Institute for Employment Research

The Research Institute of the Federal Employment Agency

IAB

IAB-Discussion Paper 19/2015

Articles on labour market issues

Location choice of German multinationals in the Czech Republic

The importance of agglomeration economies

Veronika Hecht

ISSN 2195-2663

Location choice of German multinationals in the Czech Republic

The importance of agglomeration economies

Veronika Hecht (IAB)

Contents

List of tables

List of figures

Abstract

This paper analyses the location choice of German investors in the Czech Republic based on a unique dataset covering all Czech companies with a German equity holder in 2010. The identification of the regional determinants of foreign direct investment (FDI) location is an important regional policy issue as FDI is supposed to improve the labour market conditions of the host region. Using a nested logit approach the impact of agglomeration economies, labour market conditions and distance on the location choice decision is investigated. The main result of the paper is that apart from a low distance to the location of the parent company the attractiveness of a Czech district for German investors is mainly driven by agglomeration economies. Besides localisation economies the agglomeration of German companies in a region plays a decisive role. The importance of labour market characteristics differs between investment sectors, sizes and periods.

Zusammenfassung

Auf Basis eines einzigartigen Datensatzes, der alle tschechischen Unternehmen umfasst, die im Jahr 2010 einen deutschen Kapitaleigener aufwiesen, analysiert dieses Papier die Standortwahl von deutschen Investoren in Tschechien. Die Identifikation der regionalen Determinanten von ausländischen Direktinvestitionen ist ein wichtiges regionalpolitisches Thema, da ausländische Direktinvestitionen zu einer Verbesserung der Arbeitsmarktbedingungen in der Zielregion beitragen sollen. Anhand eines nested logit-Ansatzes wird der Einfluss von Agglomerationseffekten, Arbeitsmarktbedingungen und Distanz auf die Standortwahl von ausländischen Investoren untersucht. Das zentrale Ergebnis des Papiers ist, dass für die Attraktivität einer tschechischen Region für deutsche Investoren neben der geringen Distanz zum Standort des deutschen Mutterunternehmens insbesondere Agglomerationseffekte ausschlaggebend sind. Neben Lokalisationseffekten spielt die Agglomeration von deutschen Unternehmen in einer Region eine entscheidende Rolle. Die Bedeutung von Arbeitsmarkteigenschaften unterscheidet sich zwischen Investitionssektoren, -größen und -zeiträumen.

JEL classification: F23, R12, R30

Keywords: Location choice, FDI, Multinational enterprises, Germany, Czech Republic, Agglomeration Economies

Acknowledgements: The author thanks Lutz Bellmann, Uwe Blien, Nicole Litzel, Johannes Ludsteck, Joachim Möller, Michael Moritz and Johannes Schäffler for helpful remarks and suggestions.

1 Introduction

Especially in less developed countries the attraction of foreign direct investment (FDI) is seen as a motor for regional development. Foreign investors bring not only financial capital but also technology as well as marketing and organisational knowledge into the host countries (Resmini 2004). As a result of forward or backward linkages with the affiliates of multinational enterprises (MNEs), the introduction of new technologies, or the hiring of workers trained by MNEs, local firms in the FDI's host country may be able to improve their productivity (Blomström/Kokko 1998). As the positive externalities generated by FDI are locally linked to the location of the investment, thus to the host regions and their labour markets (Dinga/Münich 2010; Merlevede/Purice 2015), the location choice of FDI may contribute to the emergence of regional disparities as well as to the reinforcement of existing regional economic differences in the destination country of FDI (Hilber/Voicu 2010). Getting insight in the regional characteristics driving the attractiveness of a region for FDI location is therefore not only an interesting subject in regional economics but also an important issue concerning regional policy.

To analyse the location choice of foreign investors this study makes use of the fall of the Iron Curtain in 1989/90 as an important point in the process of the economic integration of the European markets. With the fall of the Iron Curtain, it became in the first place possible for investors from Western European countries to invest in the formerly closed economies of the Central and Eastern European Countries (CEECs). The significantly lower labour costs combined with the spatial proximity made these countries an attractive target for FDI from Western European countries. The focus in this paper is on the two neighbouring countries Germany and the Czech Republic as these two countries constitute a prime example what concerns spatial proximity and wage costs differentials (Pflüger et al. 2013). Since 1989/90 the economic integration between the two countries has constantly progressed and trade barriers have steadily been reduced. This process resulted in the Czech Republic's entry to the European Union in 2004 and finally the free movement of workers from the Czech Republic to Germany in 2011. The high wage costs differential – in 2004, e. g., the average hourly labour costs amounted to 26.8 € in Germany and to 5.8 € only in the Czech Republic (Eurostat 2015) – and the small distance between the two neighbouring countries led to a special interest of German firms to invest in the Czech Republic. Consequently, in 2010 the Czech Republic has been the country that attracted with an amount of more than 23 billion € the highest German foreign direct investments (Deutsche Bundesbank 2012) – and was thus more attractive for German investors than Russia, India or Japan. The interest of German firms to invest in the Czech Republic also faced a special interest of the Czech Republic to attract foreign capital. Already in 1992, the Czech Ministry of Industry and Trade founded the Investment and Business Development Agency CzechInvest to promote the Czech Republic as an attractive target country for FDI (CzechInvest 2011). From the Czech perspective, Germany has been with the Netherlands the most important investor over a long period (Czech National Bank 2010).

The factors determining the location choice of German investors in the Czech Republic are identified by using a nested logit setup. Three categories of regional characteristics are included in the analysis of location choice: agglomeration economies, distance features and labour market characteristics. The importance of agglomeration economies for the location choice of FDI has been emphasised in many previous studies (Barrios/Görg/Strobl 2006; Binh 2010; Crozet/Mayer/Mucchielli 2004; Guimarães/Figueiredo/Woodward 2000; Hilber/Voicu 2010). Besides localisation and urbanisation economies this study puts special emphasis on the measurement of German-specific agglomeration, i. e. the existence of German firms in the region prior to the investment. The importance of foreign-specific agglomeration has been, among others, highlighted in the studies by Head/Mayer (2004) and by Head/Ries/Swenson (1995). Concerning distance issues, the distance between the location of the German parent company and the Czech affiliate is included in the analysis. Especially with the concentration on the two neighbouring countries Germany and the Czech Republic as well as with the distinction in vertical FDI (VFDI) and horizontal FDI (HFDI), the analysis of distance is very interesting. As the two countries under consideration share a common border, the border region might be an attractive location especially for vertical FDI as the proximity to the German parent company is combined with lower transportation costs for intermediate goods. But FDI might also be attracted to the border region through the existence of transnational networks or a higher share of Czech people with German language knowledge (Schäffler/Hecht/Moritz 2014). Regarding the labour market characteristics, at first, labour costs seem to be an important factor influencing the location decision of FDI – with higher labour costs deterring FDI (Barrios/Görg/Strobl 2006; Fallon/Cook 2009; Halvorsen 2011). A second factor included here is the regional unemployment rate. Furthermore, there is evidence that regional policy influences the location choice. While the effects of financial investment incentives and special economic zones are not evaluated as positive per se, the regional infrastructural endowment is found to have a positive impact in previous literature (Cieślik 2013).

The contribution of this study to the existing literature on FDI location is threefold. First, with the IAB-ReLOC dataset a new and unique database is used that comprises the total population of Czech companies with a German investor in the year 2010. As this database contains very detailed address information for the parent company as well as for the Czech affiliate, the location choice decision can be analysed at a highly disaggregated regional level – 76 Czech districts (LAU1 regions)[1]. A shortcoming of many studies in this field of research is, however, that they focus on the investment characteristics at a national level (Fukao/Wei 2008; Halvorsen 2011; Head/Ries/Swenson 1995) or at an only slightly disaggregated regional level

[1] LAU1 is the abbreviation of local administrative unit. Actually, there are 77 LAU1 regions in the Czech Republic. For purpose of the analysis, two LAU1 regions – Jeseník and Šumperk – were combined as until 1996 the two regions have been one. Thus, the analysis is based on 76 regional alternatives.

(Binh 2010; Fallon/Cook 2009; Gauselmann/Marek 2012; Hayakawa/Tsubota 2011; Head/Mayer 2004; Pusterla/Resmini 2007). But especially when analysing the role of agglomeration economies, a high regional disaggregation is necessary as the decision-making process of companies is influenced by industrial linkages at the regional level (Krugman 1991). Second, the bulk of existing studies includes in the location choice analysis FDI from more than one country of origin. Only very few papers deal with the location choice of FDI from one specific country. However, these studies concentrate on FDI from Japan (Hayakawa/Tsubota 2011; Head/Mayer 2004; Head/Ries/Swenson 1995; Kawai 2006) or from France (Mayer/Mejean/Nefussi 2010). This paper contributes to the literature by analysing the location choice of FDI from a highly developed country (Germany) to a transition country (the Czech Republic) based on a highly disaggregated regional level. Third, the regional location determinants of FDI are separately identified for different investment characteristics as, e. g., different target industries of FDI or different investment motives. Thus, there is a distinction made between FDI motivated in reducing costs – referred to as vertical FDI (VFDI) – and FDI aiming at the development of new markets – referred to as horizontal FDI (HFDI). Despite the theoretical differentiation between these two types of FDI (Helpman 1984; Markusen 2002) and the large literature on the motives behind FDI (Alfaro/Charlton 2009; Brainard 1997; Buch et al. 2005; Carr/Markusen/Maskus 2001; Hanson/Mataloni/Slaughter 2001), the studies on the location choice of FDI mostly neglect the difference between these two types of FDI. One study that distinguishes between vertical and horizontal FDI is the paper by Fukao/Wei (2008). Their distinction between vertical and horizontal FDI builds on the destination of the sales and is thus based on an indirect measure of the motives. In this study, a direct measure stemming from survey information on the main motive for the investment abroad is used.

The findings of the paper indicate that the location choice of German MNEs in the Czech Republic is mainly influenced by agglomeration economies and here especially by localisation economies and a pre-investment agglomeration of German firms in a region. Moreover, regions that are located farther away from the location of the parent company are less attractive while the influence of labour market characteristics depends on the investment characteristics.

The paper is organised as follows. Section 2 gives an overview of related literature with a special focus on studies referring to transition economies. In section 3, the database is described. In point 3.1, the IAB-ReLOC data are described and descriptive evidence on the regional distribution of German affiliates in the Czech Republic is provided. Point 3.2 refers to the regional data and the regional characteristics used to analyse the factors driving the location choice. The econometric analysis is presented in section 4. Point 4.1 gives an overview of the nested logit model. In point 4.2, the results for the total population of FDI as well as for different subgroups are presented. Section 5 concludes by summing up the main findings and showing potential for possible follow-up studies.

2 Related literature

With the increase in FDI in the last decades the interest in the locational determinants of FDI has grown, too. This is reflected in a rising number of studies analysing the location choice of FDI. But, despite the fact that the CEECs have become more and more successful in attracting FDI over the last two decades (Medve-Bálint 2014), the bulk of studies in this field of research focuses on the location choice of FDI in developed countries. Only in recent years the location decision in transition countries has been attracting more interest. Apart from the rising importance these countries play in the allocation of FDI, this is probably also due to the better availability of reliable data.

One of the most popular studies analysing the location choice behaviour of foreign investors is the study by Guimarães/Figueiredo/Woodward (2000) focussing on the location choice of FDI start-ups in Portugal. The authors identify agglomeration economies as the most important factor driving location choice. While the agglomeration of service firms and the agglomeration of firms belonging to the same industry as the investment attract foreign investors, the agglomeration of foreign firms in a region has no significant influence. In contrast to that, Head/Ries/Swenson (1995) emphasize that especially foreign-specific agglomeration matters in attracting further FDI to a region. When analysing the location choice of Japanese companies in the United States they find that the attractiveness of a state rises with the number of Japanese firms already located in the region. Other studies highlight that agglomeration effects are mainly driven by intra-industry spillovers as foreign investors are mainly attracted to regions with a high number of firms active in the same industry. This is, for example, found by Pelegrín/Bolancé (2008) who focus on the location of foreign firms in Spain, by Head/Mayer (2004) analysing the location choice of Japanese companies in Europe and Crozet/Mayer/Mucchielli (2004) who focus on foreign firms in France. Besides agglomeration economies, the latter study investigates the role of regional policy in attracting FDI. Only very little evidence of any positive effect is identified. This result is in line with the findings of Barrios/Görg/Strobl (2006). In their study on the role of public incentives in attracting FDI to more disadvantaged areas of Ireland they find that regional policy is only successful in attracting low-tech firms. For the location of high-tech firms urbanisation economies are much more important.

