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# Regional distribution and location choices of immigrants in Germany

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## ABSTRACT

This paper investigates initial and subsequent location choices of recent European Union immigrants in Germany at the county level (NUTS-3). Using federal employment register data, the evidence suggests heterogeneous preferences among individuals regarding regional characteristics. For the first location choice, good labour market conditions seem to attract immigrants strongly, while the presence of co-nationals appears to be less important. However, regarding subsequent location choices, ethnic concentration apparently increases its impact on regional attractiveness. The primary conclusion of this paper is that assimilation in the sense of a more equal distribution of immigrants across regions seems to fail.

## KEYWORDS

location choices; regional distribution; employment-based immigration; spatial assimilation

JEL C35, F22, R23

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## INTRODUCTION

In the last decade, Germany established its status as a top country for immigration within the European Union (EU). This development was driven by substantial changes in the institutional setting for migration, such as the ongoing EU enlargement, which includes the freedom of settlement and the free movement for workers. Furthermore, excellent economic conditions, such as Germany's rapid recovery from the Great Recession in 2008/09, increased immigrant numbers and led to significant changes in the composition of Germany's immigrant population. Whereas Southern European countries still suffer from unemployment caused by the crisis, Germany has risen to be Europe's economic superstar (Dustmann, Fitzenberger, Schönberg, & Spitz-Oener, 2014). In seeking economic opportunities, people from the Mediterranean area (particularly from Greece and Spain) and from the new member states in the East (e.g., from Poland and Hungary) migrate to Germany. In contrast, immigration from traditional sending countries (Turkey and the former Yugoslavia) has declined to a negligible level. Changes in the composition of Germany's immigrant population are reflected not only in countries of origin but also in the most relevant labour


market characteristic: education (Boeri, Brücker, Docquier, & Rapoport, 2012; Brücker et al., 2014; Kogan, 2011; Organisation for Economic Co-operation and Development (OECD), 2012). While former migration waves were characterized by unskilled and semi-skilled guest workers in the 1960s and 1970s, family reunification in the 1980s or forced immigration in the 1990s, the qualification level of recent EU immigrants is considerably higher and reaches roughly the share of highly skilled workers in the total population.

Questions about the integration of increasing numbers of immigrant men and women into the labour market and all other areas of society have moved into the centre of political discourse. Growing evidence suggests a strong connection between successful integration and the living environment. In this context, a primary characteristic of immigrants is their geographical concentration (Bartel, 1989; Bauer, Epstein, & Gang, 2007; Damm, 2009; Jaeger, 2008; Zavodny, 1999). To date, the vast majority of existing studies have analyzed location choices based on traditional and low-skilled immigration groups with a highly restricted access to the host country's labour market (e.g., Mexicans in the United States). For Germany, Glitz (2014) finds similar high concentration tendencies for former guest workers in densely populated areas, such as the

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Rhine-Ruhr region. In earlier times, this region was the economic centre of Germany, but today the Rhine-Ruhr area has seen its economic status fall relative to that of other regions. Nevertheless, the immigrant share remains high because immigrants do not seem to move away from their ethnic networks, even though labour market conditions are worsening.

However, Massey (2008) offers a new perspective, indicating that regional attractiveness and the process of spatial assimilation may be notably different for today's immigrants than for those in the past. Considering that immigrants coming after the Great Recession and EU enlargement are not comparable with former immigration inflows, this paper focuses on the determinants of the recent immigrant wave and how those immigrants distribute geographically over time. Recent EU immigrants are of special interest for Germany because their skill level is favourable for labour market outcomes and reflects the skill composition that the country wants to attract in a possible future immigration law for people coming from outside the EU (Mayer, 2017). The determinants of recent immigrants' location choice are an important consideration concerning integration issues and in designing immigration policy. On the one hand, economic development officials at the local level benefit from that knowledge when they attempt to stem or stimulate inflows and regional growth. On the other hand, the federal government learns about the diverse impacts of its national immigration policies at a regional level (Scott, Coomes, & Izyumov, 2005).

This study employs an equilibrium sorting model (Bayer & Timmins, 2005) that incorporates a rich set of heterogeneous individual preferences for local characteristics through a set of choice-specific fixed effects. Using unique register data from the Federal Agency of Employment merged with regional statistics from the German Federal Office of Statistics, the underlying study can detect possible changes in received importance of location characteristics concerning initial and subsequent location choices. Therefore, this study not only focuses on a group of immigrants with different demographic characteristics but also contributes to the relatively new field of research on immigrants' internal migration patterns. Furthermore, by examining location choices on a low aggregation level, that is, urban and rural districts (NUTS-3), this study can obtain a highly accurate understanding of the importance of regional characteristics. Finally, in a discrete choice framework, employment-based EU immigrants seem to be the most interesting group. In contrast to other immigrant groups, employment-based immigrants can freely choose their place of residence (Wang, De Graaff, & Nijkamp, 2016), are more sensitive to economic characteristics (Bartel, 1989) and face the same low regulations regarding labour market access.

The paper is structured as follows. The next section addresses the theoretical background of location choices and the empirical investigation. The data set is then explained in detail. Before discussing several

methodological issues, the main results on the spatial distribution and the determinants for first and second location choices will be outlined. Finally, the paper concludes with an implication for further research.

