

Li, Chen

**Conference Paper**

## Do immigrants attract FDI? District-level evidence from Germany

Beiträge zur Jahrestagung des Vereins für Socialpolitik 2015: Ökonomische Entwicklung - Theorie und Politik - Session: Foreign Direct Investment I, No. D05-V3

**Provided in Cooperation with:**

Verein für Socialpolitik / German Economic Association

*Suggested Citation:* Li, Chen (2015) : Do immigrants attract FDI? District-level evidence from Germany, Beiträge zur Jahrestagung des Vereins für Socialpolitik 2015: Ökonomische Entwicklung - Theorie und Politik - Session: Foreign Direct Investment I, No. D05-V3, ZBW - Deutsche Zentralbibliothek für Wirtschaftswissenschaften, Leibniz-Informationszentrum Wirtschaft

This Version is available at:

<https://hdl.handle.net/10419/113130>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

# Do immigrants attract FDI?

## District-level evidence from Germany

Chen Li<sup>\*†</sup>

August 24, 2015

### Abstract

Using data from 1999-2011 on 402 German districts, we analyse whether the presence of immigrants in a particular location helps to attract inward FDI from the immigrants' country of origin. Results show that a one standard-deviation increase in the immigrant share is associated with a 3.3% rise in firm entry. This effect is stronger for smaller firms, the services sector, firms with one foreign shareholder only, and an investor's first entry into Germany. There is also indication that firms from developing countries depend more on immigrants than firms from developed countries. A quasi-natural experiment exploiting the migration of ethnic Germans from Russia in the 1990s ('Spätaussiedler') confirms the qualitative results.

JEL classification: *F14, F22, F23, R12, R30*

Keywords: *FDI, Multinationals, Migration, Location, Germany*

---

\*I thank Daniel Baumgarten, Matthias Beestermoeller, Rajeev Dehejia, Carsten Eckel, Dominik Fischer, Lisandra Flach, Anna Gumpert, Daniel Heuermann, Monika Schnitzer, Claudia Steinwender, Felix Tintelnot, Martin Watzinger, seminar participants at the University of Munich and conference participants at Nottingham GEP, Düsseldorf EGIT and Göttingen IWB for helpful comments. I thank Miguel Fajardo Steinhäuser for excellent research assistance. I also thank the staff of the Deutsche Bundesbank for their hospitality and support during my research stays. I am also indebted to Albrecht Glitz and Jens Ruhose for providing me with data on Ethnic German immigrants. Support by the DFG Research Training Group 1928 is gratefully acknowledged.

†Affiliations: University of Munich, Seminar for Comparative Economics. DFG Research Training Group 1928, Microeconomic Determinants of Labour Productivity. Email: chen.li@econ.lmu.de

# 1 Introduction

When multinational companies scout possible investment locations abroad, they have a multitude of factors to take into account. This includes candidates such as infrastructure, supplier access or local regulations. Suffering from the ‘liability of foreignness’, these investors may face difficulties obtaining such information without any local support.<sup>1</sup> As the Economist puts it, ‘Although anyone can place a long-distance call, not everyone knows whom to call, or whom to trust.’<sup>2</sup> Hence, investors may also consider the ease at which information about potential locations can be accessed as an important factor. At this point, immigrants from the investor’s country of origin can step in to bridge the informational gap between their host country and their home country. Common nationality links immigrants abroad with investors through formal and informal contacts based on common language, culture, history and shared institutions. In a survey, Schüller and Schüler-Zhou (2013) provide anecdotal evidence for the relevance of these channels for Chinese investments in Germany.

In this paper, we analyse whether immigrants are indeed a location factor, i.e. whether the presence of immigrants in a particular location helps to attract inward FDI from their country of origin. In answering this question, we use a dataset on 402 German districts, 84 source countries and 13 years (1999-2011).<sup>3</sup> We can hence exploit the variation between districts, countries, and over time. In addition, a quasi-natural experiment of large-scale ethnic German migration in the 1990s from Russia with random allocation of immigrants is exploited to confirm the qualitative results.

Our simple model postulates that obtaining information about potential investment locations is costly, and that immigrants help in reducing the information cost. In our estimation, we mitigate various channels of endogeneity by using appropriate controls and varying specifications.

In the baseline specification, an one-SD increase in the share of  $j$ -country immigrants in district  $i$  raises  $ij$ -firm entry by 3.3% each year. Using further disaggregation, we can show that, as hypothesized, this effect is driven by the role of immigrants in providing information: The effect is stronger if we are looking at an investor’s first entry, but weaker if the investor already has experience. A split by country groups reveals that the FDI-migration link seems stronger for firms from developing countries and East Asia, compared to firms from Europe. The former group is also expected to face stronger informational barriers. Results show that smaller firms

---

<sup>1</sup>As foreign direct investment (FDI) does not exclusively originate from multinational companies, the more general term ‘investor’ for the investing party will be used from now on.

<sup>2</sup>The Economist, April 24th 2010.

<sup>3</sup>Germany is divided into 16 states and 402 districts. Districts have an average population of around 200,000 inhabitants, and an average area of around 900km<sup>2</sup>

are more dependent on immigrants, since they do not have the means to hire external help to obtain information, and are more likely to rely on informal contacts. In addition, firms with only one foreign investor rely more in immigrants than joint-ventures. Lastly, the effects are also stronger for services firms, which also happen to be smaller. The results from the disaggregated analysis provide ample support for the hypothesis that information provision is at the heart of the FDI-migration link.

The question whether immigrants attract FDI is particularly interesting for policymakers who like to know about the benefits and costs of immigration, especially at the local district level. This paper assesses the amount of FDI that the presence of immigrants can help to attract, hints at which immigrants are most effective at doing so, and what kind of FDI may be involved.

Compared to the existent literature on the FDI-migration link, we contribute in several ways: First, we provide ample evidence in favour of the hypothesis that information provision plays a crucial role in the FDI-migration link. Second, data quality has markedly improved: The analysis is conducted at a more detailed small-scale level than in any previous paper, namely the district level. In addition, the number of source countries has tripled, and the German data allows us to use *annual* variation in immigration. Third, this paper is the first to take geographical interdependencies between districts into account, while the previous literature has been largely oblivious to this issue. Lastly, the paper deals with the endogeneity problem that have plagued many in a much more comprehensive way by using appropriate controls, different specifications and a quasi-natural experiment.

Germany is an interesting case in point to study the relationship between FDI and migration. Germany is the world's 4<sup>th</sup> largest recipient (2<sup>nd</sup> in Europe) of FDI,<sup>4</sup> and the world's 3<sup>rd</sup> largest country (2<sup>nd</sup> in Europe) in terms of immigrant population.<sup>5</sup>

The remainder of the paper is organized as follows: Section 2 reviews the existing literature and assesses the contribution of this paper. Section 3 is the theory section and presents a simple model to explain the FDI-migration link. Section 4 describes the datasets and presents some descriptive statistics. Section 5 explains the methodology and specifications employed in this paper. Section 6 presents the baseline results, and a further disaggregated analysis. Section 7 provides results from the quasi-natural experiment on ethnic German migration in the 1990s. Section 8 concludes.

---

<sup>4</sup>CIA World Factbook 2013. 1<sup>st</sup> in Europe is the United Kingdom.

<sup>5</sup>UN Population Division 2013. 1<sup>st</sup> in Europe is Russia.

## 2 The Literature

Our research question merges several strands of the academic literature. On the one hand, there is a debate about the importance of information in determining FDI (Daude and Fratzscher (2008), Cristea (2015)). For example, Daude and Fratzscher (2008) have shown that FDI is much more sensitive to barriers in information than other forms of capital flow. Similarly, a literature on cultural proximity deals with the question of preference for culturally similar people in trade (Guiso et al., 2009). On the other hand, there is a large literature on the effects of migration on local communities. This includes effects on labour markets (Borjas (2003), Card (2005)), housing costs (Saiz, 2007) and crime (Bianchi et al., 2012), for example. This paper contributes to the debate in both strands by examining the sensitivity of FDI to information flows, adding increased inward FDI as a possible benefit of the presence of immigrant communities.

While the literature on the relationship between FDI and migration has lagged behind the literature on trade and migration (Gould (1994), Rauch and Trindade (2002)), it has gained some ground in recent years: Kugler and Rapoport (2007) and Javorcik et al. (2011) both use data on US outward FDI and inward migration to find a positive relationship between the two. However, their focus differs from ours, as our focus is on inward FDI. The channels through which the FDI-migration link works and policy implications for inward FDI may be quite different.

Analyzing these questions using national level data, as the papers above, may be insufficient because of endogeneity problems. Variables that influence FDI often also influence migration: It could be the case that the US has some special link with one country (e.g. for some historical reason) that causes this country to both send in more immigrants and receive more FDI. In that case, the positive relationship that we observe between the two variables would be spurious.

Undertaking the analysis at the sub-national level means that any national determinants of FDI and migration can be held constant. This means that there is no need to worry about variables that may only vary at the national level such as differences in domestic institutions, historical ties, common language, currencies or national tax laws which may pose endogeneity problems. Hence, the analysis at the sub-national level should improve upon identification of the effects. Papers that analyse the relationship between inward FDI and migration at the regional level include Buch et al. (2006), Foad (2012) and Hernandez (2014).

Buch et al. (2006) look at the contemporaneous relationship between FDI and immigrants in Germany, using the same dataset on FDI as in this paper, but with disaggregation at the state

level. Their model of factor complementarity postulates that foreign firms receive a higher return on their capital when they invest in a state with a higher share of immigrants from their own country. The underlying assumption here is that immigrant workers have to be employed by the foreign affiliates for a positive relationship between the two to emerge. Following this model, their empirical results show that FDI and migration are positively linked in both directions, with the effects being stronger for OECD countries.

Foad (2012) undertakes his analysis using US data from 1990 to 2004. Data on FDI comes from the US Bureau of Economic Analysis database, while migration data are sourced from the US Census, which is updated every ten years. The basic model explains the distribution of the FDI stocks across states and nations, where he finds that states with twice as strong immigration networks will receive on average 20 more affiliate entries per year. In a dynamic framework, he further finds that contemporaneously, FDI and migration may act as substitutes, but the complementary nature between the two kicks in after a few years.

