Where do immigrants move in Germany? The role of international migration in regional disparities in population development

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Abstract
We examine the impact of foreign migration on regional disparities in population development in Germany by analysing spatial patterns and determinants at the county level for the period of 2007–2017. Counterfactual analyses show that international migration has been the major component of population growth across German regions. However, immigration has mainly been directed towards large cities and highly urbanised areas and has therefore reinforced the existing spatial disparities in population development. Spatial econometric models nonetheless reveal that international migrants are not attracted by agglomeration per se. The location choices of international migrants were mainly driven by existing regional ethnic networks and factors that are related to different personal life stages, such as education or changes in family status. Furthermore, the estimated regional determinants vary strongly across migrant groups from different geographical backgrounds as well as between the external and internal migration of foreigners.

KEYWORDS
counterfactual analysis, domestic migration, international migration, population development, spatial autoregressive model

1 | INTRODUCTION

Since the beginning of the 21st century, Germany has become one of the major destination countries for international migrants from European countries as well as from more distant regions of origin (OECD, 2014). The reasons for the increasing immigration rates range from increased labour mobility following the enlargement of the European Union (EU) to the severe economic decline after the global financial crisis in 2008 in many Southern European countries and to political crises and civil wars, particularly in some Middle Eastern countries.

Most recently, since the massive influx of refugees from Syria and Iraq in 2015, immigration has been one of the most controversial and debated topics in Germany and many other European countries. In addition to aspects of internal security and the (macro) economic costs and benefits of immigration, the national and regional distribution patterns of migrants have been some of the core issues of those debates.

Similar to many other countries of the global north, Germany has long suffered from demographic change and a shrinking domestic population. Hence, net immigration has become one of the major sources of population growth (Champion, 1994) and an indispensable factor affecting future demographic and economic stability (Livi Bacci, 2018). However, the spatial patterns of demographic change and population shrinkage as well as of foreign migration to Germany are far from being clear-cut and stable (see Figure 1). In recent years,
Germany—like the United States and other Western European countries—has experienced a period of significant reurbanisation (Dembski et al., 2019; Glaeser & Gottlieb, 2006), involving the movement of particularly highly educated young adults to large cities (Siedentop, Zakrzewski, & Stroms, 2018) and a drastically declining and ageing population in many small cities and rural areas, especially in eastern Germany (Gans & Schlömer, 2014a; Sander, 2014). Given that foreign migrants have been strongly concentrated in large western German cities in the past (Gans & Schlömer, 2014b) and that international immigration has significantly contributed to the population growth of the largest cities (Gans, 2000, 2018), one could assume that the increasing net immigration rates since the mid-2000s have reinforced the above-mentioned patterns of spatial divergence (Bucher, Martina, & Schlömer, 2002).

Conversely, there is growing evidence from other European countries of increasing proportions of foreign migration to non-metropolitan areas (Collantes, Pinilla, Sáez, & Silvestre, 2014; Fonseca, 2008; Hugo & Morén-Alegrét, 2008; Janská, Čermák, & Wright, 2014; Kasimis, 2008). This phenomenon, although largely neglected by policymakers and researchers alike, raises the question of whether foreign migration could actually play a role in counteracting population decline and maintaining demographic and economic sustainability in small cities and rural regions. Despite the fact that Germany, even before the peak of the recent refugee movement in 2015, was the world’s second most popular international migrant destination (OECD, 2014), the regional implications of foreign migration are largely unresearched. This is surprising insofar as the spatial patterns and determinants of international migration have important implications for regional development and the degree of demographic and economic disparities within a host country. Although there have been some very recent efforts to explain the spatial patterns of foreign employment (Lehmann & Nagl, 2019) and the location choices of EU migrants in the aftermath of the 2009 financial crisis (Tanis, 2020), the consequences of foreign migration for regional development and spatial divergence or convergence processes in Germany still remain a remarkable gap in the research.

This paper aims to fill this gap by analysing the spatial patterns of foreign migrants at the county level (NUTS3) between 2007 and 2017. We map the spatial patterns of foreign migration towards and within Germany and carry out counterfactual analyses to examine how foreign migration has contributed to reinforcing or counteracting the spatial polarisation of population development. The results show that while international migration has been an important and positive factor for population development in all types of German regions, foreign migrants have been strongly attracted by highly urbanised regions. Thus, immigration has reinforced the existing spatial polarisation in demographic development.

However, spatial regression models with a large set of explanatory variables reveal that international migrants are not attracted by agglomeration per se. Instead of by the degree of urbanisation, the location choices of international migrants were mainly driven by existing regional ethnic networks and factors that are related to different personal life stages, such as education or changes in family status. In addition, we found that the estimated regional determinants vary strongly across migrant groups from different geographical backgrounds as well as between the external and internal migration of foreigners. In strong contrast to the internal migration of German citizens, economic factors such as unemployment rates and the structural transformation towards a service and knowledge economy play only a minor role in the sub-national spatial patterns of international migration.

Our results not only are of empirical interest regarding the specific German context but also contribute to a relatively small but growing literature on the interlinkage between internal and international migration studies (for an overview, see Ellis, 2012; King & Skeldon, 2010). Moreover, they have a high policy relevance at different spatial tiers, entailing important implications for the design of national distribution policies for asylum seekers and appropriate regional strategies for regions to attract and maintain foreign migrants.
2 | LITERATURE REVIEW

The primary goal of this paper is to assess the role of immigration in regional differences in population development. Thus, it must necessarily relate to the literature on (i) the general patterns and determinants of internal (interregional) migration, (ii) the subnational spatial distribution/location choices of international migrants, and (iii) approaches addressing the interlinkages between international and internal migration flows.

The former strand of literature is—at least regarding the developed countries of the global north—strongly focused on the question of whether economic opportunities or natural and man-made (cultural) amenities are the primary pull factors of domestic migration (Greenwood & Hunt, 1989). We discuss amenities equivalent to quality of life-related factors, such as safety, cultural and entertainment facilities, or outdoor activities and recreation, which are complementary push/pull factors next to regional labour market conditions (Marans & Stimson, 2011; Niedomysl & Hansen, 2010). Although the scientific debate around this question is ongoing, there exists abundant evidence that both categories are important predictors of interregional migration flows (e.g., for Germany, see Buch, Hamann, Niebuhr, & Rossen, 2014). Further, some authors have shown that the preferences for labour market and/or quality of life-related factors vary across the different personal life cycle stages (Chen & Rosenthal, 2008; Ferguson, Ali, Olfter, & Partridge, 2007; Heider, 2019b) and socio-economic backgrounds of migrants (Niedomysl & Hansen, 2010).

In contrast to the literature on the determinants of internal migration, the literature on the spatial distribution and location choices of international migrants is less focused on amenities versus economic opportunities. Most studies on the spatial distribution of international migrants in host countries found that migrants are strongly concentrated in large and dense metropolitan areas (Bartel, 1989; Chiswick & Miller, 2004). Although this phenomenon can partially be attributed to the fact that large agglomerations are better equipped with economic opportunities and certain urban amenities, the concentration of immigrants in particular cities can, in general, be described as a self-reinforcing process. Pioneer immigrants settle in certain cities that are geographically or relationally close to their origin country (e.g., in border cities) or that are important hubs within a globalising economy (Benton-Short, Price, & Friedman, 2005; Friedmann, 1986). This leads to the rise of so-called gateway cities (Price & Benton-Short, 2008), with large ethnic networks attracting new immigrants. Those newcomers benefit from ethnic networks in two ways. First, ethnic networks reduce the costs of migration by lowering potential barriers (e.g., culture and language) and providing direct assistance (e.g., access to housing and labour markets). Second, ethnic networks are an important source of information and information updates for potential subsequent immigrants in origin countries (Winters, De Janvry, & Sadoulet, 2001). In this context, network effects seem to be stronger for immigrants from low-income countries compared with high-income countries (Pedersen, Pytlíkova, & Smith, 2008). A growing number of studies have found evidence that existent ethnic networks are a major factor, especially for the initial location choices of international migrants (e.g., Bartel, 1989; Nowotny & Pennerstorfer, 2019; Tanis, 2020). The spatial distribution of foreign migration within host countries should therefore be strongly persistent.