## MODELLING LOCATION CHOICES

### Determinants – theoretical considerations and hypotheses

The theory of utility maximization suggests that a rational individual will choose the location out of a set of possible locations that maximizes his/her utility minus moving costs. Utility is typically measured by an indirect utility function depending on prices and incomes: after settling in a certain location, the individual sells his/her skills on the local labour market, buys products/services and benefits from local externalities.

Following Jayet, Ukrayinchuk, and De Arcangelis (2010), the utility of a location depends on three types of factors. The first type of location factor is of an economic nature and refers to expected wages and prices on local markets. In particular, the latter are usually not available and have to be replaced by variables determining the local market equilibrium. The second type of location factors is linked to migration costs. Distance to the home country or regional fixed effects serve as a standard proxy in most studies. Finally, the third type of location factors captures local amenities, public goods and, most notably, such externalities as those arising from ethnic networks. As already stated, the migration literature has found ethnic networks to be the strongest location factor for newcomers, even though the effect direction is twofold. On the one hand, existing networks provide support for entering new labour and housing markets, but they also help in remaining close to familiar cultures. On the other hand, living close to other immigrants may hinder successful integration into the host society because they make it less necessary to acquire host-country specific skills, e.g., linguistic abilities. In this context, Borjas (2000) shows that living in an ethnic enclave lowers the probability of equal wages, for example. Nevertheless, networks were found to be the most important driver for generating persistence in settlement patterns among immigrants (Funkhouser, 2000; Jayet et al., 2010; McKenzie & Rapoport, 2010; Rodríguez-Pose & Ketterer, 2012). Jayet et al. (2010) refer to this dependency as lock-in effect. However, first- and second-type location choice factors may also lead to a lock-in effect if previously and newly arrived immigrants are equally attracted by economic conditions. Hence, lock-in effects imply that a location affected by a negative economic shock may still be attractive to newcomers because of their dependency on existing networks. Other studies refer to this phenomenon as the 'ethnic mobility trap', which leads back to Wiley (1967).

Considering heterogeneous preferences additionally, analyzing regional and individual effects separately does not seem to be sufficient as one might expect that migrants select into regions where their individual-specific characteristics are requested and migration outcomes are highest. Thus, individual and regional characteristics jointly become

an explanation for location choices. Previous studies have found that immigrants are attracted by ethnic concentration differently: whereas less-educated immigrants depend highly on ethnic networks, better-educated immigrants are less attracted to this regional feature (e.g., Bartel, 1989).

Following the outlined theoretical considerations and empirical results, this paper assumes that population characteristics (in particular, the concentration of own ethnicity and the overall immigrant share) are important determinants for the first location choice. Nonetheless, the changing economic and institutional settings, as well as the new composition of the immigrant group, must be considered. Thus, regional economic conditions, such as local unemployment rates and average wage levels, might play a more crucial role than in earlier studies. EU membership allows immigrants to choose the region that maximizes their expected utility by, for example, choosing regions with high income levels. This effect may be reinforced by the fact that some Eastern EU immigrants represent a group without existing networks of co-nationals in Germany. Even though immigrants from Southern EU countries can rely on large networks in Germany, they might be highly attracted by local economic conditions because of their relatively high education levels and thus their lower level of dependency on networks.

According to Massey and Denton's (1985) model of spatial assimilation, the residential location of immigrants reflects their level of cultural and economic assimilation. The key point of this model is the direct link between cultural (linguistic), economic and spatial assimilation. Consequently, the importance of some location choice determinants (in particular, the concentration of own ethnicity and the overall immigrant share) depends on the time of residence. To maximize the outcome of their migration decision, newly arrived immigrants tend to choose residential concentrations of their own ethnicity for mutual support. After a certain length of residence in the host country, immigrants assimilate culturally. With the objective of generating higher economic outcomes in the national labour market than in the narrow immigrant labour market, they leave ethnic concentrations and search for areas with a higher share of native residents providing more efficient network externalities (Zorlu & Mulder, 2008). In an earlier study, Bartel and Koch (1991) investigated internal migration patterns of international immigrants in the United States and found small but significant differences regarding location decisions. Regarding spatial assimilation, it is hypothesized that network variables will be less important for subsequent location choices. The next section explicitly models these considerations in a comprehensive framework.

### Empirical model

#### *Equilibrium sorting model – considering heterogeneous preferences*

Immigrant  $i$  maximizes his/her indirect utility function in choosing location  $j$  from  $J$  possible locations at time  $t$  by:

$$V_{ij,t} = \gamma_i R_{j,t-1} + \varepsilon_{ij,t} \quad (1)$$

where  $R_j$  denotes a vector of location characteristics observed in the previous year of settlement, such as local unemployment rate, wages, immigrant stocks etc. Lagging the regional variables reflects the assumption that the location decision in  $t$  is based on information of the previous year  $t-1$ . The error term  $\varepsilon_{ij}$  consists of both unobserved regional and individual characteristics.  $\gamma_i$  describes the valuation parameter and is written as a function of the immigrant's individual characteristics  $X_i$  (e.g., gender, age, education):

$$\gamma_i = \beta_0 + \beta(X_i - \bar{X}) \quad (2)$$

To understand the estimated constants better, the individual characteristics are standardized by subtracting the sample mean. Substituting equation (2) in equation (1) results in:

$$V_{ij} = \lambda_j + (X_i - \bar{X})\beta R_j + \varepsilon_{ij} = Z_{ij} + \varepsilon_{ij}, \quad (3)$$

where  $\lambda_j$  measures the attractiveness of location  $j$  by valuating the included location factors:

$$\lambda_j = \beta_0 R_j + n_j \quad (4)$$

If the random error term  $\varepsilon_{ij}$  is assumed to be identically distributed, then the probability that immigrant  $i$  chooses location  $j$  among all other locations is given by McFadden's (1978) conditional logit:

$$P_{ij} = \frac{e^{Z_{ij}}}{\sum_{j=1}^J e^{Z_{ij}}} \quad (5)$$

with:

$$L^* = \sum_{i=1}^I \sum_{j=1}^J D_{ij} \log P_{ij}, \quad (6)$$

where  $D_{ij} = 1$  if immigrant  $i$  chooses region  $j$ , and 0 otherwise.