Hernandez (2014) also employs a US dataset to explain the FDI-migration link. He uses a sample of 288 FDI entries by 27 countries between 1998 and 2003 from the Directory of Corporate Affiliations. Using a fixed effects probit model, he finds that a 1% increase in immigration concentration has an average marginal effect of 1.35% increase in the probability of FDI entry for a particular state. The effects are particularly strong for knowledge-intensive industries and firms without prior experience. However, the analysis is only cross-sectional in nature due to the data limitations of decennial immigrant data from the US census and the small sample size in FDI entries.

This paper contributes to this literature on several margins:

First, we present comprehensive evidence in favour of a particular theory of the FDI-migration link, namely the role of information provision by immigrants. With the partial exception of Hernandez (2014), previous papers have either offered explanations different from information provision, or not presented direct evidence in favour of the information channel. Evidence is presented by breaking down the results by order of entry, firm size, shareholders, sector, and country of the investor's origin. These disaggregated analyses are new to the literature and provide interesting new insights on the exact channels of the FDI-migration link, as well as what kind of FDI immigrants can attract.

Second, data quality has markedly improved. This paper is the first to take the sub-national analysis to a more detailed level, namely the district level, as opposed to previous papers which used the state level as their unit of analysis. This allows for much more precise estimates. When talking about agglomeration effects and the benefits of immigrants for FDI, the state level may still be too large to conduct meaningful analyses. Two unrelated areas may get conflated in a

state-level analysis, leading to aggregation bias. On the other hand, districts are more likely to constitute the appropriate unit of analysis: Geographical mobility and knowledge about local characteristics is often confined to the district level, if one thinks of daily commuting distances.<sup>6</sup> Hernandez (2014) also cited the advantage of a more detailed small scale analysis for the same reasons. In addition, the dataset spans 13 years (1999-2011) and contains annual variation in both FDI and migration. This is in contrast to papers employing US data, where migration is only updated every ten years. Furthermore, the number of source countries has increased to 84, which includes all countries that have invested in Germany over the sample period. This allows us to exploit much more detailed variation within districts over time, between districts, and between countries.

Third, despite the more granular analysis, the larger picture of inter-district dependencies has not been left out. Previous papers have treated all states symmetrically, without any geographical interdependency. This omits the fact that firms may take location determinants in neighbouring states into account. It also gives rise to some arbitrariness in state variables such as GDP, since its size is determined in parts by how the political boundaries are drawn.<sup>7</sup> This is the first paper to weight variables by distance, with closer districts receiving larger weights than districts further away. It accounts for the fact that firms may also factor in immigrants in neighbouring districts when determining their location decision and ameliorates the arbitrariness in political boundaries.

Fourth, we deal with the endogeneity problems of the previous literature in a more comprehensive way. By looking at FDI entry rather than FDI stocks, and varying the lag length of explanatory variables, the problem of reverse causality can be mitigated. Lagged stocks of FDI are included to control for potentially spurious effects from country-specific firm agglomerations in a particular district. The inclusion of district fixed effects removes the possible endogeneity channel of district agglomeration effects. Country fixed effects control for the fact that source countries differ in their likelihood to invest, which could bias the results if there was systematic correlation with migration patterns. While a few of the above remedies have been used in previous papers, none has approached all aforementioned endogeneity issues at once.

Lastly, we exploit a quasi-natural experiment. The setting uses the large-scale migration of ethnic Germans ('Spätaussiedler') in the 1990s from Russia to Germany, who were exogenously allocated across districts. Due to the small sample size of immigrants and related firms, the setting is only used as a validation exercise. Nevertheless, this is the first paper in the literature to exploit truly exogenous variation in the form of a quasi-natural experiment to shed new light

---

<sup>6</sup>According to Winkelmann (2010), 80% of commuters in Germany have a daily commuting distance of below 25km.

<sup>7</sup>In Germany, this means that many small districts in the Ruhr area have rather small GDP, despite the fact they are actually part of a much larger metropolitan region, which implies large market potential.

on the question of causality.

### 3 Theory

Possible channels for the FDI-migration link include the provision of information and cultural proximity. For investors who may have insufficient knowledge about a particular country abroad, knowing immigrants in location  $i$  helps to put this place on the map, letting investors know about the existence of this location in the first place. In addition, immigrants can provide investors with information about possible local investment projects, greenfield sites and market characteristics. They can also help to liaise with authorities as immigrants may have a better grasp of the local language. Some of the information may be unique to the location in question, while some information (e.g. about national laws) can be generalized to the whole country. Hence, immigrants help in providing location-specific as well as nation-specific information. Moreover, cultural proximity may cause investors to favour dealing with brokers who are more similar to themselves, introducing a preference for own-country immigrants abroad (McPherson et al. (2001), Guiso et al. (2009)). All these factors help to lower entry costs for investors in locations where a large immigrant community from their own country can be found.

This section presents a simple model to convey the general idea of the FDI-migration link, and how the strength of the link depends on the characteristics of the investor and the investment.

An investor  $h$  from country  $j$  maximizes profit by choosing a district  $i$ . Profit consists of two components: The first component is  $r_{hi}$ , which denotes the revenue that investor  $h$  can generate in district  $i$ . It is assumed that  $r_{hi}$  is unrelated to the investor's country of origin. The revenue  $r_{hi}$  enters the profit function positively, and is a 'black box' containing all investor- and district-specific determinants of revenue, such as market potential or the investor's sector of business.

The second component is the cost  $c_{hij}$ , which denotes the investor- and district-specific cost that is needed to obtain necessary information about the location before investing there. As described in the introduction, this includes costs of inquiring market characteristics, potential sites for investment and liaising with local authorities. This cost enters the profit function negatively. More formally, the investor's maximization problem is as follows:

$$\max_i \pi_{hij} = r_{hi} - c_{hij} \tag{1}$$



The information cost  $c_{hij}$  in turn consists of two components: The district-specific cost  $c^D$  represents the cost of obtaining information about a particular district. The nation-specific cost component  $c^N$  represents the cost of learning nation-specific characteristics (e.g. national tax laws).

$$c_{hij} = c_{hij}^D(\cdot) + c_{hij}^N(\cdot) \quad (2)$$

The cost of acquiring information occurs only once. As soon as an investor has obtained district- or nation-specific information, it can be used repeatedly for additional investments in the same entity at zero marginal cost. This implies that once an investor entered a district (nation), it will never have to incur the cost of acquiring information about the same district (nation) again. This weakens the FDI-migration link for subsequent entries. More formally:

$$c_{hij}^K(\cdot) = \begin{cases} \phi_{hij}^K(\cdot) > 0 & \text{if first entry by } h \text{ in } K \\ 0 & \text{if subsequent entry by } h \text{ in } K \end{cases} \quad K = D, N \quad (3)$$

Here,  $\phi_{hij}^K$  denotes the non-zero part of the information cost, so  $\phi_{hij}^K = c_{hij}^K$  for any first entry.

For an investor, own-country immigrants help to lower the cost of obtaining both types of information through the link of common nationality. With  $mig_{ij}$  denoting a measure of immigrants from country  $j$  in district  $i$ , we have:

$$\frac{\partial \phi_{hij}^K(\cdot)}{\partial mig_{ij}} < 0 \quad K = D, N \quad (4)$$

Each investor  $h$  has an idiosyncratic cost function, reflecting the difficulty he faces in obtaining information about a location. Investors from countries further away or with larger differences in institutions compared to the host country have higher information costs. The label  $h$  orders investors in ascending order by the costs they face:

$$\phi_{(h+1)ij}^K(\cdot) - \phi_{hij}^K(\cdot) > 0 \quad K = D, N \quad (5)$$

For investors who face higher costs in obtaining information, immigrants are assumed to provide an absolutely larger reduction in these costs:

$$\frac{\partial \phi_{(h+1)ij}^K(\cdot)}{\partial mig_{ij}} - \frac{\partial \phi_{hij}^K(\cdot)}{\partial mig_{ij}} < 0 \quad K = D, N \quad (6)$$

The above model gives rise to three hypotheses:

**Hypothesis 1:** Districts with a larger measure of immigrants from country  $j$  receive more firm entries from country  $j$ .

**Hypothesis 2:** Once an investor has already invested in a country, the importance of immigrants decreases for the subsequent entry in the same country.

**Hypothesis 3:** Immigrants are more important for investors who face larger information barriers.

The later sections of this paper will assess the hypotheses using German district-level data.

## 4 Data

### 4.1 Data Description

The dataset has a panel structure with 3 dimensions: Districts, countries and years. There are 402 districts in Germany, but since the state of Saarland collects immigrants data only at the state level, the number of districts was essentially reduced to 397, with Saarland's 6 districts merged into one unit. The sample originally contained 197 countries, for which FDI and immigrant inflows could potentially be observed. For computational reasons, all countries that have not invested in Germany in the sample period were dropped, which leaves us with 84 countries only.<sup>8</sup> In terms of years, the sample ranges from 1999 - 2011. In total, the panel dataset contains 433,524 observations, where the cross-sectional unit is 'district-country'.

9

The data on inward FDI in Germany is obtained from the 'Mikrodatenbank Direktinvestitionen (MiDi)' database by the Deutsche Bundesbank (the German Central Bank). The MiDi database collects annual statistics on German inward and outward FDI in accordance with the German

---

<sup>8</sup>One could argue that this approach leaves out valuable information, and reduces the explanatory power of the analysis. But from a policy perspective, we are in fact keeping the interesting countries only, since the analysis would not be too interesting for countries that never invest in Germany in the first place.

<sup>9</sup>Regressions will show less observations as we lose time periods through lags and the PPML estimator drops some observations.

Foreign Trade and Payments Regulation. For inward FDI, all firms within Germany having a balance sheet exceeding 3mn € and a direct foreign share of more than 10% are required by law to report to the Deutsche Bundesbank. Indirect participating interests need to be reported if they exceed 50%. Hence, due to the compulsory nature of reporting, the MiDi database contains the complete universe of inward FDI in Germany (above the threshold).