However, in many countries of the developed world, there is also growing evidence of immigration to areas outside these traditional arrival cities. This development involves the rise of not only new immigrant gateways in second-tier cities and suburban regions (Janská et al., 2014; Painter & Yu, 2008; Singer, Brettell, & Hardwick, 2008), but also foreign migration to rural areas (Collantes et al., 2014; Fonseca, 2008; Hugo & Morén-Alegret, 2008; Kasimis, 2008). Although this relatively recent trend can be partially explained by studies in the realm of spatial assimilation theory, which posits that with increasing assimilation, immigrants are likely to move away from ethnic neighbourhoods (Massey, 1985; Massey & Denton, 1985) and that the impact of ethnic networks decreases for subsequent (internal) movements of international migrants (Bartel, 1989; Funkhouser, 2000), there is also evidence that new immigrant destinations attract migrants directly from abroad (Painter & Yu, 2008, p. 1163). Thus, the narrative of international migration as an entirely urban phenomenon no longer holds.

Finally, the empirical research conducted in this paper also relates to a strand of literature examining the interlinkages between immigration and internal migration flows. Many studies in this realm are based on the hypothesis that the native citizens who are most vulnerable to immigrant competition for jobs would leave regions with high levels of immigration (see, e.g., Card & DiNardo, 2000; White & Imai, 1994; Wright, Ellis, & Reibel, 1997). This flight of the native-born from immigration would, in the long run, result in a “demographic balkanisation” of host countries (Frey, 1995). The evidence on this redistribution mechanism is ambiguous. Some studies on the United States have found that particularly low-skilled natives, presumably the group most exposed to immigrant labour market competition, have indeed left areas of high immigration (Frey, 1995; Frey & Liaw, 1998). Other researchers have countered these findings by showing that immigration has little or no effect on internal migration (Card & DiNardo, 2000; White & Imai, 1994) and that the measurement of this linkage is extremely sensitive to model specification and the scale and sample of the observed units (Wright et al., 1997). In addition, for some European countries, there is evidence that international migration has played a fundamental role in the revival of rural regions that have gone through long phases of demographic shrinkage due to low fertility rates and outmigration, especially of young and skilled native citizens (Collantes et al., 2014; Kasimis, 2008). In this context, immigrants were especially important in feeding the labour demand of a thriving agricultural sector. Thus, the causal linkage between external and internal migration flows might be the other way around, and immigration could, in the future, play a crucial role in counteracting regional population shrinkage.
3 | DATA AND DEFINITION OF MIGRANT SUBGROUPS

Research on the subnational patterns and determinants of international migration in destination countries has often been limited due to severe data restrictions. Many studies are therefore based on rather representative survey data (Bartel, 1989; Chiswick & Miller, 2004; Tanis, 2020) and/or take a strictly cross-sectional perspective (Lymperopoulou, 2013, Lehmann & Nagl, 2019). In this regard, the relatively strict German registration law and the related administrative statistics—which provide the most important base for this paper—represent an interesting exception. The figures published by the federal statistical office (DESTATIS) report annual migration flows of foreign citizens for each German county and distinguish between internal and external migration. Moreover, they differentiate between migrants from different origin regions (e.g., pre-2004 EU member states, new EU member states, different continental subregions). Hence, our empirical analysis is able to distinguish not only between initial and subsequent migratory movements of non-natives to and within Germany but also between migrants from different regional backgrounds with different initial purposes of migration (e.g., European labour migration, refugees, etc.).

Within the restrictions of these predefined groups of origin countries, we choose to focus on five country groups that are essentially representative of the most important migratory movements towards Germany during the observed period: EU15 countries ("Western" EU member states before May 2004), EU13 countries (new "Eastern" members after May 2004), the "rest of Europe" (all European states without EU membership), the Middle East (17 states in Southwest Asia), and the "rest of the world" (all other countries not yet included). It must be noted that the composition of these five geographical subgroups strongly differs between the net immigration between 2007 and 2017 (relevant for external migration patterns) and the total migrant stock in 2017 (relevant for internal migration patterns; see Figures S1 and S2). According to Frey (1995), international migration might influence native-born domestic migration. Therefore, we also integrated the migration of the German population as a reference group into some of our analyses.

For the entire period from 2007 to 2017, Germany gained a surplus of almost 5 million immigrants. After an initial decline, the net immigration to Germany has dynamically developed since 2009 (see Figure 4.1). The immigration of Western Europeans has played an important role since 2009, when the economic crisis hit the Southern European states and triggered an increasing amount of work-related and educational migration to Germany. In addition, the enlargement of the EU in 2004 and 2007 resulted in the freedom of movement of workers from the new eastern member states. As a consequence, there was also a continuous increase in economically motivated migration from those countries. The total immigration throughout the observed period, but especially since 2009, has been significantly influenced by Eastern Europeans.

Whereas the period from 2009 to 2012 can therefore be characterised by a significantly increasing migration gain, the period from 2013 to 2017 was outstanding, with a surplus of over half a million migrants per year. In particular, extreme values with a surplus of approximately 1 million migrants were registered for the years 2015 and 2016. The most important origin regions of immigrants in those years were Middle Eastern countries. This group mainly included war refugees from Syria and Iraq.1 The two remaining subgroups, the "rest of Europe" and the "rest of the world," were rather heterogeneous. Both involved refugees (e.g., from the Ukraine or Afghanistan) and migrants with work- or education-related motives (e.g., from China or India). Hence, the migration balances of "Middle East" and the "rest of the world" drastically increased due to war refugees in 2015 and 2016. Since then, the stronger regulation of refugee migration towards the EU and Germany has led to a rapid decline in immigration from these countries. However, the migration surplus in 2017 was still high compared with the end of the 2000s.

The German registration system was overstrained by this influx of refugees, leading to severe limitations in data quality for the years 2015 and 2016 (DESTATIS, 2019b; DESTATIS, 2020a). These limitations especially pertain the above-defined subgroups—"Middle East" and the "rest of the world." To avoid any wrong inferences due to bad data quality, we have subdivided most of our empirical analyses into two subperiods (2007–2014 and 2015–2017). Whereas the results for the first period should be largely unbiased, the results for the latter period, in particular for the aforementioned groups of origin countries, have to be interpreted with caution. For the regression analysis in Section 5, we have therefore completely omitted the critical period2

In the latter section, the above-described migration figures have been additionally combined with a comprehensive set of contextual variables measuring potential push and pull factors of immigration, such as demographic and economic factors as well as amenities, and geographic accessibility (see Section 5.1). These indicators were provided by the INKAR database of the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR, 2020) and by the German police crime statistics (Bundeskriminalamt, 2008).

4 | PATTERNS OF FOREIGN MIGRATION ACROSS GERMAN COUNTIES

4.1 | Basic indicators and county typology

In Section 4, we will present the main patterns of foreign migration in Germany from a regional perspective. First, we will introduce important indicators of this study and a county typology, allowing us to discuss basic trends of population change and migration along an urban-rural gradient (Section 4.1). Then, we analyse the spatial patterns of the external and internal migration of foreigners and Germans as reference group. In addition, we focus on the total migration impact of the various subgroups of foreigners as described above (Section 4.2).