The first studies analysing the location choice of foreign investors in the transition countries of Central and Eastern Europe aimed at identifying national or sectoral rather than regional factors driving FDI location choice (Cieślik 2013). Comparing ten CEECs, Resmini (2000) finds that low labour costs are an important channel through which foreign investors are attracted. This result is confirmed by Bevan/Estrin (2004), who find that, apart from market size and proximity, labour costs are the most important factor for FDI from Western Europe in the CEECs. One of the first studies analysing the location choice of foreign investors in the transition countries of Central and Eastern Europe focussing on regional determinants is pro-

vided by Pusterla/Resmini (2007). In their paper on the location choice of FDI in Bulgaria, Hungary, Poland and Romania they find – in line with the papers focussing on developed countries – that agglomeration economies are important factors in the location choice of foreign investors. The probability that an investor locates in a specific NUTS 2 region increases with the number of firms operating in the same sector and – in contrast to, e. g., the findings by Guimarães/Figueiredo/Woodward (2000) – especially with the number of foreign firms operating in the same sector as the new investment. Furthermore, FDI is attracted by cheap and abundant labour as well as by regions with high market potential and good infrastructure. The regional skill level does not influence the location decision. FDI does not seem to be risk-averse, as special economic zones and lower country risk indices deter FDI. That special economic zones are not effective in attracting FDI is also found by Mucchielli/Yu (2011) in their analysis of the location choice of US and European affiliates in China and by Cieślik (2005) focussing on foreign investments in Poland. But both studies identify a positive impact of agglomeration effects. The decisive role played by agglomeration effects is also supported by Békés (2005) for FDI in Hungary, by Binh (2010) for FDI in Vietnam and by Hilber/Voicu (2010) for FDI in Romania. Even when including county-specific effects in their conditional logit model they find that industry-specific foreign and domestic agglomeration as well as service agglomeration increase the attractiveness of a region. That a higher service share makes a region more attractive for foreign investors has also been shown by Schäffler/Hecht/Moritz (2014) in their study on the regional determinants of FDI in Germany and the Czech Republic. Gauselmann/Marek (2012) identify in their paper on the location decision of FDI in the transition countries of East Germany, Poland and the Czech Republic a positive impact of sectoral specialization. Furthermore they show that higher wages do not *per se* discourage foreign investors. This result is in line with Hilber/Voicu (2010) but in contrast to most empirical findings for the location choice of FDI in developed countries.

Apart of the above mentioned three-country study by Gauselmann/Marek (2012) and the paper by Schäffler/Hecht/Moritz (2014) there is only little evidence on the locational determinants of FDI in the Czech Republic. A first paper analysing the location preferences of FDI in the Czech Republic is provided by Rajdlová (2003). The main finding of her analysis of the location choice of FDI in the Czech Republic between 1994 and 2003 is that foreign agglomeration attracts further investors to a region. Another study focussing only on the Czech Republic is the paper by Kawai (2006). He analyses the location choice decision of Japanese investors in the Czech Republic between 1999 and 2004 and finds that for Japanese investors the agglomeration of other Japanese firms as well as the agglomeration of other foreign firms plays an important role in the location choice. There is also some evidence that Japanese FDI favour good regional infrastructure endowment and a higher regional wage level – what is interpreted as a measure for high skilled labour. By comparing the location decision of Japanese investors to those of 72 German ones the author shows, that the location choice of German FDI differs to a small extent. For German

investors the agglomeration of other German firms has no impact, but their location choice is positively influenced by the availability of investment incentives. A more qualitative study based on interviews with foreign firms active in the Czech Republic finds that the attractiveness of a region declines with the region's distance to Prague as well as to the Bavarian border (Spilková 2007). Moreover, regions with a higher educational level and with higher wage levels are preferred. Differences in the location preferences of firms belonging to different industries and having different experience in investing abroad are derived, too.

A shortcoming of many of the presented studies analysing the location choice of FDI in the Czech Republic is that they are all based on very small samples of foreign investors. Rajdlová (2003) analyses the location decision of only 320 foreign investments done in the Czech Republic in the period 1994 to 2002. In comparison to that, the dataset used in this paper contains 1,745 investments from German companies targeting to the Czech Republic in the same period. The results of Kawai (2006) are based on the analysis of 58 manufacturing investments done by Japanese investors and 72 projects with German investors.

By making use of a new database containing the total population of Czech firms with a German investor by 2010, this study contributes to the location choice literature. As shown above, previous evidence on FDI location choice in the Czech Republic mainly comes from qualitative studies or from quantitative studies considering only a small number of investment projects. There is no distinction made between different subgroups of investments. This paper presents for the first time an in-depth analysis of the location choice of German investors in the Czech Republic. The location choice is analysed not only for the whole sample of investments, but distinctions are made between the manufacturing, the services and the trade sector as well as between greenfield and brownfield FDI. Furthermore, results are separately derived for vertical FDI and for horizontal FDI, for small, medium and large investments and according to different investment time periods. The detailed differentiation between investment characteristics in combination with the very small regional analysis level distinguishes this study also from the paper of Schäffler/Hecht/Moritz (2014). In their analysis they identify the regional determinants of FDI from a cross-border viewpoint and focus on NUTS 3 regions, only. That there is no distinction made between different investment characteristics is not only a shortcoming of studies focussing on the Czech Republic only, but of the bulk of previous studies in general (Cieślik 2013). To distinguish between different investments motives is, however, even more important when considering that FDI is seen as the motor for regional development, as the consequences for the regional labour market may differ according to FDI characteristics.

3 Data and descriptive evidence

3.1 Company-level data

The analysis of the location choice of German multinationals in the Czech Republic is based on the newly established IAB-ReLOC dataset. This dataset comprises information on the total population of Czech companies with a German equity holder (with an equity share higher than 25 percent) in the year 2010.[2] Originally, based on the Czech Commercial Register, 5,700 Czech companies with a German owner have been identified. For the purpose of this analysis only the 3,894 Czech companies with a German parent company are used. The additionally identified Czech companies owned by a German private person are not included in this analysis as the investment motivation of private persons should differ from that of companies.

One great advantage of this dataset compared to other data sources used in scientific research is the large number of investment projects. For example, the Amadeus database of Bureau van Dijk contained only 1,500 Czech companies with a German owner in February 2011. Furthermore, the number of FDI projects in the IAB-ReLOC data exceeds by far the number of investment projects used in the bulk of previous studies on FDI location choice in the Czech Republic. A second great advantage of the ReLOC data is the detailed company-level information provided, including the name and the exact address of the company as well as the date the German investor entered or founded the company. This information is extracted from the Czech Commercial Register. The date of investment is approximated by the date the German investor has been inscribed in the Czech Commercial Register (as it is done, e. g., also in the study by Gauselmann/Marek (2012)). As information on the industrial affiliation of the companies is available in the dataset (provided by the Czech commercial data supplier ČEKIA) the location choice process can be separately analysed for different subsamples. A further special benefit of the data is that for a subgroup of 459 investments survey information on the investment motive is available. This allows for a division of the sample into vertical FDI searching lower costs and horizontal FDI looking for new markets.

The extraordinary high number of investments in the ReLOC dataset and the rich information available especially by means of the industrial affiliation and the survey data allows to analyse the location choice decision of German multinationals in the Czech Republic in an extensive way. Especially the identification of the regional investment determinants separately for vertical and for horizontal FDI gives new insights into the location choice of FDI, as this distinction has only rarely been addressed in previous studies and has been based only on indirect classification methods as, e. g., the industry affiliation of the parent company and the affiliate. Due to the rich dataset, a direct measure can be applied in this study.

---

[2] A detailed overview of the data compilation process and the associated company survey can be found in Hecht/Litzel/Schäffler (2013).

A closer look at the data shows that the German investments in the Czech Republic go mainly to three sectors: manufacturing with 34.4 percent of the German investments, trade and accommodation with 31.8 percent and business services with a share of 23.7 percent respectively (see Table 1). A much lower share of investments is assigned to the industry "Transport, storage and communication" with only 5.2 percent, followed by construction with 2.6 percent. The sectors "Agriculture", "Other services and extraterritorial organisations", "Education and health" and "Public administration" play a negligible role.

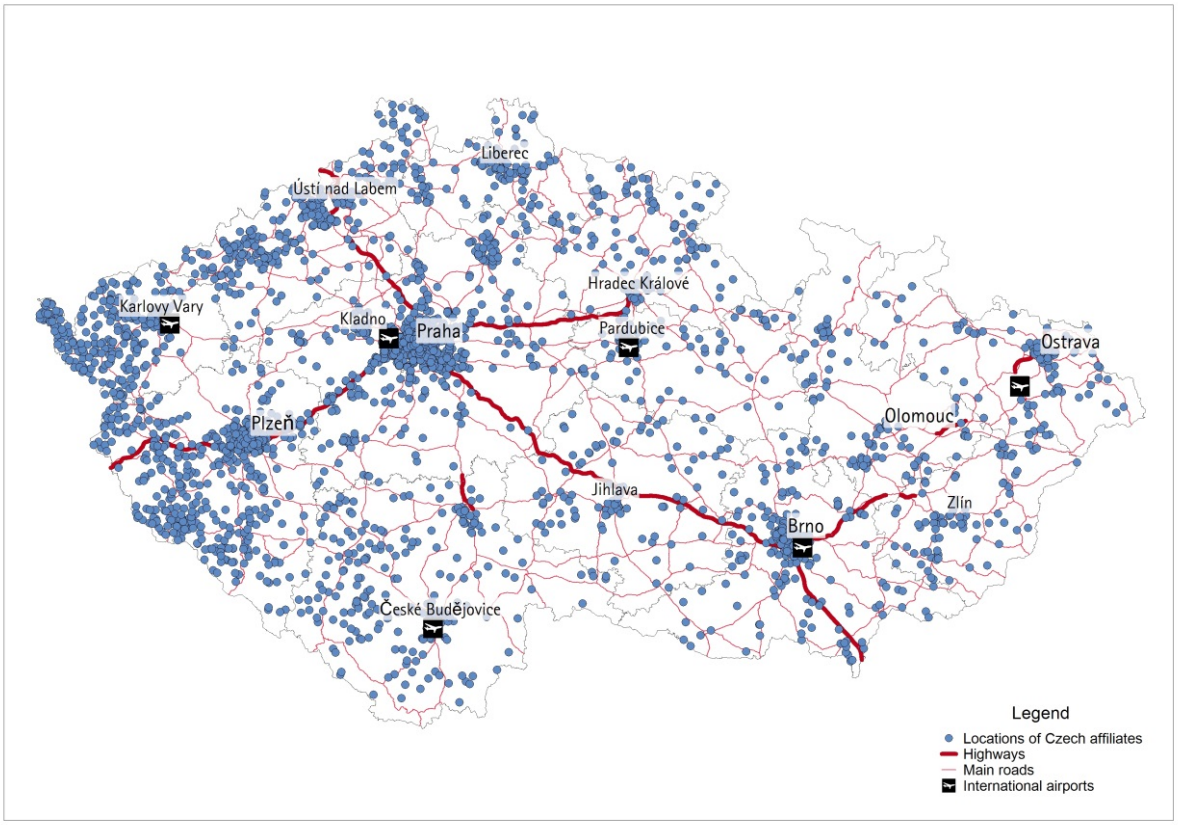
Table 1
Sectoral distribution of the Czech companies with German owner (in %)

Industry	Czech companies with German equity holder
Agriculture	0.8
Manufacturing	34.4
Construction	2.6
Trade and accommodation	31.8
Transport, storage and communication	5.2
Business services	23.7
Public administration	0.0
Education and health	0.5
Other services and extraterritorial organisations	0.8
Not specified	0.2
Number of investments	3,894

Source: IAB-ReLOC data.

What concerns the regional distribution of German FDI in the Czech Republic, a concentration in the Czech agglomerations can be observed (see Figure 1). Approximately 30 percent of the German investments in the Czech Republic go to the region of Prague, the Czech Republic's capital city. A high number of German affiliates can also be found in the smaller agglomerations of Plzeň, Brno and Ostrava. Apart from the bigger cities, affiliates of German companies are mainly located in the Czech-German border region, and here especially in the Czech-Bavarian border region. Around 30 percent of all German investments in the Czech Republic go to NUTS 3 regions adjacent to Germany. The pattern that around one third of the affiliates is located in the border region and one third in the region of Prague can be regarded as a first indication for the importance of agglomeration effects and distance features in the location choice decision. Further evidence for the importance of distance is the location pattern of the German parent companies on the German side of the border. Here, too, a large share of the companies investing in the Czech Republic is located near the border (Schäffler/Hecht/Moritz 2014).