An important topic is the issue of multi-location firms in the MiDi database. We only know the headquarter location of the firm. This means that for multi-location firms, we would not be able to distinguish additional branches belonging to the same legal entity as the headquarter.<sup>10</sup> This could potentially introduce a margin of error if we want to measure multinational activity of multi-location firms in a particular district. As in Spies (2010), we will use the number of firms as our dependent variable, as the extensive margin is much less affected by this error than the intensive margin.

Data on immigrants in Germany are provided by the Federal Statistical Office of Germany in its Genesis database, sourcing their information from the Central Foreigner’s registry (‘Ausländerzentralregister’). In this context, immigrants are classified as foreign passport holders.<sup>11</sup> Data are available at the district-national level. This means that for each year  $t$ , we have information on how many immigrants from country  $j$  were residing in district  $i$ .

Further data on district variables (e.g. district GDP, settlement share, coordinates) were also sourced from the Federal Statistical Office, using its regional database. Country coordinates for computing distances were obtained from the GeoDist database of CEPIL. More information about data processing (e.g. the distance weighting process) is included in the appendix.

## 4.2 Ethnic German Immigrants Data

As a validation exercise, the large-scale immigration by ethnic Germans from Russia in the 1990s (‘Spätaussiedler’) is used as quasi-natural experiment. After the break-up of the Soviet Union, travel restrictions were lifted and millions of ethnic Germans living in the former Soviet Union were now able to move to Germany and were granted German citizenship upon arrival due to their ethnic origins. Ethnic migration of Germans in the mid-1990s largely took place from Russia and the Central Asian Republics. The immigrants were allocated to the federal states,

---

<sup>10</sup>On the other hand, legally independent affiliates of the same investor would indeed show up as separate entries in the MiDi database.

<sup>11</sup>A potential shortcoming of the dataset is that it does not include naturalized citizens. Naturalized citizens would be captured by the term ‘migrational background’, which is surveyed in the annual micro census. However, the census’ sample size is too small to draw inferences at the district level for smaller immigrant groups. The micro census sample was nevertheless examined for some large immigrant groups to infer whether the ratio of ‘migrational background’ vs. ‘foreign passport holders’ varies regionally. It turns out that the ratio is much lower in East Germany, which is why East Germany is excluded from the sample in a robustness check.

who then further applied state-specific allocation keys.<sup>12</sup> From 1996 on, new laws required immigrants to stay at their assigned place, otherwise they would lose all their benefits. This policy was in place until 2001. Piopiunik and Ruhose (2015) provide evidence that compliance with this policy was high.

This historical setting can thus be viewed as a quasi-natural experiment, where immigrants were randomly allocated across districts, and where the allocation decision is independent of any FDI determinants. We employ the same dataset as used in Glitz (2012). The dataset includes inflows of ethnic Germans into each district from 1996- 1998. Exceptions include Bavaria and all 5 East German states, where records were either not kept at the district level, or where records were too patchy. For more details of the data and the historical background, please see Glitz (2012).

### 4.3 Descriptive Statistics

**Table 1**

*Top FDI stock districts in 2011*

	District	# firms
1.	Frankfurt	1010
2.	Hamburg	797
3.	Berlin	784
4.	Munich (City)	749
5.	Düsseldorf	732
6.	Munich (District)	483
7.	Cologne	367
8.	Mettmann	209
9.	Main-Taunus	194
10.	Essen	173
11.	Hannover Region	169
12.	Stuttgart	142
13.	Offenbach (District)	140
14.	Rhein-Kreis Neuss	129
15.	Bremen	127

Source: RDSC of the Deutsche Bundesbank, MiDi 1999-2011, own calculations.

<sup>12</sup>Allocation to the federal states is undertaken using the Königssteiner Schlüssel, which allocates shares to states according to their population and tax base. Further allocation of immigrants to the district level within states was then undertaken based on the population shares of the districts.

In this section, some descriptive statistics concerning the distribution of FDI and immigrants in Germany will be presented. Starting with inward FDI, the dependent variable, table 1 shows the Top 15 districts concerning the number of foreign affiliates in Germany. We can see that FDI shows a very skewed picture, with large city districts dominating as attractive investment hubs. In 2011, the Top 10 districts contained 37.7% of total inward FDI in Germany in terms of the number of firms. Despite the concentration of FDI at the top, there is also a rather long tail of districts that receive some intermediate amount of FDI. In total, there were 14,590 foreign affiliates in Germany in 2011.

**Table 2**  
*Top FDI stock districts by country in 2011*

	France	# firms	Italy	# firms	Netherlands	# firms
1.	Frankfurt	69	Munich	99	Hamburg	175
2.	Berlin	62	Hamburg	27	Düsseldorf	159
3.	Düsseldorf	54	Köln	19	Frankfurt	151
4.	Hamburg	50	Munich (District)	19	Berlin	127
5.	Köln	48	Frankfurt	16	Köln	110

	Switzerland	# firms	Denmark	# firms	Japan	# firms
1.	Munich	112	Berlin	61	Düsseldorf	81
2.	Lörrach	66	Hamburg	49	Hamburg	22
3.	Frankfurt	63	Flensburg	16	Frankfurt	17
4.	Berlin	55	Pinneberg	10	Rhein-Neuss	17
5.	Hamburg	52	Schleswig-Flensburg	10	Main-Taunus	14

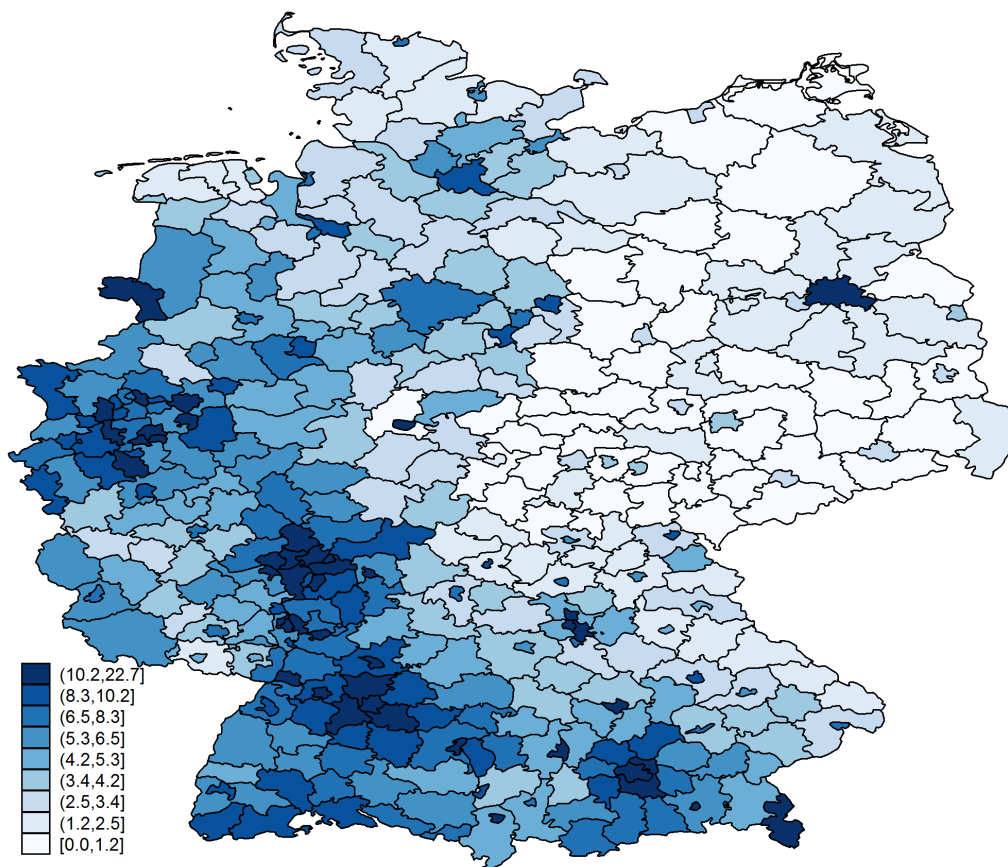
Source: RDSC of the Deutsche Bundesbank, MiDi 1999-2011, own calculations.

Table 2 plots a more detailed picture, disaggregating by source country, to show the top 5 destinations in terms of the number of affiliates for 6 chosen countries. We can see that the top destinations vary with the source country. For example, Italian firms predominantly invest in Munich, whereas Japanese firms choose Düsseldorf as their prime location. Another picture that emerges is that FDI tends to follow a gravitational pull: Countries investing in Germany prefer to do so close to their own borders. This can be observed in the case of Switzerland and Denmark, where the districts of Lörrach (bordering Switzerland) and the districts of Flensburg and Pinneberg (both close to Denmark) show up in the top 5 destinations, while they do not feature in the other countries' top 5. <sup>13</sup>

<sup>13</sup>Due to the confidential nature of the MiDi data, only large investor countries could be presented. The requirement is that the number of affiliates (including the number of investors) is not allowed to drop below 3, in order to avoid identification of particular firms. This requirement is more easily fulfilled for large investor countries.

**Figure 1**

*Immigrant population (all nationalities) as % of total district population, 2011*



Source: German federal statistical office, own calculations.

The following part presents some stylized facts concerning the explanatory variable of immigrants. Figure 1 shows a map with the distribution of the immigrant population share (aggregating across all nationalities) across Germany. We can see that larger immigrant concentrations are found in highly urbanized areas of Western Germany and Berlin. However, this does not mean that this aggregate picture is representative of particular nationalities. Instead, each nationality has their own distinctive distribution pattern across Germany, as can be seen in table 3. It shows us the top 3 districts with the highest shares of immigrants for a sample of countries. For Germany's neighbouring countries, districts with the highest concentration of immigrants are often found close to the border. This is true for France, the Netherlands and Switzerland. For the UK and the US citizens, the largest concentration is found in the vicinity of existing or former military bases. Turkish and Italian immigrants cluster in traditional industrial areas, reflecting the large scale immigration from these countries in the context of the so called 'guest worker' programme in the 1950s and 1960s. Russian immigrants prefer the surroundings of classical spa and festival towns, such as Baden-Baden and Bayreuth.<sup>14</sup> Lastly,

<sup>14</sup>In fact, on his second trip to Western Europe in 1863, Dostojewski traveled to Baden-Baden and lost nearly

**Table 3***Top immigrant share districts by country in 2011, % of total district population*

	France	Share	Netherlands	Share	USA	Share
1.	Ortenaukreis	1.03 %	County Bentheim	7.34 %	Heidelberg	0.75 %
2.	Baden-Baden	0.92 %	Kleve	5.07 %	Kaiserslautern, distr.	0.70 %
3.	Trier	0.66 %	Heinsberg	2.64 %	Hochtaunuskreis	0.55 %

	Switzerland	Share	Italy	Share	Turkey	Share
1.	Waldshut	0.91 %	Wolfsburg	4.10 %	Gelsenkirchen	8.10 %
2.	Lörrach	0.79 %	Ludwigshafen	3.54 %	Duisburg	7.91 %
3.	Konstanz	0.39 %	Solingen	3.25 %	Heilbronn	6.84 %

	Russia	Share	Japan	Share	China	Share
1.	Baden-Baden	1.21 %	Düsseldorf	0.94 %	Darmstadt	0.59 %
2.	Bayreuth	0.71 %	Frankfurt	0.40 %	Erlangen	0.58 %
3.	Düsseldorf	0.70 %	Rhein-Neuss	0.21 %	Goslar, district	0.49 %

Source: German federal statistical office, own calculations.