In order to address the role of foreign migration in regional population development along the urban-rural gradient, we present relatively simple counterfactual analyses (see also Collantes et al., 2014). Therefore, we compare the real population growth rates3 across

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1. For a detailed description of the origin regions and the reasons for immigration, see Section 4.2.
2. This is especially true for the migration balances of the "rest of the world" and "Middle East" (Section 5).
3. The growth rates are calculated as the difference between the population change due to migration and the natural increase (births minus deaths) and are thus not net growth rates.
different subtypes of regions to a set of alternative “no migration scenarios” (NMS) without the contribution of a specific group of migrants. The NMS are calculated as the difference in total population stock \( P \) at the end \( t_1 \) and beginning \( t_0 \) of the observation period minus internal and/or external immigration \( I \) and plus internal and/or external outmigration \( E \) of a chosen subgroup \( g \) within this period \( t_1 - t_0 \) divided by the total number of inhabitants \( P \) in the baseline year.

\[
NMS_{t_1-t_0}^{g} = \frac{P_{t_1} - P_{t_0} - I_{g,t_1-t_0} + E_{g,t_1-t_0}}{P_{t_0}}
\]

The respective net contribution of a specific kind of migration to total population change can be expressed by the net migration rate (NMR). This measure indicates the difference between the migration inflow \( I \) and the outflow \( E \) of a specific subgroup of migrants \( g \) in county \( i \) within the period \( t_1 - t_0 \) divided by the total number of inhabitants \( P \) in the baseline year.

\[
NMR_{t_1-t_0}^{g} = \frac{I_{g,t_1-t_0} - E_{g,t_1-t_0}}{P_{t_0}}
\]

Our typology of German counties (see Figure 2) is closely related to the typology of the Federal Institute for Research on Building, Urban Affairs and Spatial Development (Siedlungsstrukturelle Kreistypen; see BBSR, 2019). This topology mainly refers to the level of urbanisation and density, and it distinguishes between (i) larger cities (with more than 100,000 inhabitants), (ii) highly urbanised counties, (iii) less urbanised counties, and (iv) rural counties according to their population share in urban areas and their population density. Due to the relevance of large cities in the context of foreign migration, we subdivided the first category into “large cities” (over 500,000 inhabitants) and “medium-sized cities” (between 100,000 and 500,000 inhabitants). The second category mainly indicates the suburban areas of large- and medium-sized cities as well as some smaller cities. Therefore, this type will be called “suburban counties” hereinafter. Finally, the remaining two categories were grouped into one type of “rural” county due to minor differences regarding their relevance for international migration. To answer the question of whether population shrinkage in German counties has been reduced or even compensated by foreign migration, we distinguish not only between the different county types defined above but also between counties that were either growing or shrinking during the observed period (2007–2017).

### 4.2 Spatial distribution and impact of foreign migration

Tables 1 and 2 give an overview on population development and the impact of internal and external migration of non-German and German citizens across the above-defined county types for both subperiods 2007 to 2014 and 2015 to 2017. The respective impact of total foreign migration on individual counties for the total period is illustrated in Figure 3. Considering the real population development, one can observe significant different patterns of growth and shrinkage between the two observed periods. Whereas from 2007 to 2014, differences between shrinking and growing as well as rural and urban units can be identified, all county types experienced positive population development from 2015 to 2017. Yet, growth rates were significantly higher in urbanised areas.

Overall, migration has had a huge impact on regional population development. Considering the total NMRs, a positive effect of migration on population development can be observed for almost all county types and periods. Surprisingly, this effect was mainly driven by external migration, which had a distinctly stronger net impact than internal migration over both observed periods.

A look at foreign citizens in particular underlines that foreign migration (and especially external foreign migration) has played a major role in shaping regional population development. The net impact on population development across all county types was even larger than natural population development and the migration of Germans taken together. The effect of foreign migration was particularly strong in the period from 2015 to 2017, but it was already significant in the former period. Without foreign migration, all county types except growing large- and medium-sized cities (2007–2014) would have experienced population decline. Thus, foreign migration
| County type | Rural counties | Suburban counties | Medium-sized cities | Large cities |
|-------------|---------------|------------------|--------------------|-------------|
|             | Growing       | Shrinking        | Total              | Growing     | Shrinking  | Total | Growing | Shrinking | Total |
| Number of counties (N) | 79 | 121 | 200 | 74 | 54 | 128 | 39 | 13 | 52 | 12 | 2 | 14 |
| Real population development | 2.0 | -6.7 | -3.2 | 3.0 | -3.7 | 0.2 | 4.8 | -3.2 | 2.7 | 8.2 | -1.3 | 7.4 |
| Total Internal NMS | 0.9 | -3.2 | -1.6 | 1.7 | -1.5 | 0.4 | 2.7 | -1.1 | 1.8 | 4.6 | -0.1 | 1.1 |
| NMR | 1.1 | -3.5 | -1.7 | 1.2 | -2.1 | -0.2 | 2.0 | -2.1 | 1.0 | 3.6 | -2.3 | 3.1 |
| External NMS | -0.8 | -8.3 | -5.3 | -0.2 | -6.1 | -2.6 | 0.6 | -6.8 | -1.3 | 3.6 | -7.3 | 2.7 |
| NMR | 2.8 | 1.6 | 2.1 | 3.1 | 2.4 | 2.8 | 4.2 | 3.6 | 4.0 | 4.6 | 6.1 | 4.7 |
| Total NMS | -2.0 | -4.8 | -3.7 | -1.4 | -3.9 | -2.5 | -1.4 | -4.7 | -2.3 | 0.1 | -5.0 | -0.4 |
| NMR | 4.0 | -1.9 | 0.4 | 4.4 | 0.3 | 2.7 | 6.2 | 1.5 | 5.0 | 8.1 | 3.8 | 7.8 |
| Foreigners Internal NMS | 2.0 | -6.3 | -3.0 | 2.7 | -3.5 | 0.1 | 4.9 | -3.3 | 2.8 | 7.8 | -0.7 | 7.1 |
| NMR | 0.0 | -0.4 | -0.3 | 0.3 | -0.2 | 0.1 | 0.1 | -0.1 | 0.1 | 0.0 | 0.4 | -0.5 |
| External NMS | -12 | -8.6 | -5.7 | -0.7 | -6.2 | -3.0 | 0.0 | -7.1 | -1.8 | 2.9 | -7.6 | 2.1 |
| NMR | 3.3 | 2.0 | 2.5 | 3.7 | 2.5 | 3.2 | 4.8 | 3.9 | 4.6 | 52 | 6.3 | 5.3 |
| Total NMS | -12 | -8.2 | -5.4 | -1.0 | -6.0 | -3.1 | 0.1 | -7.2 | -1.8 | 2.5 | -7.1 | 1.7 |
| NMR | 3.3 | 1.5 | 2.2 | 4.0 | 2.3 | 3.3 | 4.7 | 4.0 | 4.5 | 5.7 | 5.8 | 5.7 |
| Germans Internal NMS | 0.9 | -3.6 | -1.8 | 2.0 | -1.7 | 0.5 | 2.6 | -1.0 | 1.7 | 5.0 | 0.5 | 4.7 |
| NMR | 1.1 | -3.1 | -1.4 | 1.0 | -1.9 | -0.2 | 2.1 | -2.2 | 1.0 | 3.1 | -1.8 | 2.7 |
| External NMS | -2.4 | -6.3 | -2.8 | 3.5 | -3.5 | 0.6 | 5.4 | -2.9 | 3.3 | 8.9 | -1.0 | 8.0 |
| NMR | 0.4 | -0.3 | -0.4 | -0.6 | -0.1 | -0.4 | -0.6 | -0.3 | -0.5 | -0.7 | -0.2 | -0.6 |
| Total NMS | 1.3 | -3.2 | -1.4 | 2.6 | -1.6 | 0.9 | 3.2 | -0.7 | 2.2 | 5.7 | 0.8 | 5.3 |
| NMR | 0.7 | -3.4 | -1.8 | 0.4 | -2.1 | -0.6 | 1.5 | -2.5 | 0.5 | 2.5 | -2.0 | 2.1 |