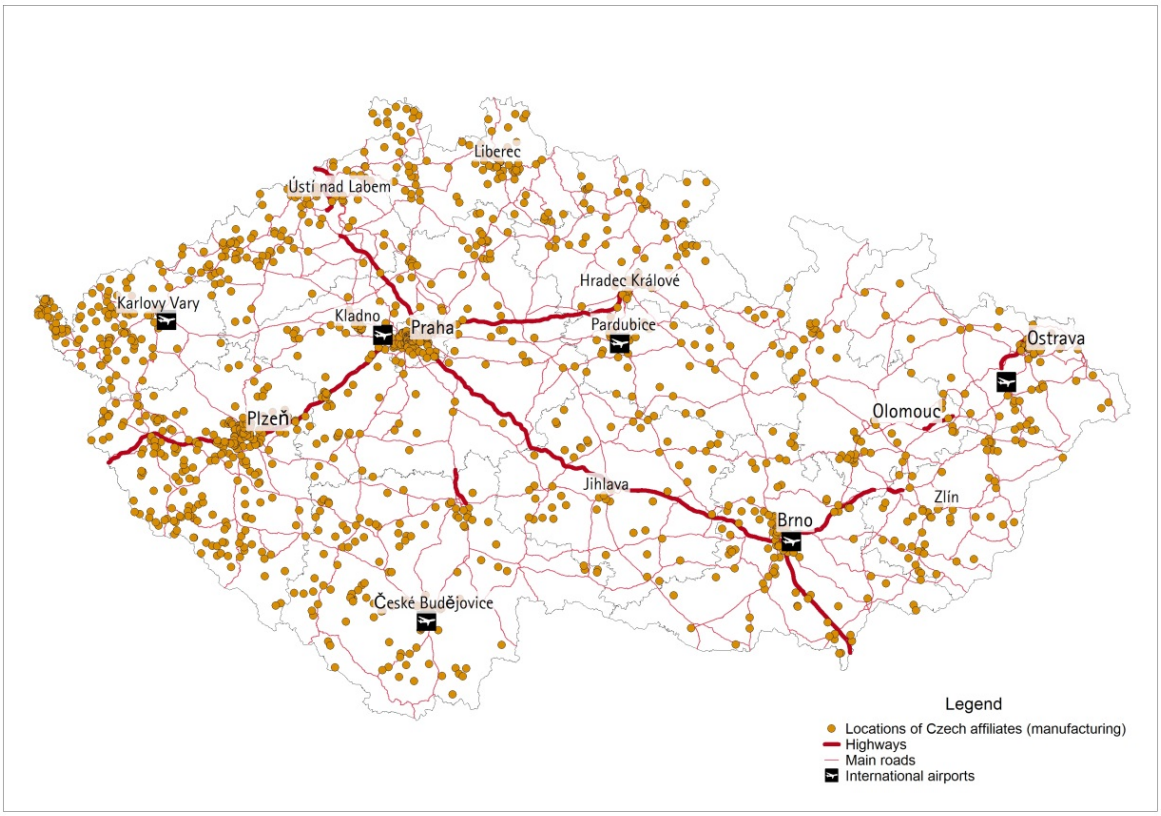
Figure 1
Distribution of Czech companies with German equity holder



Source: IAB-ReLOC data, N=3,894.

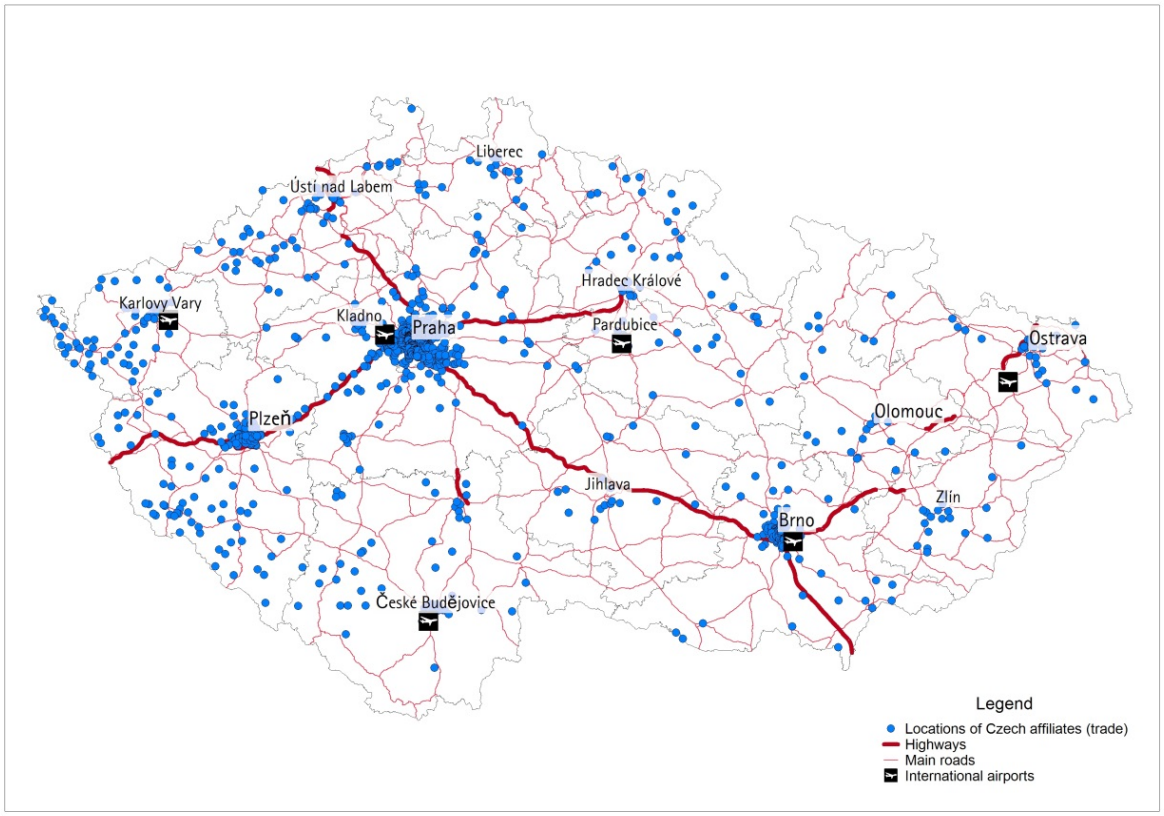
The maps of Figure 2, Figure 3 and Figure 4 illustrate the location pattern separately for different investment industries. In Figure 2, only the locations of investments going to the manufacturing sector are displayed. As with the total population of FDI, here, too, a concentration in the border region and in the agglomerations can be observed. But, compared to investments in trade (see Figure 3) and services (see Figure 4) the investments going to the manufacturing sectors are more evenly spread across the country. FDI in the trade and in the business services sector is evidently concentrated in Prague. 38.1 percent of all German investments in the capital city can be assigned to the business services sector. In the Czech Republic in total, this share lies by only 23.7 percent (see Table 1). A similar relation can be observed with the investments in trade. Here, the share in the Czech Republic is 31.8 percent, in the region of Prague it amounts to 42.3 percent. While in the manufacturing sector German investors also go to the regions in the east of the Czech Republic, there are only very little investments in the trade and especially in the business services sector located in the eastern part of the Czech Republic. Summing up, the maps indicate that the location choice decision behaviour of German investors differs between industries.

Figure 2
Distribution of the Czech affiliates in the manufacturing sector



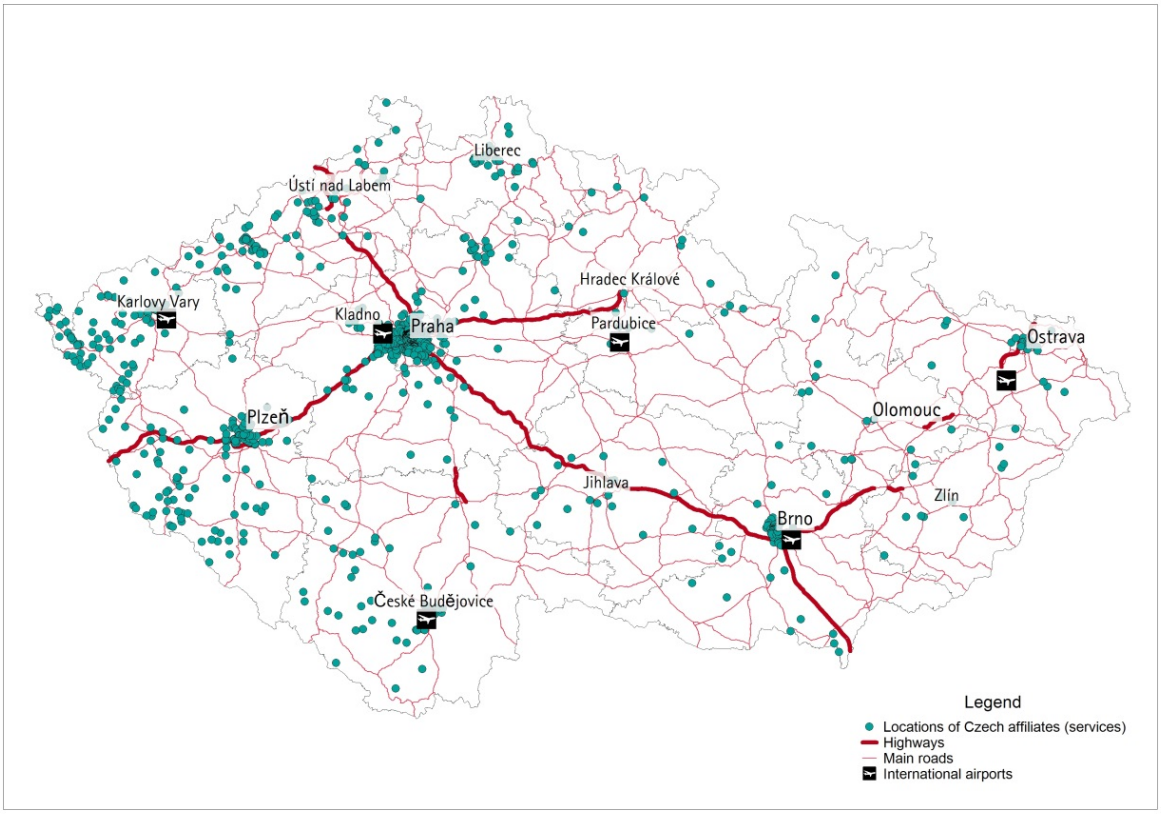
Source: IAB-ReLOC data, N=1,303.

Figure 3
Distribution of the Czech affiliates in the trade sector



Source: IAB-ReLOC data, N=1,207.