Estimating location choices with a conditional logit implies the strong assumption of the independence of irrelevant alternatives (IIA). In other words, this property states that all alternatives are assumed to be independent of each other regarding observable but also unobservable characteristics. The decision-maker chooses between unique alternatives, meaning locations. It is assumed that the set of independent variables captures all relevant characteristics, which may produce a correlation between alternatives. To capture the influence of unobservable variables, regional fixed effects are included in the regression analysis. Furthermore, all included population and labour market characteristics show high regional variety even between nearby countries. Empirically, Cheng and Long (2007) report that tests of the IIA assumption that are based on the estimation of a restricted choice set are unsatisfactory for applied work. However, it was shown that the IIA property is less likely to be violated if characteristics of decision-makers are included in the model specification (Ben-Akiva & Lerman, 1985).

### Two-step estimation process

This paper implements a two-step procedure developed by Bayer and Timmins (2005), which was also used by Bayer, Keohane, and Timmins (2009) and, most recently, by Wang et al. (2016) for modelling location choices.

The first step is to estimate the alternative-specific constants ( $\lambda_j$ ) by a conditional logit model including interaction effects between individual and regional characteristics in order to account for heterogeneous preferences among individuals. The  $\lambda_j$ 's can be interpreted as a measure of the county's general attractiveness, also accounting for unobserved features. In the second step, the  $\lambda_j$ 's are then further regressed on the regional variables. The estimated coefficients define the contribution of each regional characteristic to the overall regional attractiveness measure. In this step, the estimation may suffer from endogeneity bias if the regressors are correlated with unobservables in the error terms. To control for unobserved variation, fixed effects of the next higher regional aggregation level (NUTS-2: equals 31 regions) are included.

### Choice set

An analysis of the low aggregation level results in a very large choice set, which leads to computational issues. Thus, previous studies often used more aggregated levels. However, using more aggregated regions does not account for regional heterogeneity within the aggregation. Consequently, the estimation loses precision. The IIA property of the conditional logit model can be exploited to use a random sample technique for the underlying choice set of 326 counties (Manski & Lerman, 1977). McFadden (1978) has shown that restricting the full choice set to a random subset leads to consistent parameter estimates. Nerella and Bhat (2004) recommend using a minimum of 1/8 of the full choice set. Following this recommendation, the final choice set consists of 40 counties (the chosen county plus 39 randomly assigned counties).

## DATA AND VARIABLES

The aim of this study is to reflect the most recent inflow of immigrants to Germany after the Great Recession and the granting of full labour market access for the new members states joining the EU in 2004. Therefore, this study focuses on EU immigrants arriving in 2011. Regarding the immigrants' second location choice and in order to gain knowledge regarding possible spatial assimilation processes, those individuals are observed three years later in 2014. Again, restricting the data set to EU immigrants ensures that the IIA holds and thus the validity of discrete choice models (Wang et al., 2016). Moreover, EU immigrants have similar reasons for migration and are culturally close to Germany.

### Individual data

Individual information is detected from the IAB-Integrated Employment Biographies (IEB)<sup>1</sup> provided by the German Federal Agency of Employment (BA). The data

set contains a 30% sample of immigrants arriving in 2011 who either began working or registered officially as job seekers. The data are reported annually by employers for employees or by job centres for job seekers. Immigrants have their first spell in the data as soon as they register themselves as job seekers or start employment in Germany and are observed until they emigrate or become unemployed without registering as unemployed or job seeking. However, immigrants cannot register directly as unemployed and receive unemployment benefits because this status requires at least one year of social security employment in Germany.

The data set contains necessary information about the nationality of each individual, the place of residence and important sociodemographics. Unfortunately, it does not provide any information about the year of arrival or place of birth. Therefore, people who were born in Germany but have a foreign nationality are not strictly differentiable from first-generation immigrants. To eliminate this error source, the sample was restricted to individuals aged between 28 and 62 years. The minimum age was set at 28 years because register data from Germans showed that more than 95% of them appeared for the first time in the data before turning 28 years. Therefore, nearly all immigrants with a foreign nationality but born in Germany are excluded from the sample. Moreover, all foreign nationalities registered as unemployed in their first spell were removed because they are classified as second-generation immigrants. Finally, the data were restricted to immigrants living in Western German counties and Berlin because the overwhelming majority of immigrants live and work in Western Germany. Furthermore, economic disparities between Western and Eastern counties remain large, and newcomers are not expected to have Eastern Germany in their choice sets.

A point that needs to be discussed with regard to interpretation issues is the definition of the first location choice. First, this study defines as the first location choice the first county the immigrant searches officially for work or starts actually working in. Therefore, it might be the case that this is not the actual first location choice of the immigrant, e.g., if the immigrant stayed first at a friend's home until starting to work or registering officially as unemployed, but it is the economically important first location choice. Second, immigrants might already have found a job before arriving in Germany. Their location choice is then strongly determined by the employer and may not reflect the actual location preferences of the immigrant. However, this may be much more the case for immigrants from third-party countries who are excluded from the data because in their case finding an employer is necessary to obtain a residence permit.