Chinese migration is largely concentrated around university towns, with all top 3 districts containing large institutions of tertiary education.

These stylized facts demonstrate that there is considerable variation in both our dependent and explanatory variable. It is not the case that all FDI and immigrants simply congregate in the same metropolitan area. Instead, each country shows a very distinctive pattern of FDI and migration. This variation enables us to identify the relationship between FDI and migration efficiently.

Table 4 presents some short summary statistics for the dependent and main explanatory variables at the district-year level. On average, a district has a stock of 29.2 foreign affiliates and sees 2.8 new entries per year. However, the distribution is extremely skewed, driven by a few clusters of multinational activity, as indicated by the median and 90th percentile values. The immigrant share and share of ethnic German migration shows a more even picture, with the mean and median being closer to each other.

---

all his money in the local casino. This story has been picked up by Russian writer Leonid Zypkin later on in his novel ‘Summer in Baden-Baden’, possibly prompting Russians to follow the traces of their great novelist.

**Table 4**  
*Summary Statistics (district-year level)*

	Mean	Median	90th pctile	StDev.	N
FDI Inflow (# firms)	2.8	1	5	9.7	5161
FDI Stock (# firms)	29.2	11	55	78.9	5161
Immigrants Share (in %)	6.7	5.6	13.1	4.9	5955
Ethnic Germans Inflow '96-'98 Share (in %)	0.51	0.49	0.82	0.26	229

Source: RDSC of the Deutsche Bundesbank, MiDi 1999-2011, and German Federal statistical office, own calculations.

## 5 Methodology

### 5.1 Endogeneity

When thinking about the relationship between FDI and migration, there can be several endogeneity problems that could bias the results. First is the question of reverse causality. Are immigrants attracting investments by firms? Or is it the other way round, in that firms first decide to invest, bring their own expatriate workers, who then in turn take their families with them? This reverse causality would be difficult to disentangle if one were to use *stocks* of both immigrants and FDI. However, for *newly incoming* FDI, the existing stock of immigrants is more likely to be exogenous. A firm that contemplates investing into a particular district in year  $t$  is unlikely to have influenced the existing immigrant stock in year  $t - 1$ . Hence, the firm may view the existing immigrant stock as exogenous from its own perspective, and factor it in when forming its location decision. For this reason, we will use new FDI entries rather than stocks as explanatory variable. In total, there were 8,476 firm entries over the time period 1999 - 2011.

It could still be the case that the actual FDI decision precedes the migration decision. An investor could make a decision at time  $t - 2$  to set up a plant at time  $t$  in district  $i$ . This decision, known at  $t - 2$ , prompts immigrants from the same country to locate in district  $i$  at  $t - 1$ .<sup>15</sup> If that was true, the causality would run from FDI to migration, but our regression would wrongly suggest migration attracting FDI. To mitigate this endogeneity problem, we vary the lag of the explanatory variable of immigrants, up to  $t - 7$ . With longer lags, the above reverse causality seems less plausible. In addition, we collapse the dataset by merging several years into one time period, thereby also implicitly lengthening the lag of the explanatory variable. The results for this exercise are presented in the appendix.

<sup>15</sup>A worker team might be sent to district  $i$  to set up the plant, or other immigrants might voluntarily move there, sensing business opportunities by selling special products to expatriates.



Another endogeneity problem stems from the existing stock of firms. It could be that a large business community from country  $j$  in district  $i$  has already been formed, indicated by a large number of  $j$ -country firms. This established business community could then attract new firms from country  $j$  due to agglomeration effects. At the same time,  $j$ -country immigrants could be attracted as expatriates move in or because immigrants spot more general business opportunities. If that were the story, new FDI entries and the existing migrants stock would be spuriously correlated, with the actual effect stemming from the role of the business community attracting both FDI and migration. In order to control for that, we include the number of existing firms (the FDI stock) from country  $j$  in district  $i$  as a control variable.

Even then, it may still be the case that endogeneity stemming from district fixed factors affects our estimations. For example, district  $i$  could happen to be a very attractive location for both FDI and migration, e.g. due to the existence of an international airport. In that case, attractive district location characteristics would pull in both immigrants and FDI, most likely of all countries. Any positive relationship between FDI and migration of a particular country that we observe would then be spurious, as part of the coefficient would contain the effects stemming from district-specific location advantages. Hence, we include district fixed effects in the regression in order to control for these time-invariant location characteristics. Furthermore, an additional regression is made including the share of all other immigrants (excluding the own country), to show that our results are indeed driven by country-specific immigrants, and not just by the general presence of immigrants from any other country. Results for this additional regression are presented in the appendix.

In addition, we have seen that for Germany's neighbouring countries, both FDI and migration tend to cluster at the border. This means that distance could play a crucial role in the FDI-migration link: It may be the case that by merely being located close to country  $j$ , a particular district  $i$  will receive more FDI and migration from country  $j$ . Then, any positive relationship between FDI and migration may be spurious, reflecting the positive influence distance has on both. This channel only concerns a few neighbouring countries and can be controlled for by including a distance variable. This variable contains the geodesic distance between district  $i$  and the largest city / capital of country  $j$ .<sup>16</sup>

## 5.2 Migration Measures

We will use three ways to measure migration. The first measure is the logarithm of the absolute number of immigrants in district  $i$  from country  $j$  at time  $t$ . This may give us an indication

---

<sup>16</sup>Admittedly, distance to border may be a more precise measure. This can hopefully be included in the next version of this paper.

of the number of potential contacts a foreign business could relate to. However, this measure does not account for the size of a particular district, so large districts will automatically have large immigrant numbers, even though the relative share might be small.

To account for that, the immigrant share, measured as percentage share of the immigrant population from country  $j$  in district  $i$  at time  $t$  is included. This is defined as

$$\text{Immigrant share}_{ijt} = \frac{\text{immigrants}_{ijt}}{\text{population}_{it}} \cdot 100\% \quad (7)$$

The advantage of this measure is that the immigrant share indicates the strength of the immigrant network in the local community, and normalizes by the size of the district. A larger concentration of immigrants may be able to send a more precise signal to investors in their original home country about local circumstances (Foad, 2012).

However, the average share of immigrants varies strongly by country of origin. While a share of 1% in a particular district would be rather high for Japanese immigrants, the same number would be considered low for Turkish immigrants in Germany. Hence, a third migration measure normalizes the immigrant share in district  $i$  by the nationwide share of immigrants from country  $j$ . This measure will be called migration intensity:<sup>17</sup>

$$\text{Migration intensity}_{ijt} = \frac{\text{immigrants}_{ijt}/\text{population}_{it}}{\text{immigrants}_{jt}/\text{population}_t} \quad (8)$$

The advantage of this measure is that it tells us about the strength of an immigrant network in a particular district relative to the nationwide average share. A high migration intensity in district  $i$  would then imply that investors can tap relatively abundant information sources in this district compared to relatively scarcer information somewhere else in Germany.

In accordance with most of the literature on FDI and migration, we will use the immigrant share as the main measure in all specifications. Results using the other two measures will be shown for robustness purposes.

### 5.3 Specification

Incorporating all the considerations above, the baseline specification looks as follows:

---

<sup>17</sup>The idea draws upon Foad (2012), but the interpretation of the measure offered in this paper is different.

$$fdi\_infl_{ijt} = \beta_0 + \beta_1 migration_{ijt-1} + \beta_2 fdi\_st_{ijt-1} + \beta_3 gdp_{it} + \beta_4 dist_{ij} + \beta_5 settle_{it} + \beta_6 tertiary_{it} + \delta_i + \eta_j + \mu_t + \epsilon_{ijt} \quad (9)$$

Subscript  $i$  stands for the district,  $j$  stands for the country, and  $t$  denotes the year.

Here,  $fdi\_infl_{ijt}$  (FDI inflow) denotes the number of foreign firms from country  $j$  entering into district  $i$  in year  $t$ . As discussed above, using the number of firms entering a district as dependent variable is the recommended choice to ameliorate endogeneity problems and measurement errors. Depending on the specification,  $migration_{ijt-1}$  stands for the logarithm of absolute number of immigrants, the immigrant share (in %), or immigrant intensity. The migration variables were all weighted by distance. The own district has weight 1, and other districts enter with weights that depend negatively on distance. Details about the weighting process can be found in the data appendix. We expect a positive coefficient on the migration variable.

Variables  $fdi\_st_{ijt-1}$  and  $dist_{ij}$  were included to mitigate endogeneity problem as discussed in section 5.1.  $fdi\_st_{ijt-1}$  gives us the number of the existing stock of firms from country  $j$  in district  $i$  in year  $t - 1$ .<sup>18</sup> The variable  $dist_{ij}$  stands for the the logarithm of distance of district  $i$  to the capital/largest city of country  $j$  in kilometres.

Further variables that may influence the attractiveness of a location are included. The variable  $gdp_{it}$  contains the GDP of district  $i$  in year  $t$ . It indicates the attractiveness of a particular location in terms of its market size. As the migration variable, GDP is weighted by distance, turning the GDP variable into market potential. The variable  $settle_{it}$  stands for the share of impervious surface in district  $i$  in %. The variable offers a way to distinguish urban and rural districts, with a higher value of  $settle_{it}$  denoting a more urban district. The variable  $tertiary_{it}$  gives us the share of inhabitants holding a tertiary degree in district  $i$ .