Figure 4
Distribution of the Czech affiliates in the services sector



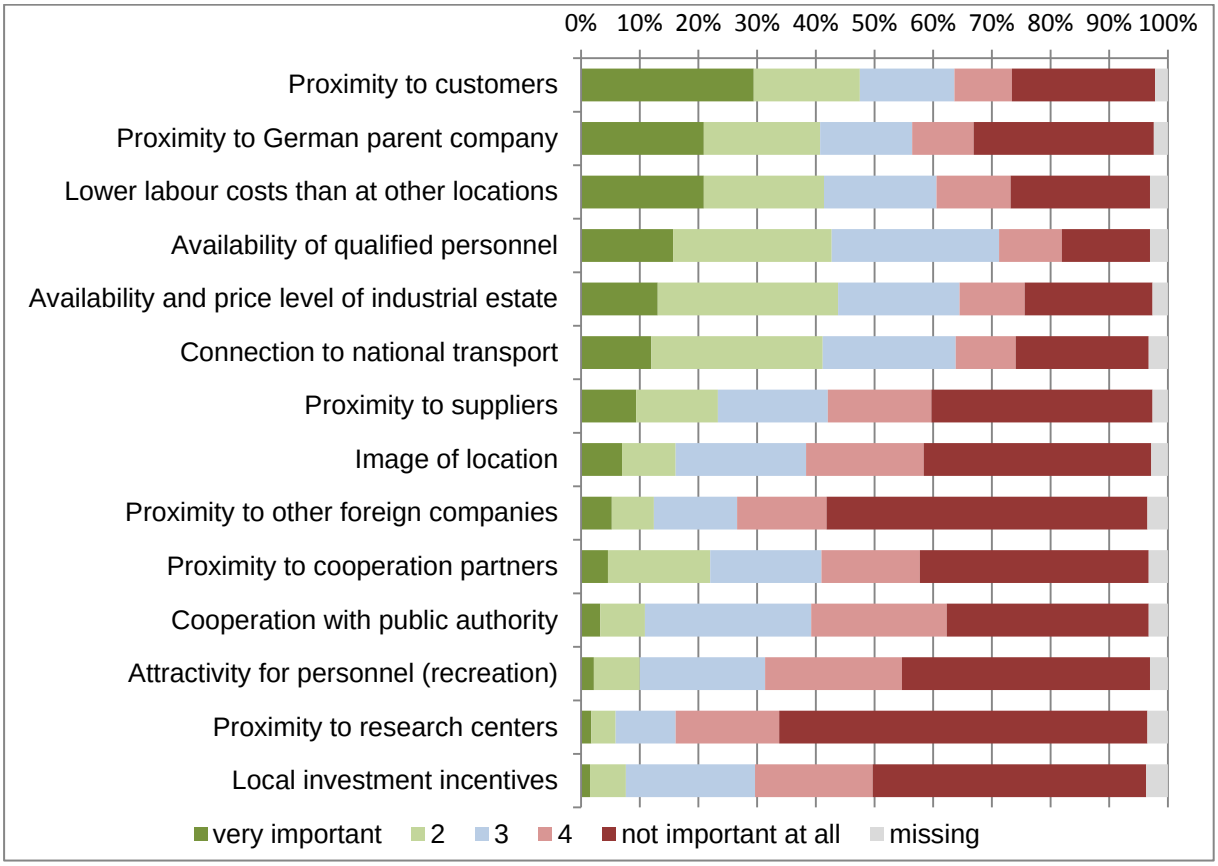
Source: IAB-ReLOC data, N=1,124.

More descriptive insight in the factors driving the location choice decision can be gained from the ReLOC survey[3]. The companies participating in the survey have been asked to assess the importance of a list of location factors for their location choice within the Czech Republic. The regional level the respondents should refer to was the district their affiliate is located in. Figure 5 displays the answers of the 459 participating German MNEs. The proximity to customers is the factor that has been most often evaluated as “very important” what indicates that the market potential of the location chosen is part of the location search process. The proximity to the German parent company is evaluated as important, too, what is another indication for distance mattering. The cost side factors “lower labour costs” and “price level of industrial estate” also belong to the important factors. Further important factors according to the survey are the availability of qualified personnel and the presence of good infrastructure – displayed by the item “connection to national transport”. The proximity to research centres, the proximity to other foreign companies and local investment incentives have in contrast been classified as unimportant. While this last result reflects the findings of several studies analysing the importance of public policy in attracting FDI, the fact that the proximity to other foreign companies is as-

[3] For a descriptive overview of the survey results see Hecht et al. (2013).

sessed as unimportant by the respondents is not in line with previous findings (see section 2).

Figure 5
Importance of different location factors for the location decision



Source: IAB-ReLOC data, N=459.

To split the sample into vertical and horizontal FDI a more general question on the investment motives is used. 56.2 percent of the respondents indicated that the main motive for their investment in the Czech Republic has been market access (horizontal FDI) and 40.5 percent saw cost savings as most crucial (vertical FDI).

3.2 Regional characteristics

The regional investment determinants are identified based on 76 Czech LAU1 regions. Regional data is provided by the Czech Statistical Office. The selection of the regional variables included in the analysis is guided by previous results in this field of research and on the descriptive evidence from the ReLOC survey as presented above. The regional characteristics supposed to influence the location choice decision can be divided in three categories: agglomeration issues, distance features and labour market characteristics.

Agglomeration issues

Previous studies have shown that agglomeration economies are an important issue for a region's capability to attract FDI (Barrios/Görg/Strobl 2006; Binh 2010; Crozet/Mayer/Mucchielli 2004; Guimarães/Figueiredo/Woodward 2000; Hilber/Voicu

2010). First, the population density is included in the model to account for agglomeration economies that arise from the overall economic activity in a region (Krugman 1991). This variable is actually expected to have a positive influence on the regional attractiveness for FDI location. However, the population density could also reflect high land price as land is relatively scarce in densely populated regions compared to less populated regions. As a high land price should be deterring for FDI, the expected sign of this explanatory variable remains ambiguous.

The agglomeration effect can furthermore be divided up into localisation economies and foreign-specific agglomeration. Localisation economies go back to Marshall (1898). As they can share inputs, it is attractive for firms to locate near other firms of the same industry. Furthermore, labour market pooling can come up that provides the firms with workers qualified in the specific skills they need and, in addition, knowledge spillovers may occur. To account for these Marshallian externalities Hoover's Localisation Index for the industry of the investment is used. This measure has also been applied by Pusterla/Resmini (2007) and by Mucchielli/Yu (2011). The index measures if a region has a comparative advantage in the industry of the investment compared to the country's average. It is calculated as presented in Formula 1[4].

$$HLI_{jk} = \frac{E_{jk}}{\sum_k E_{jk}} \Big/ \frac{\sum_j E_{jk}}{\sum_j \sum_k E_{jk}}$$

Formula 1: Calculation of Hoover's Localisation Index

The value of the index is larger than 1, when the share of employees *E* working in a specific industry *k* in a region *j* is higher than in the Czech Republic, it equals 1 when this share is the same as in the Czech Republic in total and it is smaller than 1 when the region's share of employees in an industry is smaller than at the national level. As the value of the index is higher in regions with a comparative advantage in one industry, this localisation measure is expected to have a positive impact on the location choice decision.

Another agglomeration effect analysed in this study is specific for German firms. In previous studies it has been stressed that the number of foreign firms already located in a region has a positive impact on the probability that a region is chosen by a

[4] The calculation of the Localisation Index at the LAU1 level is based on a distinction of twelve industries (see Table A.1 in the Appendix). For the calculation, changes in the classification of industries in the Czech Republic within the investigation period had to be taken into account. In the year 2008, the structure of the industrial classification changed profoundly with the introduction of the NACE Rev. 2 classification. While the index has been calculated based on the old OKEČ structure, the industry of the investment is based on the new structure. The necessary link between investment industry and index has been done using a list of the Czech Statistical Office linking the old and the new classification. As the list is not unambiguous, sometimes an individual adaptation has been necessary.

foreign investor (e. g. Guimarães/Figueiredo/Woodward (2000)). When already a high number of foreign firms is located in a region this can be a sign for potential future investors that this location provides convenient local conditions (Rajdlová 2003). By locating in such a region, the risk and also the coordination costs are reduced. Following these studies a measure for foreign specific agglomeration is included. As the focus is only on German investments, the number of German firms already located in a region is taken as a measure for pre-investment agglomeration of German firms. This number is supposed to have a positive influence on a region's capability to attract German investors.

Furthermore, the distance to the next economic centre is included in the analysis. Economic centres are all Czech cities that had more than 100,000 inhabitants at the beginning of the investigation period, thus in the year 1993. These are Praha, Plzeň, Ostrava, Olomouc, Hradec Králové and Liberec. This variable accounts for the possibility that it might be favourable for investors to locate near but not directly in agglomerations. In the surrounding areas, the land price is lower and accessibility may be better as no inner-city congestions can occur. Nevertheless, by locating not in but near an agglomeration it is also possible to profit of agglomeration benefits as, e. g., the availability of specific services as the agglomeration can be reached fast.

To account for the special position of Prague in the Czech Republic a dummy for the region of Prague is included. It has the value 1 for the LAU1 region the Czech Republic's capital city lies in and 0 for the remaining 75 regions. This dummy variable captures the characteristics of the capital city that are not yet contained in the other variables.

Distance

The distance between the potential location of the affiliate and the location of the parent company is another factor that potentially influences the location decision. To derive the expected effect of this variable a distinction of investment motives is straightforward as distance plays a different role for different motives. In the literature, horizontal FDI aiming at the opening up of new markets and vertical FDI aiming at cost reduction are distinguished (Helpman 1984; Markusen 2002). In case of horizontal FDI the probability that a location is chosen should increase with larger distance between the potential location for the subsidiary and the location of the parent company. Horizontal FDI occurs when it is more advantageous for a firm to supply the target market by establishing a subsidiary there than by exporting from the home country. With larger distance between two locations the costs for exporting or transferring goods from one location to another increase due to rising transportation costs. Thus, the probability that a region attracts horizontal FDI increases with larger distance to the location of the parent company (Egger 2008). In case of vertical FDI, in contrast, intermediate goods are normally transported between the location of the parent company and the location of the subsidiary. Thus, a large distance between the locations of the parent company and the affiliate is harmful as the transportation and transaction costs rise. In this study, the distance enters as the linear distance

between the potential location of the affiliate and the location of the parent company. For each of the 76 Czech LAU 1 regions the linear distance to each of the 3,313 German investors has been calculated[5].

Another variable categorized under “Distance” is the region’s distance to the next motorway and is intended to reflect the accessibility of a region. The accessibility of a region is an important issue for the location choice of foreign investors (see e. g. Hilber/Voicu (2010)). As a consequence, many studies include a measure for the infrastructure facilities in a region where especially the road and railroad network and sometimes also the distance to the next (international) airport are considered. Due to the low distance to Germany a region’s proximity to the next international airport should not be of significant importance for the location choice of German investors but the accessibility for truck transport. The region’s distance to the next motorway is included to capture this.

Labour market features

Another group of variables assumed to influence the location choice of multinational companies is related to the labour market. As with distance here, too, a distinction between vertical and horizontal FDI is straightforward. As vertical FDI aims at reducing costs, these investments should be especially sensitive to labour costs. For the location choice of horizontal FDI, in contrast, labour costs should only play a minor role.

As a measure for labour costs is not available at the LAU 1 level the monthly average wage in the manufacturing sector is used as a proxy. As all variables reflecting the cost side of the profit function, high labour costs, too, should exert a negative influence on the probability of a region to be chosen. But here a second interpretation is possible: A high average monthly wage could be the consequence of a high skill level of the workforce in a region. There is evidence that German FDI in Eastern European countries is not only motivated by seeking lower costs but also by seeking qualified labour (Marin 2004; Spilková 2007). As information on qualification and skills is not available at this highly disaggregated regional level, the expected sign of the monthly average wage remains ambiguous.

As a second measure of labour market features the regional unemployment rate is regarded. The impact of this variable cannot be asserted before the analysis. On the one hand, a high regional unemployment rate may be a sign for a good availability of workers and should thus attract foreign investors. On the other hand, a high regional unemployment level could also be a signal for economic weak regions and should thus deter foreign investors. Furthermore, the regional unemployment rate can also be considered as an indirect measure for the financial investment incen-

[5] As some German companies are financially involved in more than one Czech company, the number of German parent companies in the IAB-ReLOC data is smaller than the number of Czech affiliates.

tives that are offered to investors depending on the size of the investment and the characteristics of the location that is chosen (CzechInvest 2013). Data on these investment incentives is not available for the whole period, but the incentives have only been granted in underdeveloped regions with high unemployment rates. The financial support has been highest in the regions with the highest unemployment rates. Thus, the regional unemployment rate seems to be an appropriate measure for these incentives. As in this case, the expected influence of the unemployment rate is positive, the expected sign of the variable remains ambiguous.

Besides the provision of financial incentives, some countries have created special economic zones to attract foreign investments. But, e. g., for Ireland and Poland there is empirical evidence that they have not been successful (see Barrios/Görg/Strobl (2006) for the case of Ireland and Cieślik (2005) for Poland). In the Czech Republic there are no special economic zones, but from the year 1998 on, the government supported the creation of industrial zones to provide convenient infrastructure for potential national or foreign investors in the "Industrial Zone Development Support Programme" (Pokorný 2009). Until 2006, 101 such zones have been built (Pokorný 2009). They are spread all across the country. Their contribution to the regional capability to attract FDI can thus not be assessed at the regional level considered in this study. In the "Business Real Estate and Infrastructure Support Programme", that has come into force in 2006, especially the creation of strategic industrial zones comprising at least 200 ha is supported. Up to now, there are five such areas. As their creation lies at the end of the investigation period, their influence on the location choice of German investors cannot be analysed, neither.