Table 1 reports summary statistics of the individual data set. The sample includes 19,445 EU immigrants who arrived in 2011. The third column reports subsample means for immigrants who were still observed three years later in 2014 (68.7%). Possible explanations for the reduction of observations are emigration or not registering as unemployed or job-seeking or the admission of



**Table 1.** Sample properties, means.

	All immigrants arrived in 2011		Sample stayers, 2014		Relocators, 2014	
	Mean	SD	Mean	SD	Mean	SD
Male	0.591	0.492	0.579	0.494	0.635	0.481
Age	38.597	8.331	38.254	8.097	38.369	7.996
From an old European Union member state (Reference: new European Union)	0.280	0.449	0.255	0.436	0.222	0.415
Employed (Reference: job seeker)	0.787	0.410	0.836	0.370	0.860	0.347
<i>Education</i>						
No vocational education	0.444	0.497	0.431	0.495	0.432	0.495
Vocational education	0.377	0.485	0.390	0.488	0.413	0.492
University	0.180	0.384	0.179	0.384	0.155	0.362
Individuals	19,445		13,358		2526	
Proportion	1		0.687		0.130	

Note: SD, standard deviation.

Source: IAB-Integrated Employment Histories (IEB).

undeclared work. The fifth column presents statistics for relocators. These are immigrants who were still observed in 2014 but in a different location than in 2011. The education variable suffers from missing data because this information is voluntarily reported by the employer. Low transferability from foreign education attainments reduces the number of observations further. To improve the quality of the education variable, forward/backward exploration was used (Fitzenberger, Osikominu, & Völter, 2005). The dummy 'Employed' tags immigrants who started working directly after migrating to Germany compared with immigrants who registered first as job seekers. Comparing all three samples shows only rather slight differences between the sample populations.

### Regional data

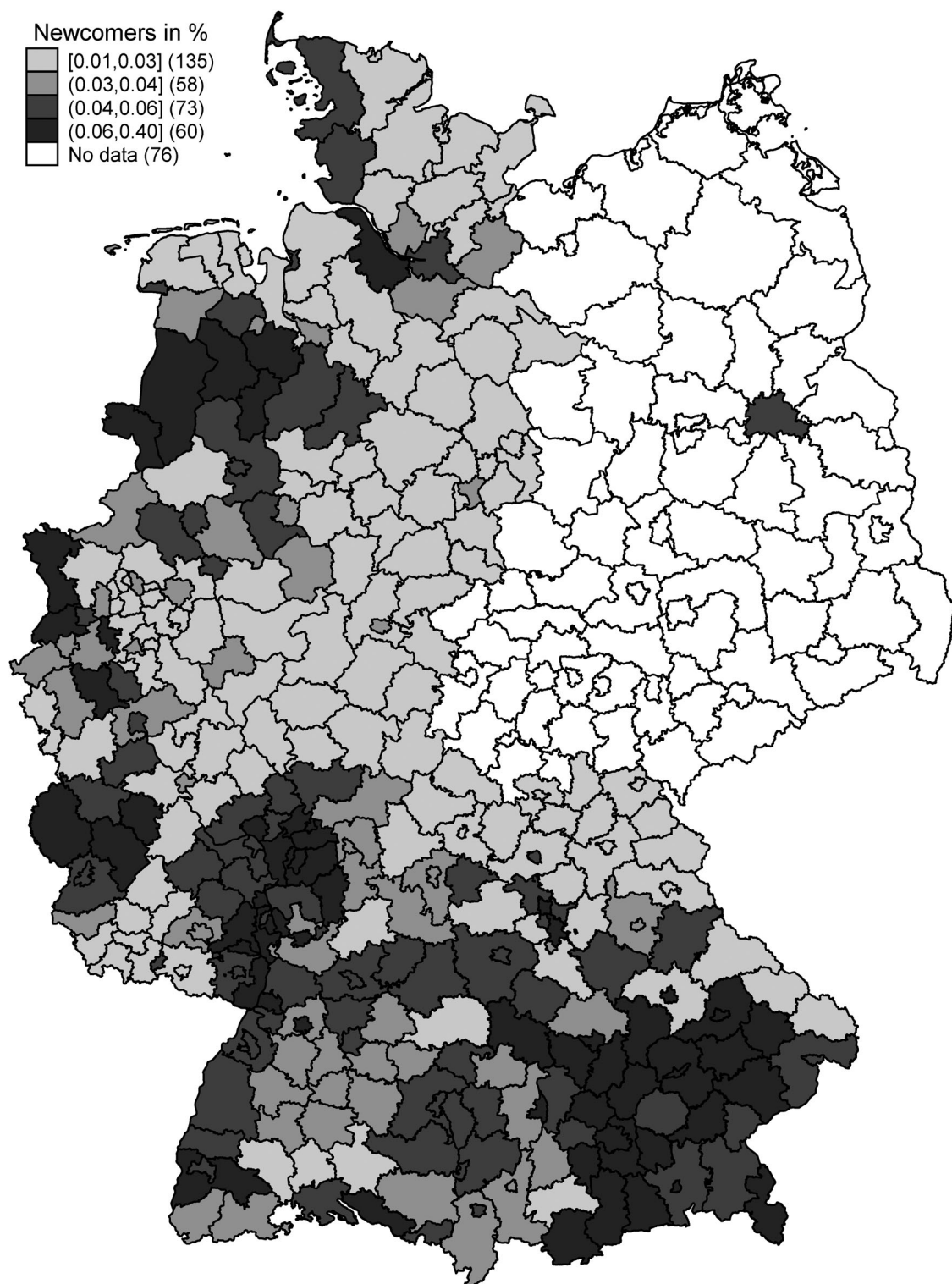
Regional information at county level originates from the statistics departments of the federation and the federal states.<sup>2</sup> It is assumed that newcomers make their location choice based on regional information on the previous year. This means that regional data of 2010 were merged with the individual data set. German counties correspond to the NUTS-3 classification,<sup>3</sup> which also includes county-free cities. The regional variables will be divided into external regional effects, which control for the economic environment, and population effects. The latter contain the regional community of the same ethnicity (ethnic concentration), the region's immigrant share (immigrant density), and the general population (population density and the population share of people aged over 65 years). Additionally, a measure of general attractiveness (overnight stays per capita) and a measure of regions' open-mindedness (the share of second votes for the left party in the parliamentary elections in 2009) will be included. The

