of Syrians comprises users who appear to have lived in Syria and who now live in Germany, while our sample of Germans comprises users who appear to have lived in Germany for an extended period and exclusively or primarily use the German language.

counties. This variation allows us to estimate that most of the observed regional differences in migrants' social integration are indeed due to causal place-based factors rather than migrant characteristics, consistent with prior work exploiting the random assignment of refugees in other countries (e.g., Auer, Egger and Kunz, 2022; Edin, Fredriksson and Åslund, 2003; Beaman, 2012; Damm, 2014).

Lesson II: *Spatial variation in migrant social integration can be decomposed into the rate at which natives befriend their neighbors in general and the particular rate at which they befriend migrants. Both forces vary across space, and both are largely influenced by local equilibria rather than spatial differences in immutable native preferences.*

Data challenges and the lack of random assignment of natives to locations have precluded prior attempts to estimate the importance of immutable native preferences in explaining variation in migrants' integration outcomes. Our unique panel data on the characteristics and behaviors of Germans who befriend Syrians allows us to make progress on this important question.

We begin by showing that the level of Syrians' social integration in a location can be decomposed into two forces: (i) the rate at which local Germans befriend their neighbors in general (their *general friendliness*), and (ii) Germans' particular friending behavior towards migrants, given by their relative propensity of befriending local Syrians versus other locals (*relative friending*). Put simply, if Germans in a given location are more likely to befriend *all* of their neighbors, including their German ones, they are also more likely to befriend newly arriving migrants. All else equal, this aids migrants' social integration, even if the level of general friendliness is unlikely to be strongly affected by migrants' behavior or integration policies. In addition, Syrian migrants will be more socially integrated when Germans befriend them at rates more similar to those at which they befriend local Germans. We show that both general friendliness and relative friending vary across locations, with differences in relative friending explaining about two-thirds of the spatial variation in the social integration of Syrian migrants.

We next explore whether spatial differences in relative friending and general friendliness are driven by immutable preferences of the populations of local natives (e.g., if Germans in some regions happen to have a persistently friendlier disposition towards foreigners) or by place-specific factors that would shift the same Germans' friending behavior if they were to move. Our analysis shows that place-specific factors such as local policies, institutions, or social equilibria play a dominant role in explaining Germans' social behaviors towards migrants, and thus the spatial variation in migrant integration outcomes.

To document this, we follow the friending behavior of Germans who move across

locations. Native movers adjust their general friendliness about two-thirds of the way to that of comparable destination natives within a year of moving; their relative friending adjusts almost fully to that of destination natives. These findings highlight that Syrian migrants' lack of integration in some locations is not primarily the result of immutable preferences or beliefs of the native locals. Instead, our results show that the probability of the same two individuals—the same German and the same Syrian—becoming friends varies substantially with the institutional frameworks or the prevailing social equilibria across locations.

Lesson III: *Integration courses can causally affect place-specific equilibrium integration levels. The availability of these courses for Syrian migrants shifted the relative rates of German-Syrian friendships.*

To understand the factors that shape regional variation in social integration, we next explore the relationships of both general friendliness and relative friending with county-level characteristics. These correlations can be informative about the mechanisms that drive migrants' integration outcomes even as they capture equilibrium relationships that complicate assigning a direction of causality. As we show, the correlational analysis can also help identify factors that merit further causal study.

We highlight three findings. First, similar to ethnographic work on integration in smaller European towns and cities (Gauci, 2020), we find that migrants' social integration decreases with population density. This is driven both by Germans in cities being less likely to befriend any of their neighbors—consistent with work exploring the “loneliness of cities” (Hammoud et al., 2021)—and by Germans in cities being particularly unlikely to befriend migrant neighbors, consistent with work showing that social segregation increases in group size (Chetty et al., 2022b). Second, the ‘relative friending’ component of integration decreases with a county's Syrian population share in 2019, but increases with the share that was Syrian in 2010. Earlier migrants may boost relative friending by supporting new arrivals and positively shaping local natives' views, whereas a large influx of migrants simultaneously may lead to the formation of migrant cliques and fewer migrant-native connections.⁴ Third, in counties with more completed integration courses per Syrian migrant, relative friending is higher, consistent with these courses potentially shifting equilibrium friending behaviors in a location.

Language and integration courses are among the few direct tools available to policymakers for fostering migrant social integration and have been a key component of

⁴This finding speaks to the “ethnic enclaves” literature that finds migrant networks support integration in some settings and hinder it in others (e.g. Lazear, 1999; Edin, Fredriksson and Åslund, 2003; Cutler, Glaeser and Vigdor, 2008; Beaman, 2012; Sale, 2021; Martén, Hainmueller and Hangartner, 2019).

German government policy. Motivated by our correlational result, we use an instrumental variables approach to study whether the provision of these courses had a *causal* effect on integration outcomes, contributing to a literature that has studied various government policies intended to integrate minority groups.⁵ Our instrument, the local availability of teachers qualified to teach these courses who were unemployed at the start of the Syrian migration wave, is correlated with the completion of integration courses, even after controlling for the overall unemployment rate and other county characteristics. This aligns with anecdotal evidence that the unavailability of qualified teachers substantially limited the government's ability to offer integration courses. We estimate that a 10% increase in 2015-19 integration course completion per Syrian (driven by higher course availability) raised friending integration by 18%. This effect comes entirely from raising Germans' rate of befriending Syrians in particular (i.e., by raising relative friending); as expected, Germans' general friendliness is unaffected by migrants' completion of integration courses.

Lesson IV: *Social integration appears to be an important channel of positive effects on migrants' labor market, housing, and education outcomes.*

While social integration is itself an important outcome for policymakers, social connections may also impact other aspects of migrants' well-being. For instance, a German native friend might help a migrant find employment or housing, assist with schooling, or provide guidance in accessing public services. Correlationally, the share of Syrian migrants employed increases with a county's friending integration, consistent with such a positive impact, but also with reverse causality.

To better understand the observed relationships between social connections and economic outcomes, we analyze responses to a short user survey fielded by Facebook that asked migrants about how native friends had impacted their experiences in Germany. We find that the number of local native friends is highly correlated with migrants' likelihood of reporting that such friends helped them find a job, secure housing, complete schoolwork, and navigate the bureaucracy. For example, a one standard deviation increase in local native friends corresponds to a 12.6% increase in the probability of reporting to have received job-finding assistance from a native German. While these results are correlational, the questions focus directly on *causal mechanisms* through which native friends help migrants, strongly supporting the notion that social integration positively affects other outcomes. These findings add to a literature on refugees' economic integration in

⁵See e.g., Abdelgadir and Fouka (2020); Abramitzky, Boustan and Eriksson (2020); Arendt et al. (2024, 2023); Bandiera et al. (2019); Battisti, Giesing and Laurentsyevea (2019); Fouka (2020); Heller and Slungaard Mumma (2023); Lleras-Muney and Shertzer (2015); Kanas and Kosyakova (2022); Emeriau et al. (Forthcoming).

high-income countries (see Becker and Ferrara, 2019; Brell, Dustmann and Preston, 2020, for overviews), highlighting social ties as an important determinant.

Lesson V: *Natives exposed to a migrant in high school are more likely to befriend other migrants later in life. Connections directly facilitated by the first migrant do not fully explain this effect.*

In the final section of the paper, we return to the determinants of natives' persistent friending behaviors and study the longer-term effects of exposure to Syrian migrants on subsequent friending patterns. Specifically, we use fluctuations in the presence of Syrian migrants across high school cohorts as a quasi-random source of variation of exposure to such migrants. We find that exposure to Syrian migrants in high school leads to higher probabilities of German natives befriendings Syrians even outside the high school setting, consistent with the contact hypothesis, which outlines the circumstances in which social contact between members of different groups can help to reduce prejudice and animosity (Allport, Clark and Pettigrew, 1954; Bursztyn et al., 2024; Boisjoly et al., 2006; Carrell, Hoekstra and West, 2019; Paluck, Green and Green, 2019; Rao, 2019; Corno, La Ferrara and Burns, 2022).

Contribution to Literature. Each of our five lessons offers new insights into the determinants and effects of migrants' social integration, a topic that has long been studied in social science research (e.g., Srole, 1956; Coleman, 1988; Putnam, 1995a; Alesina, Baqir and Easterly, 1999). Within this literature, our work relates most closely to studies that use surveys or assimilation-related measures to proxy for migrants' social integration. Laurentsyeve and Venturini (2017) provide a recent overview of this literature (see also Niehues, Rother and Siegert, 2021; Schmidt, Jacobsen and Krieger, 2020; Cheung and Phillimore, 2014). In contrast to these studies, we are able to directly measure key elements of migrants' social integration in large-scale data, allowing us to explore granular spatial variation in integration outcomes. Our unique panel data on the friending behaviors of both Germans and Syrians allows us to obtain a more holistic view on social integration, which, by its nature, depends on the behaviors of both migrants and natives. In particular, our ability to study the friending behavior of natives (and not just migrants) enables us to generate novel insights on the determinants of this integration.

We also add to a literature that uses experimental and quasi-experimental methods to study the causal effects of local environments on a variety of economic, social, and health outcomes (see Chyn and Katz, 2021, for a review). We believe we are the first to use a mover-based research design to study the effects of place on migrants' social integration, adding to existing evidence that is observational or relies on quasi-random refugee settlements (e.g. Åslund and Rooth, 2007; Damm, 2014; Braun and Dwenger, 2020; Aksoy,

Poutvaara and Schikora, 2023; Jaschke, Sardoschau and Tabellini, 2021; Sale, 2021). We also introduce the use of movers to study the effect of places on *native* rates of befriending migrants, highlighting that place-based effects are not primarily picking up fixed preferences of local natives.

The remainder of this paper is structured as follows. In Section 1 we describe our data, sample, and outcomes of interest. We also document overall patterns of social integration and the relationship of individual-level migrant and native characteristics with friending outcomes. In Section 2 we generate regional measures of social integration and use movers to study the extent to which they reflect place-based effects. Sections 3 and 4 focus on the roles of natives and local institutions, exploring the forces that make migrants more likely to integrate in one place versus another. Section 5 studies the effects of social integration on other real outcomes. Section 6 looks at how quasi-random exposure to migrants shapes natives’ long-term behavior. We conclude in Section 7.

1 Data and Descriptive Statistics

We work with privacy-protected data from the online social networking site Facebook. In March 2021, Facebook had over 2.8 billion monthly active users, including 423 million in Europe (Facebook, 2021). Facebook is used widely by Syrian migrants in Germany to share information and communicate with friends and family in Syria and elsewhere (Scheibe, Zimmer and Stock, 2019). Many individuals opened their Facebook accounts prior to arriving in Germany, while others likely created accounts during their migration, as Facebook was frequently cited as a tool used by refugees fleeing to Europe to share information (Dekker et al., 2018; Mall et al., 2015; Ritscher, 2016; Mustafa and Lamb, 2017).

Establishing a “friendship” connection on Facebook requires the consent of both parties, and a person can have at most 5,000 connections. As a result, Facebook connections are usually between individuals who interact in person (Jones et al., 2013). Facebook networks thus resemble real-world social networks more closely than networks on other online platforms where uni-directional links to non-acquaintances (e.g., celebrities) are common. As a result, prior studies have used Facebook data to explore the relationship between social connections and many economic and social outcomes such as trade flows, patent citations, travel flows, disease transmission, bank lending, social capital, social program participation, investment decisions, product adoption decisions, housing choices, migration decisions, and beliefs and behaviors related to public health (Bailey et al., 2018a,b, 2019, 2020a,b, 2021, 2022, 2024; Chetty et al., 2022a,b; Kuchler, Russel and Stroebe, 2021; Kuchler et al., 2022; Koenen and Johnston, 2024; Rehbein and Rother, 2025;

Wilson, 2019).

1.1 Sample Construction and Measures of Social Integration

We construct our primary sample from a sub-population of Facebook users who had active accounts in October 2021, were 18 or older, lived in Germany, and had 25 or more friends. Each user is predicted to live in one of 401 German districts (*Kreis*, *Landkreis*, or *Stadtkreis*), with an average population of just over 200,000.⁶ We refer to these geographies as “counties.”

Syrian Migrant & German Native Samples. For many of our analyses, we use two sub-samples.

1. *Syrian Migrant Sample:* We construct a set of users who specify a Syrian hometown or high school in their Facebook profile, or who previously had a predicted home region in Syria. There are about 350,000 such users, which we refer to as “Syrian migrants” (see footnotes 2 and 3 for details). In Appendix Figures A1 - A3, we compare the demographics and locations of our sample against the full corresponding population using administrative data from the Federal Statistical Office of Germany. Syrian migrant population shares across counties and age groups in our data closely correspond to those in the administrative data, highlighting that we observe Syrian and non-Syrian users at similar rates across demographics (though we somewhat over-sample male Syrians relative to their true population shares). For example, we find population-weighted correlations between county \times age \times gender shares in the Facebook sample versus actual population of 0.97.
2. *German Native Sample:* We also construct a group of users, which we refer to as “German natives”, who meet the criteria described in Appendix 2 based on self-reported profile information, home region predictions, and German language usage. We identify 18 million such users. The median county has 34,063 German native users; the 10th-90th percentile range is 17,057 to 74,651 German native users. Appendix Figure A4 benchmarks this sample against administrative data. The share of users in the primary Facebook sample that are natives is somewhat lower than the true population share, a result of our relatively strict assignment criteria. The German population shares in our data are also consistent with administrative data sources across county and gender, with population-weighted correlations of 0.94.