There are some further characteristics that possibly influence the location choice decision as, e. g., capital costs. In previous studies often different tax levels have been included. As in the Czech Republic there are no local taxes, the tax level is the same at all potential locations (CzechInvest 2014). Thus, a variable measuring capital costs is not included in the model. It is also common to include variables measuring the demand side, thus the market potential of the alternative locations. Often, the market potential is approximated by the regional income or the regional GDP. Unfortunately, information on regional GDP is not available for the Czech LAU1 regions but only for bigger regions. Thus, a variable measuring the market potential cannot be included in the analysis. This shortcoming is weakened by the fact that the Czech Republic in total is only a small country, so that the market potential should not differ much between potential locations. Moreover, other studies as Guimarães/Figueiredo/Woodward (2000) focussing on small regional levels have not included regional market potential measures, neither.

Table 2 gives a descriptive overview of the regional variables and their expected influence on the location choice.

Table 2
Descriptive overview of included explanatory variables

Variable	Explanation	Expected sign	Mean	Standard deviation	Min.	Max.
Agglomeration						
Population density	Agglomeration/land price	+/-	206.40	375.83	35.92	2454.84
Localisation Index	Specialisation (localisation economies)	+	0.90	0.36	0.00	3.67
Number of German companies	Risk minimization	+	26.56	76.41	0.00	1,043
Distance to the next economic centre (in km)	Agglomeration	-	45.80	27.70	0.00	130.74
Prague dummy	Capital city effect	+	0.01	0.11	0.00	1
Distance						
Distance to the investor (in km)	Proximity, low transportation costs	+/- HFDI/VFDI	434.56	171.39	10.04	903.34
Distance to next motorway (in km)	Accessibility	-	24.22	23.63	0.00	80.76
Labour market						
Wage (in Czech crowns)	Labour costs	-/+	13,056.22	4,721.67	4,513	28,128
Unemployment rate	Financial investment incentives, availability of workers/weak economic conditions	+/-	0.073	0.042	0.003	0.230

Source: Czech Statistical Office; author's own calculations.

4 Econometric analysis

4.1 Nested logit model

To analyse the location choice of German investors in the Czech Republic a random utility maximization (RUM) framework is applied. The assumption behind this approach is that a multinational firm locates in that location where the highest utility or profit is expected. As this study is based on the regional level of 76 Czech districts, this assumption implies that a German investor i chooses the regional alternative j ($j = 1, 2, \dots, J$) out of the 76 Czech districts for which he expects the highest profit. This means that the expected profit in the region to be selected is higher than in every other Czech region:

$$\pi_{ij} > \pi_{ik}; k \neq j, k = 1, 2, \dots, J$$

The expected profit depends on observable regional characteristics x_{ij} and on unobservable influences e_{ij}: The deterministic part of the profit function thus consists of alternative specific regressors.

$$\pi_{ij} = x'_{ij}\beta + e_{ij}$$

The probability that investor i chooses region j can be written as the probability that the expected profit in region j is higher than in every other region in the Czech Republic. Under the assumption of independent and identically distributed error terms with type I extreme value distribution (Cameron/Trivedi 2010), this leads to the conditional logit equation:

$$P_{ij} = Prob(\pi_{ij} > \pi_{ik}) = Prob(e_{ij} - e_{ik} > x'_{ik}\beta - x'_{ij}\beta) = \frac{e^{x'_{ij}\beta}}{\sum_k e^{x'_{ik}\beta}};$$

$$k \neq j, k = 1, 2, \dots, J$$

The conditional logit model goes back to McFadden (1974) and can – besides count data models (Arauzo-Carod/Liviano-Solis/Manjón-Antolín 2010) – be regarded as one standard approach in the location choice literature applied in a bulk of previous studies (Békés 2005; Crozet/Mayer/Mucchielli 2004; Gauselmann/Marek 2012; Guimarães/Figueiredo/Woodward 2000; Head/Ries/Swenson 1995; Hilber/Voicu 2010; Mayer/Mejean/Nefussi 2010; Mukim/Nunnenkamp 2010). The problem with the conditional model however is that it imposes the strong assumption that the choice between any two pairs of alternatives is simply a binary logit model (Cameron/Trivedi 2010). Especially in the case of this study where a large number of alternatives (76 regions) is included, this independence of irrelevant alternatives (IIA) can be a too strong restriction. As Basile/Castellani/Zanfei (2009) note “this assumption would be violated if, for example, different groups of regions had similar unobservable characteristics, so that the error terms would be positively correlated across choices”. To avoid this problem a more general model that relaxes the IIA

has been used in previous papers (Basile/Castellani/Zanfei 2009; Head/Mayer 2004; Pusterla/Resmini 2007) and is also applied in this study here: the nested logit model. By specifying a nesting structure the alternatives are split into groups with each alternative belonging to one upper nest, where errors are correlated within nests but uncorrelated across nests. The nesting structure can be interpreted as a decision tree: First, the investor decides in which upper nest to locate and in the next step, the location within the nest is chosen (Cameron/Trivedi 2010).

When the J alternatives are split into K nests, the probability that investor i chooses alternative j can be written as the product of two probabilities: The conditional probability that alternative j is chosen given that nest n has been chosen ($P_{j|n}$) multiplied with the marginal probability that nest n is chosen (P_n)[6] (a more detailed discussion of the model is, e. g., given in Basile/Castellani/Zanfei (2009) or Cameron/Trivedi (2010)):

$$P_j = P_{j|n} \times P_n = \frac{\exp(x'_{jn}\beta)}{\sum_{j\in n}\exp(x'_{jn}\beta)} \times \frac{\exp(z'_n\alpha + \tau_n I_n)}{\sum_n \exp(z'_n\alpha + \tau_n I_{n)}}$$

Thereby, the vectors x_{jn} and z_n display the regional characteristics of alternative j in nest n and the characteristics of the upper nest n respectively. $I_n = ln\{\sum_{j\in n}\exp(\mathrm{x'_{jn}}\beta_j/\tau_n)\}$ is the inclusive value and τ_n are the dissimilarity parameters. Although the model produces positive probabilities that sum to one for any value of τ_n, the additive random utility model restricts the values of τ_n to lie in the interval from $[0; 1]$. "Values outside this range mean the model, while mathematically correct, is inconsistent with random-utility theory" (Cameron/Trivedi 2010).

The information on the location choice comes from the IAB-ReLOC data described in detail in section 3. Due to data availability reasons, only investments that were made between 1994 and 2008 are included in the analysis (3,137 FDI projects)[7]. As in previous studies on location choice (e. g. in Cieślik (2005); Gauselmann/Marek (2012); Rajdlová (2003)), it is assumed that the decision where the Czech affiliate is founded is taken one year before the actual foundation of the subsidiary takes place. So, the explanatory variables are lagged one year[8]. This procedure also reduces endogeneity.

---

6 The individual subscript i that identifies each investor is not included in the formulas to simplify the notation.

7 When splitting the sample up according to different investment characteristics, it can happen that one or more regions are not selected at all by German investors. In these cases, the regions that were not chosen are excluded from the analysis as otherwise computational problems may occur.

8 As information on the employees according to industries is at the level of the Czech districts only available for the years 1993 to 2001, the Localisation Index for the entry years 2002 to 2008 refers to the year 2001.

What concerns the nesting structure, a structure that differentiates between three groups is chosen (see Figure 6). The first nest represents the Czech border region to Germany and comprises all Czech districts whose centre is located within a linear distance of 50 km to the German border. The special importance of the border region for the location of German firms cannot only be seen from the maps in Figure 1 to Figure 4 but has also been confirmed in the paper by Schäffler/Hecht/Moritz (2014). The delimitation of the other two nests is based on the historical subdivision of the Czech Republic into Bohemia, Moravia and Czech Silesia. Thus, nest 2 comprises all districts that lie in the Bohemian part of the Czech Republic – except the ones that are already included in nest 1 – and nest 3 comprises all districts that belong to Moravia and Czech Silesia[9].

Figure 6
Nesting structure of the nested logit model

Source: Author's own classification.

4.2 Results

The detailed information available in the IAB-ReLOC dataset allows to estimate the model not only for the total population of German investments in the Czech Republic (see Table 3) but also for different subgroups of the total sample. The results for

[9] Other structures with smaller regional units as upper nests as well as a structure dividing the districts up into agglomeration areas and more rural areas have been tested. In these cases, the values of the dissimilarity parameters were always bigger than 1 and thus not in line with the utility maximization model.

different investment sectors – manufacturing, trade and services – are presented in Table 3. In Table 4, results are presented for investments with the main motive of cost savings and for investments aiming at opening up new markets; a distinction between vertical and horizontal FDI is made. For purpose of comparison, the results for the location choice of investors participating in the survey are included in this table, too. Furthermore, it is analysed if the importance of regional characteristics for the location choice changed over time. A differentiation between investment periods is presented in Table 5. Results for different investment sizes can be seen in Table 6. Table 7 refers to a differentiation between greenfield and brownfield FDI. In all specifications, the explanatory variables with exception of the dummy variables are included in log form[10]. Besides the coefficients also the average marginal effects (AMEs) are reported in the tables.[11]

In all models estimated, the Likelihood Ratio Test rejects the conditional logit model against the nested logit model. In most of the estimated models, the values of the dissimilarity parameters are smaller than 1 for the nest comprising the border region and for the nest comprising the regions belonging to Bohemia, but not for the third nest. This shows, that at least within two of the three nests regions are closer substitutes than across groups.

Total population of investments

First, the results for the total population of German FDI projects in the Czech Republic are discussed (see column 2 of Table 3). The variables reflecting agglomeration economies all show the expected signs. German investors prefer to locate in agglomerative areas as the population density has a positive influence on the location choice decision. Furthermore, regions that are specialised in the sector of the investment are more attractive as the coefficient of the Localisation Index is significantly[12] positive. German agglomeration in a region influences the location choice decision in a significant and – when having a look at the subgroups – stable way. The higher the number of German companies already located in a region is, the higher is the probability that this region is chosen by a further German investor. For the total sample of investments, an increase in the number of German firms located in a region by 1 % raises the probability of that region to be chosen on average by 0.27 percentage points (AME = 0.2721). This confirms the expectation that a higher number of German companies in a region acts as a positive signal for future investors. Furthermore, the regions that have been successful in attracting German companies directly after the fall of the Iron Curtain have a long-lasting advantage com-

[10] In case of the variables where values of 0 occur, 0.1 has been added to the original value to be able to calculate the logarithm.

[11] The calculation of the AMEs is based on the procedure presented by Cameron/Trivedi (2010).

[12] Due to the high number of observations, coefficients are categorized as significant only when the significance level is lower than 5 % (as e. g. also done by Barrios/Görg/Strobl (2006)).

pared to regions that were not selected by German investors. The result that localisation economies and German-specific agglomeration are important in the location decision of German investors is in line with the findings of Hilber/Voicu (2010) for the location of FDI in Romania. The distance to the next economic centre enters with a negative coefficient as has been expected. Moreover, as in the study of Gauselmann/Marek (2012) on the location choice of foreign investors in East Germany, Poland and the Czech Republic a positive capital city effect can be observed. The coefficient of the Prague dummy is significantly positive not only for total FDI projects but also for all subgroups. Thus, Prague exhibits some additional agglomeration advantages that are not captured by the other variables included in the model. The distance to the investor influences the location decision significantly negatively. Investors prefer to locate in regions that are located near their original location and not in regions farther away. As can be seen from the AME, a 1 % increase in a region's distance to the investor lowers the probability that the investor locates in that region on average by 3.1 percentage points. Although this result is stable throughout all specifications and in line with previous findings (Buch et al. 2005; Schäffler/Hecht/Moritz 2014), it has not necessarily been expected with regard to theoretical considerations: For vertical FDI, on the one hand, distance should exhibit a negative impact as splitting up the value chain is only advantageous if transportation costs between the locations are small – thus, if the distance between the locations is small. For horizontal FDI, on the other hand, a larger distance to the destination location is assumed as advantageous as only with high transportation costs between the home and the target market the establishment of a new plant is more profitable than exporting. Although the stable negative impact of distance could be interpreted as a sign for the dominance of vertical FDI, a more plausible explanation lies in the location of the economic centres within the Czech Republic. Not only the agglomeration of Prague but also other big Czech cities like Plzeň and Liberec are located near the border to Germany. Thus, even when the main motive for investing in the Czech Republic is market access, a lower distance to the target region seems to be more advantageous. The distance to the next motorway is positively correlated to a region's probability to be chosen by a German investor. Thus, the proximity to a motorway is not a location advantage. Regarding the labour market characteristics, the wage, the proxy for labour costs, has a negative and slightly significant coefficient. The higher the monthly average wage in a region is, the lower is the probability that this region is selected by an investor. As can be seen from the further specifications of the estimation, this result does not hold for all subsamples but is driven from specific subgroups of the total population of FDI. This finding is in line with the results of Gauselmann/Marek (2012) who find that low wages do not per se attract FDI. The other labour market variable, unemployment rate, has a significantly negative impact on the location choice. Thus regions with a lower unemployment rate are preferred by German investors. Here, too, remarkable differences come up when different investment characteristics are considered as discussed below.