population variable of most interest is ethnic concentration and measures the share of the immigrant's own nationality in the total county population. Unsurprisingly, the ethnic concentration reaches a maximum of approximately 7% in counties bordering the Netherlands and Austria. The most interesting economic variable is the regional share of unemployment, which ranges between 1.9% and 16.3%.<sup>4</sup>

## ESTIMATION RESULTS

### Spatial distribution of newly arrived immigrants in 2011

Figure 1 shows the share of newly arrived EU immigrants (a 30% sample) among the total population in 2011 who started working or seeking a job in Germany. The map provides the first descriptive evidence that settlement patterns might have changed. The total immigrant stock in 2010<sup>5</sup> is highest in the major cities of Munich, Hamburg and Berlin, but also along the Rhine axis, in the Ruhr area and the Southwest. The distribution of newcomers (Figure 1) results in a similar high regional attractiveness of major cities. However, the Rhine-Ruhr area and Southwest Germany seem to have lost attractiveness because newcomers settle increasingly in the Southeast and north of the Rhine-Ruhr area. From other studies, it is known that Southwest Germany was hit especially hard by the economic crisis in 2008 (Möller, 2010). Thus, it appears that immigrants today are attracted by growing, economically strong counties, even though the immigrants' share in these regions is lower compared with alternative regions. Apart from the possible economic impact on regional attractiveness, southern Bavaria has the shortest distance to the new EU member states from the East.



**Figure 1.** Share of newly arrived European Union immigrants among the total population, 2011.  
Note: Cluster method: quantiles.

### Initial location choice determinants: cross-sectional analysis of 2011

#### First step

Table 2 provides a subset of coefficients of the interactions between regional ( $R_i$ ) and individual characteristics ( $X_i$ ) obtained by conditional logit regression, whereas the full set<sup>6</sup> includes 60 coefficients. Immigrants with low or

middle education levels compared with immigrants with a tertiary education seem to be more attracted by regions with higher ethnic concentration. This result is in line with the literature: highly educated immigrants depend less on other immigrants than lower educated immigrants. The same is the case for immigrants from the old EU countries who are mainly represented by immigrants

**Table 2.** Initial location choice – selected results of the first step estimation ( $\beta$ ).

	Ethnic concentration		Unemployment rate, total	
Male	7.366	(3.829)	0.179	(2.166)
Age	0.588**	(0.219)	-0.192	(0.128)
From an old European Union member state (Reference: new European Union)	-68.694***	(5.576)	5.096	(2.608)
<i>Education</i> (Reference: university)				
No vocational education	31.843***	(4.766)	12.623***	(3.176)
Vocational education	21.015***	(4.896)	1.622	(3.335)
Employed (Reference: job seeker)	-26.916***	(4.285)	-7.355**	(2.637)
Log-likelihood	-58,400.028			
Counties <sup>a</sup>	326			
Observations (individuals)	19,445			

Notes: Standard errors are shown in parentheses. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

<sup>a</sup>The estimation is based on a random subset of 40 counties per individual.

from Greece, Italy, Portugal and Spain in the underlying sample. An interesting aspect is that those immigrants have a higher education level (39% with a university degree) compared with those coming from the new EU member states in the East (10% with a university degree). Regarding economic conditions, employed immigrants might prefer regions with lower unemployment, while immigrants without vocational education appear to be attracted by regional unemployment. The latter may reflect a situation where other local amenities create more utility (such as ethnic networks).

Figure 2 outlines the relative county attractiveness based on the estimated alternative-specific constants ( $\lambda_j$ ). The darker the colour, the higher the attractiveness for newcomers in 2011. A comparison between the regional attractiveness and the share of immigrants in the population (see Figure A1 in Appendix A in the supplemental data online) shows that there are several counties with a relatively low immigrant share that seem to be attractive nevertheless.

### Second step

Table 3 reports the results of an ordinary least squares (OLS) regression from the alternative-specific constants ( $\lambda_j$ ) on all regional variables. Models (1) and (2) include all immigrants that arrived in 2011, regardless of whether they were still observed three years later in 2014. All coefficients show a high significance. Generally, the results remain robust and significant in model (2), which also includes NUTS-2 region fixed effects. Ethnic concentration correlates positively with regional attractiveness. However, ethnic concentration's impact seems to be small when regional fixed effects are included. The remaining regional features are associated with a larger effect on regional attractiveness. Immigrant and population density, per capita income, and the immigrant unemployment rate seem to have a positive impact on regional attractiveness.