We include district, country and year fixed effects. This controls for any time-invariant characteristics in districts or countries that may influence the FDI decision.<sup>19</sup>

---

<sup>18</sup>Readers may worry about the classical dynamic panel problem of a lagged dependent variable in the covariates in combination with fixed effects, also called known as the Nickell bias. The answer is threefold: First, the setup here is somewhat different in that our dependent variable is not the stock of FDI, but FDI entry instead. Second, the specification includes district- and country fixed effects only, rather than district-country fixed effects. This implies that any possible correlation between the error term and the covariates is extremely small, as the mean computed in de-meaning is taken across  $JT$  and  $IT$  observations, rather than just  $T$  observation as in the classical case. Third, as the Nickell Bias in a fixed effects framework is downwards, any findings of positive results actually strengthens the case for a positive relationship.

<sup>19</sup>A short note on the incidental parameter problem: The data consist of all possible district-country pairs, with only district- and country fixed effects included. This means that adding a new country would add 402x13 additional observations but only one new parameter. Adding a new district would add 84x13 additional observations but only one new parameter. Hence, there is no incidental parameter problem. See Egger et al.

The dependent variable is a count variable with only positive integer values, and a large proportion of zero observations, due to the sparse nature of FDI entry at the district-country level. As has become common in the trade gravity literature, we use the Poisson pseudo-maximum-likelihood estimator (Silva and Tenreyro, 2006) as it identifies and drops regressors that may cause the nonexistence of estimates in the classical Poisson estimator. For robustness purposes, results from a censored regression model using the Tobit estimator are also shown. Standard Errors will be clustered at the district-country level.

## 6 Results

### 6.1 Baseline Results

Results are presented in table 5. Column (1) contains the results from the baseline regression using the immigrant share as dependent variable. The coefficient on the immigrant share is positive and highly significant. The results provide support for hypothesis 1 from section 3. Interpreting the coefficient as semi-elasticity, we can see that raising the weighted percentage-point immigrant share from country  $j$  in district  $i$  by one standard-deviation (SD: 0.107) increases  $j$ -country FDI entry in district  $i$  by 3.3% for each year.<sup>20</sup>

The FDI stock variable is positive and highly significant. This gives us an indication of country agglomerations at the district level. Firms like to invest where other firms from the same country can already be found. This can create virtuous cycles and is an interesting finding in itself for local policymakers. Distance enters negatively, as could be expected. Greater distance from country  $j$  reduces the attractiveness of a district for  $j$ -country firms. The settlement share enters positively, indicating that more urbanized districts receive more FDI than more rural districts. Lastly, market potential and the share of tertiary educated inhabitants do not have significant coefficients.

Columns (2) - (3) present results using the alternative definitions of migration, namely migration intensity and total migration. In both cases, the migration variable is still positive, highly significant, and the coefficients on the other controls are stable. Column (4) shows the results using the Tobit estimator, to show that results do not depend on the particular properties of the PPML estimator. Again, the coefficient on immigrant share is positive and highly significant, with coefficients on other variables retaining sign and significance as well.

---

(2011) for further details.

<sup>20</sup> $e^{0.107 \cdot 0.2998} - 1 = 0.033$

**Table 5**  
*Baseline Results*

	(1) PPML Full Sample	(2) PPML Full Sample	(3) PPML Full Sample	(4) Tobit Full Sample
Migration Share(t-1)	0.2998*** (0.1000)			0.6316*** (0.1419)
Migration Intensity(t-1)		0.2127*** (0.0477)		
Migration Total(t-1)			0.2598*** (0.0467)	
FDI Stock(t-1)	0.0049*** (0.0009)	0.0053*** (0.0009)	0.0052*** (0.0009)	0.1007*** (0.0055)
Distance	-0.5960*** (0.0707)	-0.3919*** (0.0971)	-0.3334*** (0.0989)	-0.9433*** (0.1353)
Settlement Share	0.1220*** (0.0401)	0.1266*** (0.0403)	0.1294*** (0.0402)	0.1936*** (0.0622)
Market Potential	0.7040 (0.9556)	0.5260 (0.9603)	0.4820 (0.9592)	1.1438 (1.2804)
Distr. Tert. Share	0.0128 (0.0269)	0.0194 (0.0270)	0.0152 (0.0264)	-0.0469 (0.0390)
Constant	-11.2333 (8.9383)	-11.0927 (8.9288)	-12.1701 (8.8409)	-19.4755 (12.1819)
Observations	386,780	386,780	386,780	390,764
R-squared	0.4857	0.4831	0.4852	
District FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
SE Clusters	32619	32619	32619	32951

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: RDSC of the Deutsche Bundesbank, MiDi 1999-2011, own calculations.

## 6.2 Results by order of entry

In order to provide further support for the hypothesis that immigrants provide valuable information about national and local circumstances, we disaggregate results by the order of entry. This means that we split the sample according to whether a particular entry was an investor's first affiliate in Germany, or whether it was a subsequent entry of an investor who already has experience in Germany. The sample of subsequent entries was then further disaggregated into whether the subsequent entry was undertaken in the same district / state as the first entry, or whether it has been in a different district / state.<sup>21</sup> Hence, the specification is the same as in regression (9), only with the dependent variable being replaced.<sup>22</sup>

Results are presented in table 6. Column (1) shows the results with investors' first firm entries. We can see that the coefficient on the immigrant share is positive and highly significant, and larger in magnitude than in the baseline specification. Column (2) shows results for using investors' subsequent firm entries as dependent variable. In this specification, the coefficient on the immigrant share is much smaller, and only marginally significant. It looks like once an investor has established an affiliate in Germany, the presence of immigrants is considered much less important when deciding for a second time where to invest.

The results are consistent with the story that immigrants help to provide investors with information about nation- and district-specific circumstances, and supports hypothesis 2 from section 3. As the nation-specific part of this information has become redundant when entering for a second time, the importance of immigrants as information providers is reduced for subsequent entries.

The picture is confirmed when we disaggregate subsequent entries further. Column (3) contains only those subsequent entries as the dependent variable, where the entry was undertaken in the same district as the first entry. Now for this subsample, the coefficient on the immigrant share is not significantly different from zero. On the other hand, column (4) shows that immigrants retain their importance when the subsequent entry is undertaken in a different district than the first. However, the coefficient is still smaller in magnitude compared to first entries in column (1). This is also consistent with the story that while nation-specific information will have become redundant, district-specific information will need to be required afresh for the type of entries in column (4).

---

<sup>21</sup>Out of a total of 8,476 firm entries from 1999 - 2011, 7,020 were an investor's first entry. This leaves 1,456 firms for subsequent entries. Looking at subsequent entries in the same district leaves us with 275 firms. The reader can make his own judgements about how much significance to attach to the regressions with only small sample sizes. The results are presented nevertheless for completeness.

<sup>22</sup>In particular, the FDI stock variable remained the same, containing the whole FDI stock rather than just certain entries.

**Table 6**  
Results by order of entry

	(1)	(2)	(3)	(4)	(5)	(6)
	PPML	PPML	PPML	PPML	PPML	PPML
	First Entry	Subseq. Entry	Subseq. Same D.	Subseq. Diff. D.	Subseq. Same St.	Subseq. Diff. St.
Migration Share(t-1)	0.4685*** (0.1019)	0.2848* (0.1635)	0.0717 (0.4593)	0.3680** (0.1643)	-0.0276 (0.4789)	0.4016** (0.1717)
FDI Stock(t-1)	0.0050*** (0.0012)	0.0091*** (0.0026)	0.0131*** (0.0037)	0.0059*** (0.0019)	0.0117*** (0.0036)	0.0059*** (0.0019)
Distance	-0.7824*** (0.0780)	-0.8650*** (0.1257)	-1.3171*** (0.3145)	-0.8268*** (0.1318)	-1.2248*** (0.3092)	-0.8209*** (0.1355)
Settlement Share	0.1569*** (0.0475)	0.2589*** (0.0931)	0.5807*** (0.1726)	0.1726* (0.1029)	0.4717*** (0.1665)	0.1801* (0.1052)
Market Potential	-0.7326 (1.1033)	3.9707* (2.1347)	15.5702** (6.2850)	2.6375 (2.4551)	15.6298*** (5.6525)	2.6202 (2.3435)
Distr. Tert. Share	-0.0281 (0.0307)	0.0867 (0.0618)	0.2054 (0.2864)	0.0341 (0.0533)	0.1685 (0.2630)	0.0337 (0.0535)
Constant	2.7748 (10.4226)	-40.3933** (19.4034)	-146.8897** (59.5194)	-27.7355 (22.1047)	-146.5516*** (53.4557)	-27.6685 (21.0289)
Observations	351,040	115,752	17,175	95,304	20,436	93,324
R <sup>2</sup>	0.3562	0.2139	0.5282	0.1424	0.5136	0.1401
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
SE Clusters	29600	9750	1575	8019	1872	7854

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: RDSC of the Deutsche Bundesbank, MiDi 1999-2011, own calculations.

Column (5) has subsequent entries in the same state as the first entry as dependent variable. As in column (3), the coefficient of the immigrant share variable is insignificant. On the other hand, column (6) presents results with subsequent entries in a different state as the dependent variable. Here, immigrants seem to matter again. Interestingly, the coefficient in column (6) is larger than in column (4), implying that immigrants matter more when moving to another state rather than only another district. A possible explanation is that the further away a firm moves from its original first investment location, the more the firm will again depend on information provided by immigrants. The usefulness of information provided by immigrants is decreasing in distance.

It may also be worth noting that market potential becomes significant and the effects increase in magnitude when an investor enters for a second time, especially if the entry happens in the same district / state as before. While an investor may still face some uncertainty about the first location, thereby depending on immigrant support to overcome informational barriers, the second entry is more driven by market potential considerations.