Differences between target industries

When looking at different target industries of the investments (see columns “manufacturing”, “trade” and “services” in Table 3), differences in the impact of agglomeration economies can be observed. Only investments going to the trade sector are attracted by densely populated regions. For firms investing in the manufacturing sector and the services sector the population density has no significant impact on the location decision. Although at first glance this result for the services sector is somewhat surprising, it fits quite well to the regional distribution of the service investments. As can be seen from Figure 4, they are compared to the other two main investment sectors very strongly concentrated to Prague and less to other bigger Czech cities. While the coefficient for the Localisation Index is significantly positive in all of the three main investment industries, differences in the size of the average marginal effects show that localisation economies play a special role in the location choice of manufacturing firms (AME = 0.8115) and are of minor importance in the decision process of trading firms (AME = 0.4565). With regard to distance features, the distance to the investor influences the location choice of all of the three main branches in a negative way. But, as can be seen from the average marginal effects, distance is more deterring for FDI in manufacturing and services on the one hand and less deterring for trade FDI on the other hand. A last difference concerns the impact of the unemployment rate. While investments in the manufacturing and in the services sector are not influenced by this variable, regions with lower unemployment rates are attractive for investments in the trade sector. Thus, investments in trade seem to be sensitive to weak economic conditions and probably in consequence also lower purchasing power. In contrast to the findings of Jones/Wren (2015), the locational factors of manufacturing and services FDI are similar for German FDI in the Czech Republic. Differences can rather be observed between the locational factors of FDI in the manufacturing and services sectors on the one and FDI in the trade sector on the other hand.

Differences between investment motives

By making use of the survey information a differentiation is possible between vertical and horizontal FDI (see Table 4). As survey information is only available for a small subsample of the total population of FDI projects, the first column of Table 4 shows the results for the location choice of the investors that participated in the survey. The results are quite similar to the total FDI population. The main differences are the insignificant coefficients for the number of German companies and the population density when estimating the model only for survey participants. The sample of the survey participants can be further split up into vertical FDI with the main motive of cost savings and horizontal FDI with the main motive of market access. However, the results for the two motives are quite similar. For both motives, localisation economies influence the location choice. While the distance to the next centre is only significantly negative for vertical FDI, the region’s distance to the investor has a negative impact on the location choice decision for both motives – what has not been expected. As with rising distance the transportation and transaction costs in-

crease, this negative relation has been expected for vertical FDI but not for horizontal FDI. The average marginal effects reveal that the negative effect of rising distance to the investor is even larger for horizontal FDI (AME = -5.4006) than for vertical FDI (AME = -4.7439). As already discussed above, this might be explained by the fact that the economic centres within the Czech Republic are located near the border to Germany and thus in low distance to the original locations of the investors.

Differences between investment periods

The results presented in Table 5 are based on a differentiation according to investment periods. Investments that took place between 1994 and 1998, between 1999 and 2003 and between 2004 and 2008 are compared. What concerns the agglomeration issues, the period between 1999 and 2003 differs from the other two as here the population density is not significant. A similar picture emerges from the labour market variables, as here, too, the results are similar for the first and the last time period, but not for the second one. As can be seen from the coefficients for the unemployment rate and the wage, the investors in the early and the late years have been sensitive to high unemployment rates and to high regional wage levels whereas the coefficients are not significant for the middle time period. When having a look at the average marginal effects, it can be seen that the importance of German-specific agglomeration increases over time (AME = 0.1411 for early investors, AME = 0.3254 for late investors). Furthermore, the importance of the capital city characteristics of Prague that are not captured by the other explanatory variables decreases over time.

Differences according to investment sizes

As the dataset comprises information on the number of employees working in the Czech affiliates of German companies it is possible to distinguish between different investment sizes[13]. In Table 6 the results are presented for small investments (up to 5 employees), for medium investments (between 6 and 49 employees) and for large investments (50 and more employees) respectively. Differences in the location choice concern especially the labour market characteristics. Small investments are discouraged by high unemployment rates. This could, on the one hand, show that especially for small investments it is disadvantageous to locate in economic weak regions. On the other hand, this result could display the strategy of investment incentives of the Czech Republic. First, investment support is only granted in regions with high unemployment rates. Second, state aid is higher for large investments as some of the incentives depend on the number of newly created jobs. The second difference concerning the labour market features refers to the regional wage level. While a high regional wage level reduces the probability that a medium investment is set up by a German investor, the effect is not significant for small and large investments. Agglomeration economies matter for all investment sizes but from the

[13] The information on investment size refers to the year 2009 and is taken from the ČEKIA database.

average marginal effects can be seen that the importance of regional specialisation and of capital city characteristics increases with investment size, while the population density has no significant impact on the location choice of large investments. The number of German investors already located in a region is most important for medium-sized investments. When the number of German companies located in a region increases by 1 %, the probability of that region to be chosen rises by 0.33 percentage points in the case of medium sized investments, but only by 0.20 (0.18) percentage points in the case of small (large) investments.

Differences between greenfield and brownfield investments

In the literature on location choice of FDI often only greenfield investments, i. e. only newly established firms, are included in the analysis; brownfield investments referring to investments in already existing firms are not considered (see e. g. (Guimarães/Figueiredo/Woodward (2000))). The authors argue that the factors driving the location choice differ between these two types of investments. The results in Table 7 show that for the location choice of German FDI in the Czech Republic the locational factors are quite similar but two differences between the location behaviour of greenfield and brownfield investments can be identified. First, the unemployment rate is only significantly negative for greenfield investments. Second, the number of German companies already located in a region only influences the location choice of greenfield investments but is insignificant for brownfield investments. This discrepancy may be explained by the investment circumstances: Brownfield investors are more restricted in their regional choice as they look for suitable companies that are already located at a fix location within the Czech Republic. In some way, for these investors more the firm characteristics and less the regional characteristics play a role. For greenfield investors, in contrast, the regional characteristics should drive the decision as they build up a new plant and are thus not restricted in their regional choice. For the other explanatory variables, the significant coefficients all have the same sign. The AMEs reveal that brownfield investments are more sensitive to a change in the regional specialisation and to capital city characteristics, while for greenfield investments the region's distance to the original location of the investor is more important than for brownfield investments.

Table 3
Results for total FDI and separately for investments in the manufacturing, the trade and the services sector

	total investments			Investments in								
				manufacturing			trade			services		
	Coefficient	Std.Err.	AME	Coefficient	Std.Err.	AME	Coefficient	Std.Err.	AME	Coefficient	Std.Err.	AME
Agglomeration												
Population density (ln)	**0.2474*** **	0.0439	*0.2951*	0.1046	0.0843	*0.1063*	**0.2733*** **	0.0674	*0.5216*	0.1286	0.0737	*0.1843*
Localisation Index (ln)	**0.8576*** **	0.0586	*1.0232*	**0.7990** **	0.2334	*0.8115*	**0.2392** **	0.0886	*0.4565*	**0.5349*** **	0.1209	*0.7668*
Number of German companies (ln)	**0.2281*** **	0.0400	*0.2721*	**0.2505** **	0.0798	*0.2544*	**0.1543** **	0.0494	*0.2944*	**0.2682** **	0.0881	*0.3845*
Prague	**1.1876*** **	0.1182	*1.4168*	**1.4144*** **	0.3588	*1.4366*	**0.6184*** **	0.1112	*1.1800*	**0.9537*** **	0.1778	*1.3670*
Distance to next centre (ln)	**-0.1078*** **	0.0231	*-0.1285*	**-0.1985*** **	0.0532	*-0.2016*	-0.0304	0.0241	*-0.0580*	**-0.1233** **	0.0383	*-0.1767*
Distance												
Distance to investor (ln)	**-2.5837*** **	0.1670	*-3.0818*	**-3.1283*** **	0.3431	*-3.1751*	**-1.3845*** **	0.2417	*-2.6397*	**-2.3183*** **	0.3280	*-3.3207*
Distance to next motorway (ln)	**0.0691*** **	0.0151	*0.0824*	**0.1149*** **	0.0320	*0.1167*	0.0225	0.0159	*0.0428*	**0.0582** *	0.0268	*0.0835*
Labour market												
Wage (ln)	**-0.5656** *	0.2434	*-0.6749*	-0.5598	0.4854	*-0.5684*	-0.0425	0.2755	*-0.0811*	-0.0818	0.4247	*-0.1173*
Unemployment rate (ln)	**-0.1400****	0.0437	*-0.1670*	0.0233	0.0958	*0.0237*	**-0.1911** **	0.0574	*-0.3646*	-0.1124	0.0726	*-0.1611*
Dissimilarity parameters												
Border region	0.8581	0.0660		1.1194	0.1539		0.4088	0.0790		0.7078	0.1272	
Bohemia	0.9510	0.0613		1.2698	0.1688		0.6344	0.0756		0.7676	0.1039	
Moravia	1.1518	0.0978		1.5693	0.2202		0.5543	0.1283		0.8531	0.1973	
LR test for IIA (tau=1)	143.18***			80,69***			64.05***			27.58***		
Number of investments	3,130			1,037			976			944		
Number of observations	237,880			78,812			72,224			64,192		
Log-Likelihood	-10,075.30			-4,063.43			-2,852.47			-2,467.87		

Notes: Dependent variable: Probability that region *j* is chosen. Significance level: *** 0.1%, ** 1%, * 5%. AME denotes the average marginal effect and is indicated in percentage points. The AME can be interpreted as a semi-elasticity that refers to the average change in the probability of a region to be chosen (in percentage points) due to a one percentage change in the (untransformed) explanatory variable.

Source: Author's own calculation from IAB-ReLOC data.

Table 4
Results for vertical and horizontal FDI

	all surevy companies			cost-savings			market access		
	Coefficient	Std.Err.	AME	Coefficient	Std.Err.	AME	Coefficient	Std.Err.	AME
Agglomeration									
Population density (ln)	0.1474	0.0769	*0.2809*	0.0453	0.1770	*0.0693*	0.1287	0.0749	*0.4467*
Localisation Index (ln)	**0.6305*** **	0.1200	*1.2018*	**0.7985** **	0.2628	*1.2227*	**0.4137*** **	0.1150	*1.4369*
Number of German companies (ln)	-0.0119	0.0617	*-0.0227*	-0.1606	0.1192	*-0.2458*	-0.0518	0.0605	*-0.1800*
Prague	**1.3802*** **	0.2911	*2.6305*	**1.6023***	0.6202	*2.4533*	**1.1692*** **	0.2788	*4.0607*
Distance to next centre (ln)	-0.0788	0.0436	*-0.1502*	**-0.3276** **	0.1201	*-0.5015*	0.0084	0.0408	*0.0290*
Distance									
Distance to investor (ln)	**-2.2076*** **	0.3455	*-4.2040*	**-3.0999*** **	0.6208	*-4.7439*	**-1.5565*** **	0.3700	*-5.4006*
Distance to next motorway (ln)	0.0244	0.0252	*0.0465*	0.1124	0.0611	*0.1721*	-0.0066	0.0249	*-0.0229*
Labour market									
Wage (ln)	**-1.1126***	0.4985	*-2.1190*	-2.0010	1.1959	*-3.0623*	-0.1744	0.4091	*-0.6062*
Unemployment rate (ln)	-0.0567	0.0831	*-0.1081*	-0.0474	0.1898	*-0.0725*	-0.0878	0.0812	*-0.3050*
Dissimilarity parameters									
Border region	0.6049	0.1121		0.9327	0.2319		0.3944	0.1051	
Bohemia	0.7071	0.1157		1.0189	0.2442		0.5057	0.1088	
Moravia	0.7540	0.1724		1.3076	0.3300		0.3722	0.1862	
LR test for IIA (tau=1)	22.62***			13.06**			17.34***		
Number of investments	452			188			249		
Number of observations	30,736			11,092			12,948		
Log-Likelihood	-1,506.51			-658.21			-728.03		

Notes: Dependent variable: Probability that region j is chosen. Significance level: *** 0.1%, ** 1%, * 5%. AME denotes the average marginal effect and is indicated in percentage points. The AME can be interpreted as a semi-elasticity that refers to the average change in the probability of a region to be chosen (in percentage points) due to a one percentage change in the (untransformed) explanatory variable.