⁶These locations are assigned based on user information and activity on Facebook, including their self-reported profile information, and device and connection information.

Measures of Migrants’ Social Integration. We capture the social integration of Syrian migrants using three primary measures (see Appendix 3 for detailed definitions):

1. The number of native German friends a Syrian migrant user has in the same or a bordering county;
2. An indicator for whether the Syrian migrant user produces content such as Facebook posts and comments in German; and
3. How many local native Facebook groups (e.g., for local sport clubs or cultural societies) a Syrian migrant user joins.

1.2 Sample Summary Statistics

Panel (a) of Table 1 summarizes the Syrian migrant sample. The median Syrian migrant user is 31 years old, with a 10th-90th percentile range of 22 to 48 years. The sample is 32% female, somewhat lower than 40% in the administrative data. The median number of Facebook friends and groups joined is 226 and 56, respectively. The median user in the Syrian migrant sample first used Facebook in Germany 23 quarters ago. About 8% of Syrian migrants list a German college on their profile.

Syrian migrant users have five native local friends on average.⁷ This magnitude is broadly consistent with data from the German Socio-Economic Panel (SOEP), a longitudinal survey of German households. In the 2016 wave of the *IAB-BAMF-SOEP Survey of Refugees in Germany* the average recent Syrian migrant in Germany reported to have “regular contact” with 6.2 German acquaintances.⁸ By contrast, Syrian migrant users have 15 Facebook friendships with other Syrian migrants in the same location. About 30% of Syrian migrant users produce content on Facebook in German. At the median and 90th percentiles, Syrian migrant users are members of zero and two local native groups, respectively.

Appendix Figure A5 presents binned scatter plots showing relationships between our three primary integration outcomes—local native friends, German content production,

⁷Friendship requests between natives and Syrians are initiated at essentially equal rates by each group. On average, Syrians sent the friend request in 50.01% of their friendships with native local Germans.

⁸ The exact question asked by the SOEP is: “How many German people have you met since your arrival in Germany with whom you have regular contact?” The average responses reported in the text is based on responses from 1,095 survey respondents. If the roughly 1/3 of adult German natives we capture on Facebook were randomly selected, we might expect migrants in the SOEP to have on average $5.03 \times 3 \approx 15$ native friends. That the survey measure is somewhat lower may reflect differences in the survey timing (2016 vs 2021); respondents narrowly interpreting “regular contact” or failing to recall connections; and/or a higher propensity of migrants with Facebook accounts to friend natives with Facebook accounts.

and local native groups—at the individual level. There are strong positive relationships, both with and without controls for individual-level demographics and Facebook usage, providing evidence that our measures are capturing related and strongly correlated aspects of social integration (also see Appendix Tables A2 and A3).

Panel (b) of Table 1 summarizes the German native sample. The median user is 38 years old, with a 10th-90th percentile range of 24 to 60 years. The sample is 52% female and 33% of users list a German college on their profile. The median German native has a total of 181 Facebook friends, 79 local native friends, and 0.1 local Syrian migrant friends (users at the 99th percentile have two local Syrian migrant friends), highlighting that most German native users are not Facebook friends with a single Syrian migrant. German natives are members of four local native groups on average.

1.3 Survey Validation of Observational Integration Measures

To ensure our social integration measures capture meaningful in-person interactions, we analyze responses to a short user survey conducted by Facebook in May 2024. The survey targeted users in our Syrian migrant sample through a post on their News Feed. All questions were translated to the user’s preferred language on Facebook. Appendix 14 provides screenshots of the survey in English, German, and Arabic. In total, 3,413 individuals responded to the survey.⁹ The final column of Panel (a) of Table 1 shows the mean demographics of survey respondents. They generally align with the overall Facebook sample, with similar average friendships with local natives.¹⁰ In the survey, respondents were asked about their social interactions with native Germans broadly, as well as specific questions about visiting, hosting, dining, and playing sports with natives.¹¹

Columns 1 to 8 of Table 2 show that our Facebook measure of friending integration is a significant predictor of each specific real-world interaction with German natives. For example, columns 1 and 2 show that a one standard deviation increase in a Syrian migrant’s number of local native friends corresponds to roughly a 22% increase in the probability of having been invited to a native’s home in the past year. Columns 9 and 10 show that our measure also predicts self-reported levels of agreement with the statement “I have many

⁹Of these, 3,332 finished the survey. Most, but not all, finishers answered every question. We use the broadest sample of respondents available for each question, but have verified our facts do not change using narrower samples of users that answer every question.

¹⁰Note also that the survey sample demographics are as of May 2024 whereas the primary sample demographics are as of October 2021, which contributes to some of the observed differences between samples, for example in terms of average age.

¹¹To align survey responses with our Facebook measure of natives, the survey instructions stated: “In the following we are going to ask you several questions about your interactions with the German population. By this, we mean individuals who have lived in Germany most of their lives.”

social interactions with Germans in the city I live in.” These strong relationships provide evidence that our measure picks up real-world integration patterns.

1.4 Migrant and Native Characteristics and Integration

In the following, we first analyze the relationship between Syrian migrant characteristics and integration outcomes. We then study the relationship between native characteristics and migrant friendships.

Migrant characteristics and integration outcomes. Figure 1 shows the relationship between individual-level characteristics and integration outcomes for a cohort of Syrian migrants with an “observed arrival” in 2015-2016.¹² Migrants become increasingly socially integrated as they spend more time in Germany. For example, after their first quarter in Germany, Syrian migrant users on average had 1.4 native friends and produced 1.7% of their Facebook content in German; three years later, these numbers were 7.3 friends and 4.2% of content, respectively. The bottom row of Figure 1 shows considerable heterogeneity in the degree of integration across age and gender groups, with younger and male migrants integrating more quickly than older and female migrants. In Appendix 4, we further explore these heterogeneities in integration outcomes across individuals, using a multivariate regression model which allows us to include various controls, including controls for Facebook usage patterns, as well as state and even family fixed effects. The demographic patterns shown in Figure 1 remain: female and older migrants have fewer local native friends than male and younger migrants.¹³ We also show that the demographic differences in integration outcomes across individuals align with those in the SOEP survey.

Native characteristics and friendships with migrants. Our data allows us to not only observe the social integration of migrants, but also the characteristics of the natives that interact with and befriend migrants. We analyze these in detail in Appendix 10 and summarize our findings here.

Overall, younger and male German natives have more Syrian migrant friends than older and female natives. Because Syrian migrants in Germany are more likely to be

¹²These are Syrian migrant users who first used Facebook *outside* Germany, then began using Facebook inside Germany in 2015 or 2016. Appendix Figure A6 reproduces this plot with additional integration measures.

¹³Appendix Table A4 also presents multivariate regression results for our key language- and group-based measures of social integration, and Appendix Table A5 uses a different variation of our friend-based integration measures. Across all measures, we find highly consistent relationships between demographic characteristics and the social integration of Syrian migrants.

young and male than the average German native, one possible explanation for this finding is that homophily plays a strong role in shaping which natives befriend Syrian migrants. Put differently, younger German natives might be more likely to connect with younger Syrian migrants because younger people are more likely to connect in general, rather than because of a particularly friendly behavior toward migrants among younger versus older Germans. Consistent with such an interpretation, we show that it is, in fact, older and female natives that are more likely than others to join pro-immigration groups on Facebook, conditional on the relevant patterns of Facebook usage. In other words, it is not necessarily those who are most vocally supporting immigration (measured by supporting pro-immigration groups) that are most likely to befriend Syrian migrants and thereby directly foster their integration.

In Table 3, we explore the extent to which friendship links to Syrians disproportionately come from a small number of Germans that one might call “super integrators.” Overall, 71% of all friendships between Germans and Syrians are to Germans with three or fewer Syrian friends and only 0.04% of Germans have more than 10 local Syrian friends. While there are some Germans with more than 50 local Syrian friends—which could include Germans working directly with refugees—they account for only 1.6% of all friendships that Syrians have with Germans.

We conclude that friendships between Syrians and Germans are not overwhelmingly driven by Germans with a large number of Syrian friends. Instead, most Syrian-German friendships are with Germans with few other Syrian friends. The role of possible “super integrators” seems limited.

2 Determinants of Migrant Integration: The Effect of Place

In this section, we explore the determinants of social integration by asking “do places differ in their propensity to integrate migrants?” This question is important for understanding the extent to which local conditions (e.g., local native preferences or institutional factors) affect migrants’ social integration.

If migrants were randomly assigned locations to live without the ability to move, differences in their average outcomes by location would reflect causal effects of place. The setting in Germany does not feature such random assignment of migrants to locations. In particular, while the *number* of asylum seekers dispersed to locations within Germany is determined by a formula based on local population and tax revenues (the *Königsteiner*

Schlüssel),¹⁴ it remains possible that the *composition* of migrants by place is non-random. To overcome this challenge, we use a movers design that leverages differential changes in the same migrant’s friending across locations to explore the extent to which regional variation reflects causal effects of location. We describe this design, and its limitations, in greater detail below.

County-Level Estimates. We begin by estimating county-level averages of our measures of Syrian migrants’ social integration. Figure 2 maps the resulting county-level measures of friending integration, while Appendix Figures A9 and A10 show analogous maps for our language-based and group-based measures of integration. Syrian migrants in a 90th percentile county make more than twice as many local native friends on average as Syrian migrants in a 10th percentile county (7.9 vs. 3.9). Consistent with anecdotal evidence in Nawras (2017), the social integration of migrants tends to be highest in rural areas: migrants living in counties along the southern border, in Rhineland-Palatinate (along the western border), in Lower Saxony (in the northwest), and in Mecklenburg-Western Pomerania (near the Baltic Sea in the northeast) each have particularly high levels of social integration. By contrast, many mid-sized cities such as Ansbach, Kaiserslautern, and Cottbus rank among the bottom 20% of places in terms of the integration of migrants living there. Migrants living in larger cities, including Berlin, Munich, and Cologne, often have intermediate levels of social integration. Interestingly, there do not appear to be systematic differences between East and West Germany, despite their histories as distinct countries.

Panel A of Table 4 shows population-weighted county-level correlations between our various integration measures. The different integration outcomes are positively correlated across counties: those counties where Syrian migrants make more German friends are also the counties where they are more likely to use the German language and more likely to participate in local social groups.

County-Level Estimates: Validation. We next confirm that the differences in integration outcomes shown in Figure 2 reflect true differences in integration, expanding on the individual-level survey evidence presented in Section 1.3.

First, Appendix 5 shows that the county-level estimates of integration have high reliability, suggesting that the observed differences in integration do not arise from sampling error. For example, we find that if we randomly split the individual-level data into two

¹⁴In Appendix Section 6, we compare the distribution of refugees across places to the official assignment key and find that the two line up very closely, indicating that the assignment key has been followed relatively strictly even during these years of increased migration.

halves and estimate the county-level average of native friending in each half, the two estimates have a correlation of 0.94.

Second, one might be concerned that differences in our county-level measures of social integration might reflect spatial variation in Facebook usage. While we find no spatial differences in Facebook usage among Syrian migrants, there are small spatial differences in Facebook usage patterns of German natives which could influence some measures of Syrian migrants' integration. For example, in a region where a smaller share of German natives uses Facebook, it might incorrectly look as if local Syrians were relatively less well-integrated according to the "local native friends" measure. To account for such concerns, we always residualize the observed average integration outcomes on county-level measures of the intensive and extensive Facebook usage of German natives. However, given the small magnitude of regional differences in natives' Facebook usage patterns, results are essentially the same when using unresidualized integration measures.¹⁵

Finally, we validate our regional measures of the social integration of migrants by comparing them to the average number of native acquaintances made by Syrian migrants in Germany as reported in the SOEP (see Section 1). This survey data is only available at less granular geographic levels, so we compare the two data sources at the state (and state-by-age group) levels. Despite different definitions of friendships and small sample sizes in the SOEP data, the regional measures of social integration are correlated with $\rho \approx 0.5$ across the two data sets, providing further evidence that our Facebook-based measures are picking up true variation in migrants' social integration (see Appendix Figure A8).

2.1 Evidence of Causal Place-Based Effects

The observed regional variation in integration outcomes of Syrian migrants could be explained by at least two forces. A first possibility is that places have causal effects on integration, either because of characteristics of the German natives living there, or because of institutional forces in the location. A second possibility is that there exist systematic differences in characteristics of Syrian migrants by place that shape their propensity to integrate—for example, if migrants with knowledge of the German language are more likely to live in certain areas. In this section, we provide evidence that the observed regional differences largely reflect causal place-based effects on integration.

¹⁵Due to Facebook business restrictions, we are unable to publicly characterize the spatial distribution of natives' Facebook usage patterns. We verify that the high reliability estimates documented above are not driven by usage differences: in Appendix Table A12, we show the split-sample reliability before and after residualizing is similar (0.96 vs 0.94, for friending).