Notes: Average annual growth rates in ‰. The NMS indicates total population change minus NMR. For the calculation of NMS and NMR, see Section 4.1. Source: Authors’ calculations based on DESTATIS (2019a).
| County type | Rural counties | Suburban counties | Medium-sized cities | Large cities |
|-------------|----------------|-------------------|--------------------|-------------|
|             | Growing        | Shrinking         | Total              | Growing     | Shrinking | Total | Growing | Shrinking | Total |
| Development |                |                   |                    |             |           |       |         |           |        |
| Growing     | 79             | 121               | 200                | 74          | 54        | 128   | 39      | 13        | 52    |
| Shrinking   | 200            | 54                | 74                 | 39          | 13        | 52    | 12      | 2         | 14    |
| Total       | 279            | 175               | 274                | 103         | 67        | 180   | 52      | 15        | 66    |
| Real population development | 8.8 | 0.2 | 3.8 | 8.6 | 3.0 | 6.3 | 9.5 | 4.8 | 8.4 |
| Internal NMS |                |                   |                    |             |           |       |         |           |        |
| Total       | 6.9            | 1.2               | 3.5                | 7.8         | 3.8       | 6.2   | 10.4   | 5.6       | 9.2   |
| NMR         | 2.0            | –1.0              | 0.2                | 0.8         | –0.8      | 0.1   | –0.9   | –0.8      | –0.8  |
| External NMS |               |                   |                    |             |           |       |         |           |        |
| Total       | –0.1           | –6.7              | –4.0               | –0.7        | –5.1      | –2.5  | –2.4   | –4.6       | –2.9  |
| NMR         | 9.0            | 6.9               | 7.8                | 9.3         | 8.1       | 8.8   | 11.9   | 9.4       | 11.3  |
| Total       | –2.1           | –5.7              | –4.2               | –1.5        | –4.3      | –2.6  | –1.5   | –3.8       | –2.0  |
| NMR         | 11.0           | 5.9               | 8.0                | 10.1        | 7.3       | 8.9   | 11.0   | 8.6       | 10.4  |

| Foreigners |                |                   |                    |             |           |       |         |           |        |
| Internal NMS |                |                   |                    |             |           |       |         |           |        |
| Total       | 9.1            | 1.1               | 4.4                | 8.2         | 2.9       | 6.0   | 9.9    | 3.0        | 8.2   |
| NMR         | –0.3           | –0.9              | –0.7               | 0.4         | 0.1       | 0.3   | –0.4   | 1.8        | 0.2   |
| External NMS |               |                   |                    |             |           |       |         |           |        |
| Total       | –0.9           | –7.4              | –4.7               | –1.6        | –5.7      | –3.3  | –3.6   | –5.7       | –4.1  |
| NMR         | 9.7            | 7.6               | 8.5                | 10.2        | 8.7       | 9.6   | 13.1   | 10.5       | 12.5  |
| Total       | –0.6           | –6.5              | –4.1               | –2.0        | –5.8      | –3.5  | –3.2   | –7.5       | –4.3  |
| NMR         | 9.4            | 6.7               | 7.8                | 10.6        | 8.7       | 9.8   | 12.8   | 12.3       | 19.0  |

| Germans    |                |                   |                    |             |           |       |         |           |        |
| Internal NMS |                |                   |                    |             |           |       |         |           |        |
| Total       | 6.6            | 0.3               | 2.9                | 8.2         | 3.9       | 6.4   | 10.0   | 7.4        | 9.4   |
| NMR         | 2.3            | –0.1              | 0.9                | 0.4         | –0.9      | –0.1  | –0.5   | –2.6       | –1.0  |
| External NMS |               |                   |                    |             |           |       |         |           |        |
| Total       | 9.6            | 0.9               | 4.5                | 9.5         | 3.5       | 7.1   | 10.8   | 6.0        | 9.6   |
| NMR         | –0.8           | –0.7              | –0.7               | –0.9        | –0.5      | –0.8  | –1.2   | –1.2       | –1.2  |
| Total       | 7.3            | 1.0               | 3.6                | 9.1         | 4.4       | 7.2   | 11.3   | 8.6        | 10.6  |
| NMR         | 1.5            | –0.8              | 0.2                | –0.5        | –1.4      | –0.9  | –1.7   | –3.7       | –2.2  |

Notes: Average annual growth rates in ‰. The NMS indicates total population change minus NMR. For the calculation of NMS and NMR, see Section 4.1. Source: Authors’ calculations based on DESTATIS (2019a).
absorbed or reversed the processes of natural population decline and also compensated for losses due to the migration of natives. Only a few cities—mainly located in eastern Germany such as Leipzig, Potsdam, and Dresden—would have registered strong population growth without the contribution of foreign migration. In addition, the outskirts of Berlin, Munich, Hamburg, Freiburg, and Oldenburg would still have experienced moderate growth without the inflow of foreigners (see Figure 3). Nonetheless, despite this compensating effect in shrinking and rural regions, the strong concentration of immigrant inflows in cities and metro areas has resulted in a reinforcement of spatial disparities of population change. Hence, international migration has been the main driver of reurbanisation during the observed periods.

Figure 4 (top left) displays the spatial patterns of external foreign migration for the total period of 2007 to 2017. The external foreign migration can be characterised by a general orientation towards highly urbanised areas, as mentioned above, but there were nuances alongside this general trend. The metropolitan regions Rhine-Ruhr, Frankfurt, Stuttgart, and Munich as well as some more rural counties near the western border were the main immigrant destinations. In contrast, only a few counties and cities in eastern Germany registered above-average NMRs during the observed time period (Berlin, Chemnitz, Cottbus, and Oder-Spree).

Compared with the external migration rates, the internal migration of foreigners had a distinctively lower impact and showed different spatial patterns (see Tables 1 and 2 and Figure 5). The internal migration mainly illustrates a redistribution from rural counties to suburban and urban areas. It appears that the strongest outmigration has occurred in those counties that have strongly benefited from external migration. In western Germany, suburban counties and medium-sized cities have gained the most from the internal migration of foreigners, but large cities have also registered significant surpluses. In eastern Germany, only a few cities have experienced a positive internal migratory balance. Large parts have registered negative NMRs.

The external migration of Germans can be characterised by moderate net losses across all county types. Due to changes in the registration method (see Section 3), these losses were larger during 2015–2017. Moreover, the role of the internal migration of German citizens drastically changed between the two observed periods. From 2007 to 2014, the migration of Germans can largely be characterised as a process of (re)urbanisation with large surpluses in large- and medium-sized cities and negative NMRs in rural areas. After 2015, a reverse process of relative suburbanisation and counterurbanisation can be noticed. Urban areas registered negative NMRs, whereas some growing rural areas benefitted from domestic German migration (see Tables 1 and 2). Consequently, the migration flows of foreigners and Germans strongly diverged during that period.