Source: Author's own calculation from IAB-ReLOC data.

Table 5
Results according to investment periods

	investments in								
	1994-1998			1999-2003			2004-2008		
	Coefficient	Std.Err.	AME	Coefficient	Std.Err.	AME	Coefficient	Std.Err.	AME
Agglomeration									
Population density (ln)	**0.4148*** **	0.0912	*0.4598*	0.0359	0.0767	*0.0479*	**0.3228*** **	0.0826	*0.3957*
Localisation Index (ln)	**1.0250*** **	0.1223	*1.1365*	**0.8526*** **	0.1080	*1.1377*	**0.7322*** **	0.0860	*0.8975*
Number of German companies (ln)	**0.1273***	0.0623	*0.1411*	**0.2252** **	0.0752	*0.3005*	**0.2654** **	0.0767	*0.3254*
Prague	**1.3228*** **	0.2357	*1.4667*	**1.1825*** **	0.2141	*1.5776*	**1.0345*** **	0.1868	*1.2681*
Distance to next centre (ln)	-0.0688	0.0465	*-0.0763*	**-0.1385** **	0.0439	*-0.1848*	**-0.1261** **	0.0377	*-0.1545*
Distance									
Distance to investor (ln)	**-3.0004*** **	0.3093	*-3.3246*	**-2.3523*** **	0.3014	*-3.1363*	**-2.4657*** **	0.2753	*-3.0210*
Distance to next motorway (ln)	**0.0636***	0.0294	*0.0705*	0.0306	0.0241	*0.0408*	**0.1354*** **	0.0294	*0.1660*
Labour market									
Wage (ln)	**-0.9736***	0.4616	*-1.0777*	0.0579	0.4038	*0.0771*	**-0.9252***	0.4457	*-1.1306*
Unemployment rate (ln)	**-0.2240** **	0.0800	*-0.2484*	-0.1003	0.1079	*-0.1339*	**-0.2769***	0.1152	*-0.3394*
Dissimilarity parameters									
Border region	0.9680	0.1220		0.7496	0.1119		0.8599	0.1150	
Bohemia	1.0634	0.1139		0.8802	0.1064		0.9196	0.1036	
Moravia	1.2913	0.1759		1.0956	0.1734		1.1308	0.1744	
LR test for IIA (tau=1)	42.38***			64.00***			49.73***		
Number of investments	1,025			867			1,238		
Number of observations	75,850			65,025			91,612		
Log-Likelihood	-3,290.98			-2,888.65			-3,846.45		

Notes: Dependent variable: Probability that region j is chosen. Significance level: *** 0.1%, ** 1%, * 5%. AME denotes the average marginal effect and is indicated in percentage points. The AME can be interpreted as a semi-elasticity that refers to the average change in the probability of a region to be chosen (in percentage points) due to a one percentage change in the (untransformed) explanatory variable.

Source: Author's own calculation from IAB-ReLOC data.

Table 6
Results according to investment size

	small investments			medium investments			large investments		
	Coefficient	Std.Err.	AME	Coefficient	Std.Err.	AME	Coefficient	Std.Err.	AME
Agglomeration									
Population density (ln)	**0.2241*** **	0.0621	*0.4359*	**0.2038***	0.0919	*0.2048*	0.2244	0.1252	*0.2025*
Localisation Index (ln)	**0.3732*** **	0.0762	*0.7262*	**1.2435*** **	0.1285	*1.2496*	**1.8082*** **	0.2160	*1.6314*
Number of German companies (ln)	**0.1022***	0.0479	*0.1988*	**0.3248*** **	0.0868	*0.3264*	**0.2001***	0.0987	*0.1805*
Prague	**0.7069*** **	0.1274	*1.3755*	**1.4868*** **	0.2605	*1.4941*	**2.0953*** **	0.4016	*1.8900*
Distance to next centre (ln)	**-0.0737****	0.0262	*-0.1433*	**-0.1609****	0.0527	*-0.1616*	**-0.1624***	0.0720	*-0.1465*
Distance									
Distance to investor (ln)	**-1.5853*** **	0.2526	*-3.0815*	**-3.2329*** **	0.3248	*-3.2454*	**-3.0216*** **	0.3875	*-2.7236*
Distance to next motorway (ln)	**0.0580****	0.0194	*0.1129*	**0.0734***	0.0327	*0.0737*	**0.0945***	0.0438	*0.0853*
Labour market									
Wage (ln)	-0.1164	0.2896	*-0.2263*	**-1.0906***	0.5523	*-1.0958*	-0.2244	0.6571	*-0.2025*
Unemployment rate (ln)	**-0.2225*** **	0.0611	*-0.4327*	-0.1553	0.0942	*-0.1560*	-0.1865	0.1281	*-0.1683*
Dissimilarity parameters									
Border region	0.4650	0.0865		1.0325	0.1254		1.2536	0.1812	
Bohemia	0.5958	0.0783		1.1855	0.1211		1.3278	0.1797	
Moravia	0.5784	0.1330		1.4773	0.1876		1.6788	0.2457	
LR test for IIA (tau=1)	49.25***			55.16***			36.21***		
Number of investments	849			946			614		
Number of observations	62,826			70,004			46,050		
Log-Likelihood	-2,557.30			-3,022.37			-2,218.17		

Notes: Dependent variable: Probability that region j is chosen. Significance level: *** 0.1%, ** 1%, * 5%. AME denotes the average marginal effect and is indicated in percentage points. The AME can be interpreted as a semi-elasticity that refers to the average change in the probability of a region to be chosen (in percentage points) due to a one percentage change in the (untransformed) explanatory variable.

Source: Author's own calculation from IAB-ReLOC data.

Table 7
Results: greenfield and brownfield investments

	greenfield			brownfield		
	Coefficient	Std.Err.	AME	Coefficient	Std.Err.	AME
Agglomeration						
Population density (ln)	**0.2368*** **	0.0521	*0.2826*	**0.2592** **	0.0817	*0.3136*
Localisation Index (ln)	**0.7845*** **	0.0684	*0.9362*	**1.0232*** **	0.1130	*1.2379*
Number of German companies (ln)	**0.2910*** **	0.0521	*0.3472*	0.0853	0.0631	*0.1032*
Prague	**1.0238*** **	0.1361	*1.2218*	**1.5900*** **	0.2409	*1.9236*
Distance to next centre (ln)	**-0.0856** **	0.0276	*-0.1021*	**-0.1624*** **	0.0437	*-0.1964*
Distance						
Distance to investor (ln)	**-2.6184*** **	0.1977	*-3.1236*	**-2.4220*** **	0.3047	*-2.9275*
Distance to next motorway (ln)	**0.0710*** **	0.0183	*0.0848*	**0.0576** *	0.0271	*0.0696*
Labour market						
Wage (ln)	-0.4317	0.2866	*-0.5146*	-0.7646	0.4626	*-0.9250*
Unemployment rate (ln)	**-0.1590** **	0.0511	*-0.1897*	-0.0866	0.0887	*-0.1048*
Dissimilarity parameters						
Border region	0.8609	0.0795		0.8533	0.1188	
Bohemia	0.9568	0.0748		0.9432	0.1063	
Moravia	1.1960	0.1211		1.0591	0.1631	
LR test for IIA (tau=1)	129.34***			20.78***		
Number of investments	2,240			890		
Number of observations	170,240			65,860		
Log-Likelihood	-7,224.91			-2,824.88		

Notes: Dependent variable: Probability that region j is chosen. Significance level: *** 0.1%, ** 1%, * 5%. AME denotes the average marginal effect and is indicated in percentage points. The AME can be interpreted as a semi-elasticity that refers to the average change in the probability of a region to be chosen (in percentage points) due to a one percentage change in the (untransformed) explanatory variable.

Source: Author's own calculation from IAB-ReLOC data.

5 Conclusion

After the fall of the Iron Curtain, many transition countries saw the attraction of FDI as crucial for their economic development. There is evidence that the benefits of FDI are locally concentrated to the location of the investment. Thus, the location choice of FDI may influence the interregional allocation of economic activity. Depending on the location pattern, the location choice of FDI can lead to a reinforcement or an adjustment of existing economic disparities. This paper focuses on the Czech Republic, one major attractor of FDI among the CEECs, and one of its most important investors, the neighbour country Germany. Based on the IAB-ReLOC data, a new and unique dataset comprising the total population of Czech companies with a German equity holder, this paper gives new insights in the regional determinants that influence the location choice of German multinationals in the Czech Republic. Including regional variables covering agglomeration issues, distance features and labour market characteristics, the location choice is not only investigated for the total sample of FDI but also for different investment characteristics.

As in other transition countries, in the Czech Republic agglomeration effects play a crucial role in the location choice decision. German investors prefer to locate in densely populated regions and in regions with a comparative advantage in the industry of the investment. Moreover, a positive capital city effect can be identified. A particularly important result concerning the contribution of FDI to regional disparities is that regions with a high number of other German companies are especially attractive for German investors. This finding is crucial as it implies a path dependency. The regions that were successful in attracting German investments at the beginning of the 1990s have an advantage for the whole investigation period. That Germany is one of the most important investors in the Czech Republic attaches even more importance to that finding.

The distance between the location of the parent company and the potential locations of the affiliates has a negative impact on the location choice. This result is stable across all subgroups of investments and confirms previous findings.

The influence of the labour market characteristics on the location choice varies with different investment characteristics. The regional wage level has a negative influence on the attractiveness of a region only for medium-sized investments as well as for investments that took place before 1999 and after 2003. This result can be interpreted as a sign that German investments in the Czech Republic are not only driven by reasons of cost savings. As in previous studies, the regional unemployment rate is not a main factor in the location choice process. Only in some subsamples the regional unemployment rate has a significantly negative impact on the location choice. This can be interpreted as a sign that high regional unemployment rates are more a sign for economic weakness than for good availability of workers.

Summing up, this paper shows that for the location choice of German FDI in the Czech Republic agglomeration economies and distance play important roles and

that especially the importance of labour market characteristics in the location choice process differs between investment industries, motives and sizes. As it is still unexplored whether the consequences for the host regions' labour markets depend on FDI characteristics, there is enough space left for follow-up studies.

References

Alfaro, Laura; Charlton, Andrew (2009): Intra-Industry Foreign Direct Investment. In: American Economic Review, 99(5), pp. 2096–2119.

Arauzo-Carod, Josep-Maria; Liviano-Solis, Daniel; Manjón-Antolín, Miguel (2010): Empirical studies in industrial location: An assessment of their methods and results. In: Journal of Regional Science, 50(3), pp. 685–711.

Barrios, Salvador; Görg, Holger; Strobl, Eric (2006): Multinationals' Location Choice, Agglomeration Economies, and Public Incentives. In: International Regional Science Review, 29(1), pp. 81–107.

Basile, Roberto; Castellani, Davide; Zanfei, Antonello (2009): National boundaries and the location of multinational firms in Europe. In: Papers in Regional Science, 88(4), pp. 733–748.

Békés, Gábor (2005): Location of manufacturing FDI in Hungary: How important are inter-company relationships? MNB Working Papers 2005/7.

Bevan, Alan A.; Estrin, Saul (2004): The determinants of foreign direct investment into European transition economies. In: Journal of Comparative Economics, 32(4), pp. 775–787.

Binh, Dinh Thi Thanh (2010): Agglomeration Economies and Location Choices by Foreign Firms in Vietnam. FIW Working Paper No. 45.

Blomström, Magnus; Kokko, Ari (1998): Multinational Corporations and Spillovers. In: Journal of Economic Surveys, 12(3), pp. 247–277.

Brainard, S. Lael (1997): An Empirical Assessment of the Proximity-Concentration Trade-off Between Multinational Sales and Trade. In: The American Economic Review, 87(4), pp. 520–544.

Buch, Claudia M.; Kleinert, Jörn; Lipponer, Alexander; Toubal, Farid (2005): Determinants and effects of foreign direct investment: evidence from German firm-level data. Economic Policy January 2005.

Cameron, A. Colin; Trivedi, Pravik K. (2010): Microeconometrics Using Stata. Revised Edition, Texas: Stata Press.