Before turning to our movers design, we can directly rule out that *observable* Syrian migrant demographics are driving the regional differences in average integration outcomes. For example, regressing migrants' age, gender, and number of quarters since arriving in Germany on county fixed effects results in R^2 s of 0.005, 0.003, and 0.005, respectively, highlighting that these characteristics vary little across counties. This finding is consistent with the fact that regional integration measures with and without individual-level observable controls are highly correlated (see Appendix Figure A7).¹⁶

Migrant Movers Design. Despite the lack of evidence for selection on observables and adherence to the Königsteiner Schlüssel, one might still worry that selection on unobservable characteristics explains the regional variation in integration. For example, while restrictions exist on asylum seekers' movements after settlement, these limitations are less severe for individuals who arrived prior to August 2016 or who have been in Germany for more than three years (see Hilbig and Riaz, 2022).

We next exploit such migrant moves to separate the role of place-based and non-place-based factors. Specifically, we focus on Syrian migrants who move between non-neighboring German counties, and study changes in the moving migrants' propensity to befriend local natives. This approach builds on recent work using similar designs to study place-based effects in different contexts (e.g., Card, Heining and Kline, 2013; Finkelstein, Gentzkow and Williams, 2016, 2021; Chetty and Hendren, 2018a,b).¹⁷

To see the intuition behind this research design, consider a Syrian migrant who moves from Ansbach, where Syrian migrants generally make few native German friends, to Saarlouis, where they make more native German friends. If the differences in Syrians' friending behavior between Ansbach and Saarlouis were due to (unobservable) characteristics of the Syrians in those places, we would expect the moving migrant's likelihood of befriending local natives to remain largely unchanged after the move. By contrast, if the observed geographic differences in Syrian migrants' social integration were primarily due to a causal effect of place, we would expect the moving migrant's likelihood of befriending native locals to increase by the average difference in this likelihood across the two locations. The *within-migrant* magnitude of the change in the rate of befriending local Germans around a move thus captures the importance of each explanation.

To study migrant movers, we construct a sample of Syrian migrants who were in one

¹⁶It is also consistent with the fact that adding county fixed effects in column 2 of Table A11 had little effect on the demographic coefficients relative to estimates in column 1.

¹⁷Our movers design uses panel data, as in Finkelstein, Gentzkow and Williams (2016). This design requires weaker assumptions than cross-sectional movers designs such as Chetty and Hendren (2018a), Chetty and Hendren (2018b), and Finkelstein, Gentzkow and Williams (2021). We provide more detail on the identifying model and assumptions in Appendix 7.

county for at least four consecutive quarters followed by a different, non-neighboring county for at least six consecutive quarters. We allow a user to be included for multiple moves so long as each move meets these criteria. Our sample includes 33,772 moves and 31,721 unique movers.¹⁸

Figure 3 plots Syrian migrants' probabilities of befriending local natives around a move, where quarter = 0 is the first quarter we observe the migrant in their new location. Counties are grouped into terciles of the integration measure mapped in Figure 2. Panels (a) and (b) focus on users who lived in a bottom and top tercile county prior to moving, respectively. In each panel, the lines correspond to individuals who move to counties in different integration terciles. The vertical axis plots the probability that a migrant makes at least one local German friend in a given quarter, a flow measure of social integration that allows us to study changes in the rate of integration around a move. To avoid picking up possible differences in natives' Facebook usage across locations, we residualize this flow measure of friending on measures of German natives' Facebook usage in the same location-quarter.¹⁹

In both panels, the likelihood of migrants making new local German friends is decreasing prior to the move, consistent with individuals investing less effort in making new friends ahead of an anticipated move. There is little variation in the pre-move rate of making local German friends across the destination terciles, suggesting that individuals moving to a high-integration place behaved similarly prior to the move compared to individuals moving to a low-integration place.

Following the move, the probabilities of making local German friends vary systematically by the movers' destinations, with higher probabilities for individuals moving to places with higher overall social integration levels. These pattern exists in both panels, which we interpret as evidence for symmetric place-based effects. In general, there is also an additive increase in the rate of making local friends following a move, independent of integration levels in the origin and destination, consistent with all movers building new local networks following a move.²⁰

¹⁸Appendix Figure A11 shows that the number of moves between counties observed in the Facebook data is highly correlated with the number of moves observed in administrative data. Appendix Figure A14 shows that migrants do not systematically move to destinations with higher levels of social integration. Because our design is identified with *within-migrant* variation, even if such differential patterns of moving by local social integration existed they would not confound our results.

¹⁹In addition to overall usage, our design could be partially confounded by a differential representativeness of the Germans we pick up on Facebook (in terms of their propensity to befriend migrants) across space. The regional correlations of native behaviors with external survey data presented in Appendix 12 provide evidence that this concern is limited.

²⁰In Figure A13, we show that both the probability of incoming and the probability of outgoing Facebook friendship requests follow similar patterns around a move.

In Appendix 7 we formally outline and estimate a simple model in which a migrant's rate of befriending local natives is determined by the sum of place-based effects—which we allow to vary across time and with observable migrant characteristics—and other *unobservable* individual-level factors. Since only place-based factors change around a move, this model allows us to estimate the share of regional variation in the social integration of migrants that can be attributed to place-based effects.

The results suggest that differences in social integration across regions are largely due to causal place-based effects. Specifically, we find that nearly three-quarters of the observed regional variation in Syrian migrants' friendship formation with local natives is directly attributable to place-based effects that occur within the first year after their move. The results are not driven by any particular demographic group and are fully symmetric, with moves to low-integration places leading to declines in the rates of making native friends of the same magnitude as moves to high-integration places increase that rate. We summarize our results in Lesson I.

Lesson I: *Places differ in their propensities to integrate migrants. The substantial spatial variation in Syrian migrant integration outcomes in Germany largely reflects causal place-based effects.*

3 Place-Based Effects: Immutable Native Preferences vs. Local Equilibria

Given the evidence for causal place-based effects, we now explore the role that immutable preferences of local natives play in determining these place-based effects (see also Khatua, Zagheni and Weber, 2023). We decompose local native behaviors into the rate at which they befriend their neighbors in general and the particular rate at which they befriend Syrian migrants versus other Germans. We then ask, “To what extent do persistent native characteristics (e.g., attitudes toward neighbors or migrants) versus the structure of local institutions or social equilibria shape each force?”

If some German natives were randomly assigned locations and could not move, the extent to which their behaviors matched the average behaviors in their location would reflect the extent to which local equilibria (instead of immutable preferences) shaped friending behaviors. In the absence of such an experiment, we again study variations in within-individual behavior around a move, now focusing on native movers. We describe the design and its potential limitations in this context below.

3.1 Decomposing Migrants' Integration: General Friendliness and Relative Friending

We distinguish two forces that can contribute to regional variation in migrants' social integration.

The first force, which we call *general friendliness*, is the overall rate at which natives in a location befriend others in their community: if local natives in a given location are more likely to befriend any neighbor, they might also be more likely to befriend their Syrian migrant neighbors.

The second force, which we call *relative friending*, is the relative probability of a German native befriending a given local Syrian migrant versus a given local German native. When natives befriend migrants and other natives with similar likelihoods, social integration becomes easier for migrants.

Our unique data allow us to measure these two components separately, and thus improve our understanding of the causal effects of place documented in Section 2. We define a county's general friendliness as German natives' average number of local German friends. Relative friending in a county is defined as migrants' average number of local German friends divided by the county's general friendliness. General friendliness and relative friending thus determine friending integration multiplicatively:

$$\underbrace{NLocalFriends_j^{SY \rightarrow DE}}_{\text{Friending Integration}} = \underbrace{NLocalFriends_j^{DE \rightarrow DE}}_{\text{General Friendliness}} \times \underbrace{\frac{NLocalFriends_j^{SY \rightarrow DE}}{NLocalFriends_j^{DE \rightarrow DE}}}_{\text{Relative Friending}}. \quad (1)$$

The variables $NLocalFriends_j^{DE \rightarrow DE}$ and $NLocalFriends_j^{SY \rightarrow DE}$ correspond to the average number of local native friends among native and Syrian migrant users in county j , respectively, after residualizing on regional patterns of Facebook usage in the native population as before.

Intuitively, relative friending captures how much harder it is for a Syrian migrant to make a local native friend than it is for a native German to make that friend. To build intuition for its determinants, it is possible to re-write county-level relative friending as a function of only natives' friending behaviors. We do so using the fact that, within a county, the total number of friendships from local migrants to local Germans must equal

the total number of friendships from local Germans to local migrants:

$$Rel. \text{ Friending} = \frac{NLocalFriends_j^{SY \rightarrow DE}}{NLocalFriends_j^{DE \rightarrow DE}} = \frac{NLocalFriends_j^{DE \rightarrow SY}}{NLocalFriends_j^{DE \rightarrow DE}} \times \frac{NGer_j}{NSyr_j} = \frac{\frac{NLocalFriends_j^{DE \rightarrow SY}}{NLocalFriends_j^{DE \rightarrow DE}}}{\frac{NSyr_j}{NGer_j}}. \quad (2)$$

Here, $NGer_j$ and $NSyr_j$ are the numbers of German native and Syrian migrant Facebook users local to county j , respectively. $NLocalFriends_j^{DE \rightarrow SY}$ is the average number of local Syrian friends of German natives in county j . Relative friending will thus be equal to one if German natives befriend local Syrian migrants and other local German natives in proportion to their population shares.

Panels (a) and (b) of Figure 4 map general friendliness and relative friending by county, while Panel (c) shows their across-county correlation, with different colors representing different overall integration levels of Syrian migrants. General friendliness is higher in Western states and lower in Northern Germany, while relative friending is generally higher in Northern Germany. The industrial areas in the Ruhr area of North Rhine-Westphalia—including the cities of Duisburg, Oberhausen, Bottrop, and Gelsenkirchen—as well as parts of upper Franconia in northern Bavaria have low general friendliness and low relative friending; migrants have the lowest integration levels in these places. Overall, general friendliness and relative friending are weakly negatively correlated across counties, with a weighted correlation of -0.05.²¹

To quantify the relative importance of general friendliness and relative friending in explaining county-level differences in integration, in columns 1 and 2 of Table 5 we separately regress the log of overall friending integration on the log of each component. The R^2 estimates of 0.41 and 0.66 for general friendliness and relative friending, respectively, suggest that differences in relative friending explain 50% more of the geographic variation in integration than differences in general friendliness do (see Appendix 9 for related analyses).

For some policy questions, it is not necessarily central to determine whether good integration outcomes in a given place are driven by high general friendliness or high rel-

²¹In Appendix Figure A15 we plot our regional measures of integration and relative friending of Syrian migrants against analogous measures for migrants from countries that had many asylum seekers in Germany as of 2020. There exist strong positive relationships, suggesting local factors shape social integration similarly across migrant groups. Intuitively, the correlation is higher for the friending integration measures compared to relative friending measures, consistent with local natives' general friendliness playing an important role in shaping the former. At the same time, the variation in both plots shows there exist place-by-migrant-group-specific forces that affect integration outcomes.

ative friending. For instance, a policymaker interested in simply assessing the potential of different regions to socially integrate migrants—perhaps because they are interested in determining where to settle new refugees—may be indifferent to which of the components drive this integration. Indeed, columns 3 to 6 of Table 5 show that both components of social integration have strong and similarly-sized positive associations with language- and economic-based measures of integration that policymakers may care about.

However, the distinction between general friendliness and relative friending can be important in other settings. Consider a policymaker seeking to improve a location’s integration outcomes. While targeted policies might reduce the gap between natives’ rate of befriending migrants versus other locals (i.e., relative friending), increasing the overall friending rate of natives (i.e., general friendliness) is likely more challenging. In addition, since general friendliness and relative friending shape integration multiplicatively, interventions that raise relative friending will increase integration most where general friendliness is high. Observing each component separately therefore allows policymakers to most effectively target interventions that maximize the overall social integration of migrants.

General Friendliness Validation. A potential concern with our measure of general friendliness is that it may partially capture local social norms about Facebook usage rather than real-world friending behaviors. While we control for county-level measures of overall Facebook usage (as described in Section 2), it remains possible that there are social norms around sending and accepting Facebook friendship requests that differ by place. To explore this concern, Appendix 12 benchmarks our regional general friendliness measures against external survey measures of social activity and trust. General friendliness is strongly correlated with the survey responses, suggesting that our measure captures real-world behaviors of German natives (consistent with prior evidence that our data captured the true levels of social integration of Syrian migrants).

3.2 Separating Between Immutable Preferences and Place-Effects

We next ask what role persistent native characteristics (e.g., attitudes toward neighbors or migrants) versus place-based effects (e.g., the structure of local institutions or social equilibria) play in shaping general friendliness and relative friending. To do this, we use a movers design that explores changes in *natives’* friending patterns as they move between places with different relative friending and general friendliness. When place-based effects dominate fixed individual characteristics in determining local friending patterns, the native movers’ friending behaviors should adjust substantially towards those of natives in

the place they move to.

We focus on users who moved between two non-neighboring counties and who lived in the origin county for at least four consecutive quarters and the destination county for at least six consecutive quarters. We focus on moves since Q1 2017, when the substantial number of Syrians in Germany allows us to obtain more precise measures of friending.