### 6.3 Results by sector, size and shareholders

Table 7 presents results by sector, size of the firm and its shareholders. Column (1) and (2) split the sample into manufacturing and services firms only.<sup>23</sup> It is evident that services firms seem to be influenced more by immigrants in their location decision as compared to manufacturing firms. Given that services firms are much smaller in the sample, these results shed new light on the type of firms that immigrants attract. Instead of pulling in high value-added car manufacturers, immigrants are more likely to attract smaller services firms.<sup>24</sup>

Closely connected, columns (3) and (4) present results splitting the sample into firms with a balance sheet above and below 20mn€. We can see that the FDI-immigration link is entirely driven by the smaller firms, since only their immigration coefficient is larger than in the baseline and strongly significant. This is consistent with the hypothesis that information frictions are crucial: Larger firms may have in-house divisions to assist them in obtaining information, or can hire external consultants to help them doing so. In contrast, smaller firms may not have the financial means, thereby having to rely on informal connections through immigrants. Interestingly, larger firms put a larger emphasis on market potential of their prospective locations.

---

<sup>23</sup>Manufacturing was defined as firms with NACE 1.1 codes ranging from 1500 to 4999 and NACE 2 codes ranging from 1000 to 4499. Services was defined as firms with NACE 1.1 codes ranging above 5000 and NACE 2 codes above 4500.

<sup>24</sup>The FDI Stock variable in these two regressions was also restricted to manufacturing and services FDI, respectively.



**Table 7**  
Results by sector, size and shareholders

	(1)	(2)	(3)	(4)	(5)	(6)
	PPML	PPML	PPML	PPML	PPML	PPML
	Manufacturing	Services	$B/S > 20mn$	$B/S < 20mn$	Full Share	No Full Share
Migration Share(t-1)	0.2101*** (0.0806)	0.3466*** (0.1241)	-0.0058 (0.1167)	0.4445*** (0.1051)	0.3256*** (0.1203)	0.2788*** (0.0949)
FDI Stock(t-1)	0.0393*** (0.0079)	0.0050*** (0.0010)	0.0037*** (0.0009)	0.0055*** (0.0012)	0.0046*** (0.0009)	0.0054*** (0.0015)
Distance	-0.4933*** (0.0701)	-0.6099*** (0.0861)	-0.5554*** (0.0774)	-0.6136*** (0.0803)	-0.5661*** (0.0782)	-0.6444*** (0.0904)
Settlement Share	0.1135** (0.0572)	0.1162** (0.0457)	0.1301** (0.0527)	0.1184*** (0.0432)	0.1292*** (0.0436)	0.1191* (0.0622)
Market Potential	0.4622 (1.1171)	0.9205 (1.1806)	2.3678** (1.1632)	-0.3393 (1.0584)	0.3008 (1.0402)	2.2363 (1.4383)
Distr. Tert. Share	-0.0800** (0.0316)	0.0461 (0.0332)	-0.0323 (0.0388)	0.0278 (0.0276)	-0.0108 (0.0306)	0.0630* (0.0375)
Constant	-9.2600 (10.8449)	-14.2929 (10.8202)	-27.1624** (11.0576)	-2.8833 (9.9571)	-8.1135 (9.8047)	-26.9095** (13.5247)
Observations	259,464	357,760	246,468	362,768	314,432	308,432
$R^2$	0.1399	0.4850	0.4309	0.4038	0.4403	0.3013
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
SE Clusters	21888	30160	20805	30573	26520	25974

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Columns (5) and (6) split the sample by whether the reporting foreign investor is the full shareholder (100%) of the German affiliate, or whether this is not the case. While we do not know the exact composition of the other shareholders, holding no full share means that there is a certain likelihood of other German-based investors. With the involvement of other German investors, the problem of information frictions in searching for suitable locations is much reduced. Hence, as expected, the greater role of information frictions for full foreign shareholders results in a greater role of immigrants in their location decision, as shown by the larger immigration coefficient.

The results in this table provide evidence in favour of hypothesis 3 from section 3, as we can show that firms with larger informational frictions (smaller firms, sole foreign shareholders) are more reliant on immigrants.

## 6.4 Results by country

We can also look at whether the FDI-migration link is stronger for particular groups of countries. This is done by using the full sample again, but generating a dummy for particular country groups and interacting it with the migration share variable. The country groups are developing countries, the EU 15 countries and East Asia.<sup>25</sup>

Results are presented in table 8. Column (1) shows the results for the group of developing countries: We can see that the migration channel is much stronger for investors from developing countries, as indicated by the positive and significant interaction term. We further look at additional subgroups in column (2) (EU15) and column (3) (East Asia): The FDI-migration link is much weaker for the group of EU15 countries, and much stronger for East Asian countries.<sup>26</sup>

The picture that emerges is that investors from highly developed countries with institutional settings similar to those in Germany and geographical proximity (EU15) depend much less on immigrant support. On the other hand, investors from countries more dissimilar to Germany (developing countries) or with large distances (East Asia) find the support of immigrants much more important. This underlines the relevance of immigrants as information providers, as the results of this section indicate that subgroups with larger informational barriers tend to rely more on immigrants, and confirms the effect of institutional similarity found in Girma and Yu (2002). Again, this supports hypothesis 3 from section 3.

---

<sup>25</sup>China, Japan, South Korea and Taiwan

<sup>26</sup>Due to the non-linear nature of the PPML estimator, the interpretation of interaction terms is not as straightforward as in the linear case (Ai and Norton, 2003). Hence, the results in this section are only seen as indicative. However, interpretation as incidence ratio is still possible. See ? and ? for details.

**Table 8**  
*Results by country groups*

	(1) PPML Full Sample	(2) PPML Full Sample	(3) PPML Full Sample
Migration Share(t-1)	0.2941*** (0.0992)	0.8346*** (0.2545)	0.2941*** (0.0988)
Migration Share * Developing (t-1)	4.7044*** (0.9470)		
Developing	-4.2802*** (0.5453)		
Migration Share * EU 15 (t-1)		-0.5670** (0.2619)	
EU 15		2.0731*** (0.5721)	
Migration Share * East Asia (t-1)			5.0598*** (1.0174)
East Asia			0.4666 (0.6245)
FDI Stock(t-1)	0.0051*** (0.0009)	0.0047*** (0.0009)	0.0050*** (0.0009)
Distance	-0.5920*** (0.0709)	-0.5926*** (0.0697)	-0.5997*** (0.0703)
Settlement Share	0.1220*** (0.0400)	0.1240*** (0.0401)	0.1226*** (0.0401)
Market Potential	0.7033 (0.9527)	0.6522 (0.9565)	0.7014 (0.9536)
Distr. Tert. Share	0.0125 (0.0268)	0.0137 (0.0269)	0.0130 (0.0268)
Constant	-7.0174 (8.9009)	-10.7976 (8.9454)	-11.1736 (8.9218)
Observations	386,780	386,780	386,780
$R^2$	0.4856	0.4855	0.4860
District FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
SE Clusters	32619	32619	32619

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: RDSC of the Deutsche Bundesbank, MiDi 1999-2011, own calculations.

Further robustness checks on our estimates can be found in the appendix, where additional regressions are conducted based on subsamples (e.g. excluding large cities), further controls, varying the time lag and the weighting function, and collapsing years into fewer time periods.

## 7 A quasi-natural experiment

As a validation exercise, and to supplement the results from the comprehensive dataset, we use a quasi-natural experiment to confirm the qualitative results. The question examined here is whether districts that received larger inflows of ethnic German immigrants from 1996-98 also witness more firms from Russia investing over the time period 1999-2011.<sup>27</sup> The underlying assumption is that, despite their German heritage, the immigrants still kept ties to Russia, providing valuable information to Russian firms deciding to invest in Germany. All source countries of ethnic Germans, namely Russia and the Central Asian Republics, were merged into one country-unit. The time dimension was also collapsed into one time period only, since we use ethnic German immigrant data from 1996-98, which dates before the earliest period of the FDI dataset.

The specification looks as follows:

$$\begin{aligned}
 fdi\_fl_i = & \beta_0 + \beta_1 aussiedler_{i96-98} + \beta_2 fdi\_st_i + \beta_3 gdp_i \\
 & + \beta_4 dist_i + \beta_5 settle_i + \beta_6 tertiary_i + \mu_{state} + \epsilon_i
 \end{aligned}
 \tag{10}$$

Here,  $i$  stands for the district. The lack of a  $j$  subscript for countries stems from the fact that we are only dealing with one source country-unit here. The dependent variable is the cumulated inflow of firms from Russia over the time period 1999-2011. The variable  $aussiedler_{i96-98}$  gives us the share of ethnic German immigration (as % of total population of district  $i$ ) into district  $i$  in the years 1996 - 1998. This also explains the lack of district fixed effects, as the explanatory immigrant variable is time-invariant and would hence be completely captured if district fixed effects were included. However, state-level fixed effects were included. This accounts for the fact that at a national level, immigrants were distributed amongst the states based on population and tax intake, which could introduce an endogeneity problem if we left out state fixed effects. The other variables in specification (10) are defined as in the baseline specification (9).

Results are presented in table 9, with both PPML and Tobit specifications. As we can see,

---

<sup>27</sup>We only look at Russian firms because investments from other source countries of ethnic German migration are virtually nonexistent.

**Table 9**  
*Results on ethnic German immigrants*

	(1) PPML	(2) Tobit
Aussiedler Share '96-'98	2.2980** (0.9067)	1.8582* (0.9578)
FDI Stock '99	0.0558 (0.0743)	2.2152*** (0.3836)
Distance	5.8049* (3.0600)	-11.6204*** (3.8575)
Settlement Share	-0.0232 (0.0311)	-0.0403 (0.0245)
Market Potential	1.6728** (0.7855)	1.5074* (0.8228)
Distr. Tert. Share	0.3070*** (0.0827)	0.2499*** (0.0914)
Constant	-65.7327*** (18.3870)	72.2757*** (22.8300)
Observations	196	198
R-squared	0.3148	
State FE	Yes	Yes
SE Clusters	7	8

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: RDSC of the Deutsche Bundesbank, MiDi 1999-2011, own calculations.

the coefficient on the share of ethnic German migration is positive and significant, albeit only marginally so in the Tobit specification. Districts that received a relatively larger inflow of ethnic German immigrants from Russia from 1996 - 1998 also had more Russian firms entering from 1999-2011. Compared to the baseline specification in section 6.1, the size of the coefficient is much larger. In the PPML specification, a one SD increase (SD:0.264) in the inflow of ethnic Germans in 1996-1998 leads to a 83% rise in the number of firms from Russia entering over the 1999-2011 time period.<sup>28</sup> Bearing in mind that the absolute number of Russian firms entering Germany is rather small, the large relative effect may not be too surprising. Some of the control variables also behave differently compared to the baseline: While the settlement share is not significant any more, the share of tertiary educated inhabitants in a district seems to matter for their FDI decision. These differences may be due to country-specific characteristics of FDI decisions by firms from Russia.

