Post-transition regions as locations for foreign direct investment of multinational enterprises

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Abstract

Multinational enterprises invest abroad to tap into location-specific advantages and to enhance their own competitiveness. At the same time, they increase productivity and industrial up-grading in the region of location and can be considered agents of technological and economic development.

The aim of the thesis is to contribute to current research by investigating, which determinants and motives influence foreign investors to locate in European post-transition economies, how they appraise the quality of location factors on-site and under which conditions a knowledge and technology transfer takes place between the foreign owned firm and domestic firms, thereby leading to a better understanding of what is the impact and benefit of foreign investment in these regions.

On the one hand, the results of this thesis suggest that there is still potential for the attraction of further foreign investments into the regions under consideration and for technological interaction and transfer of knowledge between foreign and indigenous enterprises. On the other hand, however, they show, that the Central Eastern European countries are not as detached from the technological development in industrialised economies as traditionally believed. East Germany seems to increasingly attract strategic asset and capability seeking foreign direct investment and benefits from its well equipped labour force and institutional knowledge base, obviously owing to and - at the same time - supporting its advanced position in the process of economic catching-up.

Zusammenfassung

Multinationale Unternehmen investieren im Ausland, um von standortspezifischen Vorteilen zu profitieren und ihre eigene Wettbewebsfähigkeit zu verbesser. Gleichzeitig tragen sie zu einer Steigerung der Produktivität und einem wirtschaftlichen Aufholprozess am auslÃ¤ndischen Standort bei. Sie fungieren in diesem Sinne als Treiber für technologische und wirtschaftliche Entwicklung.

Das Ziel der Dissertation ist es, einen Beitrag zur aktuellen Forschung zu leisten, indem untersucht wird, durch welche Determinanten ausländische Investoren bei der Standortwahl in den europäischen Post-Transformationsregionen beeinflusst werden, welche Motive sie bei ihrer Investition verfolgen, wie sie die Qualität der Standortfaktoren vor Ort beurteilen und unter welchen Bedingungen ein Austausch von Wissen und Technologie zwischen den ausländischen Tochterunternehmen und den Akteuren der einheimischen Wirtschaft stattfindet. Dies soll zu einem besseren Verständnis beitragen, welchen Einfluss und welchen Nutzen ausländische Investitionen für diese Regionen haben.

Auf der einen Seite zeigen die Ergebnisse der Dissertation, dass es weiterhin Potenzial für die Ansiedlung ausländischer Investoren in den Untersuchungsregionen gibt. Die gilt ebenfalls für die technologische Vernetzung und einen Austausch von Wissen und Technologie zwischen ausländischen und einheimischen Unternehmen. Auf der anderen Seite zeigen die Ergebnisse jedoch, dass die mittel- und osteuropäischen LÃ¤nder nicht so abgetrennt von der technologischen Entwicklung der Industriökonomien sind wie weithin angenommen. Ostdeutschland

scheint zunehmend Investitionen anzuziehen, die das (technologische) Potenzial der Region nutzen und profitiert bei der Ansiedlung von ausländische Investoren von seinen gut ausgebildeten Arbeitskräften und seiner institutionellen Wissenslandschaft. Dies ist offensichtlich der Sonderrolle des ostdeutschen Transformationsprozesses geschuldet und treibt diesen Prozess gleichzeitig weiter voran.

Keywords:

Multinational Firms, International Investment, Research and Development, Economic Development, Regional Economic Activity

Schlagwörter:

Multinationale Unternehmen, Internationale Investitionen, Forschung und Entwicklung, Wirtschaftliche Entwicklung, Regionale wirtschaftliche Aktivitäten

JEL Classification:

F 23, F 21, O 12, O 32, R 11

Summary

The transition process from a socialist planned economy to a market economy was a very challenging task for the affected countries, since this process implicated the establishment of a new economic and institutional framework, market liberalization as well as industrial privatization and restructuring. Since the beginning of the transition process, the integration of East Germany and the Central Eastern European countries in the global economy has been significantly influenced by the activities of foreign investors.

Multinational enterprises invest abroad to tap into location-specific advantages and to enhance their own competitiveness. At the same time, they increase productivity and industrial up-grading in the region of location and can be considered agents of technological and economic development. The most important objectives which foreign direct investment can contribute to - in the course of the catching-up process of the European post-transition regions - are the alleviating of capital shortage, the supply of technology and knowledge spillovers, the privatisation process, increasing employment opportunities for local workers, and generating economic competition and new market structures.

The aim of the thesis is to contribute to existing research by investigating, which determinants and motives influence foreign investors to locate in European post-transition economies, how they appraise location factors on-site and under which conditions a knowledge and technology transfer takes place between the foreign

owned firm and domestic firms, thereby leading to a better understanding of what is the benefit of foreign investment in these regions.

Drawing on theoretical assumptions by Dunning and Cantwell, all empirical parts make use of the *IWH FDI Micro database* 2009, a very large and unique database which provides information on multinational enterprises strategic investment motives, their assessment of location factors in the host country, investment decisions, and technological activities within the foreign subsidiaries in East Germany, the Czech Republic, Hungary, Poland, Slovakia, and Romania.

The first empirical part of this thesis (chapter 4) considers the basic investment motives of multinational enterprises in East Germany and the selected Central Eastern European countries. Secondly, the assessment of the quality of location factors in these countries is evaluated. In contrast to previous studies, the analysis of this chapter takes the heterogeneity of multinational enterprises into consideration.

Results from the analysis in East Germany show a shift in the relative importance of investment motives during the course of transition. Since the mid-'90s, multinational enterprises have increasingly attracted investors aiming at economies of scope and technological advantages rather than those focused primarily on cost advantages related to production factors or economies of scale. There seems to be a match between foreign investors seeking access to localized knowledge and technology, who assess the supply of labour on average more highly and rate the potential for technological co-operation with other enterprises significantly better. By and large, this can be interpreted as a technological up-grading of the subsidiaries of MNEs in East Germany.

The analysis of the selected Central Eastern European countries suggests that investors in these countries are mainly interested in low (unit) labour costs coupled with a well-trained and educated workforce and an expanding market with the

high growth rates in the purchasing power of potential buyers. There appears to be a match between investors' expectations and the quantitative supply of unqualified labour, not however for the supply of medium qualified workers. The analysis suggests, however, that it is not technology-seeking investments that are particularly content with the capabilities of their host economies in terms of technological co-operation. Finally, technological co-operation within the local host economy is assessed more favourably with domestic firms than with local scientific institutions.

The focus of the second empirical part of the thesis (chapter 5) is the empirical identification of factors attracting foreign direct investment into post-transition economies. The analysis is designed as benchmark between three neighboring post-communist regions, East Germany, Poland and the Czech Republic which took very different transition paths. Further, it contributes to existing research by focusing the analysis on the regional level, applying a conditional logit estimation approach. It shows that in comparison with Poland and the Czech Republic, East Germany's major benefit is its modern infrastructure and its geographical proximity to West European markets. Furthermore, the results suggest that intra-industry linkages such as specialization and agglomeration economies are very important pull-factors for foreign direct investment.

The aim of the last empirical part of this thesis (chapter 6) is to investigate the determinants of R&D co-operation between multinational enterprises' foreign subsidiaries and enterprises in the region of location in post-transition economies. By means of a logit estimation approach, this chapter analyses, therefore, the firm- and region-specific factors which influence the co-operation behaviour of foreign subsidiaries in East Germany and the selected CEECs. Results suggest that, particularly in the case of the foreign subsidiary's mandate in terms of R&D, its internal

technological embeddedness, its technological capacity and the regional knowledge stock are positively associated with this co-operation.

On the one hand, the results of this thesis suggest that there is still potential for the attraction of further foreign investments into the regions under consideration and for technological interaction and transfer of knowledge between foreign and indigenous enterprises. On the other hand, however, they show, that the Central Eastern European countries are not as detached from the technological development in industrialised economies as traditionally believed. East Germany seems to increasingly attract strategic asset and capability seeking foreign direct investment and benefits from its well equipped labour force and institutional knowledge base, obviously owing to and - at the same time - supporting its advanced position in the process of economic catching-up.

1 Introduction

1.1 Setting the scene

The global economy has changed in three ways since the time of the collapse of communism: First, the information- and communication-technology revolution has made intellectual capital and knowledge intensive services more important for economic growth; second, capital markets have become more liberalized; and third, there is an increasing tendency for enterprises and organizations to form collaborative networks in the production of goods and services. This effected also multinational enterprises' (MNEs') global investment strategies and brought the region of European post-transition economies to come fore as interesting places for foreign direct investment (FDI).

The transition process from a socialist planned economy to a market economy was a very challenging task for the affected countries, since this process implicated the establishment of a new economic and institutional framework, market liberalization as well as industrial privatization and restructuring (Detscher 2006). In comparison to other post-socialist economies, the transition in East Germany followed a very distinct path. Due to the German reunification, East Germany received massive financial transfers from the western part of the country. These transfers and the institutional adoption of a well functioning market economy and democracy supported East Germany's relatively strong and quick modernization process. Nevertheless, East Germany's transition process was still very challenging (Reißig

1997). The infrastructure needed to be improved and a significant share of the transfers was spent on consumption in order to raise the purchasing power and the living standard in East Germany and in order to stop the migration towards West Germany. This development spurred the catching-up process of East Germany's wages, which already reached three-quarters of the West German level by the mid 1990s and have converged to an 80% level today (Blum, Buscher, et al. 2009). On the one hand this development might have slowed East Germany's economic growth and job creation. On the other hand the public investments into e. g. the infrastructure might have been beneficial for East Germany's competitiveness.

Since the beginning of the transition process, the integration of East Germany in the global economy has been significantly influenced by the activities of foreign and West German multinational enterprises with subsidiaries[1] on-site and the regional economic environment (Gentile-Lüdecke and Giroud 2012; Kim and Nelson 2000). During this time, the location factors in East Germany as well as the degree and quality of the international division of labour have changed dramatically. At the beginning of the 1990s, East Germany was regarded as location with several institutional and economic deficits (Beyfuss 1992). At the end of the 1990s, the situation had changed positively and multinational enterprise's investment into East Germany was mainly motivated by the access to the German and West European market and cost advantages related to production factors (Belitz, Brenke, and Fleischer 2000).

The situation was similar in other European transition regions: when communism collapsed, the Central and Eastern European countries (CEECs) were regarded as unattractive locations for FDI. Once the transitional recession was overcome and

1 According the OECD's definition, a foreign subsidiary is defined as a legally independent enterprise with a foreign equity participation of at least 10 per cent and/or an ultimate owner located abroad (OECD 2008).

the economies started on their process of catching-up with West European levels of GDP per capita, the CEECs became prime targets for FDI.

This was spurred not only by mass privatisation of state assets, but also by the expectation that these countries would swiftly integrate their already industrialised and now liberalised economies into the European economic area and hence offer above-average profit rates for foreign investors. The hope was that the CEECs would not only receive capital desperately needed for restructuring industry but also to provide modern western technology. Most of the CEECs adopted foreign direct investment policies based on attracting as much FDI as possible without concern for its quality and to provide total freedom of the activities of foreign investors in their economy (Rugraff 2008). Since the CEECs' capital stock vanished dramatically in the course of the economic crisis of the late 1980s, the transition process had to be accompanied by a vast amount of FDI. Due to the differences in economic transition as explained above, it can be expected that East Germany attracted and still attracts a different kind of FDI than the CEECs.

Further, foreign subsidiaries have an important role to play in the generation and diffusion of new technologies within the MNE (Cantwell 1989; Cantwell 1995). Technological activities of the majority of MNEs are still concentrated in their home countries. There is evidence, however, that important strategic activities such as research and development (R&D) are increasingly organized in geographically dispersed centres and in open networks in domestic or foreign locations (Narula and Guimón 2010; Patel and Vega 1999; Le Bas and Sierra 2002; Narula and Zanfei 2005). This allows MNEs to tap into location-specific advantages and to enhance their competitiveness (D'Agostino and Santangelo 2012; Dunning 1977). Owing to this development, foreign knowledge bases become more and more important to

MNEs as sources of knowledge and technology (Meyer, Mudambi, and Narula 2011).

At the same time, this increases productivity and industrial up-grading in the region of location, where foreign subsidiaries can be considered agents of technological and economic development because they usually perform better with respect to technological activities than local firms (Guenther and Gebhardt 2005). Technology transfer from developed to developing economies is based on technological linkages between the foreign subsidiary.

Thus, in summary, the most important objectives which FDI can contribute to - in the course of the catching-up process of the European post-transition regions - are the alleviating of capital shortage, the supply of technology and knowledge spillovers, the privatisation process, increasing employment opportunities for local workers, and generating economic competition and new market structures (Welfens and Borbély 2009; Stephan 2003; Stephan 2013).[2]

This leads us to the overarching research questions of the following thesis:

1. **Which firm- and region-specific determinants influence multinational enterprise's location in the European post-transition regions?**
2. **Under which conditions does a knowledge transfer between the foreign subsidiary and the host economy take place in post-transition economies?**
3. **What effect did the foreign investments have on the prospect of catching-up in these regions?**

Of course, this work remains unable to answer these questions in an all-embracing and conclusive way, and yet it attempts to contribute some important insights that help to generate answers.

2 Even though the post-transition phase is no longer characterized by institutional change, there are still functional weaknesses and economic differences which arise directly from the former political and economic system and the transition period itself (*Transition Report* 2009).

The thesis includes information on foreign subsidiaries in Hungary, Poland, Romania, Slovakia, the Czech Republic and East Germany. These countries were chosen with the purpose of covering a sample of countries which reflects different socio-political and economic stages in the transition process. Hungary and Poland are large countries where economic convergence is fairly advanced and which have been moderately successful in attracting and embedding value-adding FDI. The Czech Republic and Slovakia are smaller countries at a similar stage in the transition process, while Romania is a country which is still in transition; as mentioned above, East Germany is a particular case because of the massive financial support it received from the western part of the country after reunification (Gauselmann and Marek 2012; Narula and Guimón 2010; Filippov and Duysters 2011).

1.2 Structure of the thesis and research questions

The thesis is structured as follows:

Starting with this brief introduction (chapter 1), the thesis gives a short overview of the general theoretical framework (chapter 2) on the classification of investment motives by Dunning and Cantwell's technological accumulation approach to explain firms' internationalisation. It then shortly introduces the *IWH FDI Micro database* in chapter 3. Both, the mentioned theoretical considerations as well as the data set are applied as basis for the analyses throughout the thesis.