Figure 5 shows event studies analogous to those in Figure 3. In both panels, the overall likelihood of German natives making new Syrian migrant friends in the post-move period is higher than in the pre-move period, consistent with natives increasing their general rate of friendship formation after a move. The probability of making local migrant friends in the post-period varies systematically by the movers' destination, with higher probabilities for individuals moving to places with higher overall social integration levels.²²

We next estimate a specification that compares *changes* in the rates at which movers make friends in the year before vs. after their move to *differences* in the average friending rates of otherwise similar non-movers in each location. Appendix 7 provides additional details and a formal discussion of the underlying identifying assumptions. Specifically, the outcome variable $y_{i,t}^{\Delta}$ is the change in *yearly general friendliness* or *yearly relative friending* around a move. Yearly general friendliness is the number of local native friends a user makes in a given year. Yearly relative friending is the ratio of local Syrian migrant friends to local native friends made by a German native in a given year, compared to the relative population shares of Syrian migrants and German natives in that location (i.e., an annualized version of the “ratio of ratios” introduced in equation 2). $x_{i,t}^{\Delta}$ is the difference in the corresponding averages between native stayers of in mover's origin and destination, calculated at the same time and for the same gender \times age group. Appendix Table A9 summarizes the sample of native movers and matched non-movers. We then estimate:

$$y_{i,t}^{\Delta} = \alpha_0 + \alpha_1 x_{i,t}^{\Delta} + \zeta_t + \epsilon_{i,t}, \quad (3)$$

where ζ_T are quarter-of-move fixed effects. The slope α_1 provides an answer to the following question: “within a year of moving to a new place, to what extent does a moving na-

²²Appendix Figure A16 shows that natives do not systematically move to destinations with higher or lower levels of social integration. Because our design is identified with *within-native* variation, even if such differential patterns of moving by local social integration existed they would not confound our results.

tive's friending behavior adjust to that of observably similar destination non-movers?"²³ An α_1 close to 1 suggests native movers' behavior completely adjusts, whereas an α_1 close to 0 suggests it does not adjust at all.

Figure 6 shows conditional binned scatter plots of $y_{i,t}^\Delta$ against $x_{i,t}^\Delta$, with slopes corresponding to α_1 (Appendix Table A10 provides the underlying regressions, as well as robustness specifications).²⁴ Panels (a) and (b) show plots for general friendliness and relative friending, respectively. In both panels, the relationship is linear and symmetric around zero, providing evidence of additive place-based effects. In Panel (a), the slope estimate suggests that, within a year of moving to a new place, a native will adjust their general friending 69% of the way to the level of comparable destination natives. In Panel (b), our estimates suggest that movers' relative friending will adjust nearly fully to that of their destination, though the estimates are somewhat less precise, since few natives make any Syrian migrant friends. Both panels thus provide evidence that institutional factors and local policies play important roles in shaping natives' friending behaviors. The fact that relative friending adjusts almost fully suggests that spatial differences in time-invariant individual-level characteristics such as attitudes towards migrants play only a small role in explaining regional variation in Syrian migrants' social integration outcomes.²⁵ Lesson II summarizes this result.

²³This interpretation is intentionally narrower than that in Section 2.1, where we interpreted α_1 as the share of across-region variation in integration that is explained by place-based effects. In particular, whereas regional differences in the observables for which we allow flexibility (gender, age, and arrival cohort) were essentially non-existent for Syrian migrants, regional differences in native demographics do have the potential to shape overall variation in our measures. For example, since older people are less likely to befriend Syrian migrants, regions with older populations on average may have lower levels of integration. Since we match movers to stayers with similar observables, our estimates will not capture variation in friending patterns across space that is due to the age of the native population. (Though we will show in Section 4 that relative to other factors, the quantitative importance of these county-level differences in natives' gender and age is small).

²⁴One challenge with our estimation is that we only observe a sample estimate of each mover's $x_{i,t}^\Delta$, denoted by $\hat{x}_{i,t}^\Delta$. Measurement error in the true differences in friending probabilities of non-movers across locations would thus lead to attenuation bias in α_1 . To account for this sampling error, when estimating equation 3, we randomly split the individual-level data of the friending behavior of non-movers used to construct $\hat{x}_{i,t}^\Delta$ into two sub-samples and instrument for the value constructed in one sub-sample with the value constructed in the other sub-sample (see Appendix 5 for details).

²⁵A number of works studying place effects in the U.S. find that new places exert stronger effects on younger individuals (Kling, Liebman and Katz, 2007; Chetty, Hendren and Katz, 2016; Chyn, 2018). Consistent with this, Appendix Figure A17 shows that younger native movers adjust their general friendliness and relative friending substantially more than older native movers. One possible reason for the stronger adjustment by younger movers is that places have cumulative effects, a force that would lead our large estimates of place-based effects to *understate* the full role of places on individuals' behaviors. In Section 6, we explore the potential role of such lasting effects by analyzing whether contact between migrants and natives in one setting has lasting effects on natives' friending behavior in other settings.

Lesson II: *Spatial variation in migrant social integration can be decomposed into the rate at which natives befriend their neighbors in general and the particular rate at which they befriend migrants. Both forces vary across space, and both are largely influenced by local equilibria rather than spatial differences in immutable native preferences.*

4 Place-Based Integration Outcomes: The Effect of Policy

Given our results in Sections 2 and 3 on the importance of place-based effects beyond any immutable preferences of the local populations, we next explore the determinants of local equilibrium integration outcomes and the extent to which these are shaped by local policies. We first show salient correlations between integration outcomes and a number of regional characteristics. Motivated by these analyses, we ask “Can the provision of integration courses improve social integration?”

If the availability of integration courses varied randomly across counties, differences in average migrant integration outcomes by the availability of courses would reflect a causal effect of these courses. In the absence of such random variation, we use an instrumental variables approach to provide evidence for a causal effect of integration courses on social integration outcomes. Our instrument, which leverages quasi-random variation in the presence of qualified teachers across counties, is described below.

4.1 Correlational Analyses

Table 6 presents multivariate regression analyses that explore how various county-level characteristics correlate with social integration, general friendliness, relative friending, and language integration.²⁶ Appendix 13 describes each measure in detail, and Appendix Figure A18 presents univariate county-level correlations between these and several additional county-level measures and social integration outcomes. To help with the interpretation of magnitudes, we use the log-form for the dependent and some of the explanatory variables, but the presented relationships are similar with raw magnitudes.

Demographics & Urbanity. While Syrians tend to be less socially integrated in places with an older population unconditionally (Appendix Figure A18), this relationship weakens significantly in the multivariate regressions in Table 6. In contrast, in both univariate and multivariate analyses, migrants are better integrated in less densely populated ar-

²⁶In Table 6, we weight all relationships by the county’s Syrian migrant sample size, except when we look at general friendliness as the outcome variable, in which case we weight by the county’s German native sample size.

eas. The results in Table 6 show that this is driven by both relative friending and general friendliness being lower in urban areas. These trends are consistent with research finding that rural areas have higher levels of social capital and lower levels of social isolation relative to more densely populated urban areas (Putnam, 1995b; Rupasingha, Goetz and Freshwater, 2006; The Social Capital Project, 2018; Henning-Smith, Moscovice and Kozhmannil, 2019).

Economic Conditions. Some prior works have explored the feedback between social and economic integration. For example, Laurentsyevea and Venturini (2017) discuss the possibility that employment contributes to the social integration of migrants and Cheung and Phillimore (2014) use survey data to highlight the importance of language proficiency for employment. Table 6 shows that while there is no strong relationship between the average income level in a county and migrants' social integration, integration does appear to be higher in areas with lower unemployment rates, in particular when comparing counties within states. For instance, controlling for state fixed effects, we find that a 1% higher unemployment rate is associated with a 0.29% lower level of social integration, an effect that is largely driven by lower relative friending rather than lower general friendliness.

Attitudes Towards Migrants. We explore correlations of integration outcomes with two measures of local attitudes towards migrants: (i) the vote share for Alternative for Germany or AfD, a political party in favor of limiting immigration, in the 2014 EU Election (predating the main influx of Syrian migrants),²⁷ and (ii) the number of pro-immigration groups per capita. Support for the AfD has a strong negative relationship with social integration and relative friending: a one percentage point increase in AfD vote share relative to state-level averages is associated with a decrease in social integration of nearly 9% and in relative friending of 6.9%. Pro-immigration groups are independent organizations that offer a wide range of services to migrants, including help filing for asylum status, medical attention, and the provision of child care. We study groups registered with *ProAsyl*, a widely-known pro-immigration organization in Germany. In both univariate and multivariate analyses, we find places with relatively more pro-immigration groups per capita tend to have higher levels of social integration. Table 6 shows this is driven entirely by variation in relative friending rather than general friendliness.

Concentration of Migrants. Several researchers have studied the relationship between local co-ethnic populations and the economic integration of migrants. For example, Edin,

²⁷Because political parties in Germany are differentially important across states, and often run with varying policy positions by state, in Table 6 we always demean AfD vote share by state.

Fredriksson and Åslund (2003) and Damm (2009) find a positive effect on earnings for refugees living in areas with more co-ethnic individuals (so-called “ethnic enclaves”), while Cutler, Glaeser and Vigdor (2008) find negative effects if the community has low levels of average education. Our results suggest that newly-arriving migrants do make fewer native friends in places with more *recent* Syrian migrants. However, we see that social integration generally increases with the share of the population that was Syrian in 2010, largely through effects on relative friending. We find similar results when looking at the extent of German language usage. These patterns are consistent with earlier migrants providing important information or connections with natives to aid the social integration of new arrivals. It is also possible that local natives more exposed to Syrian migrants in 2010 became more friendly toward Syrians in the future, a notion we explore at the individual level in Section 6. On the other hand, large communities of migrants arriving at the same time appear to facilitate fewer migrant-native connections.

Integration Courses. The German government has invested heavily in efforts to integrate recent migrants (see, e.g., Bundesregierung, 2021). Integration courses, which are intended to teach migrants the German language and other relevant information, are “at the core of the government’s integration measures” (BAMF, 2015). Indeed, 1.13 million individuals participated in these courses between 2015-2019 (BAMF, 2021). In both the univariate and multivariate analyses, we find strong positive relationships between a county’s social integration outcomes and the number of integration courses completed per Syrian between 2015 and 2019. The effect appears to be entirely driven by a relationship between integration course completion and relative friending. While these results are not causal, they are consistent with integration courses supporting the integration efforts of Syrian migrants. To isolate a possible causal effect of integration courses, we next use an instrumental variables approach that leverages exogenous variation in course availability across regions.

4.2 Causal Effect of Integration Policy: Integration Courses

Unlike many regional characteristics related to social integration, such as population density, policymakers can and do influence the offering of integration courses. In this section, we therefore study the *causal* effects of integration courses on integration outcomes using an instrumental variables (IV) approach that exploits the effect of quasi-random variation in the presence of qualified teachers across counties on the availability—and in turn completion—of integration courses. This IV approach is necessary to identify causal effects, since prior work has noted that integration courses are offered more frequently in

urban areas with a high share of foreigners, attributes that themselves affect migrants' social integration (Kanas and Kosyakova, 2022).

The German government required individuals teaching integration courses to either have a college degree in teaching German as a second language or, with a degree in a different pedagogical field, significant experience teaching German as a second language (BAMF, 2018). Due to these very specific requirements, integration courses were generally taught by the small group of previously unemployed teachers with these qualifications. Indeed, in a widely-televised 2016 interview, the federal government's coordinator of refugee policy (*Flüchtlingskoordinator*) called on unemployed teachers to meet the rapid demand for integration course instructors (Tagesschau, 2016). The unemployment rate of qualified teachers in a given county at the start of the major influx of migrants thus likely affected the availability of integration courses in that county. We test this story using county-level data on 2014 teacher unemployment from the Federal Employment Agency. These data allow us to distinguish between four types of teachers: general, vocational, driving or sports, and other. "Other" teachers are primarily adult educators, often focused on non-native populations, and are much more likely than the other groups of teachers to meet the requirements to teach integration courses. Therefore, if local teacher unemployment affects integration course availability, it should do so primarily through this particular set of teachers.

Table 7 presents results that are highly consistent with the presence of qualified teachers driving the availability, and eventual completion, of integration courses. Columns 1-3 show that, after controlling for the general unemployment rate and other county-level covariates, there are at most weak relationships between integration course completion and unemployed general, vocational, and driving or sports teachers per Syrian. By contrast, column 4 shows a positive and highly significant relationship for "other" teachers: a 10% increase in the number of unemployed "other" teachers per Syrian as of 2014 corresponds to a 2.3% increase in integration course completion per Syrian. With an F-statistic of over 23, this first-stage relationship is remarkably strong given the limited number of counties.

While this evidence supports the notion that teacher unemployment meaningfully affects the completion of integration courses, for the measure to serve as a valid instrument it must also satisfy the exclusion restriction. Namely, teacher unemployment must not affect social integration other than through its effect on the availability of integration courses. To mitigate concerns that our results are driven by general economic conditions or other confounders that might affect integration, we always include a rich set of county-level controls in our regressions: general unemployment rates, the number of unemployed people per Syrian, average age, population density, average incomes, and open

training positions.²⁸ Moreover, our use of 2014 teacher unemployment, before the large influx of migrants, allows us to rule out stories in which reverse causality violates the exclusion restriction.