With regard to the different migrant groups (see Tables 3 and 4), “Eastern Europeans” were by far the most influential subgroup during the entire period, especially in less urbanised counties. The impact of the other individual groups was rather minor in rural and suburban areas but noticeably higher in cities from 2007 to 2014. The migrant groups “Middle East” and “rest of the world” played a major role in regional population development from 2015 to 2017. Because the distribution of these subgroups was strongly influenced by legal regulations (see below), their impact on rural and suburban counties also rose sharply.

In Figures 4 and 5, we compare the external and internal migration rates across different migrant subgroups throughout the whole period of 2007–2017. Against the backdrop of the general tendency of foreign external migrants towards highly urbanised areas, the Western European immigrants were also attracted to western border regions. The external migration of Eastern Europeans was focused towards suburban counties in southern Germany and on rural areas in western Germany with a strong agricultural sector. Surprisingly, no concentrations along the eastern border can be observed. The external migration of the subgroup “rest of Europe” was particularly
directed towards the southern parts of Germany near the Swiss border. The subgroups “Middle East” and “rest of the world” were rather randomly distributed across Germany.

The latter can be largely explained by regulations regarding the spatial distribution of refugees. The initial distribution of asylum applicants is determined by the so-called Königsteiner Schlüssel, a formula by which allocation quotas at the level of the German Länder (federal states) are calculated. In a second step, the residence allocation across individual cities and counties is regulated by each federal state authority. Persons undergoing asylum proceedings must usually comply with a 3-year residence requirement. Consequently, they have no free choice over their initial place of residence (for further information, see BBSR, 2017). These legal distribution schemes can also explain why some counties with “reception” or “arrival” centres have registered exceptionally high external migration rates since 2015.

In comparison with external migration, the internal migration patterns of geographical subgroups can be interpreted as some sort of redistribution, though all in their individual directions (see Figure 5). Eastern Europeans moved from urban areas to rural and suburban counties. Western Europeans showed a similar pattern of suburbanisation and counterurbanisation. This trend was mostly observed in the southern and western parts of Germany. In the east, an opposite trend towards a concentration in only a few cities became apparent. No clear spatial pattern could be identified for the “rest of Europe” despite some concentrations around large cities and in the Swiss border regions. The internal migration of the group “Middle East” was focused on medium-sized and large cities—particularly in the Rhine-Ruhr area—whereas rural areas experienced an outmigration of this group. Last but not the least, the group “rest of the world” showed a similar (internal) migration behaviour, but this group favoured large cities and their surrounding suburban counties, especially in the region around Frankfurt (Main).

In conclusion, our empirical results point out that international migration was the most important component of regional population growth during the observed period. A massive pull effect of large- and medium-sized cities significantly reinforced spatial divergences along
the urban–rural gradient. In addition, our descriptive analyses show a strongly differentiated picture of international migration to and within Germany and hint at different migration motives of certain migrant subgroups. The underlying regional determinants of these diverging patterns are analysed in the following section.

5 | REGIONAL DETERMINANTS OF FOREIGN MIGRATION

5.1 | Estimation strategy

The second part of our empirical analysis aims to identify the underlying regional factors by which we can explain the above-described spatial patterns. Moreover, we compare these determinants with those explaining the internal migration of German citizens in order to validate how the locational preferences of Germans and non-Germans deviate.

For this purpose, we estimate the following cross-sectional log-log regression model:

$$\ln(\text{NMR}_{i,t_1-t_0}) = \alpha + \sum \beta_k \ln(x_k)_{i,t_0} + \epsilon_i,$$

where $\ln(\text{NMR}_{i,t_1-t_0})$ represents the natural log of the above-described NMR for the period of 2007–2014, $\sum \beta_k \ln(x_k)$ represents the comprehensive set of county characteristics in the baseline year 2007, and $\epsilon_i$ is a random error term. This approach is similar to that of previous studies estimating the general appeal of regions for migrants (Buch et al., 2014) or the regional distribution of foreign employment (Lehmann & Nagl, 2019) in Germany. However, unlike the former authors, we are particularly interested in the diverging locational preferences between the above-described subgroups of migrants and between the external and internal migration of foreigners, and unlike the latter authors, we are interested in flows and their contribution to population development instead of the static distribution of foreigners.

FIGURE 5  The spatial distribution of internal foreign migration in Germany (2007–2017)
Notes: Migration balances per 1000 inhabitants in 2007. Classes refer to the standard deviation with regard to the respective migrant group
Source: Author’s calculations based on DESTATIS (2019a)
### TABLE 3  No migration scenarios (NMS) and net migration rate (NMR) for different migrant subgroups for 2007–2014

| County type     | Rural counties | Suburban counties | Medium-sized cities | Large cities |
|-----------------|----------------|-------------------|--------------------|--------------|
|                 | Growing | Shrinking | Total | Growing | Shrinking | Total | Growing | Shrinking | Total |
| Number of counties (N) | 79      | 121       | 200    | 74      | 54       | 128   | 39      | 13       | 52    |
| Real population development | 2.0     | −6.7      | −3.2   | 3.0     | −3.7     | 0.2    | 4.8     | −3.2     | 2.7   |
| Foreigners (total) | NMS | −1.2     | −8.2   | −5.4    | −1.0     | −6.0   | −3.1    | −7.2     | −1.8 |
| NMR | 3.3     | 1.5       | 2.2    | 4.0     | 2.3       | 3.3    | 4.7     | 4.0       | 4.5  |
| EU15 (West) | NMS | 1.6      | −6.8   | −3.4    | 2.5       | −3.9   | −0.2    | 4.3       | −3.6 |
| NMR | 0.4     | 0.1       | 0.2    | 0.5     | 0.3       | 0.4    | 0.5     | 0.4       | 0.5  |
| EU13 (East) | NMS | 0.1      | −7.4   | −4.4    | 1.0       | −4.8   | −1.4    | 2.9       | −5.1 |
| NMR | 1.9     | 0.8       | 1.2    | 2.0     | 1.1       | 1.6    | 1.9     | 1.9       | 1.6  |
| Rest of Europe | NMS | 1.7      | −6.8   | −3.4    | 2.4       | −4.0   | −0.2    | 4.2       | −3.9 |
| NMR | 0.3     | 0.2       | 0.2    | 0.5     | 0.3       | 0.4    | 0.6     | 0.7       | 0.6  |
| Middle East | NMS | 1.7      | −6.8   | −3.4    | 2.7       | −3.9   | −0.1    | 4.2       | −3.6 |
| NMR | 0.3     | 0.2       | 0.2    | 0.3     | 0.2       | 0.3    | 0.6     | 0.4       | 0.5  |
| Rest of the world | NMS | 1.6      | −7.0   | −3.5    | 2.2       | −4.1   | −0.4    | 3.7       | −3.9 |
| NMR | 0.4     | 0.3       | 0.3    | 0.7     | 0.4       | 0.6    | 1.1     | 0.7       | 1.0  |