In chapter 4, the thesis focuses on the strategic motives of foreign investors in East Germany and the selected CEECs and their assessment of the quality of location factors on-site accounting for the multinational enterprises' heterogeneity. During the observation period, the selected countries transformed from centrally planned economies with rather low levels of economic development to fully functional

market economies, integrated in the European common market, and with high growth rates and the analysis investigates whether the evolution of investment motives over time reflects this catching-up process. This chapter raises four research questions:

- Which strategic investment motives are important for foreign investors' decision to invest in European post-transition economies?
- Did the importance of these strategic motives change over time?
- How do foreign investors assess the quality of the location factors on-site?
- Is there a match between the foreign investors' strategic entry motivation and the assessment of the quality of corresponding location factors?

In chapter 5, this thesis compares the determinants of location choice for FDI in East Germany with those in two selected neighboring countries, Poland and the Czech Republic, in order to identify differences in the transition process. The aim of this chapter is the empirical identification of regional factors attracting FDI and to discuss their implications. Again, the heterogeneity of the enterprises as well as the regions' endowment with specific location factors are regarded as highly significant for foreign investors' location decisions. This chapter raises the following research questions:

- Which region-specific location factors influence foreign investment in European post-transition economies?
- Do these regional determinants differ depending on the country's level of transition?
- How important are agglomeration economies and efficiency-related determinants for the location choice of foreign investors in post-transition economies?

In chapter 6, the thesis investigates the determinants of R&D co-operation between the foreign subsidiaries of MNEs and domestic enterprises in the region of location, thereby leading to a better understanding of which firm- and region-specific factors influence this co-operative behavior. Traditionally, research into the technological activities of the foreign subsidiaries of MNEs has concentrated on advanced economies. However, the institutional and economic changes in East Germany and Central Eastern Europe (CEE) call for an investigation of the patterns in multinational enterprises' technological co-operative behavior in this particular region. This chapter offers an analysis of 1,245 foreign subsidiaries based in East Germany and Poland, Hungary, the Czech Republic, Slovakia, Romania.

The chapter's research questions are:

- Does a knowledge and technology transfer take place between the foreign subsidiaries and the domestic economy in post-transition economies?
- Which firm- and region-specific determinants influence technological linkages between foreign subsidiaries and the host economy in post-transition economies?
- Is the probability for R&D co-operation higher if both, the region and the foreign subsidiary, are endowed with a high capacity to absorb and pass knowledge and technology?

Chapter 7 summarises the main results of the thesis answering the research questions and pointing out the this thesis' contribution to existing research.

The Appendix contains further tables to the empirical parts of the thesis, a note on the representativeness of the 2009 survey of the *IWH FDI Micro database* and its

questionnaire for East Germany. [3] Furthermore, a list of all abbreviations is added at the end of the appendix.

Throughout the last twenty years, international trade and FDI have been among the fastest growing economic activities in the world economy. Owing to advantages related to technological diffusion and spillover effects as well as market potential effects, a host country's (or region's) economic development benefits from the evolution of FDI (Mitze, Alecke, and Untiedt 2008). However, the potential developmental role that inward FDI can play in any nation or region depends considerably on the amount of investment into the particular economy (Stephan 2013). Thus, the following section gives a short overview of the impact of FDI in the CEE region and East Germany.

3 The questionnaire of the *IWH FDI Micro database* 2009 for the selected CEECs differs slightly from that for East Germany and is available at http://www.iwh-halle.de/projects/2010/FDI/e/DatenundMethoden.asp.

1.3 Empirical evidence of inward FDI

The data in the following section may give insights into the role of FDI and its impact on the catching-up process in the selected economies.

1.3.1 FDI into CEECs

As can be appraised in figure 1.1, FDI inflow per capita into the CEE region has been increasing until the mid 2000s in most countries, especially in Estonia, the Czech Republic and Bulgaria. It seems, however, that the financial crises has effected and diminished these foreign inflows (in some cases with some time lag) in all countries. In most countries, the data shows a rebound in terms of FDI inflows per capita in 2010, however.[4]

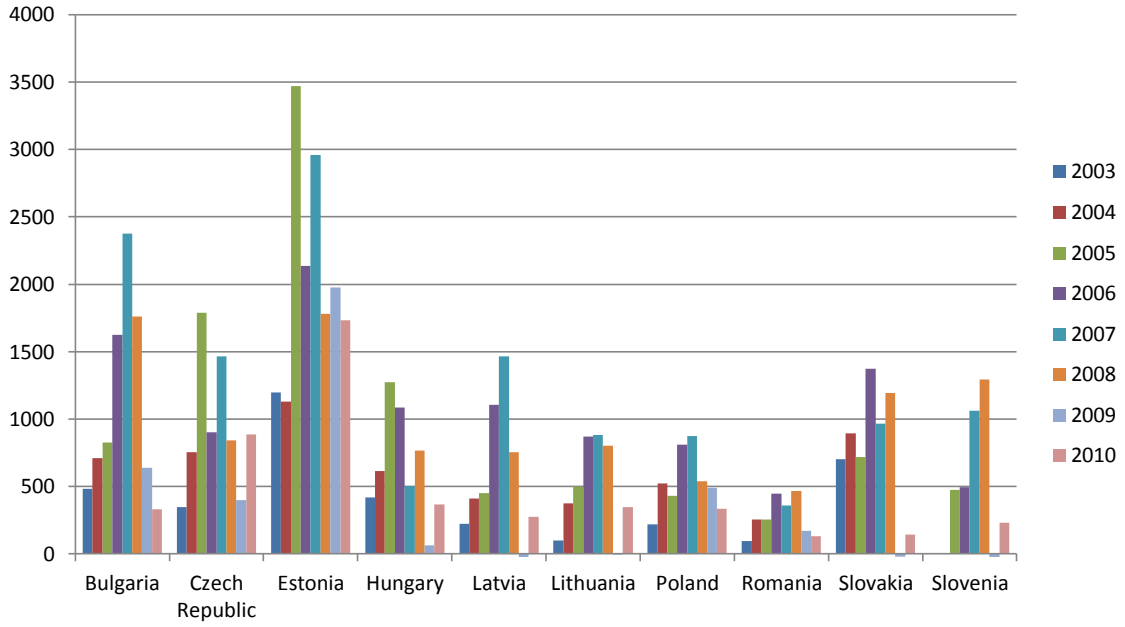


Figure 1.1: FDI inflow in million € per capita, for each year 2003-2010 into the CEECs
Own calculations; Source: wiiw Database on Foreign Direct Investment 2012.

4 Data on FDI inflow into Romania is not available.

When regarding inward FDI stock between 2003 and 2010 in the CEECs, the data in figure 1.2 shows that inward FDI stock per capita is especially high in the Czech Republic, Estonia, Slovakia, and Hungary and has been raising in all CEE-10 countries in the last ten years. Further it is clear that there is still enormous potential for the CEECs to attract inward FDI, especially in Poland and Romania, Latvia, and Lithunia where FDI stock per capita is still rather low. These results reveal that the individual CEECs are very heterogeneous within their economic and institutional transition, even in cases where a geographical or cultural proximity suggests similar development paths (see e. g. the Baltic states).

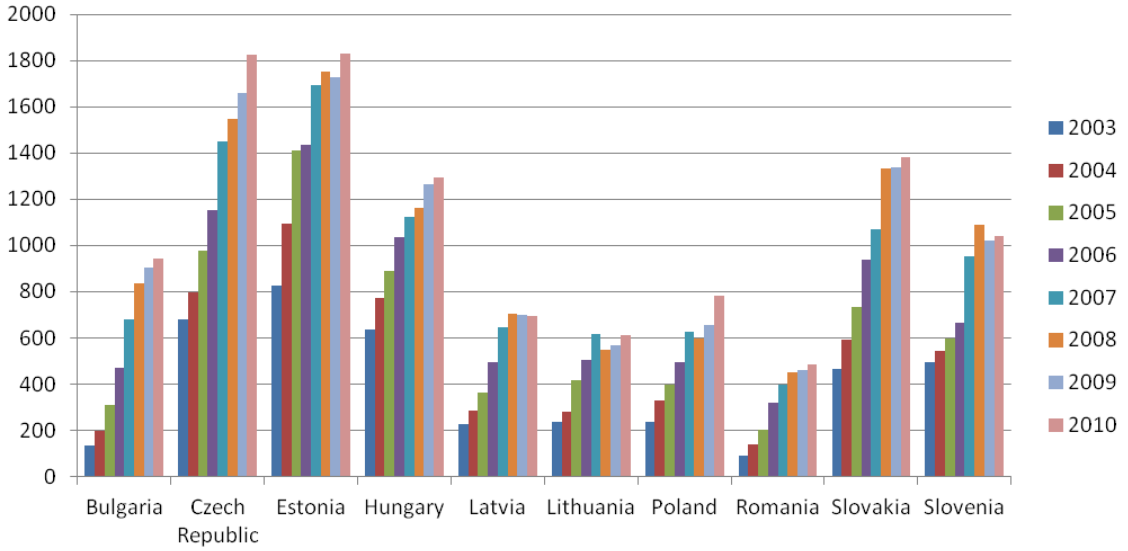


Figure 1.2: Inward FDI stock in million € per capita, for each year 2003-2010 into the CEECs
Own calculations; Source: wiiw Database on Foreign Direct Investment 2012.

Figure 1.3 on the sectoral distribution of inward FDI stock in the CEECs, shows that it is especially the manufacturing sector and services like financial intermediation and real estate activities that are foreign owned. These figures reflect the privatisation process, which has been supported by political programmes and benefits from the industrial history within these countries. They also mirror the worldwide increasing FDI into the service sector. A further splitting of the manufacturing

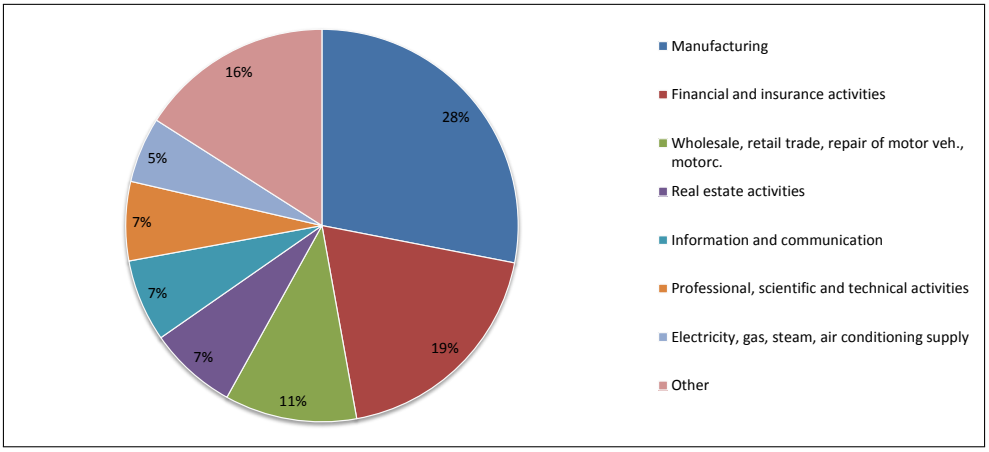


Figure 1.3: Sectoral distribution of FDI stock (by NACE) in the CEECs in 2010
Own calculations; Source: wiiw Database on Foreign Direct Investment 2012.

sector (NACE 2 digit), shows, that mainly the production of transport equipment (27%) and electrical and optical equipment (12%) in the Czech Republic is foreign owned (or financed), in Hungary mainly the production of transport equipment (20%) and electrical and optical equipment (17%), and in Poland mainly the production of food products, beverages and tobacco (19%) and transport equipment (16%). In Romania FDI stock is highest in the sector of basic metals and fabricated metal products (25%) and coke, refined petrol, chemical, rubber, and plastic (14%) and while it is highest in the sector of transport equipment (23%) and basic metals and fabricated metal products (17%) in Slovakia.[5]

A distribution of the countries of origin of foreign investors of FDI in the CEECs reveals that most investment is undertaken by West European investors (from Germany and France, but to a very large extent even small West European countries like the Netherlands, Austria, and Luxembourg) and the United States (see figure 1.4).

In contrast to the rather volatile emerging BRICS economies, the CEE transition regions have proven to be relatively safe places for FDI due to EU-

5 Own calculations; Source: wiiw Database on Foreign Direct Investment 2008/2009.

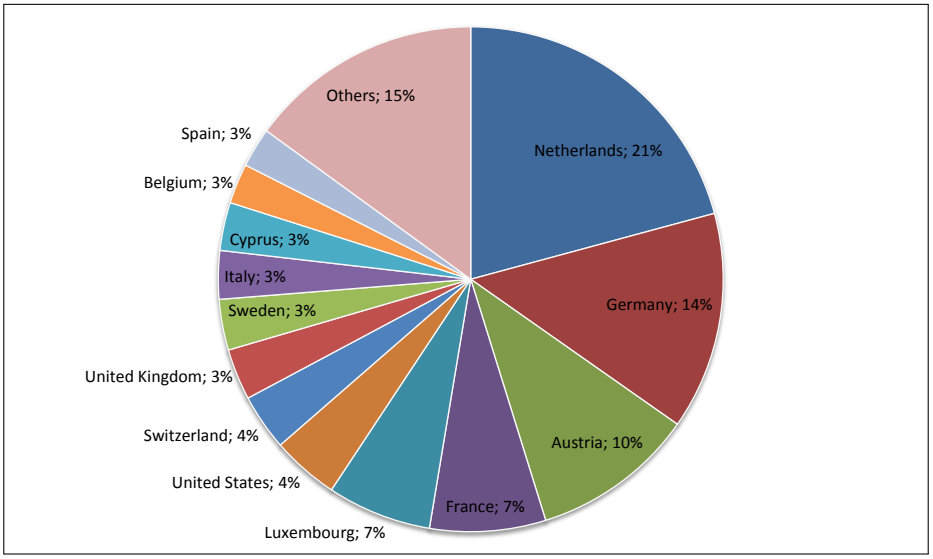


Figure 1.4: Distribution of countries of origin of FDI stock in the CEECs in 2010
Own calculations; Source: wiiw Database on Foreign Direct Investment 2012

membership, global political and societal restructuring (Filippov and Duysters 2011).

1.3.2 FDI into East Germany

Owing to the fact that data on Germany is mainly available on the national level, information on FDI into East Germany is very restricted.