Table 8 presents results from our IV regressions. Column 1 suggests that a 10% increase in completed integration courses per Syrian raises the social integration of Syrians by nearly 18%. Quantitatively, this means that moving a migrant from a 25th percentile to a 75th percentile county in terms of the relevant teacher unemployment would result in them having about 1.7 more native friends.

This IV estimate is substantially larger than the OLS estimates in columns 1 and 2 of Table 6. At least two forces contribute to this. First, our IV strategy corrects for possible downward bias due to omitted variables in the OLS estimates. Such downward bias can occur, for example, if integration courses were specifically targeted toward areas with low integration levels. We find supporting evidence that this is indeed the case: on average, courses tend to be concentrated in urban areas and places with a greater total immigrant share, both factors that are negatively correlated with integration, as discussed in Section 4. Second, the IV identifies a Local Average Treatment Effect (LATE), rather than an Average Treatment Effect (ATE). If the marginal integration course participant (aided by expanded course supply) had higher-than-average returns from integration courses, the LATE would exceed the ATE. There are good reasons to think that the marginal course participant did indeed benefit more from the course. For example, women were less likely to participate in integration courses when those courses were in short supply, but they also achieved substantially higher performance in both language and civic tests administered at the end of the course (Tissot et al., 2019; Tissot, 2021). While both LATE and ATE estimates are relevant for different applications, the LATE from our IV strategy is likely to be of particular interest for policymakers, whose primary tool to increase the completion of integration courses is to make them more easily accessible. Our LATE provides an estimate of the marginal effectiveness of such relaxations of supply constraints.

Columns 2 and 3 of Table 8 present IV estimates of the effect of integration courses on general friendliness and relative friending—the two factors driving migrant integration. Because friending behavior among natives should not be impacted by integration courses, integration courses should affect overall integration only through relative friending. Highly consistent with this story, we find significant effects for relative friending, but not for general friendliness. We summarize our results as follows:

²⁸Our controls differ from the variables used in Table 6, since we refrain from controlling for covariates that are potentially endogenous to our outcome of interest, such as the share of Syrians in 2019 or the number of pro-immigration groups.

Lesson III: *Integration courses can causally affect place-specific equilibrium integration. The availability of these courses for Syrian migrants shifted the relative rates of German-Syrian friendships.*

Columns 4 and 5 measure the causal effect of integration courses on language and economic integration. In particular, our outcomes are the share of Syrian migrant Facebook users producing content in German (in column 4) and the share of all Syrians employed or in training programs (in column 5). For both of these outcomes, we find highly significant and positive effects of integration courses. The IV estimates suggest that a 10% increase in integration course completion increases language integration by just under 2% and the rate of Syrians in employment or training by about 9%. The latter result is suggestive of causal ties between social integration and economic outcomes, which we explore in the next section.

5 The Effects of Social Integration

In the prior sections, we explored the determinants of social integration. While social integration is itself an important outcome for many policymakers, we next ask whether social integration directly affects other outcomes across the following domains: the labor market, housing, education, and health.

If German friends were assigned randomly to migrants, differences in migrant outcomes would reflect the causal effects of social connections. Conceptually, such an experiment is difficult to imagine. Instead, to understand the observed relationships between social connections and economic outcomes, we survey migrants about the ways their native friends have impacted their experiences in Germany.

Before describing our survey results, recall two prior findings that support a relationship between social integration and other outcomes. First, columns 5 and 6 of Table 5 show that a county's friending integration, general friendliness, and relative friending are all positively correlated with the share of Syrian migrants employed or in training programs. This correlation is consistent with a causal effect of social integration, but might also partially reflect a reverse effect of economic integration on social integration. Second, column 5 of Table 8 shows a positive *causal* effect of integration courses on Syrian migrant employment. However, the observed effect might be due to a direct effect of integration courses on employment outcomes rather than an effect mediated through social integration (e.g., if the course provides job-seeking support).

To address these potential confounders, we analyze responses to the short user sur-

vey described in Section 1.3.²⁹ The survey asked migrants whether they had “a German friend or acquaintance” who helped them or a member of their family in various specific ways. The relatively high average outcome levels show that migrants frequently receive help from Germans across a range of setting. For example, 48% of migrants report having received help from a native friend with finding a job, and about 55% report having received help navigating the German bureaucracy.

In Table 9, we document that migrants with more native German Facebook friends are more likely to report having received various help from natives. Column 1 shows that a one standard deviation increase in a Syrian migrant’s number of local native friends corresponds to a 12.6% (6.1 percentage-point) increase in the probability a native German helped them find a job. In column 2, a strong relationship remains even with controls for age, gender, county, and measures of Facebook usage. While this result is correlational, it is consistent with the notion that social integration *as measured by Facebook* positively affects migrants’ labor market integration (the causal framing of the question already provides direct evidence that native friends frequently help Syrian migrants find jobs).

Columns 3-8 show similarly strong relationships across a variety of additional outcomes. Columns 4, 6, and 8 suggest that, with controls, a one standard deviation increase in local native friends corresponds to an increase in the probability that a native helped find housing by 9.7%, helped with school work by 9.0%, and helped navigate the bureaucracy by 8.4%. Each of these are important factors that shape the overall well-being of migrants, consistent with normatively positive effects of social integration on other outcomes.³⁰ While there is a positive relationship between native friending and the probability of receiving healthcare help, it is insignificant, possibly because migrants are relatively young on average. We summarize our results in Lesson IV.

Lesson IV: *Social integration appears to be an important channel of positive effects on migrants labor market, housing, and education outcomes.*

6 Exposure and Native Behaviors Toward Migrants

While Lessons I-III provide insights into the across-region variation in average integration outcomes, there is also substantial within-region variation in the friending behaviors of

²⁹ All questions were translated to the user’s preferred language on Facebook. Appendix 14 provides screenshots of the survey in English, German, and Arabic.

³⁰ We also asked migrants directly about whether they were satisfied with life in Germany. There is a positive but insignificant relationship with local native friending. The lack of a stronger relationship may largely be because overall levels of satisfaction were high (an average of 4.26 of 5) with little variation.

natives (see Appendix 4). In this section, we explore one potential determinant of these differences, asking “Do differences in natives’ exposure to Syrian migrants early in life affect their later attitudes and behaviors?” We focus on studying the long-run effects of high school interactions between natives and migrants.

If migrants were randomly assigned to high schools, differences in average native later-in-life attitudes and behaviors by the presence of migrants in their school would reflect a causal effect. To approximate such a research design, we exploit Germany’s strict age cutoffs for school entry to provide variation in natives’ exposure to migrants.

Sample Construction. To generate our sample for this analysis, we first subset our German native and Syrian migrant samples to those with a birth date between 1995 and 1999. These individuals were roughly 15 to 19 years old in 2014, at the start of the major influx of Syrian migrants. We observe 26,000 Syrian migrant users and 2.2 million German native users in that age range. We match individuals to their high schools using self-reports and friend-based imputations (see Appendix 11). We assign 63.2% of individuals within this age group to a high school. We then sort individuals into cohorts within a school using the German system of age cutoffs for school entry. In Germany, children are eligible to enroll in school for the first time if they have turned six by a certain date that varies by state. Though students are allowed to enroll earlier or to defer enrollment at the advice of a pediatrician, the vast majority of students comply with the entry time suggested by the cutoff date (Schwandt and Wuppermann, 2016).

Research Design. Since students are disproportionately exposed to individuals in their own grade (relative to individuals in the years above and below them), variation in cohort composition can generate exogenous differences in the social networks formed by the members of each grade. Similar sources of variation in exposure and network composition have been utilized in other studies (e.g. Chetty et al., 2022b; Billings, Chyn and Haggag, 2021; Sacerdote, 2011). Because Syrian students are relatively uncommon in the German school system overall, we focus on how German natives are affected by having at least one Syrian migrant in their cohort. In particular, we focus on adjacent cohorts within a school where one cohort contains at least one Syrian migrant and the other does not. For instance, if the only Syrian who attends Marie Curie Gymnasium is in the class of 2016, we will study natives who fall on either side of the cutoff that divides the 2015

and 2016 cohorts.³¹ We estimate equations of the form:

$$Y_i = \alpha_1 \text{SyrianInCohort}_i + \xi_{t,L} + \gamma_s + \epsilon_{i,t}. \quad (4)$$

Here, Y_i is the number of friends of a given type that user i has today, and SyrianInCohort is an indicator variable set to one if a user has at least one Syrian in their assigned school cohort. We also include birth year-by-county fixed effects $\xi_{t,L}$ to address concerns that locations where a particular cohort is more likely to encounter a Syrian in high school might also be locations where one is more likely to encounter Syrians in other settings (such as sport clubs). Finally, we include school fixed effects, γ_s . Under the assumption that it is random whether a student's birth date places them into a cohort with a Syrian or into an adjacent cohort without one, α_1 identifies the effect of the additional exposure via placement into a cohort containing a Syrian. In some specifications, we include an interaction term, $\text{SyrianInCohort}_i \times \text{CohortSize}_i$, where CohortSize_i is the number of students in that cohort, normalized to have mean 0 and standard deviation 1. This interaction term allows us to examine how the effects of exposure differ according to the size of the cohort.

Effects of Exposure. In Table 10, we quantify the effects of being in a cohort that includes a Syrian migrant. The first column presents baseline results: students placed into a cohort containing a Syrian have 0.02 more Syrian friends by age 21, an increase of around 40% relative to the 0.054 Syrian friends that Germans in the adjacent cohort have on average. In the second column, we interact the treatment term with the cohort size. We find that treated students in a cohort that is one standard deviation larger make one-third fewer additional Syrian friends than treated students in a smaller cohort.

We next turn our attention to the mechanisms through which these friendships can be formed. Broadly speaking, there are three possible mechanisms. First, and most trivially, German natives can befriend the Syrian in their cohort. Second, the Syrian can play a direct role in mediating connections between native Germans and other Syrians by introducing previously disconnected individuals across groups. Third, the presence of the Syrian can play a role in shaping the preferences of native Germans for contact with other

³¹Conceptually, we could also study Germans around the assignment cutoff for the 2016 and 2017 cohorts. However, since many Syrians enter the German school system with low levels of German proficiency, some are assigned to a cohort younger than would be suggested by the assignment rule (though we find that most Syrians have a plurality of their friends in the cohort they would be assigned into under the allocation rules used for Germans). As a result, if we use this second design (where the Syrian is supposed to be in the older cohort), we will swap the treatment and control groups of Germans when the Syrian is assigned to a *younger* cohort. We also exclude pairs of years where there is a cohort without Syrians that is flanked by cohorts with Syrians. Since Syrians from the older cohort are sometimes misassigned, these configurations can lead us to inadvertently compare two cohorts that both contain Syrians, which would attenuate our results.

Syrians. This last mechanism could play a role in future network formation if stereotypes about individuals outside one’s own group affect friendship formation.

In columns 3 and 4, we repeat the regressions in columns 1 and 2, but now include only Syrian friends who did not attend the German’s high school in our outcome measure. This allows us to isolate friends made through the second and third mechanisms above. We find that Germans in the treated cohorts make 0.005 more friends of this type, about 17% more than the average number of such friends in the control group. As in column 2, these effects are larger for students whose cohorts are smaller. These friendships outside of one’s school comprise about one-quarter of the overall effect of exposure.

In columns 5 and 6, we exclude from the dependent variable both Syrians who attended the German’s high school (as in columns 3 and 4) as well as any friends of those Syrians. The estimate is similar to column 3, indicating that many of the new friendships were made in new social contexts and do not correspond to connections directly facilitated by the Syrians in one’s school. We summarize this finding, which is consistent with evidence that quasi-random exposure to migrants shifts natives’ attitudes found in other settings (see Bursztyn et al., 2024), as follows.

Lesson V: *Natives exposed to a migrant in high school are more likely to befriend other migrants later in life. Connections directly facilitated by the first migrant do not fully explain this effect.*

7 Conclusion

The challenge of successfully integrating immigrants into new communities has become of central importance for policymakers around the world. In the coming decades, climate change could displace as many as one billion individuals, increasing the flow of international migrants and further raising the importance of these challenges (Kamal, 2017). However, due to the difficulty of measuring social networks using traditional data sources, understanding the drivers and effects of migrants’ social integration has historically proven challenging. Are there environments where newly arriving migrants are relatively better integrated, and why? What can governments do to foster the social integration of migrants?

We use data from Facebook to draw five lessons from the experience of Syrian migrants in Germany. First, we document sizable spatial variation in the social integration of Syrian migrants in Germany. We show this variation is largely driven by causal place-based factors rather than unobserved migrant characteristics. Second, we show that regional variation in migrants’ social integration outcomes is shaped by both the rate at

which local natives befriend other locals in general (*general friendliness*) and the relative rate at which they form friendships with Syrian migrants in particular (*relative friending*). Natives' friending behavior adjusts substantially along both margins when they move between locations, suggesting that local institutions and environments are more important than fixed individual preferences of natives in determining whether a native makes migrant friends (although both play some role).