A high number of overnight stays is also correlated with higher regional attractiveness. This might be attributed to the positive correlation of overnight stays and local accommodation rents. The most negative impact on regional attractiveness appears to come from the total unemployment rate, followed by a high share of elderly in the population and the share of producing industry.

Models (3) and (4) are presented as a robustness check to investigate whether the results differ when the sample is restricted to stayers. Those models include only immigrants who were observed in both years. What applies in this specification, too, is that the effect direction of the variables of most interest (ethnic concentration and unemployment rate) remains the same. However, in model (4), which includes only stayers and regional fixed effects, the impact of ethnic concentration on regional attractiveness turns out to be less statistically significant. The significantly strong negative impact of the total unemployment rate remains in magnitude.

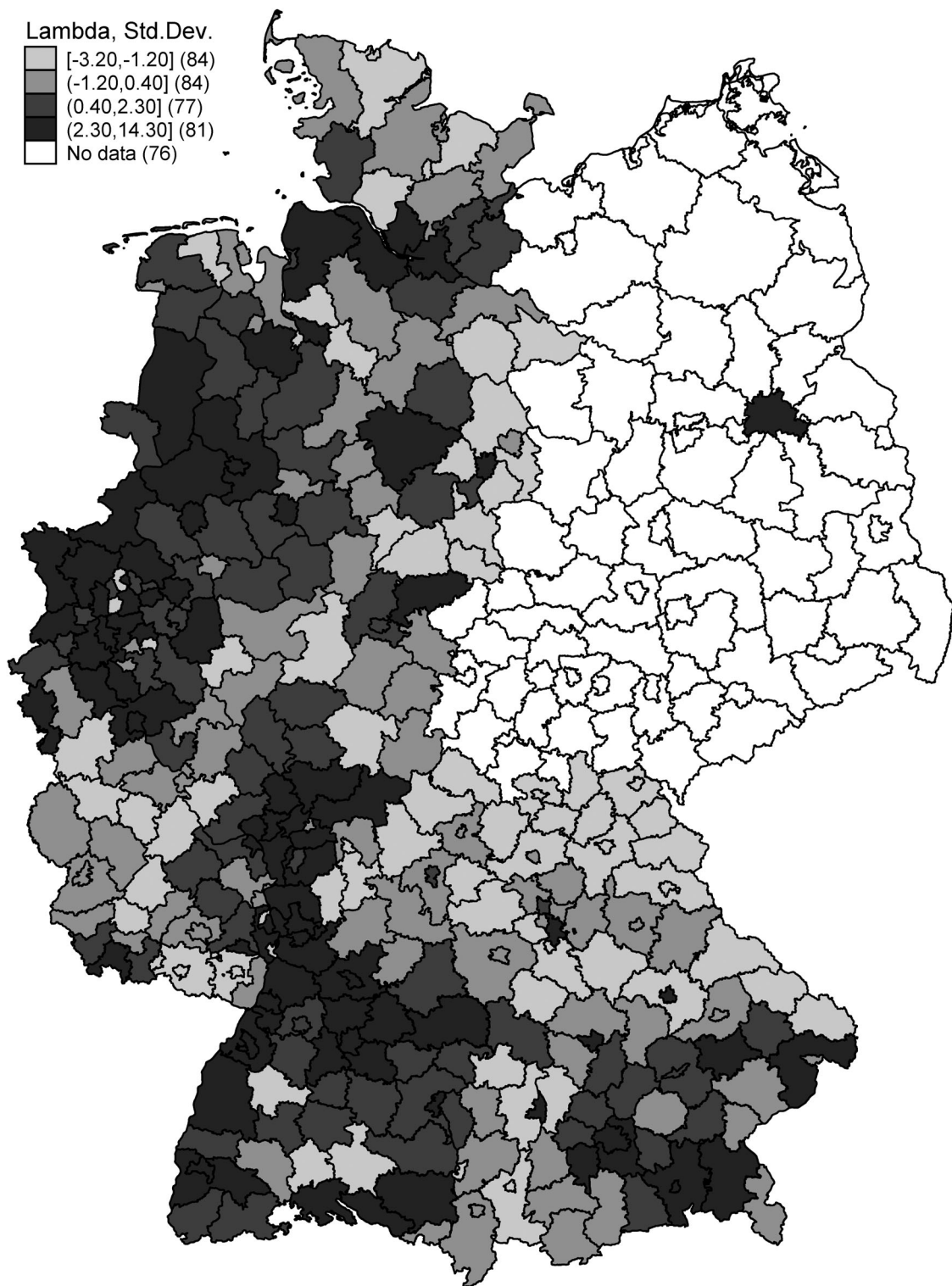
In sum, the results regarding the initial location choice show that networks also appear to be an important determinant for the underlying study population. However, the impact of ethnic concentration is small and loses even significance in model (4). The main economic factor, which is the unemployment rate, seems to have a strong negative<sup>7</sup> impact on regional attractiveness in all model specifications. These findings suggest the importance of both population characteristics (in particular in form of immigrant density) and economic factors (in particular in form of the unemployment rate).