**Notes:** Average annual growth rates in ‰. The NMS indicates total population change minus NMR. For the calculation of NMS and NMR, see Section 4.1. Source: Authors’ calculations based on DESTATIS (2019a).
| County type | Rural counties | Suburban counties | Medium-sized cities | Large cities |
|-------------|----------------|-------------------|---------------------|--------------|
|             | Growing        | Shrinking         | Total               | Growing      | Shrinking   | Total   | Growing | Shrinking | Total   |
| Number of counties (N) | 79  | 121  | 200  | 74  | 54  | 128  | 39  | 13  | 52  | 12  | 2  | 14  |
| Real population development | 8.8 | 0.2 | 3.8 | 8.6 | 3.0 | 6.3 | 9.5 | 4.8 | 8.4 | 11.4 | 5.8 | 10.9 |
| Foreigners (total) | NMS | −0.6 | −6.5 | −4.1 | −2.0 | −5.8 | −3.5 | −3.2 | −7.5 | −4.3 | −7.6 | −8.3 | −7.6 |
| EU15 (West) | NMS | 9.4 | 6.7 | 7.8 | 10.6 | 8.7 | 9.8 | 12.8 | 12.3 | 12.7 | 19.0 | 14.1 | 18.6 |
| NMR | 0.5 | 0.1 | 0.2 | 0.8 | 0.5 | 0.6 | 0.7 | 0.8 | 0.8 | 4.4 | 1.2 | 4.2 |
| EU13 (East) | NMS | 5.1 | −1.6 | 1.2 | 5.3 | 0.8 | 3.4 | 6.6 | 1.9 | 5.5 | 5.9 | 2.3 | 5.6 |
| NMR | 3.7 | 1.8 | 2.6 | 3.3 | 2.2 | 2.9 | 2.9 | 2.9 | 2.9 | 5.5 | 3.5 | 3.5 |
| Rest of Europe | NMS | 8.1 | −0.2 | 3.3 | 7.6 | 2.4 | 5.5 | 8.3 | 4.1 | 7.3 | 10.3 | 5.2 | 9.9 |
| NMR | 0.7 | 0.4 | 0.5 | 1.0 | 0.6 | 0.9 | 1.2 | 0.8 | 1.1 | 1.1 | 0.6 | 1.0 |
| Middle East | NMS | 6.1 | −2.4 | 1.2 | 5.7 | −0.6 | 3.1 | 5.0 | −0.9 | 3.6 | 7.5 | 0.1 | 6.9 |
| NMR | 2.7 | 2.6 | 2.6 | 2.9 | 3.6 | 3.2 | 4.5 | 5.7 | 4.8 | 3.9 | 5.7 | 4.1 |
| Rest of the world | NMS | 7.2 | −1.2 | 2.3 | 6.2 | 1.4 | 4.3 | 6.2 | 2.9 | 5.4 | 7.4 | 2.7 | 7.0 |
| NMR | 1.7 | 1.4 | 1.5 | 2.4 | 1.6 | 2.1 | 3.3 | 2.0 | 3.0 | 4.0 | 3.1 | 3.9 |

Notes: Average annual growth rates in ‰. The NMS indicates total population change minus NMR. For the calculation of NMS and NMR, see Section 4.1. Source: Authors’ calculations based on DESTATIS (2019a).
Our set of explanatory variables mainly refers to push and pull factors, as mentioned in the literature review above. These variables can be roughly grouped into four categories: socio-demographic factors, economic factors, amenities, and geographic accessibility. The first category of socio-demographic factors consists of four variables: population potential, the fraction of the immigrant subgroup within the total regional population, the population share of children under 6 years, and the population share of young adults between 18 and 30 years old. Population potential (for an overview, see, e.g., Pooler, 1987) refers to the increased opportunity for social interaction in and around densified urban areas, which has often been mentioned as one of the key driving forces of rural-urban migration (Glaeser & Gottlieb, 2006). The measure is calculated as the sum of the inverse distance weighted population from all locations \( j \) within a 100-km threshold radius from location \( i \): 

\[
\sum_{j=1}^{\text{pop}} e^{-d_{ij}} \text{ with } d_{ij} = 0.0693 \text{ (see Spangenberg, 2003). Therefore, population potential reflects not only the agglomeration effects within large cities but also the spill-over effects of all nearby areas. The latter might be particularly relevant for suburban regions. The expected sign of the estimator for population potential is not clear-cut, as there may be positive and negative effects of urbanity on the appeal of a region for migrants. The population fraction of the immigrant subgroup in the dependent variable reflects the so-called network effect in interpersonal migration. As explained in the literature review, immigrants are expected to be highly attracted by existing communities of people from their origin countries, but the magnitude of the coefficient might vary across certain subgroups as well as between external and internal migration. In addition, the initial population shares of children under 6 years old and young adults between 18 and 30 years old are used as proxy variables that reflect a region’s attractiveness for family and education/job entry-motivated migration. Again, the estimated parameters are expected to deviate between the different types of foreign migration.

Regional labour market conditions have proven to be a very robust predictor of regional migration. For our model, we used four different indicators to characterise these labour markets. The first two variables, unemployment rates and average wages (in €1,000), are very obvious push and pull factors, whereas the latter two, employment share of the service sector and the share of employees with an academic degree, particularly reflect the structural transition towards a service and knowledge economy, which has proven to be an important driver of interregional/interurban migration in most industrialised countries (Buch et al., 2014; Rodríguez-Pose & Ketterer, 2012).

Our third category of explanatory variables involves a relatively diverse set of amenities and quality of life-related factors that are commonly used in the internal migration literature. Although the number of annual overnight stays in hotels and other accommodations per capita reflects the general appeal of a region in terms of leisure and tourism, we also operationalise amenities by recreation area per capita, the average flat size per capita, and crime rates (committed crimes per 100,000 inhabitants). The expected signs of the amenity variables are again not clear-cut, and the direction of the expected effect on regional migration rates is highly dependent on the dominant preferences for urban or rural amenities among the immigrant subgroup in question.

Finally, travel costs between origin and destination regions have proven to be important predictors of international and interregional migration flows (Bartel, 1989). This might be particularly relevant for the location choice of migrants from Germany’s neighbour countries and is operationalised in our model by including dummy variables for counties located at the western (including northern and southern) and eastern German borders. In addition, we introduced more general measures of accessibility by including travel distances (in minutes of car travel time) to the nearest airport and highway access points.

To test for the validity of our model, we first estimated naïve ordinary least squares (OLS) regressions and ran a couple of standard econometric tests (see Tables S1 and S2). The computed variance inflation factors (VIFs) of all independent variables were distinctly below 10, which is commonly perceived as a critical threshold value with regard to multicollinearity issues. Further, the Breusch-Pagan test rejected the null hypothesis of homoscedasticity and therefore recommended the use of heteroscedasticity-adjusted standard errors. Finally, we performed Moran tests based on a queen contiguity matrix. The results hinted at significant spatial autocorrelation among the dependent variables and the residuals, which may have caused our OLS estimation to be biased (Anselin, 1988). To account for this potential bias, the baseline model in Equation 2 was extended to a spatial autoregressive model with spatial autoregressive errors (SARAR):

\[
\ln(\text{NMR}_{i,t}) = \alpha + \sum_{k=1}^{K} \beta_k \ln(\text{X}_{i,t}) + \rho \sum_{j=1}^{N} W_{ij} \ln(\text{NMR}_{j,t-1}) + \epsilon_i,
\]

where \(\sum_{j=1}^{N} W_{ij} \ln(\text{NMR}_{j,t-1})\) refers to the spatially lagged value of the endogenous variable, \(\sum_{j=1}^{N} W_{ij}\) is a spatial autoregressive error term, and \(W_{ij}\) represents the above-mentioned spatial weights matrix. Following Kelejian and Prucha (2010) as well as Drukker, Prucha, and Raciborski (2013), we estimated the above-described model parameters using a generalised spatial two-stage least squares (GS2SLS) procedure, which also allows for heteroscedasticity of an unknown form in \(\epsilon_i\).