Guenther and Gebhardt (2005) hold, that according to official data, FDI in East Germany started from a very low level in 1991 (655 million € FDI stock) and increased to 9,425 million € 2001. By the end of 2001, nearly 80% of FDI in East Germany had been invested into the manufacturing sector (especially the chemical industry, but also pharmaceuticals, electricity and metal products[6]). Thus, foreign investors play a crucial role in East Germany's economic development, as show the following calculations by Guenther and Gebhardt (2005) (see tables 1.1, 1.2 and 1.3).

6 Own calculations; Source: MARKUS database 2002.

Table 1.1: Proportion of foreign, West German, and East German enterprises, distinguished by number of firms, employment, sales, and investments in East Germany, 2001 (in %)

	Number of firms	Employment	Sales	Investments
Foreign enterprises	1.6	9.7	14.7	10.0
West German enterprises	15.0	37.8	50.2	54.5
East German enterprises	80.4	47.5	30.2	31.9

Note: Other enterprises are majority public-owned, have no majority owner or an unknowen majority owner (missing % to 100 %).

Source: Guenther and Gebhardt (2005).

Table 1.1 illustrates the influence, that foreign and West German investors have on the East German economy: A rather small number of foreign enterprises accounts for an above average part of employment, sales and investments in East Germany. This is true for West German investors, too, and even to a greater extent.

Hence, external investors play a crucial role for the transition process not only in the CEECs, but also in East Germany. The number of employees has been increasing over years (1998-2003) in external enterprises, while it has been stable

Table 1.2: Average size of foreign, West German, and East German enterprises (number of employees)

	1998	2001	2003
Foreign enterprises	115	123	137
West German enterprises	47	52	57
East German enterprises	11	12	12

Source: Guenther and Gebhardt (2005).

Table 1.3: Foreign, West German, and East German enterprises, distinguished by low-, medium-, and high-tech, 2001 (in %)

	Low-tech[a]	Medium-tech[b]	High-tech[c]
External investors	34.6	25.0	40.4
East German enterprises	43.3	35.7	21

[a] Low-tech: Food, beverages, tabacco; textiles, textiles products, leather; paper, publishing, printing; wood, wood products; nonmetallic products, Recycling. [b] Medium-tech: Rubber, plastic products; basic metal; fabricated metal products; furniture, manufacturing not elsewehere classified. [c] High-tech: Chemicals, chemical products; machinery, equipment; motor vehicles; other vehicles; electrical equipment; optical equipment.
Source: Guenther and Gebhardt (2005).

in East German enterprises (see table 1.2). As presented in table 1.3 the percentage of external investors belonging to the high-tech sector is about double of the percentage of East German enterprises belong to the high-tech sector. However, 43.3% of the latter belong to the low-tech sector.

Further, Mitze, Alecke, and Untiedt (2008) interpret data from the Statistisches Bundesamt (2007) and the Deutsche Bundesbank (2007) and find that the amount of FDI stock as well as FDI intensity in East Germany is still far below the West German level and has even decreased (relatively to the West) in the time period 2000-2005 in comparison to the former period (1993-1999).

Due to data deficiencies of FDI via official statistics, this section cannot serve with more up-to-date or more differentiated information with regard to inward FDI in East Germany.

2 General theoretical framework

This chapter gives a short overview on the theoretical considerations of firms' internationalisation. It introduces John Dunning's classification of investment motives (market seekers, efficiency seekers, strategic asset/capability seekers, and natural resource seekers) and the technological accumulation theory as developed by John Cantwell, focusing on his considerations of MNEs' location choice and technological co-operation. Cantwell suggests that an enterprise's internationalisation is initiated by the constant search for knowledge and technology in order to increase the MNE's growth and benefit.

2.1 First explanations of MNEs and MNEs' activity

There have been many different theoretic concepts to shed light on the internationalisation of firms. These theoretic considerations have changed fundamentally throughout the last 20 years, which have been characterised by an increase of the importance of knowledge-related assets within the firm and where even downstream activities have become more knowledge-intensive (Dunning 2009; Moreira 2009).

The first theory on FDI leaving behind international trade and capital movements as context of international production was presented by Stephen Hymer (Hymer 1976). The main statement of his considerations are (1) the concept of control: the firm decides on FDI (instead of other forms of internationalisation like licensing

and export) because they want to control their firm activities abroad and (2) market imperfections and the related market power which exist due to competitive advantages, so called **monopolistic advantages**, of the firm and which make it possible for the firm to overcome market entry barriers (Dunning and Lundan 2008; Kutschker and Schmid 2005). However, firms might also look for other than already existing monopolistic advantages, e. g. advantages connected to local location factors abroad.

Raymond Vernon dealt with similar questions on the reasons and motivations for firms' internationalisation focusing on the product of the firm instead of the firm itself (Kutschker and Schmid 2005). Vernon refers to **the product life cycle** and applies its basic assumptions to the international context. In his conception, a new product implicates a monopolistic advantage for the firm, which it first exploits in the domestic and then in a foreign market. Thus, he distinguished three stages to internationalisation, the first being the new product, the second being the mature product and the last being the standardised product. As the product follows these steps over time, the location of production changes to different geographic locations (usually from developed to developing countries (Kutschker and Schmid 2005; Ietto-Gillies 2005)). Even though the dynamic character of Vernon's approach was appreciated at the time, it is questionable, whether these chronologically steps actually reflect a strongly diversified MNE's course of internationalisation today.

The **internationalisation theory** as developed by Buckley and Casson (1976), McManus (1972), Rugman (1961), Teece (1977) and others focuses on the conditions under which firms internalise certain activities. The internationalisation approaches of internalization apply theoretic considerations of transaction cost theory to international firm activities. Thus the starting point of this approach is the assumption of market imperfections concerning transaction costs. Sup-

porter of the internationalisation theory explain internationalisation of the firm with cross-border transactions, which the firm can either face on the market or internalise through FDI. The firm decides on FDI (instead of exporting or licensing to the foreign market) if these transactions can be realised within the firm at a lower price than outside the firm or if these transactions cannot be realised due to market imperfections outside the firm at all (Kutschker and Schmid 2005).

While the theoretic considerations on monopolistic advantages explain how firms can profit from market imperfections, internationalisation approaches explain how firms can overcome these market imperfections. These first theoretical frameworks have led to deeper considerations on internationalisation of production.

2.2 John Dunnings classification of MNEs' investment motives and the eclectic paradigm

John Dunning (Dunning 1973) introduced an approach which explains firms' internationalisation in a more comprehensive way. He refers to the theoretical consideration of the monopolistic advantages and on the internalisation theory and develops his own approach where he considers the whole range of MNE foreign activities: FDI, exports and licensing. To explain FDI, Dunning and Lundan (2008) discuss the **motives for internationalisation** differentiating between four main types of MNEs. They are

1. **market seekers** which decide for FDI to supply goods or services to foreign markets - either to protect already established markets, or to benefit from new markets. Apart from the foreign markets' capacities, the MNE of this

group may have four different motives for internationalisation. Some MNEs follow their customers or suppliers which have headed for new markets. Other reasons for market-seeking investments is the need to adapt the local demand and the reduction of production and transaction costs of a local subsidiary. And last, a reason for market-seeking can be the 'follow the leader' kind of investment where the MNE finds it necessary to be physically present in the international markets served by its competitors.

2. **efficiency seekers**, which decide for FDI to benefit from economies of scale and economies of scope as well as from risk diversification. The aim of efficiency-seeking FDI is to exploit locational advantages in the host country such as factor endowments, institutional or economic regulations, demand patterns, and market structures. Here, some of the efficiency-seeking MNEs - usually those from developed countries investing in less developed countries - benefit from the availability and low costs of traditional factor endowments in foreign locations. Other efficiency-seeking MNEs invest in foreign locations with similar market structures and wage level. These latter aim at advantages related to economies of scale and economies of scope, or related to differences in consumer tastes and supply capabilities.

3. **strategic asset seekers or capability seekers** which decide for FDI to improve their competitiveness usually by adapting the assets and capabilities of local enterprises. The aim for strategic-asset-seeking FDI is related to the adoption of knowledge and capabilities of the host country's work force.

4. **natural resource seekers** which decide for FDI to get access to certain resources of a higher quality at lower costs than on the domestic market. This group includes mainly those MNEs that seek physical resources of some kind (e. g. mineral fuels, metals, agriculture products).

He points out, however, that most (larger) MNEs pursuit more than one of the cited investment strategies at the same time and that they cannot always be easily separated (Dunning and Lundan 2008).

To further explain the conditions of foreign firms' market entry decisions, Dunning devices four requirements on which the level and structure of a firm's internationalisation depends. In this context he distinguishes three categories of advantages which have their origin in former theoretical considerations. These categories of advantages are (1) ownership advantages, (2) internalisation advantages and (3) location advantages (Dunning and Lundan 2008; Kutschker and Schmid 2005) and can be characterised as (Dunning and Lundan 2008; Dunning 1981; Dunning 1985):

1. **Ownership-specific advantages (O) of an enterprise over those of other enterprises** which include property rights and/or intangible asset advantages (e. g. innovations, management and organisation structures, knowledge, experience and ability to reduce transaction costs), advantages of common governance (e. g. advantages resulting from economies of scope and specialisation, better access to inputs or specialisation because of multinationality like global sourcing of inputs, exploitation of geographic, economic, and institutional differences) or institutional assets (e. g. the corporate culture and intern structure within the firm).

2. **Location-specific factors (L) concerning home or host country** which refer to geographical differences in the distribution of resources and markets, costs for cross-border transport and communication, investment incentives, infrastructure, agglomeration and spillover effects, institutional and governmental characteristics etc.

3. **Internalisation advantages (I) in order to avoid or benefit from market failure** to handle all sorts of costs (e. g. search and negotiating costs, costs

of moral hazard and adverse selection), reduce uncertainties (e. g. related to the quality of inputs) and supervise or avoid control mechanisms (e. g. product quality, governmental interventions, supplies and conditions of sale of inputs).

Following Dunning and Lundan (2008) these OLI advantages explain a national enterprise's decision for FDI. The theoretical considerations of Dunning's eclectic paradigm suggest that FDI will be realised (instead of exports or licensing) if an enterprise can benefit from all three kinds of advantages. In other words: If it can benefit from ownership advantages and internalisation advantages and if the foreign investment site offers advantages in terms of some kind of locational factors. Even though Dunning recognises that the OLI advantages can change over time, the eclectic paradigm - like most other former theoretic approaches - must be interpreted not as a dynamic but as a rather static concept.

2.3 An evolutionary concept to explaining MNEs' activity: John Cantwell's technological accumulation approach

It is the **competence-based theory of the firm**, which builds on Penrose's (Penrose 1959) resource-based view of the firm, that takes into account the dynamic generation of capabilities and competences within the firm. According to the competence-based view of the firm, these capabilities or competences evolve through internal learning processes as dynamic or evolutionary experimentation (Cantwell and Piscitello 2000; Nelson and Winter 1982; Wernerfeld 1984). The firm's competences and capabilities are central in this theoretic approach (Cantwell and Piscitello 2000).

Within this line of thought it is essential for the exploitation and consolidation of the firm's competences to extend into new fields of production and technology and to spread them across various geographic locations. Thus, this approach focuses on the question of how a firm establishes and exploits a wide-ranging network for the creation of these new competences.

Cantwell's **technological accumulation approach** towards firm's internationalisation refers to the dynamic and evolutionary focus of the competence-based view of the firm. The main idea of Cantwell's theoretic approach (Cantwell 1989) is that the firm's growth is conditioned by a process of constant technological adjustment and refinements (Dunning and Lundan 2008). Thus, the technological accumulation approach sets out to explain the growth of the multinational firm and not its existence. It suggests that the process of technological renewal and the dynamic process of achieving it is to some degree unique and peculiar for each single firm.

Following Cantwell (Cantwell 1989; Cantwell 1995; Cantwell 2000), the accumulation of technology implies cumulative advantage and it is the aquisition of new skills, competences and technological capabilites that is essential for the firm to maintain and increase profits.

2.3.1 MNEs' location choice

In the 1970s the focus of theory had been on the firm level of internationalisation and not so much on the location of investment. This changed, however, in the 1990s when the importance of the foreign location as dominant consideration re-emerged due to major changes in the economic environment such as the increasing importance of knowledge as key element of growth, as well as an better access to global communication and transportation (Cantwell 2009).

In this context, firms' internationalisation into particular locations and regions and the relevance of geographical proximity have emerged as central issues of theoretic considerations (Cantwell and Piscitello 2004). Starting from Krugman's (Krugman 1991) assumption that growth can essentially be achieved by benefiting from regional economic agglomeration and specialisation, various approaches have discussed the importance of location choice on global competitiveness yet applying an evolutionary perspective on economic geography (e. g. Boschma and Lambooy 1999, Essletzbichler and Rigby 2010 and Boschma and Martin 2010).

As discussed above, the theory on MNEs had traditionally argued that technological development is an ex-ante advantage that allows firms to internationalise (Dunning 1988), while Cantwell and others see the firm's possibility to develop new technological competencies in internationally dispersed locations (Cantwell 1995; Kuemmerle 1997).

Thus, following Cantwell and Mudambi (2005) (see also Dunning 1996; Dunning and Narula 1995; Dunning 1995; Patel and Vega 1999 and Kuemmerle 1999b) there are two categories of MNEs:

- Those that pursue **competence-exploiting activities** in the sense that they extend and adapt already existing competences developed by the headquarter or other enterprise units to the foreign market.
- And those that have recently gained importance and pursue **competence-creating activities** in the sense that augment the competences of their headquarter or enterprise group.

In this line of thought a firm's investment abroad is no longer only a mean for the exploitation of internal ownership advantages as to serve the foreign market (Hymer 1976; Vernon 1966; Buckley and Casson 1976), but additionally a

mean for the augmentation of the firm's competitive advantage (Cantwell and Piscitello 2004; Frost 2001; Kuemmerle 1999b). Foreign subsidiaries which were in the past mainly established to serve the local market have been increasingly integrated into international networks within the MNE and have been increasingly established in geographically dispersed locations (Cantwell 2009; Jindra 2011).

Cantwell and Piscitello (2000) argue, that the MNEs benefit from dynamic economies of scope that derive from complementarity in foreign locations. International expansion of production implicates the adaption of a firm's goods and technology to the host market but on the other hand also feeds back in terms of knowledge and technology to the MNE as a whole (Cantwell 1989; Cantwell and Iammarino 2002; Jindra 2011). According to Cantwell's considerations (Cantwell 1989; Cantwell 1995) firm internationalisation is location-specific as well as firm-specific. Furthermore, successful MNEs tend to invest in several sub-national locations where they transfer knowledge and technology to the local economy and where they, at the same time, benefit of the specific and complementary on-site location factors.