Hence, this setting confirms the qualitative results of a positive FDI-migration link using a quasi-natural experiment.

## 8 Conclusion

We have looked at the question whether the presence of immigrants from country  $j$  helps to attract FDI from the same country at the sub-national level of 397 districts. Our model postulates that obtaining information about potential investment locations is costly, and that immigrants help in reducing the information cost. The granular dataset allowed for a much more precise estimation of the effects compared to the previous literature. The methodology controls, in a more comprehensive way than previous papers, for various endogeneity problems that could confound the analysis. In addition, a quasi-natural experimental setting in the 1990s of large-scale ethnic German migration from Russia was exploited to confirm the qualitative results.

Controlling for reverse causality, district-country agglomeration effects, distance as well as district-, country- and year fixed effects, there is still a positive significant relationship between firm entry and the presence of immigrants. In the baseline specification, an increase in the share of immigrants in a district by one standard deviation raises firm entry by 3.3% each year.

We provide evidence in favour of the hypothesis that the role of immigrants in providing information to investors is at the heart of the story. Using further aggregation, we show that the FDI-migration link is stronger if we are looking at an investor's first entry, but weaker if

---

<sup>28</sup>  $e^{0.265 \cdot 2.298} - 1 = 0.83$

the investor already has experience. A split by country groups reveals that the FDI-migration link seems stronger for developing countries and East Asian groups. Smaller firms are more dependent on immigrants, since they do not have the means to hire external help to obtain information, and are more likely to rely on informal contacts. In addition, firms with only one foreign investors rely more in immigrants than joint-ventures, as the former are more likely to face informational barriers, that can be overcome with immigrants. Lastly, the effects are also stronger for services firms (which also happen to be smaller). Hence, we may need to revise our knowledge about the FDI-migration link, acknowledging that the immigrants' pull extends less to larger manufacturers, but more to smaller services firms.

## References

- AI, C. AND E. C. NORTON (2003): “Interaction terms in logit and probit models,” *Economics letters*, 80, 123–129.
- AMITI, M. AND B. JAVORCIK (2008): “Trade costs and location of foreign firms in China,” *Journal of development economics*, 85, 129–149.
- BIANCHI, M., P. BUONANNO, AND P. PINOTTI (2012): “Do immigrants cause crime?” *Journal of the European Economic Association*, 10, 1318–1347.
- BORJAS, G. J. (2003): “The labor demand curve is downward sloping: Reexamining the impact of immigration on the labor market,” Tech. rep., National Bureau of Economic Research.
- BUCH, C. M., J. KLEINERT, AND F. TOUBAL (2006): “Where enterprises lead, people follow? Links between migration and FDI in Germany,” *European Economic Review*, 50, 2017–2036.
- CARD, D. (2005): “Is the new immigration really so bad?” *The Economic Journal*, 115, F300–F323.
- CRISTEA, A. D. (2015): “The effect of communication costs on trade in headquarter services,” *Review of World Economics*, 151, 255–289.
- DAUDE, C. AND M. FRATZSCHER (2008): “The pecking order of cross-border investment,” *Journal of International Economics*, 74, 94–119.
- EGGER, P., M. LARCH, K. E. STAUB, AND R. WINKELMANN (2011): “The trade effects of endogenous preferential trade agreements,” *American Economic Journal: Economic Policy*, 113–143.
- FOAD, H. (2012): “FDI and immigration: A regional analysis,” *The Annals of Regional Science*, 49, 237–259.
- GIRMA, S. AND Z. YU (2002): “The link between immigration and trade: Evidence from the United Kingdom,” *Weltwirtschaftliches Archiv*, 138, 115–130.
- GLITZ, A. (2012): “The labor market impact of immigration: A quasi-experiment exploiting immigrant location rules in Germany,” *Journal of Labor Economics*, 30, 175–213.
- GOULD, D. M. (1994): “Immigrant links to the home country: Empirical implications for US bilateral trade flows,” *The Review of Economics and Statistics*, 302–316.
- GUIO, L., P. SAPIENZA, AND L. ZINGALES (2009): “Cultural biases in economic exchange?” *The Quarterly Journal of Economics*, 124, 1095–1131.
- HERNANDEZ, E. (2014): “Finding a Home away from Home: Effects of Immigrants on Firms Foreign Location Choice and Performance,” *Administrative Science Quarterly*, 59, 73–108.
- JAVORCIK, B. S., Ç. ÖZDEN, M. SPATAREANU, AND C. NEAGU (2011): “Migrant networks and foreign direct investment,” *Journal of Development Economics*, 94, 231–241.
- KUGLER, M. AND H. RAPOPORT (2007): “International labor and capital flows: Complements or substitutes?” *Economics Letters*, 94, 155–162.



- MCPHERSON, M., L. SMITH-LOVIN, AND J. M. COOK (2001): “Birds of a feather: Homophily in social networks,” *Annual review of sociology*, 415–444.
- PIOPIUNIK, M. AND J. RUHOSE (2015): “Immigration, Regional Conditions, and Crime: Evidence from an Allocation Policy in Germany,” .
- RAUCH, J. E. AND V. TRINDADE (2002): “Ethnic Chinese networks in international trade,” *Review of Economics and Statistics*, 84, 116–130.
- SAIZ, A. (2007): “Immigration and housing rents in American cities,” *Journal of Urban Economics*, 61, 345–371.
- SCHÜLLER, M. AND Y. SCHÜLER-ZHOU (2013): “Chinese investment strategies and migration: Does diaspora matter?: A case study on Germany,” *MPC Research Report*.
- SILVA, J. S. AND S. TENREYRO (2006): “The log of gravity,” *The Review of Economics and statistics*, 88, 641–658.
- SPIES, J. (2010): “Network and border effects: Where do foreign multinationals locate in Germany?” *Regional Science and Urban Economics*, 40, 20–32.
- WINKELMANN, U. (2010): “Manche pendeln weit - Berufspendler im Bundeslaendervergleich,” *Statistisches Monatsheft Baden-Wuerttemberg*.

# Data Appendix

## Changes in the FDI database

In the MiDi database, there have been some changes to the reporting requirements over time: In 2002, the foreign share needed for reporting was lowered from 50% to 10%, and the balance sheet requirement was raised from 1mn DM to 3mn€. In 2007, minority stakes would no longer need reporting. Only the 2002 change may have affected our results because they may have led to spurious entry in the database in the year of 2002. Robustness checks excluding the year of 2002 were conducted, but qualitative results were unchanged.

## District mergers

The data on migration was provided based on the district existing at that time. However, during the time period of analysis, several East German states have enacted reforms that merged and restructured the existing districts. This applies to Saxony-Anhalt in 2007, Saxony in 2008, Mecklenburg-Vorpommern in 2011 as well as the cities of Hannover and Aachen who were merged with their surrounding rural district. Old district immigrant data were allocated to the newly formed districts, so the analysis is based on the new, reduced number of districts as of 2011. The old district of Anhalt-Zerbst was divided almost equally into 3 parts, and each of the 3 parts got merged into a different new district. Hence, this district could not be properly allocated to a new one and was thus dropped from the sample.

## Weighting variables

In order to employ geographical weighting of variables, a first step required obtaining coordinates for longitude and latitude for each district. These data were only available at the municipal level, so population-weighted centroids at the district level were computed from the raw data. In a next step, Stata's `geodist` command was used to translate these coordinates into distances between districts. A district is hereby assumed to be small enough so that a district is a mathematical point and has zero distance to itself.<sup>29</sup>

The weighting function used was a negative exponential function, which is different from the common inverse function mostly used in the literature (e.g. see Amiti and Javorcik (2008)). The weighted total number of immigrants from country  $j$  in district  $i$  would then be given by:

---

<sup>29</sup>Distances of each district to each country were computed in the same way.

$$weightsum\ immigrants_{ijt} = \sum_{h=1}^H e^{-\frac{d_{hi}}{k}} \cdot immigrants_{hjt} \quad (11)$$

Here,  $d_{hi}$  gives us the distance (in km) between district  $i$  and  $h$ , and  $k$  is some chosen weight. A larger  $k$  implies a larger weight applied to nearby districts. In the baseline specifications,  $k = 20$  was chosen. The weighted variable for GDP is computed in the same way.

Using the negative exponential function has the advantage of removing the tradeoff that exists when using an inverse function in the form of  $d_{hi}^{-k}$ , as is common in the literature. When using  $d_{hi}^{-k}$ , there is a problem of choosing the appropriate units in which distance is measured. If units are chosen too large (e.g. '000 km), there is the problem that when computing district  $i$ 's market potential, a close district  $h$  may obtain a weight larger than one, even larger than district  $i$  itself. On the other hand, if the units are chosen too small (e.g. distance measured in km), weights would fall off very quickly with distance even for districts that are close nearby.

For the immigrant share and migration intensity, the weighted measure was computed as:

$$weightedsum\ immigrant\ share_{ijt} = \frac{\sum_{h=1}^H e^{-\frac{d_{hi}}{k}} \cdot immigrants_{hjt}}{\sum_{h=1}^H e^{-\frac{d_{hi}}{k}} \cdot population_{hjt}} \quad (12)$$

## Robustness checks

Table 10 presents some robustness checks. Columns (1) and (2) exclude particular groups from the sample. As we have seen in the stylized facts section, the distribution of FDI in Germany is skewed towards large cities. In order to make sure that the FDI-migration link is not only driven by those large metropolitan areas, column (1) contains the regression results excluding the 10 largest cities in Germany. While the model loses some of its explanatory power, the coefficient on the immigrant share becomes even larger and retains its significance. The link between FDI and immigrants seems to be even stronger outside the metropolises, indicating that in the absence of the advantages of well-connected large cities, the benefits provided by own-country immigrants become even more relevant. In column (6), East German states were excluded to obtain a more homogenous sample, given that East Germany has a somewhat different immigration history.<sup>30</sup>

Column (3) present results with an additional explanatory variable, called 'other migrants'. For observation  $ijt$ , the variable contains the share of all immigrants (excluding immigrants of

---

<sup>30</sup>The ratio of people with migrational background vs. foreign passport holders is much lower in East Germany, as large-scale migration only started after reunification.