### 5.2 | Regression results

Tables 5 and 6 depict the results for estimating Equation 3 for the external and internal migration of each of the above-mentioned migrant subgroups (including the internal migration of German citizens). The explanatory power of our model expressed by the Nagelkerke pseudo \(R^2\) varied greatly across the different types of migration. Although the model performed relatively well in explaining the spatial patterns of the external migration of foreigners, the pseudo \(R^2\) for internal migration patterns was rather low for most subgroups, except for Eastern Europeans.10 Moreover, the pseudo \(R^2\) was, in general, relatively high for the migration patterns of EU13 citizens and rather poor for non-EU Europeans and for migrants from the Middle East.
With regard to the explanatory variables in our model, there was no factor that was consistently significant across all subgroups of migrants. However, we found the estimator for the initial population share of the respective subgroup of migrants to be highly significant for all cases of external migration. This implies that the location choices of foreign migrants were strongly driven by network effects.
and were therefore highly path dependent. In strong contrast, non-significant or even negative significant coefficients were found for internal migration rates, indicating that ethnic networks were only relevant for the initial location choices of foreign migrants and did not matter for subsequent movements. This is basically in line with spatial assimilation theory (Massey, 1985; Massey & Denton, 1985) and was

| Migrant group        | Foreigners total | EU15 (West) | EU13 (East) | Rest of Europe | Middle East | Rest of the world | Germans |
|----------------------|------------------|-------------|-------------|----------------|-------------|------------------|---------|
| Population potential | 5.31e-05         | -8.53e-05   | 0.0139***   | 0.000361       | 0.000441*** | 0.000371         | 0.00893** |
| Ethic network        | 0.000131         | -0.00018*** | -0.0365***  | -0.000366**    | -0.000228** | -0.000176        | 0.205*** |
| Share <6 years       | 0.0121***        | 0.000256    | 0.0271**    | 0.00276***     | 0.00282***  | 0.00569***       | 0.0586***|
| Share 18–30 years    | -0.0150**        | -0.00219*** | 0.0249**    | -0.00344***    | -0.00128*   | -0.00451***      | 0.0133   |
| Unemployment         | 6.67e-05         | -0.00066*** | -0.0135***  | -0.000358      | 0.000716*** | 0.000466         | -0.0203***|
| Wage                 | 0.00596*         | 0.000128    | 0.0806***   | 0.00274**      | 0.00184***  | 0.00351***       | 0.0298***|
| Service share        | -0.000361        | -9.67e-05   | -0.00748*   | -0.000139      | 0.000107    | -0.00320         | 0.00978** |
| Academic share       | 0.00205          | 0.000920*** | 0.0235**    | 0.000596       | 0.000392    | 0.000107         | 0.0492***|
| Flat size            | -0.00899**       | -0.00106    | 0.0422*     | -0.00238*      | 0.000612    | -0.0109          | 0.0228   |
| Recreation area      | -0.000338        | -5.87e-06   | -0.00254    | -0.000314**    | 2.39e-05    | -0.00173         | -0.00637***|
| Tourists             | -8.74e-05        | -4.45e-05   | 0.000399    | -0.000117      | 5.73e-05    | 0.000180         | 0.00304***|
| Crime                | -0.000238        | 2.07e-05    | -0.00298    | 0.000257       | 0.00144     | 0.000348         | 0.00398  |
| Distance highway     | -0.000120        | -0.000105   | -0.00311    | -9.31e-05      | -1.64e-05   | 8.19e-05         | -0.00187 |
| Distance airport     | -0.000787        | -2.66e-06   | -0.00230    | -0.000215      | 7.35e-05    | -0.000271        | 0.000287 |
| Border east          | 0.000245         | 1.15e-05    | 0.0111      | -0.000209      | -3.01e-05   | -0.000111        | -0.00670 |
| Border west          | 6.30e-06         | 0.000315*** | -0.00302    | 0.000114       | 9.93e-05    | -0.00147         | -0.00363 |
| Spatial lag          | -0.000178**      | 1.14e-06    | 0.00164**   | -6.76e-05      | -3.20e-05   | -5.99e-05        | -0.00208***|
| Spatial error        | 0.266**          | -0.0432     | 0.235       | 0.216**        | 0.0860      | 0.271**          | 0.578*** |
| Pseudo R²            | 0.335            | 0.294       | 0.679       | 0.323          | 0.186       | 0.3321           | 0.5689   |
| Observations         | 394              | 394         | 394         | 394            | 394         | 394              | 394      |

Note. All variables except for the border dummies are log transformed; dependent variable: ln(NMRg(t1−t0)/C0/C1); heteroscedasticity adjusted standard errors in parentheses. Source: Author’s calculations based on BBSR (2020), Bundeskriminalamt (2008), and DESTATIS (2019a).

***p < 0.01.
**p < 0.05.
*p < 0.1.
confirmed by most previous empirical studies on the regional location choices of immigrants (Bartel, 1989; Funkhouser, 2000). However, this finding contrasts with results of Tanis (2020) on the initial and subsequent location choices of EU immigrants in Germany in the aftermath of the great economic recession in 2008.

In addition to those network effects, for external foreign migration in total, we only found significant estimates for tourist stays and the initial share of young adults between 18 and 30 years old, indicating that regional attractiveness in terms of landscape and/or cultural amenities, as well as motives related to education and/or job entry, were relevant to the initial location choices of foreign migrants in Germany. Moreover, we found significant effects of airport accessibility. Surprisingly, we did not find any significant correlations between local labour market characteristics and the external migration rates of foreigners.

The estimates for internal migration balances of foreigners stand in strong contrast to the above-described drivers of external migration. Instead of educational motives (approximated by the initial population share of young adults, which resulted in a significant negative coefficient), family-related motives approximated by the share of children under 6 years old, average wages, and the flat size per capita (negative) were significant explanatory variables. The findings for flat size were, in general, rather ambiguous, as available living space might be especially restricted in regions of strong population growth due to immigration.

Although the above-presented counterfactual analysis has shown that highly urbanised regions received above-average benefits from the international migration surplus during the observed period, the estimates mostly do not hint at specific preferences of international migrants for agglomeration and “buzz.” Holding all further factors constant, significant positive coefficients for population density could only be found for the internal migration rates of Eastern Europeans, Europeans from non-EU countries, and citizens from the Middle East.

Regarding the different subgroups of migrants, our estimates partially reflect specific cultural preferences and socio-demographic compositions. For example, migrants from EU15 countries and the rest of the world were significantly attracted to regions with a high fraction of young adults, high service sector shares, high touristic attractiveness (external migration), and a high share of employees with an academic background (internal migration). Hence, one could conclude that this group was dominated by highly skilled migrants with strong preferences for amenities and dynamic labour markets. These results stand in strong contrast to our findings for the external migration rates of EU13 citizens, which were significantly negatively correlated to the share of young adults, wages, and the share of employees with an academic degree. This could be partially explained by the circumstance that migrants from Eastern Europe (in particular Romania and Bulgaria) are more often economically and/or socially deprived (Algan, Dustmann, Glitz, & Manning, 2010). Therefore, such migrants were forced to move to economically rather weak places with labour-intensive industries and more relaxed housing markets (see also Lymperopoulou, 2013). This pattern was complemented by the fact that the effect of regional ethnic communities was particularly strong for this subgroup of migrants. In addition, we found that EU13 migrants were particularly attracted to rural regions, as indicated by the significant negative coefficient for population density. Employment opportunities in agriculture, rural tourism, and gastronomy might explain this.

Although we estimated a positive coefficient of the western border dummy on the migration rates of EU15 citizens, we did not find a similar effect regarding the migration of Eastern Europeans. This might be attributed to the fact that many of Germany’s eastern border regions are among the structurally weakest in the whole country and partially suffer from drastic population decline (Heider, 2019a). Some of the western border regions, on the other hand, have achieved high levels of economic development due to long-lasting cross-border economic interaction (Topaloglou, Kallioras, Manetos, & Petrakos, 2005).