As a result, agglomeration economies develop and further strengthen the host location as well as the ownership advantage within the MNE (Cantwell and Iammarino 2001; Cantwell and Iammarino 2003). It is worthwhile to point out that the location's endowment with capabilities is not only considered a pull factor for the internationalisation of technological activities but also for production within Cantwell's considerations. Thus, the location choice of MNEs is supposed to be influenced by different kinds of agglomeration economies at the sub-national level of the host location.

2.3.2 MNEs' technological networks

As discussed above, Cantwell suggests that a firm needs to internationalise its capabilities in new fields of technology and production in order to achieve technological consolidation and development (e. g. Cantwell and Iammarino 2002). The importance of the 'regional dimension' of an innovation system has emerged from considerations by Kline and Rosenberg (1986), which considers the firm's external knowledge sources. These knowledge linkages between firms and suppliers, customers, research institutions and/or the institutional environment are essentially influenced by geographical proximity (Lundvall 1988; Hippel 1989).

According to Cantwell and Iammarino (2002) the development of local and regional technological activities can be related to

1. the access to external sources of knowledge in a geographically close environment
2. the possibility of informal channels for knowledge diffusion (so called tacit knowledge) which again calls for geographical proximity
3. the technological capability of the region of investment.

An important factor for a firm's internationalisation of technological activities is the foreign location's knowledge base and the foreign location's technological endowment. Both are related to each other and enable the MNE to establish and exploit external sources of knowledge and technology. The traditional advantages of the centralisation of technological activities at the headquarter is thus increasingly offset by those associated with geographical dispersion (Cantwell and Iammarino 2002).

Hence, MNEs internationalise in order to establish technological linkages with foreign production, indigenous markets, suppliers, customers and non-market institutions and to exploit the host country's technological knowledge and competencies. Tapping into local knowledge, the MNE gains a comparative advantage which - as already mentioned above - can be exploited by the subsidiary itself or transferred back to the headquarter (or both) and enhances the enterprise's global technological expertise (Cantwell 1989; Cantwell and Iammarino 2002). These theoretical considerations are basis for the empirical analyses throughout the thesis.

3 The *IWH FDI Micro database*

This chapter gives a short overview on general micro data availability in the selected countries, and then introduces the basic population, the survey sampling and implementation, the survey representativeness and the survey questionnaire of the IWH FDI Micro database 2009. The empirical parts of this thesis are all based on this data set.

3.1 Micro data availability

Traditionally research on FDI location by MNEs uses bi-lateral country level aggregate data on FDI flows.[7] Empirical studies on FDI spillover effects based on a production function approach by and large employ aggregate industry-level data on FDI stocks in combination with inter-sectoral linkage coefficients derived from national-level input-output tables. However, recent theoretical advances require micro data sets at the enterprise level in order to take account of firm heterogeneity.

In the case of Germany, the Micro database Direct Investment (Mikrodatenbank Direktinvestitionen, MiDi) maintained by the Bundesbank could serve as a potential initial choice. Enterprises with direct investment report their international capital links if their balance sheet total exceeds 3 million € (Lipponer 2009). However, the registration of companies only above a certain threshold introduces a bias

7 This chapter has been published in a similar expression as Guenther, Gauselmann, et al. (2011).

towards large enterprises (Plueger, Blien, et al. 2010). In addition, the consolidation procedure of different units at the level of the German regional headquarter creates an unknown degree of distortion in terms of regional disaggregation (Arndt 2009; Becker, Egger, and Merlo 2009). As a result of size bias as well as the distorted regional disaggregation, the number and volume of foreign investment is underestimated for regions in East Germany (Guenther 2005; Votteler 2001). By nature, the MiDi only contains information on foreign participation. However, West German investment played a crucial role in the transition process in East Germany (Haas 1996; Guenther 2005).

An alternative choice for micro data is the Establishment Panel of the Institute for Employment Research (IAB). The panel also provides information on majority ownership (foreign, West German, East German, public). The IAB Establishment Panel is a possible micro data source for any research that looks at host country effects of foreign and West German owned affiliates that requires a control group of East German owned enterprises. However, ownership is not a criterion for survey stratification. Thus, it is not possible to tell whether the survey data is representative for the sub-group of foreign-owned or West German-owned enterprises in East Germany. In addition, caution is required with regard to regional disaggregation of the survey data, which in the best case would be possible at the NUTS-1 level ('Bundesländer'). Thus, more regionally fine grained analysis on the effects of location choice requires an alternative micro data set that could serve as a source of information that draws from total population enterprises.

The micro data availability is similarly limited for most post-transition economies in CEE. The Vienna Institute for International Economic Studies (wiiw) publishes the wiiw Database on Foreign Direct Investment in Central, East and Southeast Europe (see chapter 1, section 3). However, this database contains only aggregate data on FDI flows for 18 CEE countries.

3.2 *IWH FDI Micro database*

Given the constraints described above on the availability of enterprise-level data for East Germany and other selected post-transition economies, the IWH opted for a novel collection of primary data. The *IWH FDI Micro database* provides a total population drawn from the MARKUS data base, in the case of East Germany, and from the AMADEUS database in the case of the selected post-transition economies in CEE. Both commercial data sets are compatible and allow for a uniform identification of the population through complex ownership information. This serves as a basis for an annual survey in East Germany and a bi-annual survey in selected CEE economies. After a pilot survey in 2002, the project was fully launched in 2007 as part of a Strategic Targeted Research Project 'Understanding the relationship between knowledge and competitiveness within the enlarging EU – Uknow' (2006-2009) financed by the 6th EU Framework Programme (see table 3.1 for an overview).

Table 3.1: Overview of the *IWH FDI Micro database*

	2002	2007	2008	2009	2010	2011	2012
Countries	Estonia Hungary Poland Slovakia Slovenia	East Germany Romania Croatia Poland Slovenia	East Germany	East Germany Romania Slovakia Czech Republic Hungary Poland	East Germany	East Germany Romania Slovakia Czech Republic Hungary Poland	East Germany
Industries	Manufacturing	Manufacturing	Manufacturing, Other selected Services	Manufacturing, Other selected Services	Manufacturing, Other selected Services	Manufacturing, Other selected Services	Manufacturing, Other selected Services
Type of FDI	Inward FDI	Inward FDI	Inward FDI Outward FDI	Inward FDI Outward FDI	Inward FDI Outward FDI	Inward FDI Outward FDI	Inward FDI Outward FDI
Thematic Focus	Technological Upgrading	Technology Transfer and Spillovers	Performance Expectations	Investment motives and location factors	Performance Expectations	Linkages of Production and Technologies	Performance Expectations Innovation

Source: IWH.

In 2007 the survey was implemented in Slovenia, Croatia, Poland, Romania and East Germany. In 2009 the countries selected were Hungary, Czech Republic, Poland, Romania, Slovakia, and East Germany. This country set-up will remain fixed for all subsequent bi-annual surveys. In 2007 the survey covered only manufacturing industries (NACE Rev.1: 15-37). Since 2008 this has been extended to include mining and quarrying (NACE Rev.1: 10-14), electricity, gas, steam and hot water supply (NACE Rev.1: 40-45), wholesale (NACE Rev.1: 51), transport and financial services (NACE Rev.1: 60-67), computer, R&D and other business related services (NACE Rev.1: 72-74), as well as sewage and waste disposal, media, and other services (NACE Rev.1: 90-93). This sectoral selection will remain fixed for all subsequent surveys. Until 2007 the survey covered only inward FDI. Since 2008, this survey has been extended to also include enterprises with outward FDI. Since 2009 the bi-annual survey has been implemented centrally by one provider for the CEECs. Each survey has a standard set of questions on shareholder structure as well as technological capabilities. The survey implemented in even years (2008, 2010, 2012) only in East Germany has a set of questions on expectations for future employment, turnover, exports, and investment. Each bi-annual survey (2007, 2009, 2011) has a particular special thematic focus. The survey data can be used for cross-sectional analysis. Data from the population has a longitudinal dimension. The information provided below on basic population, survey implementation, and representativeness relates to the 2009 survey of the *IWH FDI Micro database*, which will be applied on the analyses of this thesis.

3.2.1 The basic population

The population for East Germany is drawn from the MARKUS database provided by the Verband der Vereine Creditreform e.V. The information in the MARKUS database is drawn from public indexes, balance sheets, annual reports, the daily

press and surveys. MARKUS contains about 1.1 million German enterprises. According to the Verband der Vereine Creditreform e.V., 97% of all commercially registered and economically active German companies are listed in the database. For Germany, these figures seem to be reliable, since any commercial entity is obligated to register with its local chamber of commerce. The MARKUS database contains enterprise-level information such as name, legal form, date of registration, sector, address, ownership, balance sheet and financial information. The MARKUS database also forms the basis for the population underlying other established micro data sets such as the Mannheimer Innovation Panel (Harhoff and Licht 1993) or the KFW/ZEW Start-up Panel (Fryges, Gottschalk, and Kohn 2010) are both operated by Centre of European Economic Research (ZEW).

For the CEECs the firm population is drawn from the AMADEUS database provided by Bureau van Dijk (BvD). In total AMADEUS contains data on 14 million European enterprises and covers 10 transition economies. Of those, data for Hungary, Czech Republic, Poland, Romania and Slovakia were selected. This data is fully compatible with the information drawn from the MARKUS database. In fact the latter forms the basis (in a slightly reduced form) for the German part of the AMADEUS database. BvD describes its AMADEUS data set as robust against a coverage bias since "35 expert and local information providers assure" the quality of the data (see BvD). Given the compatibility of the MARKUS and AMADEUS databases, the population underlying the *IWH FDI Micro database* was drawn upon using the following uniform selection criteria for inward and outward FDI in all countries (the analyses of the following thesis only uses the inward FDI information):

- Enterprises with one or more foreign investor: INWARD FDI

  The population of enterprises with one or more foreign investor is defined as all enterprises belonging to the selected sectors and countries in 2008, in

which at least one foreign investor holds either a minimum of 10% direct shares/voting rights or a minimum of 25% indirect shares/voting rights. These enterprises are independent affiliates with their own legal entity or they are branches without a legal entity but with their own commercial register entry. Shareholders or ultimate owners are not limited to foreign enterprises headquartered abroad but also include natural persons, donors, foundations and financial investors with headquarters outside their respective country. In the case of East Germany, the basic population of enterprises with foreign participation has been supplemented by enterprises belonging to the selected sectors and countries in 2008, in which at least one West German multinational investor holds either a minimum of 10% direct shares or voting rights or a minimum of 25% indirect shares or voting rights. A West German multinational investor is defined as an entity that is headquartered in West Germany and has either a minimum of 10% direct shares/voting rights or at least 25% indirect shares/voting rights in one or more entities located abroad. The federal state of Berlin is considered a part of East Germany in line with other established micro data sets and official statistics

- Enterprises investing in an enterprise abroad: OUTWARD FDI

  The population of enterprises holding shares in an entity abroad is defined as enterprises belonging to the selected sectors and countries in 2008, which hold either a minimum of 10% direct shares/voting rights or a minimum of 25% indirect shares/voting rights in one enterprise located abroad. The enterprises could be independent affiliates (de jure independent person) or an independent branch (no de jure independent person) with their own commercial register entry.

3.2.2 Survey sampling and implementation

The sample stratification for the survey in East Germany was proportionally differentiated for ownership (FDI inward, West German MNE inward, FDI outward). For FDI inward and West Germany MNE inward the sample was further stratified by differentiating between producing industries (NACE REV.1: 10 to 37) and all other industries (NACE Rev.1: 40-45; 51; 60-67; 72-74; 90-93). Subsequently each of the two sectors was further stratified according to enterprise size in terms of number of employees (up to 9, 10-49, 50-249, more than 250). FDI outward was only divided by sector into producing industries (NACE REV.1: 10 to 37) and all other industries (NACE Rev.1: 40-45; 51; 60-67; 72-74; 90-93).

The sample stratification for the survey in the CEECs based on the AMADEUS data was broken down by country and by ownership (FDI inward, FDI outward). Both ownership groups were further broken down by differentiating between producing industries (NACE REV.1: 10 to 37) and all other industries (NACE Rev.1: 40-45; 51; 60-67; 72-74; 90-93). Subsequently only the FDI inward group was further broken down by enterprise size in terms of number of employees (up to 9, 10-49, 50-249, more than 250). Thus, each country sample has a total of 19 segments for stratification.

The contact addresses and the sample stratification were transferred to infas Institute for Applied Social Sciences (infas) and the Zentrum für Sozialforschung Halle (zsh). The survey was implemented by means of computer assisted telephone interviews (CATI). CATI was chosen as the appropriate method because the survey of the *IWH FDI Micro database* requires a special design for highly standardised surveys, involves complex target groups, and has substantial filtering in the questionnaire. CATI are fast, relatively inexpensive and generate high response rates. In order to further increase the response rate, the enterprise received information about the IWH, the *IWH FDI Micro database*, survey and data confidentiality per fax

and/or e-mail in advance upon request. The questionnaire was first programmed and internally tested for coherency before being submitted to at least five pre-tests per country between 6 August and 3 September 2009. The pre-test necessitated minor changes and resulted in a questionnaire which required 15 minutes on average for completion. The interviewers at both providers received intensive training by the author of this thesis. The interviews only were conducted by native speakers from each country under observation.

Between 22 September and 21 December 2009 infas Institute for Applied Social Sciences as the provider for the CEECs and Zentrum für Sozialforschung Halle responsible for East Germany, completed the required interviews in line with the respective sample stratification. In 2009, the total population (inward and outward FDI) of the *IWH FDI Micro database* for East Germany and the CEECs included 3,905 and 7,894 enterprises respectively. Altogether 2,815 East German and 6,801 CEE companies could be contacted during the survey. About 28% of East German enterprises and 14% of CEE enterprises could not be contacted due to reasons such as wrong contact numbers, insolvency or incorrect information. For East Germany, a total sample of 654 interviews could be conducted, which corresponds to a response rate of 23.07%. In the case of CEECs, 651 interviews could be realised, which corresponds to a response rate of 9.57%. Thus, a total of 1,305 enterprises participated in the 2009 survey for the IWH FDI Micro Database. This generates an overall response rate of 13.57%.