Carr, David L.; Markusen, James R.; Maskus, Keith E. (2001): Estimating the Knowledge-Capital Model of the Multinational Enterprise. In: The American Economic Review, 91(3), pp. 693–708.

Cieślik, Andrzej (2013): Determinants of the Location of Foreign Firms in Polish Regions: Does Firm Size Matter? In: Tijdschrift voor economische en sociale geografie, 104(2), pp. 175–193.

Cieślik, Andrzej (2005): Regional characteristics and the location of foreign firms within Poland. In: Applied Economics, 37(8), pp. 863–874.

Crozet, Matthieu; Mayer, Thierry; Mucchielli, Jean-Louis (2004): How do firms agglomerate? A study of FDI in France. In: Regional Science and Urban Economics, 34(1), pp. 27–54.

Czech National Bank (2010): Foreign Direct Investments in 2010: Czech National Bank.

CzechInvest (2014): Infoblatt Nr. 13 - Steuersystem. http://www.czechinvest.org/de/de-download (2015-03-19).

CzechInvest (2013): Investment Incentives. Your Gateway to Prosperity. http://www.czechinvest.org/data/files/overview-amendment-to-the-act-on-investment-incentives-3268-en.pdf (2013-02-20).

CzechInvest (2011): CzechInvest - Gateway to the Czech Republic.

Deutsche Bundesbank (2012): Bestandserhebung über Direktinvestitionen. Statistische Sonderveröffentlichung Frankfurt: Deutsche Bundesbank.

Dinga, Marián; Münich, Daniel (2010): The impact of territorially concentrated FDI on local labor markets: Evidence from the Czech Republic. In: Labour Economics, 17(2), pp. 354–367.

Egger, Peter (2008): On the role of distance for outward FDI. In: The Annals of Regional Science, 42(2), pp. 375–389.

Eurostat (2015): Labour cost levels. http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lc_lci_lev&lang=en (2015-03-23).

Fallon, Grahame; Cook, Mark (2009): Exploring the Regional Distribution of Inbound Foreign Direct Investment in the UK in Theory and Practice: Evidence from a Five-Region Study. In: Regional Studies, 44(3), pp. 337–353.

Fukao, Kyoji; Wei, Yuhong (2008): How do the Location Determinants of Vertical FDI and Horizontal FDI Differ?: Institute of Economic Research, Hitotsubashi University.

Gauselmann, Andrea; Marek, Philipp (2012): Regional determinants of MNE's location choice in post-transition economies. In: Empirica, 39(4), pp. 487–511.

Guimarães, Paulo; Figueiredo, Octávio; Woodward, Douglas (2000): Agglomeration and the Location of Foreign Direct Investment in Portugal. In: Journal of Urban Economics, 47(1), pp. 115–135.

Halvorsen, Thomas (2011): Size, Location and Agglomeration of Inward Foreign Direct Investment (FDI) in the United States. In: Regional Studies, 46(5), pp. 669–682.

Hanson, Gordon H.; Mataloni, Raymond J., Jr.; Slaughter, Matthew J. (2001): Expansion Strategies of U.S. Multinational Firms. In: National Bureau of Economic Research Working Paper Series, No. 8433.

Hayakawa, Kazunobu; Tsubota, Kenmei (2011): Location Choice in Low-Income Countries: Evidence from Japanese Investments in East Asia. IDE Discussion Paper No. 301.

Head, Keith; Mayer, Thierry (2004): Market Potential and the Location of Japanese Investment in the European Union. In: Review of Economics and Statistics, 86(4), pp. 959–972.

Head, Keith; Ries, John; Swenson, Deborah (1995): Agglomeration benefits and location choice: Evidence from Japanese manufacturing investments in the United States. In: Journal of International Economics, 38(3–4), pp. 223–247.

Hecht, Veronika; Hohmeyer, Katrin; Litzel, Nicole; Moritz, Michael; Müller, Jo-Ann; Phan thi Hong, Van; Schäffler, Johannes (2013): Motive, Strukturen und Auswirkungen deutscher Direktinvestitionen in Tschechien: Erste Untersuchungsergebnisse aus dem IAB-Projekt ReLOC - Research on Locational and Organisational Change. IAB-Forschungsbericht 1/2013, Nürnberg.

Hecht, Veronika; Litzel, Nicole; Schäffler, Johannes (2013): The ReLOC project - method report for implementing a cross-border company survey in Germany and the Czech Republic. IAB-Forschungsbericht 4/2013, Nürnberg.

Helpman, Elhanan (1984): A Simple Theory of International Trade with Multinational Corporations. In: Journal of Political Economy, 92(3), pp. 451–471.

Hilber, Christian; Voicu, Ioan (2010): Agglomeration Economies and the Location of Foreign Direct Investment: Empirical Evidence from Romania. In: Regional Studies, 44(3), pp. 355–371.

Jones, Jonathan; Wren, Colin (2015): Does Service FDI Locate Differently to Manufacturing FDI? A Regional Analysis for Great Britain. In: Regional Studies, pp. 1–15.

Kawai, Norifumi (2006): Spatial Determinants of Japanese Manufacturing in the Czech Republic. Dusiburg Working Papers on East Asian Studies No. 71/2006.

Krugman, Paul (1991): Increasing Returns and Economic Geography. In: Journal of Political Economy, 99(3), pp. 483–499.

Marin, Dalia (2004): A Nation of Poets and Thinkers: Less so with eastern Enlargement? Austria and Germany. CEPR Discussion Paper 4358.

Markusen, James R. (2002): Multinational Firms and the Theory of International Trade, Cambridge: MIT Press.

Marshall, Alfred (1898): Principles of economics, London: Macmillan and Co.

Mayer, Thierry; Mejean, Isabelle; Nefussi, Benjamin (2010): The Location of Domestic and Foreign Production Affiliates by French Multinational Firms. International Monetary Fund Working Paper 10/22.

McFadden, Daniel (1974): Conditional logit analysis of qualitative choice behavior. In: Zarembka, Paul (1974): Frontiers in Econometrics, New York: Academic Press, pp. 105–142.

Medve-Bálint, Gergő (2014): The Role of the EU in Shaping FDI Flows to East Central Europe. In: JCMS: Journal of Common Market Studies, 52(1), pp. 35–51.

Merlevede, Bruno; Purice, Victoria (2015): Distance, time since foreign entry, and productivity spillovers from foreign direct investment. In: Papers in Regional Science**:** Online first.

Mucchielli, Jean-Louis; Yu, Pei (2011): MNC's location choice and agglomeration: a comparison between US and European affiliates in China. In: Asia Pacific Business Review, 17(4), pp. 431–453.

Mukim, Megha; Nunnenkamp, Peter (2010): The Location Choices of Foreign Investors: A District-level Analysis in India. Kiel Working Papers No. 1628.

Pelegrín, Angels; Bolancé, Catalina (2008): Regional Foreign Direct Investment in Manufacturing. Do Agglomeration Economies Matter? In: Regional Studies, 42(4), pp. 505–522.

Pflüger, Michael; Blien, Uwe; Möller, Joachim; Moritz, Michael (2013): Labor Market Effects of Trade and FDI: Recent Advances and Research Gaps. In: Jahrbücher für Nationalökonomie und Statistik, 233(1), pp. 86–116.

Pokorný, Zbyněk (2009): Investment Support in the Czech Republic: Ministry of Industry and Trade of the Czech Republic.

Pusterla, Fazia; Resmini, Laura (2007): Where do foreign firms locate in transition countries? An empirical investigation. In: The Annals of Regional Science, 41(4), pp. 835–856.

Rajdlová, Jana (2003): FDI Location Preferences: Empirical Evidence from the Czech Republic. CERGE-EI Discussion Paper 105. Prague: CERGE-EI.

Resmini, Laura (2004): Economic integration and industry location in transition countries. ZEI working paper, No. B 10-2004.

Resmini, Laura (2000): The determinants of Foreign Direct Investment in the CEECs: New evidence from sectoral patterns. In: Economics of Transition, 8(3), pp. 665–689.

Schäffler, Johannes; Hecht, Veronika; Moritz, Michael (2014): Regional determinants of German FDI in the Czech Republic: evidence from a gravity model approach. IAB-Discussion Paper 3/2014, Nürnberg: Institut für Arbeitsmarkt- und Berufsforschung.

Spilková, Jana (2007): Foreign firms and the perception of regions in the Czech Republic: A statistical examination. In: Tijdschrift voor economische en sociale geografie, 98(2), pp. 260–275.

Appendix

Table A.1
Industry sectors in the Czech Republic (OKEČ classification)

A	Agriculture, hunting and forestry	AB	Agriculture
B	Fisheries and aquaculture		
C	Mining and quarrying	CDE	Manufacturing
D	Manufacturing		
E	Electricity, gas and water		
F	Construction	F	Construction
G	Wholesale and retail trade; repair of motor vehicles and motorcycles; undifferentiated goods- and services-producing activities of household for own use	G	Wholesale and retail trade; repair of motor vehicles and motorcycles; undifferentiated goods- and services-producing activities of household for own use
H	Accommodation and food service activities	H	Accommodation and food service activities
I	Transport, storage and communication	I	Transport, storage and communication
J	Financial and insurance activities	J	Financial and insurance activities
K	Real estate activities; business activities	K	Real estate activities; business activities
L	Public administration and defence; compulsory social security	L	Public administration
M	Education	M	Education
N	Health and social care, veterinary activities	N	Health and social care, veterinary activities
O	Other public, social and personal services	OPQ	Other services and extraterritorial organisations
P	Activities of households		
Q	Activities of extraterritorial organisations and bodies		

Source: Czech Statistical Office; author's own aggregation.

Recently published

No.	Author(s)	Title	Date
4/2015	Osiander, C. Dietz, M.	What could all the money do? Ergebnisse eines faktoriellen Surveys zur Bedeutung von Opportunitätskosten bei Weiterbildungsentscheidungen	1/15
5/2015	Lucht, M. Haas, A.	The productivity effect of migrants: Wage cost advantages and heterogeneous firms	2/15
6/2015	Brenzel, H. Müller, A.	Higher wages or lower expectations? Adjustments of German firms in the hiring process	2/15
7/2015	Vallizadeh, E. Muysken, J. Ziesemer, T.	Offshoring of medium-skill jobs, polarization, and productivity effect: Implications for wages and low-skill unemployment	2/15
8/2015	Busk, H. Jahn, E. J. Singer, C.	Do changes in regulation affect temporary agency workers' job satisfaction?	2/15
9/2015	Eisermann, M. Moritz, M. Stockinger, B.	Multinational resilience or dispensable jobs? German FDI and employment in the Czech Republic around the Great Recession	3/15
10/2015	Walwei, U.	From deregulation to re-regulation: Trend reversal in German labour market institutions and its possible implications	3/15
11/2015	vom Berge, P. Schmillen, A.	Direct and indirect effects of mass layoffs: Evidence from geo-referenced data	3/15
12/2015	Brenzel, H. Reichelt, M.	Job mobility as a new explanation for the immigrant-native wage gap: A longitudinal analysis for the German labor market	3/15
13/2015	Schanne, N.	A Global Vector Autoregression (GVAR) model for regional labour markets and its forecasting performance with leading indicators in Germany	4/15
14/2015	Reichelt, M. Abraham, M.	Occupational and regional mobility as substitutes: A new approach to understanding job changes and wage inequality	4/15
15/2015	Zapf, I.	Individual and workplace-specific determinants of paid and unpaid overtime work in Germany	4/15
16/2015	Horbach, J. Janser, M.	The role of innovation and agglomeration for employment growth in the environmental sector	6/15
17/2015	Dorner, M. Fryges, H. Schopen, K.	Wages in high-tech start-ups – do academic spin-offs pay a wage premium?	6/15
18/2015	Möller, J.	Verheißung oder Bedrohung? Die Arbeitsmarktwirkungen einer vierten industriellen Revolution	6/15

As per: 2015-06-30

For a full list, consult the IAB website
http://www.iab.de/de/publikationen/discussionpaper.aspx

Imprint

IAB-Discussion Paper 19/2015

Editorial address
Institute for Employment Research
of the Federal Employment Agency
Regensburger Str. 104
D-90478 Nuremberg

Editorial staff
Regina Stoll, Jutta Palm-Nowak

Technical completion
Gertrud Steele

Website
http://www.iab.de

Download of this Discussion Paper
http://doku.iab.de/discussionpapers/2015/dp1915.pdf

ISSN 2195-2663

For further inquiries contact the author:

Veronika Hecht
Phone +49.911.179 2373
E-mail veronika.hecht@iab.de