The estimates for the subgroups “rest of Europe,” “rest of the world,” and ‘Middle East’ must be interpreted with caution. While in the case of the first two subgroups, the validity of our estimates with regard to revealed locational preference was limited due to the strong heterogeneity of these groups, the spatial patterns of Middle Eastern migration might have been strongly biased by distribution policies for refugees and problems with the official reporting system. This reasoning is also supported by the rather low pseudo $R^2$s for Middle Eastern migration rates.

Finally, the estimates for foreign migrants are compared with the internal migration of German citizens. It can mainly be concluded that in contrast to the subnational distribution of foreign migration, the internal migration of Germans was more strongly driven by economic factors such as unemployment and structural changes in the German economy. In addition, we estimated a significantly positive elasticity regarding the initial population share of children under 6 years old, indicating that family migration played a dominant role in the internal migration of native citizens. A significant positive sensitivity regarding the initial population share of Germans further implied that natives were more attracted to regions with relatively low population shares of foreigners. Although this should not be interpreted as causal inference, this finding supports the hypothesis that immigration can be a cause of the outmigration of native-born residents (Frey, 1995; Frey & Liaw, 1998).

In conclusion, our regression results show that the strong concentration of recent foreign migration in highly urbanised counties was more related to the initial patterns of ethnic concentration than to the more general effects of density and agglomeration. Whereas the share of immigrants from the same origin region is a strong and significant predictor of external migration rates across all subgroups of immigrants, we could not find a significant positive effect of agglomeration on NMRs. In contrast to the internal migration of the German population, we also found that economic motives and amenities played a rather minor role in the initial location choices of foreign migrants. However, a general conclusion on the regional preferences of foreign migrants is difficult to draw, because there were strong differences even between our rather broadly defined migrant subgroups as well as between the external and internal migration patterns of those groups.
CONCLUSION

Our empirical findings clearly demonstrate that immigration has become a key factor in recent regional population changes in Germany. We have shown that international migrants are mainly attracted by large cities and highly urbanised areas. Rural areas still play a very minor role as residential arrival spaces. Hence, international migration has reinforced the spatial disparities in population development. However, our spatial regression models also reveal that international migrants are not attracted per se by agglomeration. Instead of the degree of urbanisation, the location choices of international migrants were mainly driven by existing regional ethnic networks and factors that are related to different personal life stages, such as education or changes in family status. In other words, it is not density and “buzz” in themselves that make urban places attractive to migrants; rather, it is certain qualities of places that are partly related to agglomeration and density.

Moreover, our results also demonstrate that the regional patterns of foreign migration strongly diverge across different subgroups of migrants as well as between migration from abroad and the internal movements of non-Germans. Diverging location choices among geographical subgroups of immigrants can be explained by differences in education and financial resources as well as access to the labour market and freedom of migration. In particular, immigration from lower income countries (e.g., Eastern Europe) is strongly associated to ethnic networks. Although ethnic networks have a strong influence on the initial location choices of immigrants, they seem to be less relevant for the explanation of internal migration decisions of foreign citizens. This could be explained by a better knowledge on local conditions regarding subsequent movements of immigrants and by spatial assimilation (Massey, 1985; Massey & Denton, 1985). Moreover, we found strong differences when comparing the driving factors of foreign migration with those of the internal migration of Germans. In strong contrast to the latter, the subnational location choices of international migrants were much less driven by “traditional” factors such as regional labour markets and cultural amenities. These findings generally suggest that future research on migrants’ location choices should be carried out on the basis of their different origins.

Our findings have strong implications for research on regional and urban population development (e.g., Heider, 2019b; Rees et al., 2017; Sander, 2014; Stawarz & Sander, 2020), which has in the past been strongly focused on internal migration—as primary driver of suburbanisation, counterurbanisation, and reurbanisation—as well as on the determinants of internal migration (e.g., Buch et al., 2014; Ferguson et al., 2007; Greenwood & Hunt, 1989). Concerning the latter, the question of whether economic opportunities or amenities are decisive in explaining regional disparities in migration rates has been controversially discussed in the scholarly literature. If, at least in the context of developed high-immigration countries, international migration has become a major source of regional population development and if the locational preferences of native and foreign migrants differ widely, the simple narrative of “jobs versus amenities” might no longer hold. Future research on regional population growth should therefore explicitly distinguish between the effects of domestic and international migration. Furthermore, existing ethnic networks must be considered as one of the key determinants of regional population growth. In line with King and Skeldon (2010) and Ellis (2012), we argue for a better integration of the internal and international migration literature.

With regard to the political relevance of our findings, the question of whether international immigration can reduce the shrinkage of certain areas is of particular importance. In general, the residential attractiveness of cities and regions depends on their capability of providing favourable socio-economic environments for international migrants. An immigration-friendly social climate and existing ethnic networks can be seen as critical determinants in this regard. However, because these factors are very unequally distributed over space and are highly path dependent, it is relatively unlikely that international migration will contribute to a reduction of interregional disparities in population development in the near future. In this regard, it might be particularly interesting to examine how the massive influx of refugees in 2015 has created new spatial patterns that will—in the longer run—affect the future locational decisions of international migrants.

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NOTES
1 Due to the predefined scheme of origin regions created by the German statistical office, it was not possible to summarise all origin countries of refugees within one particular group; for example, Afghanistan, another very important origin country, is included in the group “rest of the world.”
2 Furthermore, there were some adjustments in the registration method of the external migration of German citizens in 2016, which specifically resulted in an increased reported net emigration of Germans. Thus, the values for German external migration for 2015–2017 also have to be interpreted with caution (DESTATIS, 2020b).
3 In 2011, the annually updated population figures were corrected due to the first population census in Germany since 1987. Hence, population change rates for 2011 could not be calculated. Consequently, we excluded all changes between 2011 and 2012 from our analysis.
4 For the ease of visualisation, the NMR is expressed as per thousand fraction of the total initial population in the descriptive part of this paper.
5 If both categories are concurrently addressed, the term “urban” is used henceforth.
6 In sum, there are 401 counties in Germany, but only 394 counties provide spatially separated statistics of foreign migration. Accordingly, the county of Spree-Neiße and Cottbus in Brandenburg as well as the county of Kassel and city of Kassel in Hessen are summarised. The state of Saarland only provides one statistic for the whole federal state, so the six counties are aggregated to one single unit of “suburban counties.” The city of Duisburg is classified as a large city due to its minimal deviation from the threshold value of 500,000 inhabitants (498,110 inhabitants in 2017).
7 For further evidence on this new phase of suburbanisation, see Stawarz and Sander (2020).
8 In order to log transform the NMR, we had to add up the value of 1.
9 As described above, foreign migration to Germany between 2015 and 2017 was strongly dominated by the massive influx of refugees. The external and internal migration flows of refugees were regulated by legal distribution schemes and probably biased due to errors in the official
reporting system. Hence, we decided to restrict the observed period from 2007 to 2014.

10 These remarkable differences in model fit can mostly be attributed to the fact that a large share of total variance regarding external migration rates could be explained by the initial population share of the migrant group in question. As this effect was distinctly lower for internal migration, the pseudo $R^2$ also diminished.

11 This pattern was consistent throughout most immigrant subgroups except for citizens from EU13 countries. Whereas education and job entry were dominant motives for external migration flows, internal flows could be mostly explained by family-related motives for migration.

12 See also Bartel (1989), who found that the location choices of lower educated migrants are more affected by the existence of ethnic networks.

13 This preference of Eastern European migrants for less urbanised regions resembles Lymperopoulou’s (2013) findings for the United Kingdom.

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