3.2.3 Survey representativeness

The following section summarises the results of various tests on the representativeness of the samples for East Germany and the CEECs in comparison with the respective basic population. For a more detailed description, please see the corresponding methodological notes (IWH 2009a, IWH 2009b). For the sample

of multinational investors in East Germany (FDI inward and West German MNE inward), the distribution does not differ significantly from the underlying population with regard to sectors (producing industries and all other industries) and ownership structure (full, majority or minority multinational-owned) (see table 3.2). In contrast, there are significant differences for the regional distribution (at the level of the federal states as well as at the level of 'Raumordnunsgregionen'), industries (NACE 2 digit level), and firm size (up to 9, 10-49, 50-249, more than 250 employees)(see table 3.2).

Table 3.2: Significant differences in the distribution between the basic population and sample in East Germany

	Response Rate*	Federal States	Regional Level – ROR	Sectors	Industries (NACE)	Size of Employment	Ownership Structure**
East German enterprises with a multinational investor							
Total	17.0%	yes	yes	no	yes	yes	no
Foreign	16.4%	yes	yes	no	yes	yes	no
West German	18.5%	no	no	no	no	no	no
East German enterprises investing abroad							
	12.3%	no	no	no	no	no	no

*Ratio between the number of enterprises in the population and sample; **Ownership structure in the case of inward FDI refers to full, majority, or minority. In the case of outward FDI it refers to a differentiation between East German ownership or Foreign/West German ownership of the enterprise.

Source: Own calculations; *IWH FDI Micro database* 2009.

These significant differences are caused by the sample of foreign-owned firms in East Germany while the sample of West German owned firms is representative with respect to all dimensions tested. Among East German enterprises with a foreign investor, the regional sample deviation is mostly driven by the strong under-representation of enterprises located in Berlin. It is worthwhile pointing out, that the regional distribution was not part of the sample stratification. Furthermore, there is an under-representation in the sample of companies with more than 250 employees. The sample of East German firms with outward FDI does not show significant differences in its regional, sectoral, size or ownership distribution in comparison to the underlying population. As for the inward FDI sample from the CEE economies, significant differences in the distribution across the five countries due to under-representation of Czech and Polish firms and corresponding over-

representation of Hungarian, Slovakian and Romanian firms occur (see table 3.3).

Table 3.3: Significant differences in the distribution between the basic population and sample in the CEECs

	Response Rate*	Country Level	Sectors	Industries (NACE)	Size of Employment	Ownership Structure**
CEE enterprises with a foreign investor						
Czech Republic	6.9%	--	no	no	no	--
Hungary	16.0%	--	no	yes	no	--
Poland	6.7%	--	no	no	no	--
Romania	13.4%	--	no	no	no	--
Slovakia	19.9%	--	no	no	no	--
Total	**8.4%**	**yes**	**no**	**no**	**no**	**--**
CEE enterprises investing abroad						
Czech Republic	6.0%	--	no	no	no	no
Hungary	19.6%	--	no	no	no	no
Poland	5.1%	--	no	no	no	no
Romania	7.7%	--	no	no	no	no
Slovakia	27.6%	--	no	no	no	no
Total	**9.5%**	**yes**	**no**	**no**	**no**	**no**

*Ratio between the number of enterprises in the population and sample; **Ownership structure refers only to FDI outward with a differentiation of whether the investing enterprise itself is (partly) owned by a foreign investor.
Source: Own calculations; *IWH FDI Micro database* 2009.

For each individual country sample, no significant deviation in the sectoral distribution (producing industries and all other industries) between population and sample is found. This also applies to the industry distribution (at NACE 2-digit level). The only exception here is the Hungarian sample. In addition, significant differences in the firm size distribution between population and sample for the transition economies cannot be detected. For outward FDI from CEECs, the country composition again significantly deviates from the population. This is explained by an under-representation of Czech and Polish firms and over-representation of Hungarian and Slovakian firms. The distribution of firm size, sectors, industries and ownership is representative for each outward FDI country set. In general, the results suggest that the population and its corresponding samples generate a reliable micro database. The survey is representative of various indicators; therefore, it meets the relevant criteria for scientific research within this field. Deficiencies with regard to regional deviation (inward FDI in the case of

East Germany, inward/outward FDI sample for CEECs) need to be checked for when processing the data.

3.2.4 Survey questionnaire

In 2009 the thematic focus of the survey was investment motives, the evaluation of locational factors, and technological activities. The corresponding 2009 questionnaire includes 38 questions and is divided into five sections. The first section (questions 1-5) mainly covers the evaluation of locational factors. These are broken down into traditional factors such as quantitative labour supply, the availability of government grants and subsidies, as well as the potential for technological co-operation. In addition,'soft' locational factors including culture, image, health care and availability of housing have been evaluated by the participating firms. The first part of the questionnaire also covers standard questions about the shareholder structure of enterprises with foreign/West German ownership (questions 6-12). This includes questions on the type of investor, headquarter location, date of entry, mode of entry, investment motive, as well as the autonomy over particular business functions. The second part (questions 13-20) is answered by enterprises with outward FDI. This includes questions on time, mode of entry, investment motives, vertical vs horizontal FDI and corresponding location. The third part of the questionnaire deals with questions about R&D (questions 21-26) including changes to R&D employment through internationalisation and R&D co-operation. All R&D indicators are in line with the international standards as codified in the Frascati-Manual (OECD 2002). Part four of the questionnaire (questions 27-30) deals with product innovations including their intensity and changes to product innovation intensity through the internationalisation processes. All innovation-related indicators are in line with the international standards as codified in the Oslo-Manual (OECD 2005). The final part of the questionnaire

includes questions on employment, turnover, intermediate inputs, exports as well as changes to selected performance indicators through the internationalisation processes.

As mentioned above, this thesis' empirical analyses are based on the information on inward FDI of the *IWH FDI Micro database* 2009.

4 Investment motives and assessment of location factors

This chapter is structured as follows: In a first section, the current state of research is discussed and then the importance of MNEs' investment motives and MNEs' assessment of location factors in East Germany, taking heterogeneous firm characteristics into consideration, are empirically analyses. In a second section it applies the same analysis on the selected CEECs. This chapter's research questions are: Which strategic investment motives are important for foreign investors' decision to invest in European post-transition economies? Did the importance of these strategic motives change over time? How do foreign investors assess the quality of location factors on-site? Is there a match between the foreign investors' strategic entry motivation and the assessment of the quality of corresponding location factors?

4.1 MNEs in East Germany: Investment motives and assessment of location factors

4.1.1 Current state of research

Even though recent studies suggest that access to the market continues to dominate as an investment motive, the access to location-bound knowledge and technology

has gained importance over time.[8] This can be explained partly by the development of the scientific infrastructure in East Germany (Thum, Berlemann, et al. 2007; Guenther, Stephan, and Jindra 2008a; Bochow 2007). International research considers firm heterogeneity when analysing MNEs' investment motives, and location factors using survey data and differentiates by country of origin, industry as well as time and mode of market entry (e. g. Chung and Alcacer 2002). Previous empirical studies on East Germany, however, have not yet considered these aspects in detail.

Therefore, the first part of this section analyses the motives of MNEs for investing in East Germany, taking into account the country of origin, time and mode entry as well as sectoral differences. The second part of the section considers MNEs' assessment of selected location factors in East Germany and again differentiates this assessment by considering firm heterogeneity, including the MNE's investment motive. This differentiated approach allows fresh conclusions and specific economic recommendations. The chapter uses data from the 2009 wave of the *IWH FDI Micro database*.

4.1.2 Strategic motives of foreign investors investing in East Germany

As discussed above, according to the theory of fims' internationalisation, motives for investing abroad can be classified into four groups: access to a new market, aspects of efficiency, access to strategic technology and access to natural resources (Dunning and Lundan 2008) (see chapter 2). The efficiency motives can be further differentiated into cost advantages related to production factors (labour, capital, land), economies of scale (expansion of production of existing products), and

8 This section has been published in a similar expression as Gauselmann and Jindra (2010).

economies of scope (expanding the product range). This theoretical classification formed the basis of the *IWH FDI Micro database*'s questionnaire of 2009, while previous studies on MNE investment in East Germany had up to this point differentiated only between the investment motives 'market access' and 'local production conditions' (e. g. Thum, Berlemann, et al. 2007).

In the *IWH FDI Micro database* 2009, the foreign investors were asked to provide an indication of the level of importance of each of the six investment motives at the time of their individual market entry using an ordinal rating scale ranging from 1 for 'not important at all' to 4 for 'very important' (see table 4.1).

Table 4.1: Investment motives of foreign investments into East Germany, distinguished by regions of origin

	Total		Investment motives distinguished by regions of origin…							
			West European countries[a]		Emerging markets[b]		Non-European developed countries[c]		West Germany	
	(n=629)		(n=310)		(n=49)		(n=74)		(n=186)	
Investment Motive	rank [1]	mean [2]	rank	deviation [3]	rank	deviation	rank	deviation	rank	deviation
Market access	**1**	3.115	1	0,22**	1	-0.23	1	0.15	1	-0,12
Product diversification	**2**	2.614	2	-0.12	2	0.2	3	-0,25*	2	0,20**
Costadvantages	**3**	2.502	3	0,00	4	-0.24	4	-0,32***	3	0,24***
Access to knowledge and technology	**4**	2.471	4	-0.06	3	0.04	2	0,20	5	-0,05
Scale Economies	**5**	2.328	5	0.03	5	-0.07	5	-0,34**	4	0,17*
Access to natural resources	**6**	1.839	6	0.02	6	-0.02	6	-0,22	6	0,10

a) This category includes Belgium, Denmark, Finnland, France, Greece, Ireland, Italy, Luxembourg, Netherlands, Austria, Sweden, Spain, United Kingdom (EU 15) and Swizerland, Norway und Liechtenstein. b) This category includes Bahrein, Republic of Belarus, China, Cuba, Czech Republic, Estonia, Georgia, India, Iran, Litvia, Malaysia, Mexico, the Netherlands Antilles, Poland, South Korea, Russia, Saudi Arabia, Slovakia, Turkey, Ukraine and Southafrica. c) This category includes Australia, Canada, Singapur, Japan and USA.

[1] The rank results from the order of the average assessment of each single investment motive in each category. [2] Mean is defined as average of the importance of the respective investment motive on a scale ranging from 1 (not at allimportant) to 4 (very important). Deviations are defined as differences between the mean of the specific country group category and the mean of the rest population. * is significant at the .1 level, ** at the .05 level, and *** at the .01 level.

Source: Own calculations; *IWH FDI Micro database* 2009.

Table 4.1 shows the mean values (arithmetic mean) of the assessments of the importance of investment motives. Results show that, over the whole sample, investors in East Germany evaluate 'market access' as the most important investment motive. Economies of scope and product diversification are of secondary importance, followed by cost advantages related to production factors and access

to location-bound knowledge and technology. The achievement of economies of scale and - not very surprisingly - the access to natural resources are of least importance to foreign investment (Gauselmann 2010).

However, the importance of these investment motives differs, depending on the foreign investors **country of origin**. MNEs which have their headquarters in industrialised European countries, rate 'market access' as significantly more important than do foreign investors from other countries. Multinational investors from industrialized overseas countries assess efficiency motives (cost advantages related to production factors, economies of scale, economies of scope) as significantly less important. The opposite is the case for MNEs that have their headquarters in West Germany.

When considering the importance of different **investment motives over time**, a considerable shift in MNEs' market entry motivation can be made out. From reunification until the end of privatization (1989-1995) the following ranking in the relative importance of motives can be observed: market access, cost advantages, economies of scale, economies of scope, access to technology and access to natural resources (see table 4.2). The results for the following investment period (1996-2000) show, however, that - compared to the previous period (1989-1995), access to a new market and cost advantages related to production factors have lost a significant degree of importance as strategic aims for foreign investment in East Germany.

Similarly, the importance of investment for the purpose of economies of scale has significantly declined. Instead, in the period 1996-2000 East Germany increasingly attracted multinational investors for whom product diversification (economies pf scope) was a key priority in the establishment of a subsidiary. Thus, from the mid-'90s until the recent investment period (2006-2009), a new ranking of investment motives can be observed: market access remains the most important motive, while

product diversification and access to localized knowledge and technology gain in importance. In contrast, cost advantages related to local production factors and economies of scale lose importance, while access to natural resources is considered of least importance over all observed time periods - and not surprisingly so (see table 4.2).

Table 4.2: Investment motives of foreign investments into East Germany, 1989-2009

Investment motive	Investment motives in investment period…							
	1989 -1995 (n=180)		1996-2000 (n=115)		2001-2005 (n=182)		2006-2009 (n=152)	
	rank [1]	mean [2]	rank	deviation [3]	rank	deviation	rank	deviation
Market Access	**1**	3.320	1	-0,31**	1	0,02	1	0,02
Cost advantages	**2**	2.718	4	-0,28**	4	-0,05	4	0,02
Scale economies	**3**	2.524	5	-0,23*	5	0,03	5	-0,22*
Product diversification	**4**	2.443	2	0,23*	2	0,06	2	-0,11
Access to knowledge and technology	**5**	2.388	3	0,19	3	-0,12	3	0,05
Access to natural resources	**6**	1.880	6	-0,06	6	-0,01	6	0,01

[1] The rank results from the order of the average assessment of each single investment motive in each category. [2] Mean is defined as average of the importance of the respective investment motive on a scale ranging from 1 (not at all important) to 4 (very important). [3] Deviations are defined as differences between the mean of the category during the period of observation and the one of the previous period. * is significant at the .1 level, ** at the .05 level, and *** at the .01 level.

Source: Own calculations; *IWH FDI Micro database* 2009.

The *IWH FDI Micro database* also allows for a distinction according to the MNE's **mode of entry** (Greenfield vs acquisition). The present analysis shows that MNEs engaging in Greenfield investment in East Germany consider cost advantages to be significantly more important, while for those engaging in acquisitions, economies of scope and access to local technology are significantly more important as investment motives. It has to be noted, however, that the proportion of Greenfield investment by MNEs decreased dramatically during transition in East Germany.[9] The significant change in the relative importance of investment motives during the transition process in East Germany has been associated with a lower proportion of investment projects in industry and a growing interest in services, energy supply

9 The sample shows that the share of acquisition increased from 51% of total investment in the first investment period (1989-1995) to 78% in the last period (2005-2009).

and wholesale.[10] Considering the differences in the relative importance of **motives for investment by sector**, results suggest that investors in industry sectors rate cost advantages related to production factors and economies of scale significantly higher than do investors in other sectors.