**Table 10**  
*Results - Further robustness checks*

	(1)	(2)	(3)	(4)	(5)
	PPML	PPML	PPML	PPML	PPML
	Ex Large cities	Ex East Germany	Full sample	2-year	3-year
Migration Share(t-1)	0.4593*** (0.0750)	0.2949*** (0.1119)	0.2799*** (0.1015)	0.3569*** (0.1057)	0.3102*** (0.1045)
FDI Stock(t-1)	0.0221*** (0.0030)	0.0049*** (0.0009)	0.0050*** (0.0009)	0.0017*** (0.0005)	0.0007 (0.0004)
Other Migrants(t-1)			-0.0435*** (0.0161)		
Distance	-0.4657*** (0.0598)	-0.6117*** (0.0784)	-0.5896*** (0.0701)	-0.6073*** (0.0692)	-0.6335*** (0.0691)
Settlement Share	0.1151*** (0.0364)	0.1144** (0.0521)	0.0859** (0.0423)	0.1084*** (0.0419)	0.0893** (0.0439)
Market Potential	0.3988 (0.7867)	0.4683 (1.0299)	1.7216* (0.9921)	-0.7349 (0.9030)	-0.0576 (0.9980)
Distr. Tert. Share	0.0189 (0.0276)	0.0138 (0.0304)	-0.0142 (0.0256)	0.0037 (0.0271)	-0.0159 (0.0271)
Constant	-9.9231 (7.5619)	-11.1691 (11.8548)	-20.2147** (9.2123)	3.7506 (8.5433)	-1.5133 (9.3165)
Observations	317,800	304,320	386,780	193,390	128,152
R-squared	0.2531	0.4921	0.4849	0.5964	0.6663
District FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
SE Clusters	26810	25360	32619	32619	32619

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

country  $j$ ) in district  $i$  at time  $t$ . Including this variable works as a placebo test, which can show that our results are indeed driven by country-specific immigrants, and not just the general presence of immigrants from any other country. The coefficient on own-country immigration is still positive and significant, as in the baseline regression.

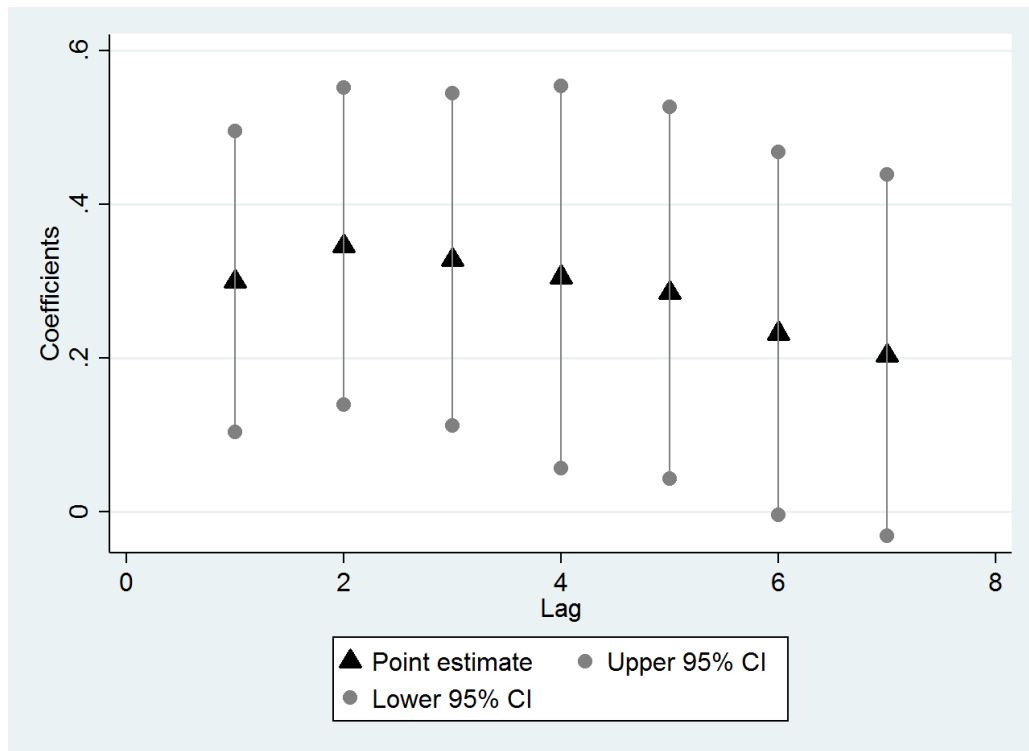
For the results in columns (4) and (5), years were collapsed into fewer time periods. Aggregating years raises the proportion of observations with non-zero entries of the dependent variable, thereby increasing the stability of the coefficients. It can also help to mitigate endogeneity problems: If the FDI decision to set up a firm at time  $t$  was actually made at time  $t - 2$ , and hence precedes the migration decision, but caused immigrants to arrive at  $t - 1$  already, we would have reverse causality. Collapsing time periods implicitly extends the lag of the explanatory variables, making the above reverse causality channel less likely. In column (4), two years are collapsed into one time period, leaving us with  $T = 6$ , as opposed to  $T = 13$  in the baseline. In column (5), three years are collapsed into one time period, leaving  $T = 4$ . The results show that collapsing years into fewer time periods preserves the qualitative results, with the FDI-migration link increasing slightly in importance.

As a further robustness check, we present results on the FDI-migration link using different lags. In the baseline regression, we used a lag of  $t - 1$  of the stock of immigrants to explain the inflow of FDI at time  $t$ . However, one could argue that the FDI-migration link takes longer to materialize. Extending the lag can also help to mitigate the endogeneity problem of the FDI decision preceding the migration decision, as described in the paragraph above. The longer the lags, the less likely this endogeneity problem becomes. We will hence use a more agnostic specification, and reestimate the baseline regression using lags ranging from  $t - 2$  to  $t - 7$ . Figure 2 presents the results on the immigrant coefficients for different lags, with point estimates on the immigration coefficient ranging from 0.20 to 0.35. As we can see, the peak is reached at lag  $t - 2$ , implying that the FDI-migration link materializes in a comparatively short time. Hence, we can see that the results are robust to using different lags, with coefficients losing significance at higher lags.

As discussed before, the share of immigrants variable does not only account for immigrants in the particular district, but also in neighbouring districts, using appropriate weights. The weighting function used in the baseline regression is a negative exponential function. This holds some advantages over using an inverse function. To show that the results do not depend on the choice of weight of the weighting function, this section presents results on the immigrant coefficient using different weights  $k$  on the function described in equation 12. A larger  $k$  implies that neighbouring districts get relatively larger weight. Figure 3 presents results for varying weight  $k$ . The point estimates on the regression coefficients range from 0.30 to 0.34, and are always significant at the 5% level. We can hence see that the link is robust to varying the

**Figure 2**

*Immigration coefficient for varying lags, with 95% CI*

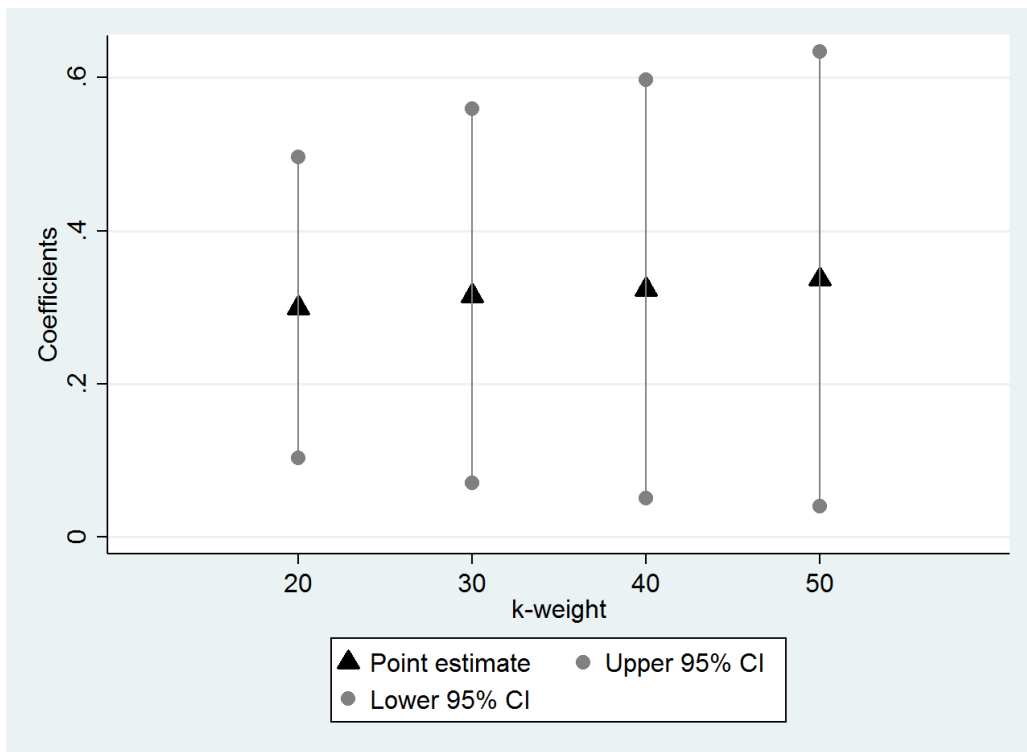


Source: RDSC of the Deutsche Bundesbank, MiDi 1999-2011, own calculations.

weights, with the coefficients increasing slightly as neighbouring districts get more weight. This points to the importance of immigrants not only in the own district, but in districts located further away as well.

**Figure 3**

*Immigration coefficient for varying weights  $k$ , with 95% CI*



Source: RDSC of the Deutsche Bundesbank, MiDi 1999-2011, own calculations.