We then describe several characteristics of communities where migrants are better integrated. For example, our results suggest that large numbers of migrants arriving at the same time may lead to fewer migrant-native connections, but when migrants arrive in a place with many *earlier arriving* migrants they make more native connections. Similarly, our third lesson is that integration courses have a substantial positive *causal* effect on relative friending. This finding highlights that integration outcomes are not immutable, but can be shaped by government policies.

While social integration is itself an important outcome for policymakers, social connections may also impact other aspects of migrants' well-being. Using responses to a short Facebook user survey, we document our fourth lesson: social integration has positive causal effects on migrants labor market, housing, and education outcomes. Finally, our fifth lesson is that natives exposed to a migrant in high school are more likely to befriend other migrants later in life, consistent with a long literature on the contact hypothesis (Allport, Clark and Pettigrew, 1954).

While our paper does not make concrete policy suggestions, several of our insights are relevant for policymakers. For example, the fact that regions differ in their ability to integrate migrants—combined with the fact that migrants do not seem to disproportionately move to regions with better integration outcomes—suggests that a better understanding of where migrants have the best chance of socially integrating could become an important consideration in policymakers' decisions of where to locate newly arriving migrants. Similarly, the positive causal effects of integration courses on equilibrium integration outcomes suggest that policymakers might consider expanding the use of such programs.

We hope that the increasing availability of data sources similar to the ones used in this paper—as well as other digital trace data discussed in Kuchler and Stroebel (2023)—will help researchers better understand the forces that shape social integration and help policymakers develop programs that effectively foster interconnected communities. For example, while our work has focused primarily on studying the relationship between Syrian migrants and native Germans, future work should additionally consider the determinants and effects of the relationships between migrants, including between migrants from different origin countries. In particular, it would be interesting to study the extent to

which such relationships are complements or substitutes to friendships between migrants and natives. In addition, given the global scale of the Facebook platform, we are hoping to construct measures of the “relative friending” between native-migrant pairs that cover a much wider range of host and origin countries. This would allow researchers to better understand which migrants find it easier to integrate socially in what host communities.

Data Availability

The analysis code used in the article can be found in (Bailey et al., 2025) in the Harvard Dataverse, https://doi.org/10.7910/DVN/P920SP_2025. The data used in this project is proprietary and cannot be accessed without a research agreement with Meta.

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8 Tables

Table 1: Syrian Migrant and German Native Sample Summary Characteristics

Panel (a): Syrian Migrant Sample

	Mean	SD	P10	P25	P50	P75	P90	P99	Survey Mean
Age	32.90	10.26	22	25	31	38	48	66	39.97
Female (0/100)	32.07	46.68	0	0	0	100	100	100	25.79
DE College (0/100)	7.92	27.00	0	0	0	0	0	100	6.29
N Friends	347.89	385.84	62	117	226	423	751	2431	527.27
N Groups	104.55	137.09	8	22	56	129	256	831	192.39
Qs Since 1st on FB in DE	20.30	8.04	7	15	23	25	28	36	30.51
N Local Native Friends	5.03	12.24	0	0	1	4	13	87	5.43
N Local Syrian Friends	14.99	17.43	1	4	9	20	36	103	20.56
Produces DE Content (0/100)	30.40	46.00	0	0	0	100	100	100	29.42
N Local Native Groups	0.55	1.41	0	0	0	0	2	9	1.58

Panel (b): German Native Sample

	Mean	SD	P10	P25	P50	P75	P90	P99
Age	40.23	13.79	24	29	38	51	60	77
Female (0/100)	51.74	49.97	0	0	100	100	100	100
DE College (0/100)	32.93	47.00	0	0	0	100	100	100
N Friends	253.72	243.28	51	93	181	327	535	1535
N Groups	25.22	34.52	2	6	14	30	59	231
Qs Since 1st on FB in DE	31.87	8.26	18	33	36	36	36	36
N Local Native Friends	122.52	128.88	12	32	79	168	295	687
N Local Syrian Friends	0.09	0.34	0	0	0	0	0	2
Produces DE Content (0/100)	100.00	0.00	100	100	100	100	100	100
N Local Native Groups	3.98	4.92	0	1	2	5	10	26

Note: Table presents summary statistics describing users in our samples. Panel (a) shows users in the Syrian migrant sample. Panel (b) shows users in the German native sample. Each measure is winsorized at the 99% level. Section 1.1 describes the sample construction. Appendix 3 provides more information on how individual-level outcomes are defined. Appendix Table A1 provides additional summary statistics. The final column of panel (a) shows summaries of survey respondents, as described in Section 1.3. The demographics in this column are as of May 2024, rather than October 2021, as described in footnote 10.

Table 2: Survey Responses vs Measured Friending Integration at Individual Level

	Been Invited to Native Home		Invited Native to Own Home		Visited Restaurant with Native		Played Sports with Native		Freq. of Native Social Interactions	
N Local Native Friends	0.823*** (0.086)	0.779*** (0.105)	0.658*** (0.088)	0.628*** (0.105)	0.884*** (0.087)	0.797*** (0.107)	0.609*** (0.083)	0.396*** (0.116)	0.007*** (0.002)	0.006*** (0.002)
Control Covariates	X		X		X		X		X	
N	2,987	2,940	2,987	2,940	2,987	2,940	2,987	2,940	3,328	3,286
Sample Mean	42.85	42.69	54.6	54.69	44.69	44.8	33.38	33.37	4.053	4.051

Note: Table shows results of individual-level regressions of survey responses on the number of local native friends. The outcomes in columns 1-8 are responses to “Which of the following interactions with Germans have you had in the past year?” The sub-questions were: “I have been invited to a German friend’s home (for a dinner, a birthday party, etc.)” (columns 1-2); “I have invited a German friend to my home (for a dinner, a birthday party, etc.)” (columns 3-4); “I have gone to a restaurant, cafe, or bar with German friends” (columns 5-6); “I have played sports with German friends” (columns 7-8). Columns 9-10 show agreement with the statement “I have many social interactions with Germans in the city I live in” on a scale from 1 (strongly disagree) to 5 (strongly agree). Columns 2, 4, 6, 8, and 10 include (i) controls for age and gender; (ii) fixed effects for the number of quarters on Facebook in their current county and the number of quarters since arrival in Germany (we use a single dummy value for those for which we do not observe arrival); (iii) three linear controls for measures of Facebook usage: $\log(0.5 + \text{minutes on FB in the last 28 days})$, $\log(91 - \text{days on Facebook out of the last 90})$, $\log(1081 - \text{days on Facebook out of the last 1080})$; (iv) county fixed effects; and (v) controls for each user’s total number of friends outside Germany, total number of non-local/native groups joined, and total amount of content produced in the last year. Standard errors are clustered by county. Significance levels: *($p < 0.10$), **($p < 0.05$), ***($p < 0.01$).

Table 3: Concentration of Friendships Between Syrian Migrants and German Natives

Number of Migrant Friends	Share of Natives	Share Friendships to Migrants	Average Age		Share Male		Total Friends	
			Native	Migrant Friends	Native	Migrant Friends	Native	Migrant Friends
0	93.96%	0%	43.1	-	0.474	-	262	-
1	4.47%	44.6%	36.4	32.8	0.512	0.865	493	886
2-3	1.19%	26.8%	35.4	31.8	0.524	0.879	644	915
4-5	0.21%	9.0%	35.7	31.6	0.528	0.882	777	927
6-10	0.12%	8.7%	36.8	32.0	0.531	0.872	861	929
11-20	0.03%	5.5%	38.3	32.6	0.548	0.859	965	937
21-50	0.01%	3.7%	39.7	33.3	0.555	0.849	1119	956
51-100	0.002%	1.0%	42.9	33.6	0.601	0.845	1516	994
100+	0.0004%	0.6%	41.2	34.4	0.58	0.854	1981	1087

Note: Table shows summary statistics on Germans natives with various numbers of connections to local Syrian migrants. For example, the second row shows that about 4.5% of Germans have a single Syrian friend. These friendships make up 44.6% of all friendships between migrants and Germans. On average, Germans with 1 Syrian friend are 36.4 years old, and have 493 total Facebook friends. Their Syrian friends are, on average, 32.8 years old, and have 886 Facebook friends.

Table 4: Correlation Between County-Level Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Baseline Integration Measures							
(1) SY Migrants - N Local Native Friends	1.00						
(2) SY Migrants - Produced Content in DE	0.59	1.00					
(3) SY Migrants - N Local Native Groups	0.25	0.49	1.00				
(4) SY Migrants - N Local SY Friends	-0.03	-0.51	-0.41	1.00			
Panel B: Decomposition of Integration Measures							
(5) General Friendliness	0.62	0.29	-0.04	0.11	1.00		
(6) Relative Friending	0.73	0.51	0.40	-0.16	-0.05	1.00	
Panel C: Labor Market Integration Measure							
(7) Share Syrians in Employment or Training	0.45	0.59	0.13	-0.36	0.29	0.33	1.00

Note: Table presents correlations across county-level estimates. Panel A shows the regional averages of Syrian migrants after residualizing on measures of local German natives' intensive and extensive Facebook usage (see Section 2). Panel B shows the regional decomposition measures described in Section 3.1. Row 5 is general friendliness, generated as the regional average of German natives' local native friends after residualizing on local patterns of Facebook usage. Row 6 is relative friending, generated as the quotient from dividing the measure in row 1 by the measure in row 5. Panel C shows an external county-level measure of the share of all Syrians that are employed or in training programs according to data from the federal employment agency (see Appendix A16). Correlations are weighted by the number of Syrian migrant users in each county. Appendix Table A6 presents analogous signal correlations, which remove noise due to sampling error from the correlations.

Table 5: County-Level Relationship Between Integration Measures

	Friending Integration		Language		Employment / Training	
General Friendliness	1.098***		0.183***		0.558***	
	(0.13)		(0.07)		(0.08)	
Relative Friending	1.056***		0.255***		0.459***	
	(0.07)		(0.03)		(0.06)	
Friending Integration			0.228***		0.494***	
			(0.04)		(0.05)	
N	401	401	401	401	385	385
R-Squared	0.408	0.664	0.367	0.374	0.353	0.356

Note: Table shows results from multivariate regressions exploring the county-level relationship of integration measures with general friendliness and relative friending. In every specification, the outcomes and all controls are measured in logs. The outcomes are friending integration (columns 1 and 2), the share of Syrian migrants on Facebook who produce German content (columns 3 and 4), and the share of Syrians employed or in training programs (columns 5 and 6) according to data from the federal employment agency (see Appendix A16). Regressions are weighted by the number of Syrian migrants in the Facebook data. Significance levels: *($p < 0.10$), **($p < 0.05$), ***($p < 0.01$).

Table 6: County-level Multivariate Relationships with Friending Integration

	Friending Integration		General Friendliness		Relative Friending		Language	
Average Age	-0.032 (0.02)	-0.034* (0.02)	-0.034*** (0.01)	-0.034*** (0.01)	0.015 (0.02)	0.003 (0.02)	-0.005 (0.01)	-0.011* (0.01)
Log Pop. Density 2018	-0.098* (0.05)	-0.136*** (0.03)	-0.029 (0.03)	-0.071*** (0.02)	-0.066** (0.03)	-0.058** (0.03)	-0.034** (0.01)	-0.016 (0.01)
Log Average Income (in EUR)	-0.198 (0.26)	0.140 (0.18)	0.168 (0.14)	0.097 (0.10)	-0.296 (0.20)	0.054 (0.15)	0.070 (0.08)	0.035 (0.06)
Log % Unemployed	-0.056 (0.09)	-0.291*** (0.09)	-0.108*** (0.04)	-0.065* (0.04)	0.015 (0.07)	-0.209*** (0.07)	-0.129*** (0.03)	-0.032 (0.03)
Vote Share AFD European Elections 2014	-8.953*** (2.64)	-6.167*** (1.92)	-1.939** (0.85)	-1.039 (0.69)	-6.917*** (2.29)	-5.091*** (1.55)	-0.569 (0.68)	-1.289** (0.65)
Number of ProAsyl Groups per Pop	4.778* (2.55)	4.286*** (1.40)	-1.381 (1.22)	-0.341 (0.76)	4.876*** (1.69)	3.167** (1.29)	3.557*** (0.85)	1.558** (0.62)
Log Fraction of Syrians 2010	0.105*** (0.02)	0.150*** (0.02)	0.025*** (0.01)	0.030*** (0.01)	0.067*** (0.02)	0.114*** (0.02)	0.019** (0.01)	0.043*** (0.01)
Log Fraction of Syrians 2019	-0.239*** (0.08)	-0.135*** (0.05)	-0.048* (0.03)	-0.065*** (0.02)	-0.117** (0.05)	-0.060 (0.04)	-0.044* (0.02)	-0.103*** (0.02)
Log Int. Courses Completed 2015-19 per Syrian	0.235*** (0.05)	0.200*** (0.04)	0.005 (0.02)	-0.013 (0.02)	0.222*** (0.04)	0.202*** (0.03)	0.076*** (0.02)	0.052*** (0.01)
State FE		x		x		x		x
R-squared	0.487	0.709	0.261	0.665	0.330	0.633	0.519	0.668
N	390	390	390	390	390	390	390	390