4.1.3 Endowment with location factors assessed by foreign investors in East Germany

In the second part of this empirical analysis, the quality of East Germany's location factors is considered and it is again differentiated by the MNEs' heterogeneous characteristics, trying to find a match between the foreign investors' strategic investment motive and the assessment of the quality of location factors on-site.

In a recently presented study by Ifo Institute's Dresden Branch, a survey of 42 parent companies of foreign investors in East Germany was conducted on the relevance of different location factors. In addition, this study asked 186 foreign subsidiaries in East Germany about the actual quality of these location factors (Thum, Berlemann, et al. 2007). Results of this survey reveal that the political, legal and social conditions as well as the infrastructure in East Germany are rated very good. Among the less well-rated factors are labour market regulation, the tax burden, the research community and the availability of highly skilled workers. A differentiation of quality of location factors by firm size, however, reveals no significant differences and the consideration of the differences by sectors is hampered by the small number of surveyed subsidiaries in the service sector (Thum, Berlemann, et al. 2007).

10 This sample indicates that in the first investment period (1990-1995), 57% of the subsidiaries belonged to the manufacturing sector and 43% to other sectors (wholesale, energy supply, services, etc.), while in the recent investment period (2005-2009), the share of the other sectors increased to 71% of all investment projects.

Building on these results, the *IWH FDI Micro database* 2009 collects information from 629 multinational subsidiaries. They were asked to assess the quality of a total of 18 location factors. These factors were grouped into four categories: availability of labour supply, availability of government grants and subsidies, the potential for technological co-operation and the local socio-cultural environment.

The subsidiaries were asked to provide an indication of the level of quality of each of the location factors at the time of the survey, using an ordinal rating scale ranging from 1 for 'very poor' to 4 for 'very good'. Considering the mean values of the four categories of location factors for the whole sample, results show, that the multinational subsidiaries assess the quality of the socio-cultural environment in East Germany best among the selected location factors.

In terms of the assessed quality, the category of these so-called 'soft' location factors is followed by those corresponding to the potential for local technological co-operation, then by those corresponding to the supply of labour and - assessed as of poorest quality - by those corresponding to the supply of government grants and subsidies in East Germany.[11] However, the individual location factors in these categories show very mixed results (see table 4.3).

Thus, the supply of low-skilled workers and trainees is rated higher than the availability of young professionals with a university degree and skilled workers. The supply of labour is therefore assessed the lower, the higher the skills or experience of the work force. Beyond that, the supply of young professionals with a university degree and skilled workers within the given selection belongs to the lowest-rated location factors. This relatively critical assessment is consistent with the results of other studies (e. g. Thum, Berlemann, et al. 2007).

11 It should be pointed out, though, that in this last category of location factors, the proportion of subsidiaries answering 'don't know' was relatively high, ranging from 9% (availability of investment incentives) to 25% (availability of investment credits (KFW)).

Table 4.3: Endowment with location advantages assessed by foreign investments in East Germany, whole sample and distinguished by investment motive

Location factors	Total		Assessment of location factors distinguished by investment motives…													
			Market access		Cost advantages		Scale economies		Product diversification		Access to knowledge and technology		Access to natural resources	
	(n=629)		(n=309)		(n=99)		(n=108)		(n=159)		(n=124)		(n=51)	
	rank[1]	mean[2]	rank	deviation[3]	rank	deviation	rank	deviation	rank	deviation	rank	deviation	rank	deviation
Quantitative supply of labor		**2.780**												
Low qualification-workers	1	3.34465	1	0.04	3	0,06	1	0,06	1	-0.02	1	0.08	1	-0.05
Apprentices (trainees)	2	2.74558	2	0,00	1	-0,02	2	0,04	2	0.10	2	0,15**	2	0.12
Junior employees with university degrees	3	2.56667	3	-0,02	2	-0,19**	3	-0,05	3	-0.06	3	0.05	3	0.05
Qualified employees	4	2.47258	4	-0,05	4	-0,17**	4	0,04	4	0.05	4	0.05	4	-0.11
Availability of state support		**2.638**												
Availability of investment incentives (government grants or tax incentives)	1	2.84657	2	-0,05	1	0,17*	1	0,09	1	0,15**	1	0.05	1	-0.07
Availability of wage subsidies	2	2.71608	1	0,00	6	-0,06	2	0,08	2	0.06	2	0.02	3	-0.10
Availability of investment credits (KfW)	3	2.64846	3	0,04	2	0,16	4	-0,03	5	0.00	3	0.05	2	0.15
Availability of fiscal incentives concerning R&D and innovation	4	2.62551	4	-0,06	3	0,13	6	-0,06	3	0,17**	4	-0.04	5	-0.16
Possibility for special depreciations	5	2.54241	5	0,02	4	0,06	5	0,04	4	0,23**	5	-0.01	4	0.03
Availability of government guarantees	6	2.45161	6	0,09	5	0,11	3	0,20**	6	0.11	6	-0.01	6	0.00
Potential for technological cooperation		**2.904**												
With local public and private science institutions	1	3.07018	1	-0,07	1	-0,01	1	-0,02	1	0.08	1	0.07	1	-0.11
With other local firms	2	2.73785	2	-0,04	2	0,06	2	-0,05	2	0.02	2	0,13**	2	0.00
Local socio-cultural environment		**3.006**												
Supply of housing and accomodation	1	3.26403	1	0,05	1	-0,12	1	0,07	1	0.07	1	0.07	1	0.08
Supply of child-caring facilities	2	3.07557	3	0,00	2	0,01	2	0,11	3	0.02	2	0.03	2	0.06
Security of foreign employees	3	3.06809	2	0,02	3	-0,08	3	0,02	2	0.04	3	0.00	3	-0.02
Supply of health services	4	2.95652	4	-0,03	4	-0,16**	5	0,00	4	0,14**	4	0.08	4	-0.10
Culture on offer	5	2.89414	5	0,02	6	-0,29**	4	0,09	5	0.04	5	0.03	5	-0.14
Image of the region in general	6	2.77958	6	-0,07	5	-0,15*	6	0,12	6	0.02	6	0,14*	6	-0.13

[1] The rank results from the order of the average assessment of location factors in each category. [2] Mean is defined as average of the quality of the respective location factor on a scale ranging from 1 (very poor) and 4 (very good). [3] Deviation is defined as difference of the mean value of each location factor for those firms that assessed the respective investment motive as 'very important' to its average of the group of firms who value the strategic motive as 'very important' and the firms that value this motive as either 'important', 'less important', or 'not important at all'.

Source: Own calculations; *IWH FDI Micro database* 2009.

Taking into account the heterogeneity of investors when looking at the evaluation quality of location factors in East Germany, it is clear that the supply of labour from all skill levels is assessed similarly by MNEs with different countries of origin. A sectoral differentiation finds that subsidiaries belonging to the industry sectors assess the availability of skilled workers significantly lower, while investors belonging to other sectors see in contrary less availability of low-skilled workers. International studies (e. g. Chung and Alcacer 2002) suggest that an MNE's investment motive, too, has an impact on the evaluation of the quality of location factors.

4.1.4 Endowment with location advantages and investment motives in East Germany

In accordance with these findings, results suggest that investors who aim at cost advantages related to production factors evaluate the supply of skilled labour and junior employees less highly when compared to investors for whom this investment motive is of secondary importance. This result could be explained by an un-willingness among this group of investors to pay skilled labour, supposing that labour costs increase with the level of qualification. Investors who aim at access to localised knowledge and technology in East Germany, however, assess the supply of labour on average more highly, and in the case of apprentices and trainees, even significantly so. These results shows that it is worth accounting for MNEs' investment motives when analysing the quality of location factors.

In the following paragraph, the availability of government grants and subsidies as a second category of location factors is considered. The Ifo Institute's study showed an average rating of the quality of public funding. The availability of

investment incentives (including government grants and tax incentives) is best assessed (see table 4.3) in the analysis at hand.

Wage subsidies, the availability of investment credits from the Reconstruction Loan Corporation (KFW), the availability of fiscal incentives related to R&D and innovation, the possibility of special depreciations, and, lastly the availability of government guarantees follow in this category of location factors.

Once again, the analysis shows differences in results when accounting for the investors' heterogeneity: MNEs from industrialized countries overseas assess the availability of fiscal incentives related to R&D and innovation more highly, while the availability of investment credits of the KFW is less highly assessed, compared to MNEs from other countries of origin. Differences related to the sectoral classification can be spotted in the evaluation of the availability of investment incentives. Investors belonging to the industry sectors assess these as significantly better than do others.

MNEs which seek cost advantages also assess the availability of investment incentives in East Germany as significantly better, while MNEs which aim at economies of scale do so with regard to the availability of government guarantees. On the other hand, subsidiaries that were established to benefit from economies of scope assess the availability of investment incentives, the possibility for special depreciations and the availability of fiscal incentives related to R&D and innovation significantly better than those that pursue different investment motives.

The Ifo Institute's study has shown that the quality of the East German research landscape is one of the location factors that is assessed rather poorly by foreign investors (Thum, Berlemann, et al. 2007). The data of the *IWH FDI Micro database* allows for a further differentiation between local partners for technological co-operation. Results reveal, that the potential for technological co-operation with East German research institutions is rated better than the potential for technological

co-operation with other enterprises (customers, suppliers, competitors) (see table 4.3). However, the potential for technological co-operation with other enterprises is rated significantly better by those foreign investors who invest in East Germany in order to gain access to localized knowledge and technology (compared to those foreign investors who accord this investment motive less importance). This finding is in-line with interpretations of the 2007 wave of the *IWH FDI Micro database* suggesting that foreign investors in East Germany show high R&D and innovation activities and judge the local innovation system as very important for the realisation of these activities (Guenther 2008).

In the category of socio-cultural location factors, the availability of housing in East Germany is assessed most highly (see table 4.3). This factor is followed by the availability of child care, the personal safety of foreign employees, the local health care and the cultural offerings. The general image of the region is assessed poorest in this category of location factors. However, it should be noted that, in-line with the Ifo Institute's study, the general image of the region is on average assessed as good by all investors in the sample. Beyond that, results show that investors who give high priority to localized knowledge and technology when making their investment decisions, assess the general image of the region even better (and significantly so). The opposite is true for MNEs, which give high importance to cost advantages related to production factors. The differences in outcomes of the quality of location factors in East Germany are in accordance with the shift in the importance of MNEs' investment motives in the course of the East German transition process, as discussed above.

However, there are also apparent differences in the assessment of further socio-cultural location factors when considering the heterogeneity of MNEs: Investors from the (non German) European industrialized countries for instance, assess local health care significantly lower, while this factor is significantly better assessed by in-

vestors from West Germany and overseas. The availability of housing is rated as significantly poorer by foreign investors from emerging economies, while the opposite is true for investors from industrialized countries overseas.

4.2 MNEs in Central East Europe: Investment motives and assessment of location factors

4.2.1 Current state of research

In contemporary international research on MNEs, heterogeneity has an important influence on investment motives and location factors.[12] As mentioned above, heterogeneous characteristics include the country of origin of the foreign investor, the sector, the year, and mode of entry of the foreign investor. Research on investment choice is yet mainly concerned with the impact of (single) specific location factors. Basile (2004) and Mudambi and Mudambi (2002) focus on the mode of entry and consider the difference between acquisitions and Greenfield investment. Mudambi and Mudambi relate MNEs' decision on Greenfield or acquisition to the MNEs' decision to diversify or concentrate their business. In their analysis they take into account location factors like rate of industry growth and market power in the host country and industry and R&D intensity of the MNE. Basile (2004) finds that the importance of location determinants in Italy differ strongly depending on the MNE's mode of entry.

Analyses on location factors concentrate on either specific host countries or a specific home country of the foreign investor, such as Disdier and Mayer (2004) for location choices by French firms in Eastern and Western Europe. Their analysis

12 This section has been published in a similar expression as Gauselmann, Knell, and Stephan (2011).

focuses on a possible East-West divide and finds out that location decisions in this respect are strongly influenced by the institutional quality of the host country. Boudier-Bensebaa (2005) investigates the FDI in one selected CEEC, Hungary, at a regional level while Chidlow, Salciuviene, and Young (2009) do so for FDI in Poland. Some contributions select single determinants for location choice, such as the access to technology and the influence of R&D activity (Chung and Alcacer 2002), or, with focus on the CEECs, labour costs (Bellak, Leibrecht, and Riedl 2008) or institutional framework in the host country (Bevan, Estrin, and Mayer 2004; Meyer and Jensen 2005).

Other surveys investigate the determinants of FDI in the CEECs at the sectoral level showing that sector specific factors affect the choice of the final location (Resmini 2000; Pusterla and Resmini 2007). Using the example of Italian firms in selected CEECs Majocchi and Strange (2007) find out that not only market size and growth, the endowment with labour, and infrastructure are important determinants of FDI but also financial and market liberalization. Thus, several studies provide in-depth research on the contribution of MNEs to the different phases of the transition process and the location determinants influencing FDI in the CEECs. Despite this interest, very little is known about the heterogeneity of MNEs' investment motives in those countries.

In addition to the existing literature, this section considers the investment motives analysed by time of entry, country of origin and industry classification of the MNEs. Furthermore, it interprets the endowment with location factors in the selected CEECs depending on investment motive, country of origin and industry. The section analyses whether there are differences in the choice of investment motives and the perception of location factors due to the heterogeneity of the MNEs and whether investors find a match between their strategic motives and the location advantages. The analysis also adds to research on location choice by

comparing the five selected CEECs to each other in terms of the mentioned factors while most existing papers focus either on the CEE region as a whole or on one specific CEEC.

The location choice of multinational firms is influenced by a range of different factors, which are partly external and partly internal to firms. Dunning's OLI concept (Dunning 1977; Dunning 1981; Dunning and Lundan 2008) may be insightful where it is concerned with the interaction of mainly ownership and location advantages: a firm will attempt in its localisation decision to align the advantages that particular localisation offers with its particular, firm-specific set of ownership advantages (or may assume to be in the position to contribute to changing location advantages itself to better complement its ownership advantages). The assumed relationship between localisation and ownership advantages then gives rise to the investment motive a particular firm has established when investing in a particular location.