### Subsequent location choice determinants: cross-sectional analysis in 2014

#### Results of the two-step estimation

Table 4 provides striking information on the second step<sup>8</sup> of the estimation regarding regional attractiveness for subsequent location choices. Both models with and without





**Figure 2.** Initial location choice – relative county attractiveness ( $\lambda_i$ ).  
Note: Cluster method: quantiles.

regional fixed effects show an extremely high positive correlation between ethnic concentration/immigrant density and regional attractiveness. This result is in line with the finding of Damm (2009), which is that the main push factors are a lack of co-nationals and other immigrants. The same relation might be transferred to the employment-based immigrants in this sample. If immigrants already

find a job in Germany while they are still residing in their home country, they move to that region where the job is located. In this study, possible reinforcing mechanisms are rapidly increasing numbers of international job advertisements of German enterprises due to native labour force shortages, or special labour market programmes (e.g., MobiPro-EU<sup>9</sup>) with the aim of attracting EU immigrants

**Table 3.** Initial location choice – results of the second step estimation ( $\beta_0$ ).

	All immigrants arrived in 2011		Sample stayers, 2014	
	Model (1)	Model (2)	Model (3)	Model (4)
Ethnic concentration	4.151*** (0.256)	0.997*** (0.203)	3.561*** (0.325)	0.803** (0.258)
Immigrant density	5.926*** (0.039)	3.788*** (0.035)	4.068*** (0.049)	1.428*** (0.044)
Population density (thousands)	0.092*** (0.003)	0.164*** (0.003)	0.101*** (0.003)	0.201*** (0.003)
Share of over 65 years old	-16.518*** (0.050)	-9.655*** (0.045)	-15.239*** (0.062)	-8.062*** (0.054)
Unemployment rate, total	-11.956*** (0.095)	-12.738*** (0.094)	-11.545*** (0.122)	-12.181*** (0.121)
Unemployment rate, immigrants	8.721*** (0.040)	3.867*** (0.041)	9.115*** (0.050)	3.758*** (0.052)
Per capita income (thousands)	0.078*** (0.000)	0.071*** (0.000)	0.102*** (0.000)	0.091*** (0.000)
Share of producing industry	-2.524*** (0.011)	-2.511*** (0.012)	-2.754*** (0.013)	-2.760*** (0.014)
Per capita overnight-stays	0.112*** (0.001)	0.058*** (0.001)	0.137*** (0.001)	0.087*** (0.001)
Share of left party voters	1.834*** (0.039)	0.036 (0.060)	1.218*** (0.047)	0.619*** (0.068)
Constant	0.378*** (0.012)	0.719*** (0.011)	-0.553*** (0.015)	-0.141*** (0.015)
Adjusted $R^2$	0.534	0.704	0.529	0.700
NUTS-2 fixed effects (31 regions)	No	Yes	No	Yes
Observations (counties)	326	326	326	326

Note: Standard errors are shown in parentheses. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .  
NUTS, Nomenclature of Territorial Units for Statistics.

to vocational training. Those enterprises are located in areas with low unemployment rates, explaining why these firms search for labour internationally. This correlation may also explain the huge impact of the total unemployment rate on perceived regional attractiveness in immigrants' first location choice. Therefore, it might be the case that immigrants do not freely choose their initial location, if they already have a job offer before moving to Germany. Another point that needs to be discussed is that the total unemployment rate switches sign depending on whether or not regional fixed effects are included. The same phenomenon is observed for population density. Controlling for regional fixed effects leads to a positive impact of the total unemployment rate on regional attractiveness. This finding might be explained by the fact that the coefficient indicates only the impact of the regional unemployment rate as a deviation from the NUTS-2 average. Those deviations are urban counties and county-free cities that generally have a higher unemployment rate. In sum, the hypothesis on subsequent location choices which was based on assimilation theory cannot be verified in this study.<sup>10</sup>

### Probability of relocation

Another way to investigate whether or not the utility level of certain locations is time-constant is to calculate relocation probabilities. Table A4 in Appendix A in the supplemental data online shows the estimated coefficients of logit models as robustness check: model (1) includes only regional variables, and model (2) additionally includes interaction effects with the education variable. The number of individuals differs slightly from the number of individuals reported in Table 1 because 267 sample stayers moved to a county in the Eastern part of Germany and were thus excluded from this part of analysis. The dependent variable is a dummy that becomes 1 when the immigrant is observed in 2014 somewhere other than his/her initial place of residence in 2011. This way of analyzing subsequent location choices shows that immigrants living in regions with ethnic concentration have a lower relocation probability than those who do not live in such an area. This illustrates a typical lock-in effect within an immigrant's residential history in the host country and seems to confirm the picture that spatial assimilation is not present within this immigrant group.

**Table 4.** Subsequent location choice – results of the second step estimation ( $\beta_0$ ).

	Model (1)	Model (2)
Ethnic concentration	25.673*** (1.869)	10.725*** (1.573)
Immigrant density	19.649*** (0.370)	8.532*** (0.402)
Population density (thousands)	-0.211*** (0.026)	0.167*** (0.025)
Share of over 65 years old	-33.299*** (0.774)	-15.368*** (0.650)
Unemployment rate, total	-8.352*** (1.015)	9.754*** (1.268)
Unemployment rate, immigrants	-2.079*** (0.438)	-13.473*** (0.613)
Per capita income (thousands)	0.057*** (0.002)	0.043*** (0.002)
Share of producing industry	-2.590*** (0.128)	-1.539*** (0.162)
Per capita overnight-stays	-0.317*** (0.008)	-0.432*** (0.007)
Share of left party voters	4.729*** (0.407)	-14.934*** (1.083)
Constant	4.298*** (0.145)	4.862*** (0.138)
Adjusted $R^2$	0.163	0.312
NUTS-2 fixed effects (31 regions)	No	Yes
Observations (counties)	326	326

Note: Standard errors are shown in parentheses. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

NUTS, Nomenclature of Territorial Units for Statistics.