Note: Table presents results from regressions of various county-level measures on the logs of friending integration (columns 1 and 2), general friendliness (columns 3 and 4), relative friending (columns 5 and 6), and language (columns 7 and 8). The regional measures are average age, log 2018 population density; log average income, log employment rate; the vote share for the Alternative for Germany, demeaned by state, pro-immigration groups per capita; log of the shares of the population that were Syrian in 2010 and 2019, and log of the numbers of integration courses completed from 2015-2019 per Syrian. For more information on each measure see Appendix Table A16. Regressions are weighted by the number of Syrian migrants in the Facebook data in columns 1-2 and 5-8. Regressions in columns 3 and 4 are weighted by the number of natives in the Facebook data. Standard errors are shown in parentheses. Significance levels: *(p<0.10), ***(p<0.05), ***(p<0.01)

Table 7: Integration Courses and Teacher Unemployment Rates

	Log Integration Courses per Syrian 2015-19			
Log Unemp. General Schools Teachers 2014 per Syrian	0.103*			
	(0.06)			
Log Unemp. Vocat. School Teachers 2014 per Syrian		0.089*		
		(0.05)		
Log Unemp. Driving and Sports Teachers 2014 per Syrian			0.056	
			(0.06)	
Log Unemp. Other School Teachers 2014 per Syrian				0.234***
				(0.05)
Control Covariates	x	x	x	x
Control Log General Unemployment Rate	x	x	x	x
F-statistic	3.44	4.43	1.17	23.56
N	390	387	388	390
R-Squared	0.398	0.401	0.394	0.427

Note: Table presents results from county-level regressions between various 2014 teacher unemployment rates per Syrian and integration course completion. The outcome is the log of the number of integration courses completed per Syrian between 2015 and 2019. In all regressions we control linearly for the log of the share of the population unemployed, the number of unemployed people per Syrian (as of 2014) as well as average age, log population density, log average income and log number of open training positions per applicant. Regressions are weighted by the total number of Syrians in each county as of 2019. Standard errors are shown in parentheses. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01)

Table 8: IV Estimates - Measures of Integration and Integration Courses

	Integration	General Friendliness	Relative Friending	Language	Employ. / Training
Log Integration Courses per Syrian	1.792*** (0.34)	0.154 (0.17)	1.542*** (0.27)	0.342*** (0.07)	0.902*** (0.15)
Control Covariates	x	x	x	x	x
Control Log General Unemployment Rate	x	x	x	x	x
N	390	390	390	390	384

Note: Table presents results from county-level IV regressions of various measures related to integration on the completion of integration courses. We instrument for integration courses with the 2014 total number of unemployed “other” per Syrian. In both stages of our estimation we include the same controls as in Table 7. The outcomes are overall friending integration (column 1), general friendliness (column 2), relative friending (columns 3), the share of Syrian migrant Facebook users producing content in German (column 4), and the share of all Syrians employed or in training programs (column 5). All dependent variables are specified in logs. Regressions are weighted by the total number of Syrians as of 2019 except when the outcome variable is general friendliness in which case we weight by the number of German natives in the Facebook data. Standard errors are shown in parentheses. Significance levels: *($p < 0.10$), **($p < 0.05$), ***($p < 0.01$)

Table 9: Outcomes vs Measured Friending Integration at Individual Level

	Native Friend Helped Find Job		Native Friend Helped Find Housing		Native Friend Helped with School		Native Friend Helped with Bureaucracy		Native Friend Helped with Healthcare	
N Local Native Friends	0.497*** (0.095)	0.347*** (0.109)	0.370*** (0.096)	0.375*** (0.121)	0.159* (0.084)	0.191* (0.102)	0.444*** (0.095)	0.375*** (0.109)	0.131 (0.090)	0.084 (0.112)
Control Covariates	X		X		X		X		X	
N	2,738	2,687	2,738	2,687	2,738	2,687	2,738	2,687	2,738	2,687
Sample Mean	48.32	48.49	47.59	47.45	26	25.98	54.67	54.45	32.58	32.45

Note: Table shows results of individual-level regressions of survey responses about real outcomes on the number of local native friends. The outcomes in all columns are responses to the question “Do you have German friends or acquaintances that have helped you or a member of your family? If so, please select all the ways in which they have helped.” The sub-questions were: “Finding a job” (columns 1-2); “Finding an apartment or place to live” (columns 3-4); “Completing school work” (columns 5-6); “Navigating the bureaucracy (filling out official documents, identifying the right people to speak to, etc.)” (columns 7-8); “Navigating the healthcare system (finding doctors, scheduling appointments, etc.)” (columns 9-10). Columns 2, 4, 6, 8, and 10 include the same controls used in 2, including for age, gender, county, and measures of Facebook usage. Standard errors in these columns are clustered by county. Significance levels: *(p<0.10), **(p<0.05), ***(p<0.01).

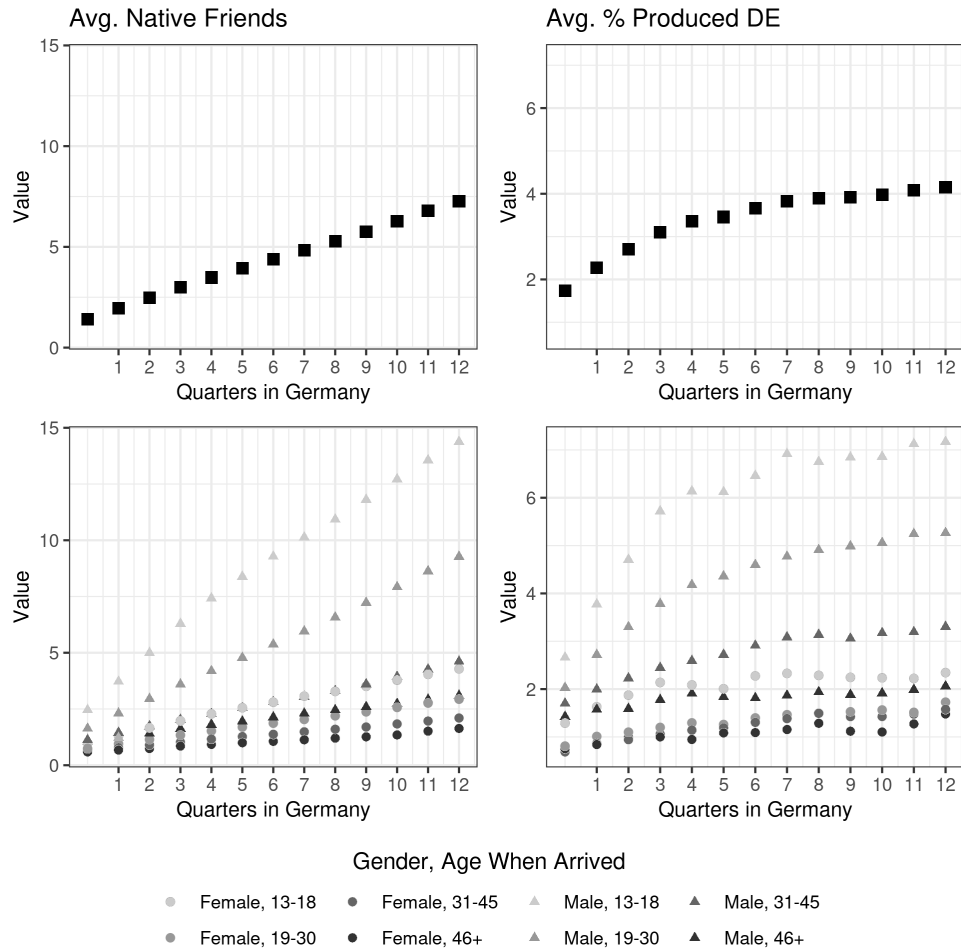
Table 10: Impacts of High School Exposure on Friendship

	Syrian Friends		Syrian Friends (Excluding Classmates)		Syrian Friends (Excluding Syrian Classmates and their Friends)	
Syrian in Cohort	0.020*** (0.002)	0.020*** (0.002)	0.005*** (0.002)	0.005*** (0.002)	0.005*** (0.001)	0.005*** (0.001)
Syrian in Cohort x Standardized Cohort Size		-0.007*** (0.001)		-0.003*** (0.001)		-0.003*** (0.001)
School FE	X	X	X	X	X	X
Birth Year x County FE	X	X	X	X	X	X
N	115,625	115,625	115,625	115,625	115,625	115,625
Mean in Control Cohort	0.054	0.054	0.029	0.029	0.027	0.027

Note: Table presents results from regressions of the form outlined in Equation 4. The sample includes Germans who were assigned to a high school cohort pair where the younger cohort contains a Syrian and the older cohort does not. The treatment years include students who entered kindergarten between 2001 and 2004, while students in the paired control cohorts entered kindergarten between 2002 and 2005. In columns 1-2, we include all Syrian friends that a user makes; in columns 3-4, we only include Syrian friends who did not attend the user's high school; and in columns 5-6 we only include Syrian friends who did not attend the user's high school and who did not have a prior friendship with a Syrian that attended the user's high school. In all columns, we include only Syrian friends made in the first 21 years of a person's life, in order to avoid mechanically calculating larger treatment effects for older users. All users in our sample have already turned 21. In all columns, we cluster standard errors at the school and cohort level. *(p<0.10), ***(p<0.05), ***(p<0.01)

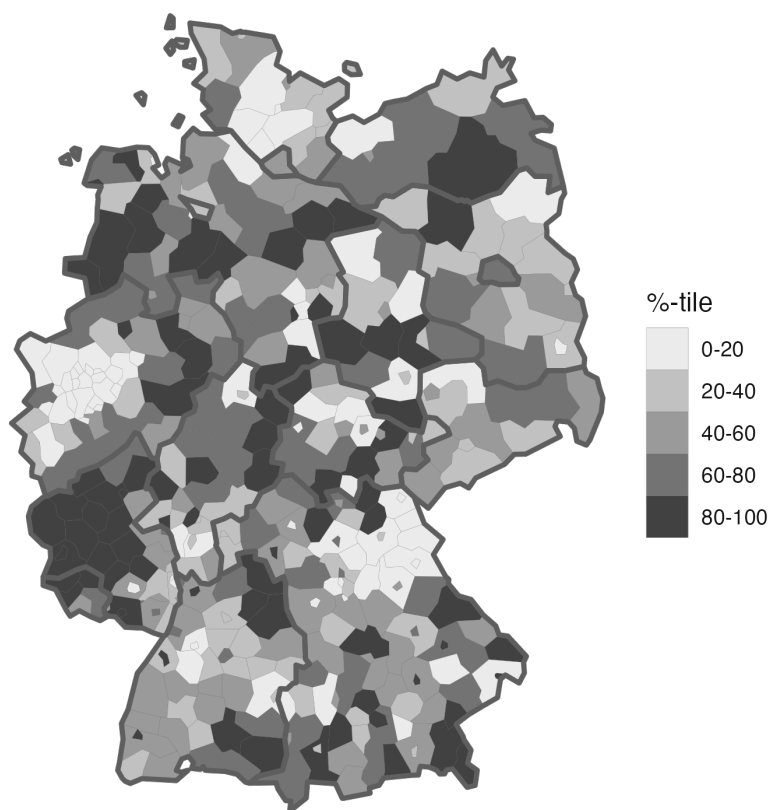
9 Figures

Figure 1: Integration Over Time For 2015-16 Arrival Cohort



Note: Figures show the average values, by quarter since they arrived in Germany, of integration measures for users in the Syrian migrant sample with an observed arrival in 2015 or 2016. The measures are total native friends (left column) and the share of content produced in German (right column). Appendix 3 provides more details on each measure. The top row shows overall trends. In the bottom row each observation's shape and color represents a gender-by-age group.

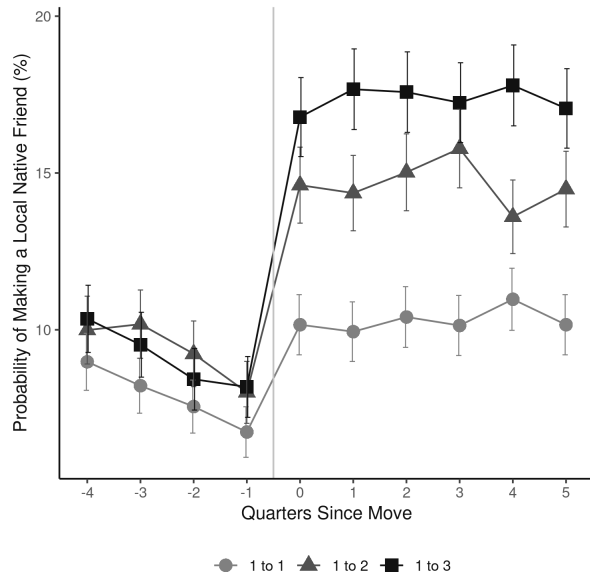
Figure 2: Regional Estimates of Integration – Friending to Native Locals



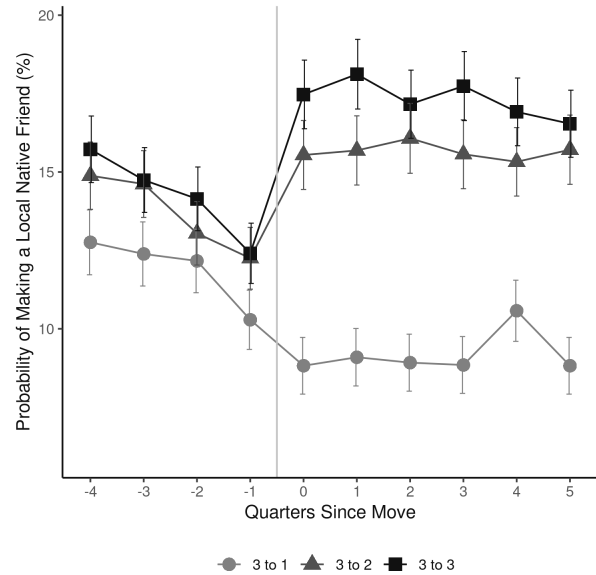
Note: Figure shows county-level estimates of Syrian migrant integration based on the average number of local native friends among Syrian migrants in each county (residualized on regional patterns of German natives' Facebook usage). Colors correspond to measure ventiles. Darker areas indicate the counties with the highest integration levels. The county-level estimates are reported in Appendix [15](#).