More recently, agglomeration theories have come to the fore when explaining location choices of multinational firms. Their main points of interest include the existence and shape of localised externalities and the effects competition between foreign and domestic firms. Fujita, Krugman, and Vanables (1999) emphasise the importance of cross-border regional factors that influence the decision-making process for engaging in FDI. Literature on location preferences of foreign additionally considers: micro-economic incidence of FDI does not only depend on the types of activities of firms or the characteristics of the host country, but also on the multinational firms' investment motives. MNEs seek locations that offer the best economic and institutional facilities for their own individual aims (Dunning and Lundan 2008; Enderwick 2005). Dunning's classification of investment motives will be used throughout the section.

As described in chapter 3, the *IWH FDI-Micro database* provides information on the current population of foreign affiliates of MNEs in selected CEECs. This database identifies 616 foreign investors in the five CEECs, including 185 in the Czech Republic, 57 in Hungary, 216 in Poland, 128 in Romania, and 30 in Slovakia. The following analysis uses the simple mean comparison t-test and reports the deviations and the significance levels. The following contribution provides a broad overview on factors that underlie the firms' investment decision, and adds to previous international literature by taking the heterogeneity of MNEs into consideration. Furthermore, the quality of location factors is also analysed, which provides a unique insight into how MNEs decide to invest in the CEECs.

4.2.2 Strategic motives of foreign investors investing in Central East Europe

As introduced above, six distinct strategic motives for investment are distinguished in the analysis: market access, cost advantages of production factors (which mainly relate to the comparatively low wage levels in the region as compared with Western Europe), economies of scale, product diversification in the foreign investor's network, access to local knowledge and technology, access to localised natural resources.

Table 4.4 provides an overview of the importance of each of the motives for investors at the time of entry. The indicators are organised as ordinal rating scales ranging from 1 for 'not important at all' to 4 for 'very important'. Firms were asked to provide an indication of the level of importance for each of the six motives. Over the whole population of investors into CEE, the strategic motive of reaping cost advantages of production factors and the motive of market access dominate in the assessment of importance by foreign investors into the CEECs.

Of slightly less importance are the efficiency-motives of scale economies and product diversification, whereas the motive of access to local knowledge and technology rates surprisingly high considering that the countries were largely disconnected from Western technological developments during their socialist era. Access to localised natural resources play a very limited role for investments into the CEECs.

Table 4.4: Investment motives of foreign investments into the CEECs, distinguished by regions of origin

	Whole sample	Distinction by regions of origin		
		West European countries [a]	Emerging markets [b]	Non-European developed c. [c]
	n=604	n=506	n=47	n=51
	mean	deviation	deviation	deviation
Market access	3.11	0.04	-0.04	-0.04
Cost advantages	3.14	0.01	-0.10	0.08
Scale economies	2.91	0.09	-0.16	-0.00
Product diversification	2.70	-0.17	0.47***	-0.13
Access to technology	2.72	-0.17	0.05	0.25*
Access to natural resources	1.99	-0.07	0.12	0.02

Notes: Mean is defined as average of the importance of the respective investment motive on a scale ranging from 1 (not at all important) to 4 (very important). Deviations are defined as differences between the mean of the specific country group category and the mean of the rest population. * is significant at the .1 level, ** at the .05 level, and *** at the .01 level.

[a] Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

[b] Belize, Croatia, Cyprus, Czech Republic, North-Korea, Hungary, Lebanon, Lithuania, Malta, Netherlands Antilles, Poland, Romania, Russian Federation, San Marino, Slovak Republic, Slovenia, South Africa, Turkey, Ukraine.

[c] Canada, Israel, Japan, United States.

Source: Own calculations; *IWH FDI Micro database* 2009.

These means, however, mask some important differences between the **countries where the foreign investment originates** (home country) even if the differences are less pronounced than anticipated. Grouping home countries according to the probably most important sources of heterogeneity, the level of economic development and the proximity to the European Union, it is possible to uncover some important insights: As expected, investors from emerging markets place less emphasis on cost advantages and scale economies, as they can easily obtain those

advantages at home. The motive of product diversification also appears more important (and significantly so). Investors from emerging markets appear to use their locations in the CEECs to improve their product mix, possibly complementing their established, standardised products home-produced in larger quantities. Certain differences emerge, despite being statistically not significant. In contrast with the emerging markets, the sign for product diversification appears negative for both the European and other developed economies.

More importantly, the strategic motive of access to technology also appears less important for West European countries, whereas it is relatively more important (and significant) for the group of other non-European developed countries. Investors from non-European developed countries follow different objectives when investing in the CEECs than their West European competitors. Western European firms tend to rely on nearby home technology bases, whereas non-European investors see more opportunities to make profitable use of the local or national innovation systems. In other words, space may explain local technology sourcing, but more importantly, adaptation of the product to the local market conditions and environment in the host economy will play a more important role in this context (Boudier-Bensebaa 2005).

These results suggest that FDI may play an important role for technological development in the CEECs (foreign affiliates are often expected to find economically useful technical knowledge), which most often originates from non-European developed countries, and not from emerging market economies or West Europe. This suggests that the CEECs are not as detached from Western technological development as traditionally believed and that over time they may be able to offer new technical knowledge that is specific to the region. The absorptive capacity of the affiliate and the price for access to technology may explain much of this trend, but more importantly, the CEECs are increasingly able to make commercially

valuable use of their long and un-interrupted industrial history and the technology they were able to get access to exactly because of their successes in attracting FDI in the more recent past.

Table 4.5 illustrates the **evolution of strategic motives for investment into the CEECs**. Four periods, covering the transition from a centrally planned economy located in the Soviet sphere to a fully functioning capitalist economy integrated into the European market, are distinguished in the table: The period of systemic transition that began in 1989; the second period, which started in 1996 when most of the large-scale privatisation was completed in most transition countries; the third period, which began in 2001 when economic development already relied on a broader basis of a mix of large and small and medium-sized firms and FDI was already less focused on privatisation projects; and the period of integration and financial crisis, which began in 2007. During the transition, one would expect the strategic motives to change from mainly cost and efficiency-related advantages to localised technology advantages in particular, as has been the case in East Germany (see chapter 4, section 1).

The survey indicates that the cost-advantage motive was significantly less important in the final period, but there was no corresponding increase in importance of the technology-related motive. It appears that the technology-related motive became relatively less important then in the third period. The loss of this advantage may be due to the current financial crisis, where investors tend to re-allocate the more sensitive business functions into the headquarters to reduce short-term risks. But this may be temporary, as MNEs often postpone R&D projects, or shift certain functions within the enterprise, until when the economy recovers, but in general they develop their R&D strategy with a long time-horizon. Since the survey only covers the initial stages of the financial crisis, it is too early to tell whether the trend will be long lasting.

Table 4.5: Investment motives of foreign investments into the CEECs, 1989-2009

	1989-1995 n=162	1996-2000 n=186	2001-2006 n=160	2007-2009 n=108
	mean	deviation	deviation	deviation
Market access	3.31	-0.22**	-0.11	0.04
Cost advantages	3.14	0.06	-0.04	-0.21*
Scale economies	2.87	0.04	0.06	-0.08
Product diversification	2.57	0.10	0.09	0.09
Access to technology	2.71	-0.06	0.20**	-0.21*
Access to natural resources	1.96	0.01	0.08	-0.03

Notes: Mean is defined as average of the importance of the respective investment motive on a scale ranging from 1 (not at all important) to 4 (very important). Deviations are defined as differences between the mean of the category during the period of observation and the one of the previous period. * is significant at the .1 level, ** at the .05 level and *** at the .01 level.

Source: Own calculations; *IWH FDI Micro database* 2009.

An important question that arises from the analysis is whether the apparent trend away from technology sourcing in the CEECs depends on the geographic origin of the investment. As suggested in table 4.4, non-European investors were comparatively more technology-seeking, whereas European investors put less emphasis on this motive.

But the survey also indicates that the share of non-European investment into the CEECs increased in weight 8.6% in period three to 12% in period four, likewise the share of investments from emerging markets has risen from 5% to 11%, respectively. While the decline in the technology-related motive may be the result of foreign investors centralising more risky technological activities near their headquarters, a deterioration of the quality of the national innovation system in the host economy, or a change in industrial structure of foreign investments, further data collection is necessary to fully explain what is happening.

Investment motives are not homogenous across different **host economies**. Host countries with particularly low (unit) wage costs, such as Romania, tend to attract investors who place more weight on the motive of tapping cost advantages, whereas large host countries, such as Poland or other countries with sufficient

purchasing power on the domestic market, such as the Czech Republic, should expect to attract interest in foreign-market-seeking FDI. Countries with better developed national innovation systems in general and public and private science sectors in particular (mainly the Czech Republic, but also possibly Poland and Hungary) should be attractive for those who are seeking localised knowledge and technology.

Table 4.6: Investment motives of foreign investments into the CEECs, distinguished by host economy

	Czech Republic n=185	Hungary n=57	Poland n=216	Romania n=128	Slovakia n=30
	deviation	deviation	deviation	deviation	deviation
Market access	0.13	-0.01	-0.23**	0.08	0.28
Cost advantages	-0.06	-0.09	-0.10	0.24**	0.10
Scale economies	0.03	0.10	-0.07	-0.05	0.17
Product diversification	0.13	-0.16	-0.13	0.17	-0.21
Access to technology	0.29***	0.05	-0.35***	0.04	0.22
Access to natural resources	-0.18*	0.45**	-0.19**	0.28**	-0.10

Notes: Deviations are defined as differences between the mean of the particular country category and the mean of the rest population. * is significant at the .1 level, ** at the .05 level and *** at the .01 level.

Source: Own calculations; *IWH FDI Micro database* 2009.

Table 4.6 suggests that foreign investors in Romania consider cost advantages as the most important investment motive. The strategic motive of tapping localised knowledge and technology is significantly more important in the Czech Republic as compared with the others, and equally higher average level of importance is attached to this motive in Slovakia, although this deviation appears not significant. Interestingly, foreign investors in Poland appear to place much less weight on the role of the national innovation system for their own technological development, the average weight is sizably and significantly lower than in the rest of the sample. This does not support the Polish policy of transforming and developing its actors in the national innovation system. Access to natural resources did not play an important role for the population as a whole. Still, much higher levels (with significant deviation) are attached to this motive in Hungary and Romania. In Romania,

this may be a result of lignite mining, a resource that is available also elsewhere, but relatively low wages and possibly weak labour protection regulations are important in this case. These results suggest that some explanatory variables may be missing, which need to be considered in future surveys.

Whether the firm is engaged in **manufacturing production or the provision of a service** is amongst the most important determinants the motive to invest.

Table 4.7: Investment motives of foreign investments into the CEECs, distinguished by industry classification

	selected services (A)	manufacturing (B)	(B) – (A)
	n=279	n=337	
	mean	mean	deviation
Market access	3.34	2.92	-0.42***
Cost advantages	2.93	3.30	0.38***
Scale economies	2.79	3	0.21***
Product diversification	2.74	2.67	-0.07
Access to technology	2.77	2.68	-0.09
Access to natural resources	1.92	2.04	0.12

Notes: Mean is defined as average of the importance of the respective investment motive on a scale ranging from 1 (not at all important) to 4 (very important). Deviations are defined as differences between the mean of the manufacturing category and the mean of the category selected services. * is significant at the .1 level, ** at the .05 level and *** at the .01 level.

Source: Own calculations; *IWH FDI Micro database* 2009.

Table 4.7 shows that market access is significantly less important for firms in manufacturing industries, while for the same firms cost advantages have a significantly higher importance considering a foreign investment. The reason may be that firms in selected services have to be on-site while manufacturing firms also have the possibility to access a market by exporting their products, which explains why market access is more important to firms of selected services.

Cost-advantages are significantly more important to manufacturing firms, because the quantity and variety in qualification of the personnel they need might be higher than that of firms in the selected services. The significant difference in

importance of scale economies to manufacturing firms might be due to the fact, that these firms are more likely to adopt their products to the new market. The difference in importance of product diversification is slightly negative comparing firms in manufacturing industries to those in selected services. Latter firms adapt more to the characteristics of the new market, which may explain why product diversification is more important for them and comparatively less important for manufacturing firms. Access to technology, too, is slightly less important for manufacturing firms, while access to natural resources tends to be more important.

4.2.3 Endowment with location factors assessed by foreign investors in the CEECs

Alcácer and Chung (2007) suggest that the perceived weight that foreign investors attach to the different strategic investment motives influence their assessment of quality of location factors. The *IWH-FDI Micro database* 2009 proposes 14 location factors, which are grouped in four classes:

1. Quantitative supply of labour (low qualification-workers, apprentices (trainees), junior employees with university degrees, qualified employees)
2. Availability of state support (investment subsidies, financial incentives for R&D and innovation)
3. Potential for technological co-operation (with local public and private science institutions, with other local firms)
4. Socio-cultural environment (culture on offer, supply of health services, supply of housing and accommodation, no hostility against foreign workers, supply of child-minding facilities, image of the region in general).

An analysis of the quality of location factors requires an assessment of the entire population and for each of the four CEECs. A comparison of the relative importance of investment motives with quality of location factors is done, but without distinguishing between countries to simplify the analysis. Using plausible assumptions provides a way to further qualify and test the match between strategic motives and fulfillment in terms of perceived quality of location factors.

In other words, do firms which value cost advantages as very important also find the local quantitative supply of labour in the different employee-categories to be of a sufficient quality? Is it also possible to ascertain which of the employee-categories are in good supply for those investors and which ones are not?

Table 8.1 shows that the socio-cultural environment assumes the highest quality level in the assessment of FDI across all the CEECs and location factors. This is followed by the potential for technological co-operation and the quantitative supply of labour.

The location factor of availability of state support is the comparatively weakest. This finding suggest that foreign investors expect more from their affiliate. Whether this is important or not for policy-making remains open. Foreign investors almost always accept state support for their investments and their technological activities. The important question, however, is whether investors come because of the subsidies or take an interest in the host economy that goes beyond subsidies, which brings the analysis back to the issue of quality versus quantity in attracting FDI. Not least, European state aid rules strictly limit the possibilities in this respect. Distinguishing between our five host economies, compared with the rest of the population, the survey reveals that foreign investors in Romania are the least content with the provision of state support, both for the two categories of investment subsidies and financial incentives for R&D and innovation. This result may indicate either a lesser quality in the provision of state support that is more or

less granted for all investments into the EU, or that investors in Romania expected more support. By contrast, investors in Hungary are significantly more content with the quality of state support, for both categories.