## DISCUSSION

Research investigating immigrants' location choices must contend with endogeneity issues. Endogeneity arises because the existing migrant stock is supposed to be an endogenous amenity: a concentration of migrants in a region may be the result, as well as the cause, of location choices. The following procedures are adopted to reduce endogeneity issues to the best achievable degree.

First, endogeneity arises if the behaviour of the reference population, that is, the existing immigrant stock in the region, is influenced by the behaviour of the sample population (simultaneity bias). There is common agreement in all fields of research that this bias is mostly neglected by lagging explanatory variables (e.g., Clemens, Radelet, Bhavnani, & Bazzi, 2012; Green, Malpezzi, & Mayo, 2005). This paper follows previous research and includes all regional variables with a one-year time lag. The more critical, second endogeneity issue occurs when reference and sample populations are influenced by the same unobservable characteristics. In this context, common unobservable characteristics may be determinants referring

to the housing market, such as rents and housing prices. If this influence of omitted variables is time invariant, it is captured by the regional fixed effects. Moreover, the implementation of a two-step estimation has the advantage that the influence of unobservables on regional attractiveness is explicitly modelled in the first step. In sum, the robustness regarding the estimated coefficients between models with and without regional fixed effects also suggests that the second source of endogeneity may not substantially bias the analysis.

## CONCLUSIONS

The Great Recession in 2008 and changing institutional settings for migration led to new immigration inflows and thus to changes in the immigrant population composition. The aim of this paper is to investigate these immigrants' location choices during their stay in Germany. The focus lies on the following questions:

- Does the composition of the population or economic factors determine this decision?
- Are those factors valued differently by individuals?
- Are those factors valued differently in initial and subsequent location choice decisions?

Evidence suggests that local economic conditions seem to affect overall regional attractiveness strongly. Compared with previous studies, this effect is relatively strong. In contrast, population characteristics also seem to be important, but to a lesser extent. Regarding subsequent location choices, precisely the opposite is true. In particular, ethnic concentration appears to have a fairly large positive effect on regional attractiveness. Therefore, one might argue that the mechanisms of lock-in effects are less relevant for initial but stronger for subsequent location choices in this study. If fixed effects are included, regional unemployment shows a positive sign. This finding might be observed because regional unemployment correlates negatively with (rising) housing prices or other migration-specific amenities. The probability of relocating is also driven by population characteristics. Immigrants residing close to other co-nationals have a lower probability of moving than others. This result may be explained by early self-selection. Once an immigrant resides in areas with high numbers of co-nationals, she/he will stay in these regions.

The interesting findings of this paper may be caused by the specific sample population. Currently, EU immigrants face different local economic conditions than their predecessors. In particular, immigrants from the Southern countries affected by the Great Recession are assumed to prefer a quick labour market entry in order to improve their living conditions. Therefore, they might take the first available job, independent of the region and its population characteristics. This effect is reinforced by the relatively higher educational levels because those immigrants are less dependent on networks. However, after a certain period of residence, immigrants are pulled by externalities arising from living close to other immigrants. To put it

carefully, this finding may indicate that integration in initial locations, which seem to be economically strong, might fail somehow. Otherwise, immigrants would not leave such an area.

What do those results imply? Today, immigrants seem to be less dependent on networks and choose regions with a low share of immigrants. This phenomenon is a positive result for regions suffering from labour shortages because they seem to be able to attract those immigrants in the first case. Advertising excellent labour market conditions in international job announcements could be one strategy for local officials to stimulate immigrant inflows. However, after a period of time, those regions seem to lose attractiveness, while regions with high shares of immigrants seem to gain attractiveness. This relationship warrants further study in order to gain precise knowledge regarding the experiences of these people that lead them to decide to move away.

## DISCLOSURE STATEMENT

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## NOTES

1. For further information, see [http://fdz.iab.de/en/FDZ\\_Individual\\_Data/Integrated\\_Employment\\_Biographies.aspx/](http://fdz.iab.de/en/FDZ_Individual_Data/Integrated_Employment_Biographies.aspx/).
2. For further information, see <https://www.regionalstatistik.de/>.
3. For further information, see <http://ec.europa.eu/eurostat/web/nuts/>.
4. For detailed summary statistics, see Table A1 in Appendix A in the supplemental data online.
5. For further details, see Figure A1 in Appendix A in the supplemental data online.
6. For the full set of valuation parameters, see Table A2 in Appendix A in the supplemental data online.
7. Total unemployment appears to be negatively correlated with regional attractiveness but positively with immigrants' unemployment (see Table A3 in Appendix A in the supplemental data online). In this case, other migration-specific amenities may be present, which compensate for immigrants' poor employment probabilities.
8. For the results of the first step estimation, see Table A3 in Appendix A in the supplemental data online.
9. For further information on this programme, see <http://www.thejobofmylife.de/en/home.html/>.
10. Figure A2 in Appendix A in the supplemental data online reports the relative regional attractiveness of the subsequent location choice obtained in the first step of the

analysis in 2014. It states descriptive evidence that the regional attractiveness seems to approximate more to traditional migration centres and thus to other immigrants (see Figure A1).

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