Figure 3: Change in Syrian Migrants' Friending of Local Natives Around a Move

(a) Moving From Bottom Integration Tercile

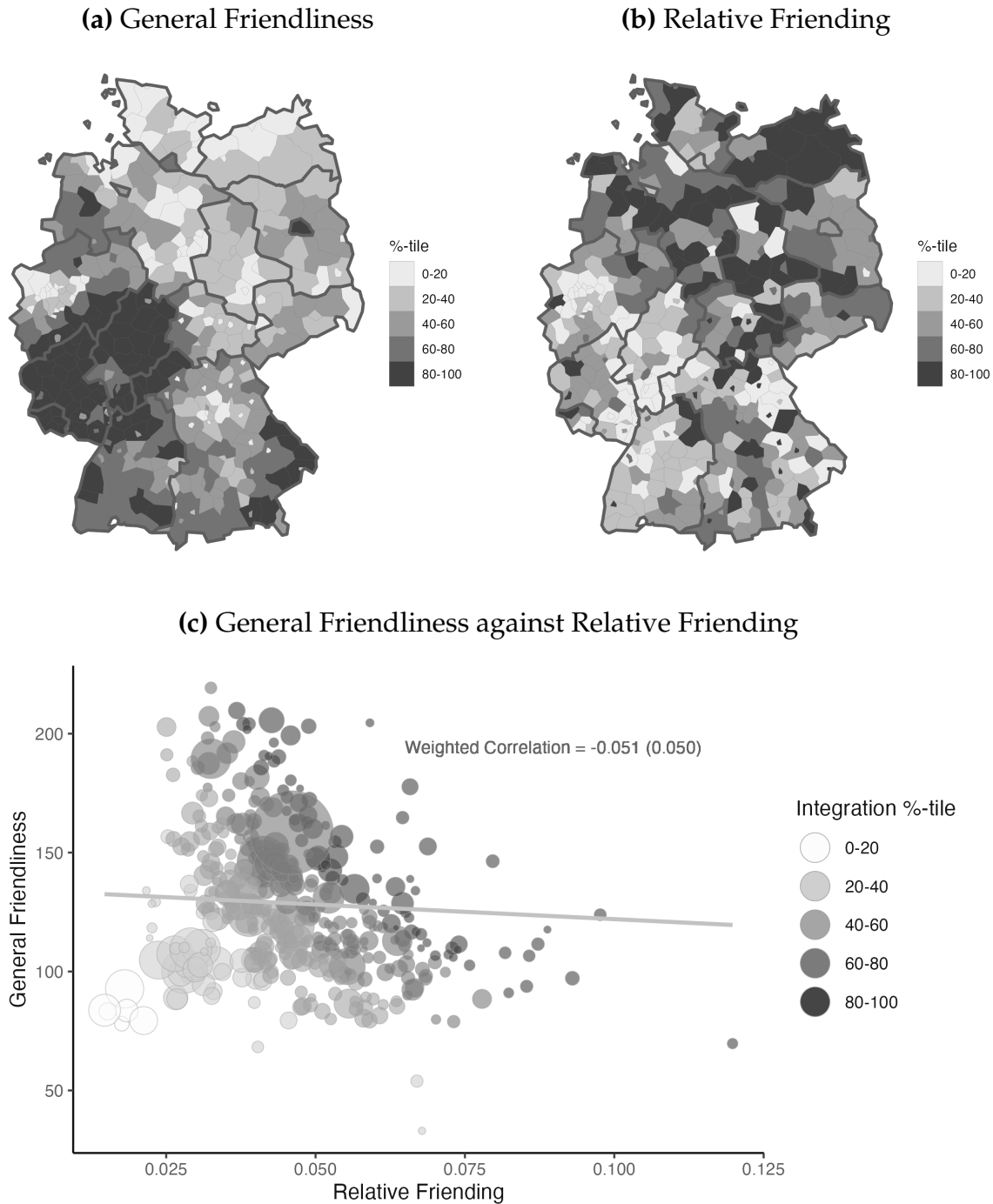


(b) Moving From Top Integration Tercile



Note: Figures show the quarterly probability that a moving Syrian migrant befriends at least one local German native, relative to the timing of the migrant's move. The population is Syrian migrant users who moved between non-neighboring counties and were in the first and second county for 4+ and 6+ consecutive quarters, respectively. Counties are grouped into terciles (weighted by the number of Syrian migrant users) of the regional friending-based measures of integration in Figure 2. Panels (a) and (b) limit to users who move from a county in the bottom and top tercile of integration, respectively. The different lines show movers to counties in each of the three terciles of social integration. The individual-level outcomes are residualized by the regional measures of Facebook usage described in Section 2. Bars display 95% confidence intervals of the estimates.

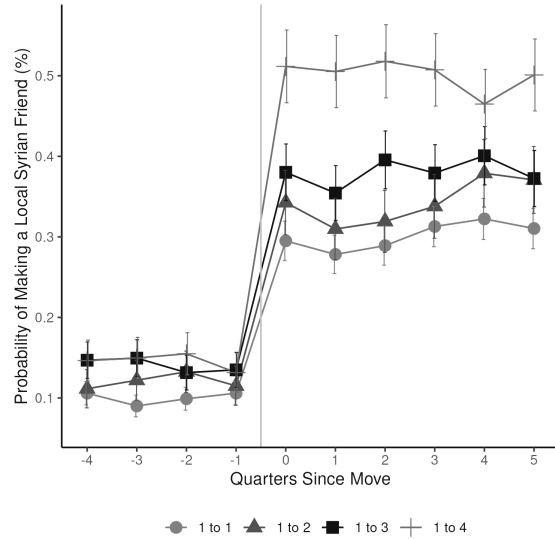
Figure 4: Regional Estimates of General Friendliness and Relative Friend-
ing



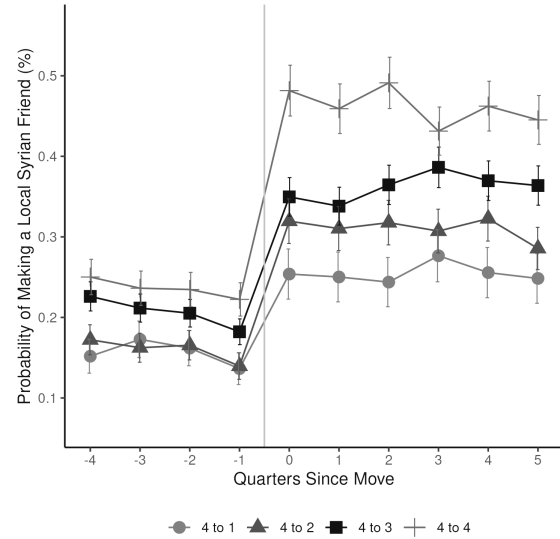
Note: Panel (a) shows county-level estimates of general friendliness, the average number of local native friends among natives in each county (residualized on Facebook usage). Panel (b) shows county-level estimates of relative friending, given by the ratio of the overall friending integration measures and general friendliness (see equation 1, also residualized on Facebook usage). Colors correspond to measure ventiles. Darker colors indicate counties with higher values of general friendliness and relative friending, respectively. Panel (c) shows a county-level scatter plot of relative friending against general friendliness. The size of the bubbles corresponds to the number of Syrian migrants in the county. Darker colors indicate counties with the highest friending integration levels (mapped in Figure 2). The county-level estimates are reported in Appendix 15.

Figure 5: Change in Natives' Friending of Local Syrian Migrants Around a Move

(a) Moving from Bottom Integration Quartile

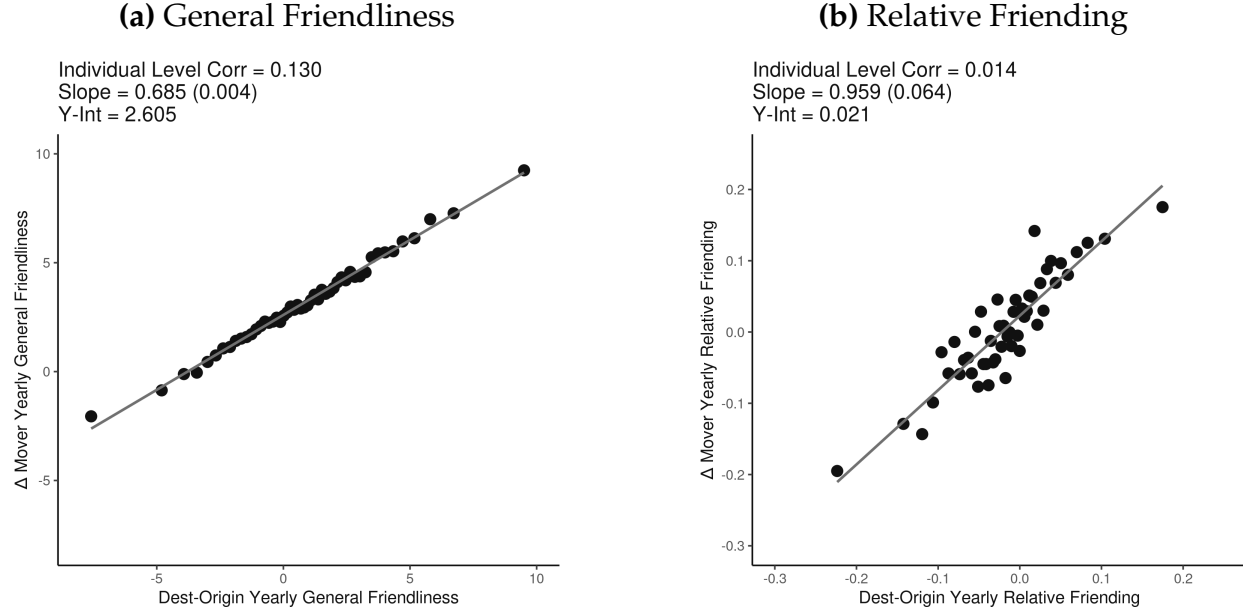


(b) Moving from Top Integration Quartile



Note: Figures show the quarterly probability that a moving German native befriends at least one local Syrian migrant, relative to the timing of the native's move. The population is German native users who moved between non-neighboring counties and were in the first and second county for 4+ and 6+ consecutive quarters, respectively. Counties are grouped into quartiles (weighted by the number of German native users) of the regional friending-based measures of integration in Figure 2. Panels (a) and (b) limit to users who move from a county in the bottom and top quartile of integration, respectively. The different lines show movers to counties in each of the four quartiles of social integration. The individual-level outcomes are residualized by the regional measures of Facebook usage described in Section 2. Bars display 95% confidence intervals of the estimates.

Figure 6: Δ Native Mover Behaviors vs. Matched Non-Movers



Note: Figures show binned scatter plots describing the change in the friending behavior of German natives before and after a move within Germany. The population is German native users who moved between non-neighboring counties and were in the first and second county for at least 4 consecutive quarters each. In both panels, the y-axis displays $y_{i,t}^{\Delta}$, an individual level change in movers' behavior the year before vs. after the move, and the x-axis displays $\hat{x}_{i,t}^{\Delta}$, the difference in average outcomes for comparable non-movers at the same time. In panel (a), the outcome is the change in the number of local German native friends made (*yearly general friendliness*) between the years. In panel (b), the outcome is the change in the ratio of the number of local Syrian migrant vs. local native friends, divided by the ratio of the number of local Syrian migrants vs. natives in the Facebook data (*yearly relative friending*) between the years. Panel (b) excludes users who make no local native friends in either the year before or after the move. In both panels we match each mover to a set of non-movers who match on gender and age buckets (18-29, 30-44, 45+). We include observations for which there are at least 1,000 non-movers in both the origin and destination match groups. Both panels include quarter-of-move fixed effects. We correct for sampling error in the x-axis measures by randomly splitting the individual-level non-mover data into two halves and instrumenting for one set of averages with the other. See Appendix 5 for more information this procedure. Standard errors are shown in parentheses.