The supply of low qualification workers and the supply with qualified personnel also appears to be less of a problem than is the case for apprentices or trainees and junior employees with university degrees. In all four categories of employees, foreign investors in the Czech Republic are comparatively less content, even significantly so for apprentices or trainees and junior employees with university degrees, whereas in Hungary and Poland, junior employees with university degrees turn out to be significantly better supplied than in the respective rest of the population. In Poland, this equally applies to trainees, and in Romania, young university graduates appear to be more difficult to get. When differentiating between the industry-groups (manufacturing and selected services) soft location factors show statistically significant disparities.

Table 8.2 indicates that manufacturing firms are significantly less satisfied with the endowment of cultural offer, supply of health services, supply of housing and accommodation and the general image of the selected CEECs. The reason may be that manufacturing firms often locate in the periphery of agglomerations (commercial parks) where the supply with socio-cultural offers is less pronounced. Service firms often locate in the core of agglomerations (town and cities) where the socio-cultural environment is denser. Manufacturing firms also appear to be less satisfied with the endowment of all categories of labour force, except for the endowment with low qualified workers. In this case, satisfaction is significantly higher than that of firms providing services. A reason for this may be that the demand for qualified personnel is higher in the manufacturing sector while there is a greater need for low qualified workers in services. Manufacturing firms are also relatively less satisfied with the availability of state support and the potential

for technological co-operation. Co-operation with local public and private science institutions is statistically significant, which indicates that there is a need to improve FDI policy.

4.2.4 Endowment with location advantages and investment motives in the CEECs

Tables 8.1, 8.2, and table 4.8 ask whether the valuations by foreign investments of qualities of location advantages of host economies relate to their strategic investment motives. If foreign investors that seek cost advantages view the supply with personnel and the availability of state support for their investment as particularly positive. Those investors holding that cost advantages are 'very important' also assess the supply of low qualified personnel as being significantly better than all other investors for which cost advantages are not 'very important', that is, either value that motive as 'important', 'less important', or even 'not important'. This appears not to be the case for apprentices or junior employees with university degrees (with a negative deviation to 'the rest', even if not significant) nor for qualified employees (with a positive sign, yet not significant).

The negative deviations for middle-qualification employees suggest a mismatch: The expectation of foreign investors is not fulfilled. Cost advantage seekers also find state support to be of better quality than all other foreign investors, this however, with a small margin and not significant. Cost advantages were particularly relevant for investors in Romania from the point of view of the host country (see table 4.6). State support was felt to be particularly weak and the assessment of the supply of labour is mostly negative (see table 8.1). Foreign investments into Slovakia, also comparatively more cost advantage-seeking (see table 4.6), appear to be quite satisfied with the supply of labour (apart from

labour at the lower end of the qualification-spectrum), even if not with significant deviations.

Foreign investors seeking access to localised technology and knowledge are expected to find a good match with their strategy if they were to positively assess the quality of potentials for technological co-operation. While this appears to be the case (positive deviations, more so with regard to science institutions, not so much with other firms), the deviations are, however, not statistical significant. It seems that local market seekers and foreign investments trying to reap scale economies assess technological co-operation potentials higher than in fact technology-seekers. In this case, the local economic community appears technologically more active with other local firms than with the foreign investors. Foreign investors in the Czech Republic were particularly interested in localised technology and knowledge (see table 4.6), and were also comparatively more satisfied with potentials for co-operation with science local institutions (statistically significant).

Hence, results reveal the kind of positive match that policy should take as a momentum of strength in their efforts to attract FDI. Other local firms where important for fulfilling the expectation of foreign investors. In Slovakia, the opposite is true. Foreign investors also look out for access to localised knowledge and technology (see table 4.6), yet seem to find this less with scientific institutions but rather (and significantly so) with other local firms. Finally, foreign investments that search for local technology, on product diversification, and on market access that place particular weight on those soft location advantages often prove to be so important in the decision-making of foreign investors.

Table 4.8: Endowment with location advantages assessed by foreign investments in the CEECs, distinguished by investment motive

	Market access n=254	Cost advantages n=225	Scale economies n=172	Product diversification n=161	Access to technology n=130	Access to natural resources n=78
	deviation	deviation	deviation	deviation	deviation	deviation
Quantitative supply of labour						
Low qualification-workers	0.04	0.14**	0.01	-0.10	0.02	-0.03
Apprentices (trainees)	0.09	-0.07	0.04	0.03	0.12*	0.07
Junior employees with university degrees	0.03	-0.06	0.03	-0.06	-0.06	0.00
Qualified employees	0.26***	0.10	0.08	0.18**	0.12	0.03
Availability of state support						
Investment subsidies	0.02	0.01	-0.02	0.01	0.07	0.03
Financial incentives for R&D and innovation	0.02	0.06	0.13*	0.05	0.15*	-0.01
Potential for technological cooperation						
Local public and private science institutions	0.03	0.01	0.05	-0.03	0.10	-0.02
Other local firms	0.14**	0.04	0.09*	0.09*	0.03	0.14**
Socio-cultural environment						
Culture on offer	0.16**	-0.01	0.10	0.08	0.27***	-0.03
Supply of health services	0.09	-0.06	0.02	0.21**	0.14**	0.06
Supply of housing and accommodation	0.11**	0.04	0.09	0.19**	0.05	0.03
No hostility against foreign workers	0.18**	0.09*	0.18**	0.04	0.03	0.04
Supply of child-minding facilities	0.08	-0.03	0.11*	0.14*	0.16**	0.06
Image of the region in general	0.13**	0.03	0.09	0.15**	0.19***	0.02

Notes: Deviations are defined as difference between the average of the group of firms who value the strategic motive as "very important" and the firms that value this motive as either "important", "less important", or "not important". * is significant at the .1 level, ** at the .05 level and *** at the .01 level.

Source: Own calculations; *IWH FDI Micro database* 2009. Results of the whole sample are presented in table 8.1.

5 Regional determinants of MNEs' location choice

This chapter is organised as follows: It gives a short overview of the current state of research and the (enterprise and regional) data. It then empirically analyses regional determinants - agglomeration and labour market factors in particular - of MNEs' location choice, using the example of East Germany, Poland, and the Czech Republic and applying a conditional logit approach. In a last section, results are discussed. This chapters' research questions are: Which region-specific location factors influence foreign investment in European post-transition economies? Do these regional determinants differ depending on the country's level of transition? How important are regional agglomeration economies and efficiency-related determinants for the location choice of foreign investors in post-transition economies?

5.1 Current state of research and hypotheses

The discussion about FDI in East European regions and East Germany was dominated in the past by market access, quality of the local institutions and the degree of political and economic stability in these countries (Resmini 2000).[13] Only

13 This chapter has been published in a similar expression as Gauselmann and Marek (2011) and in a similar expression as Gauselmann and Marek (2012). Published here with kind permission of Springer Science and Business Media.

in recent years have regional location determinants been taken into account when looking at the location choice of MNEs.

In order to analyse MNEs' location decisions reliably, a range of regional characteristics has to be taken into consideration. Agglomeration effects and labour market factors are among the most important determinants in international FDI research (see e. g. Bellak, Leibrecht, and Riedl 2008; Barrios, Goerg, and Strobl 2006). This chapter follows this line of research and empirically identifies the influence of different agglomeration, labour market and other region-specific characteristics on the location choice of MNEs in post-transition economies. To explain MNEs' regional location choice in post-transition economies adequately, this chapter considers in the following the two most important streams of literature.

The first stream emphasises the importance of agglomeration economies on regional development and attraction of investment from abroad (Cantwell 1989; but also Krugman 1991; Dunning and Lundan 2008). Following Marshall (1920), agglomeration effects are made up of three main factors: labour market specialisation, supplier linkages and knowledge spillovers. In the context of the regional attractiveness for FDI, agglomeration economies describe a positive correlation between a region's ability to attract further investors and the number of firms already existing in a specific sector.

In contrast, Crozet, Mayer, and Mucchielli (2004) theoretically show that the agglomeration effect depends on a trade-off between the positive externalities and the negative impact of competition. Empirically, the former effect seems to dominate as recent studies have shown. At a national level a significantly positive impact of agglomeration economics on the attractiveness of FDI in economically developed countries is shown by Disdier and Mayer (2004) and Basile, Castellani, and Zanfei (2008) in the case of Europe, on regional levels by Crozet, Mayer, and Mucchielli (2004) for France, Barrios, Goerg, and Strobl (2006) for Ireland,

and Guimarães, Figueiredo, and Woodward (2000) for Portugal. In terms of post-transition economies, regional agglomeration economies also turn out to be one of the most important determinants for the spatial distribution of FDI as show Pusterla and Resmini (2007) for the CEE region, Chidlow, Salciuviene, and Young (2009) for Poland, Hilber and Voicu (2010) for Romania, and Boudier-Bensebaa (2005) for Hungary.

Drawing on Cantwell's technological accumulation approach (Cantwell 1989 and also in-line with Krugman's new economic geography Krugman 1991) three hypothesis are established in this chapter on the detailed impact of agglomeration economies on MNEs' location choice, regarding regional specialisation, regional supplier linkages, and knowledge spillovers.

This leads to the first set of hypotheses:

Hypothesis 1a: The specialisation of the regional workforce in the sector of investment is positively associated with the location of FDI in post-transition economies.

Hypothesis 1b: The potential for supplier linkages is positively associated with the location of FDI in post-transition economies.

Hypothesis 1c: The potential for knowledge spillovers is positively associated with the location of FDI in post-transition economies.

The second stream of literature focuses on location factors in post-transition economies. From a theoretic perspective investment motives of MNEs can be classified in four groups according to Dunning and Lundan (2008): market seekers, efficiency seekers, strategic assets or capability seekers and natural resource seekers. Chapter 4 shows that MNEs' investment into European post-transition economies is still dominated by market- and efficiency seeking motives; the search for local knowledge is of secondary importance and natural resource seeking is

least important (Gauselmann and Marek 2011). While market-seeking investment motives are presumably important for foreign investment in general, it has been shown that FDI has especially been attracted to the post-transition economies by the endowment with production factors, especially the availability of a skilled workforce at relatively low labour costs (Gauselmann and Marek 2011; Chidlow, Salciuviene, and Young 2009; Resmini 2000; Bevan, Estrin, and Meyer 2004; Galego, Vieira, and Vieira 2004). Chidlow et al. (2009) find a strong positive impact of efficiency-seeking local determinants for Poland and Galego, Vieira, and Vieira (2004) find evidence on this impact for all CEECs.

This leads to the second set of hypotheses which deal with efficiency-seeking investment strategies and the regional location of FDI:

Hypothesis 2a: A high regional wage rate in the sector of investment is negatively associated with the location of FDI in post-transition economies.

Hypothesis 2b: The availability of human capital in the region of investment is positively associated with the location of FDI in post-transition economies.

Taking the economic differences in the economic performance between transition and western industries into account, the results of the numerous FDI location studies on western countries might not apply for post-transition economies. With respect to the regional level of analysis, Cantwell's technological accumulation approach emphasises the importance of industrial linkages at the regional level in the decision-making process of firms. Hence, it is straightforward to analyse the importance of agglomeration economies on a regional rather than on a national level. This is why in this study, MNEs are assumed to make their location decisions based on the level of the European Union's regional statistical units (NUTS-2 region)[14]. A conditional logit model is applied to estimate the location

14 The empirical analyses of the thesis (chapter 5 and chapter 6) are based on data on the sub-national level, referring to EU-standards of territorial divisions, the so-called NUTS (NUTS: Nomenclature des unités territoriales statistiques (Nomenclature of territorial units for statistics))

choice of FDI in the 33 NUTS-2 regions in East Germany, the Czech Republic and Poland.[15]

This chapter contributes to empirical literature on location choice of MNEs through a combination of four research characteristics. Firstly, it increases the explanatory power regarding post-transition economies by providing a multi-country study on a regional level, whereas the majority of former studies analyse location determinants on a macro level or on the regional level for merely one single country. Secondly, it focuses on the influence of regional *and* transition specific determinants - the effects of agglomeration and efficiency seeking factors in particular - on foreign investors' location choice of FDI. Thirdly, it allows a cross-sectional comparison, because the heterogeneous character of foreign investments suggests to analyse whether location choice in the manufacturing and service sector is driven by different regional factors and motivations (Galego, Vieira, and Vieira 2004). Most former analyses, however, focus on manufacturing plants only. Fourthly, it exploits a data set of regional, sectoral and subsidiary-level data. The subsidiary-level data is drawn from a unique, very large and up-to-date data set, the population of the *IWH FDI Micro database*, while in former research variables have mainly been firm-specific, region-specific *or* industry-specific.

5.2 Estimation approach

A MNE bases its decision to invest abroad on at least three things (see, e. g., Basile, Castellani, and Zanfei 2008). Firstly, the MNE decides whether to serve a foreign

levels, which are divided in NUTS 0 (national states), NUTS 1 (major socio-economic regions), NUTS 2 (basic regions) and NUTS 3 (small regions). See also www.eurostat.eu/European Commission/Eurostat/NUTS - Nomenclature of territorial units for statistics/Introduction.

15 Poland and the Czech Republic belong to the so-called Visegrád States. The Visegrád States are the economically most powerful countries in CEE and comprise Poland, Slovakia, Hungary, and the Czech Republic. They represent a rather homogeneous group within the CEECs because of their relatively strong orientation to the capitalist West (Detscher 2006).

market. Secondly, the MNE takes the decision on how to serve this market. This investment can be implemented through exports, joint ventures, licensing, or FDI. Thirdly, the investing company chooses a region for its foreign investment. In this chapter, the location choice of a MNE, which has on a national level already decided where to invest, is analysed. It faces the decision of choosing one or more of the $j \in J$ regions as the location for its foreign investment by focusing on the impact of agglomeration economies and efficiency-seeking factors.

The analysis is based on a conditional logit approach. In this approach, the location choice is based on a stochastic utility maximization process for a MNE which results from the choice of region as a subsidiary location selected from a set of possible regions of the sample. Following Greene (2003) and Train (2009), it is assumed that the MNE chooses the region where it expects to make the largest profit. In this analysis, the deterministic part of the profit function is made up by alternative choice-specific regressors (e. g. GDP or the industrial structure in a specific region). The stochastic and unobservable part of the equation is represented by an error term. The latent individual profit function, π_{ij}, of MNE i ($i = 1, ..., I$) for region j ($j = 1, ..., J$) can be described by the following equation where z_{ij} denotes the choice-specific regressors and e_{ij} the individual unobservable error term:

$$\pi_{ij} = z'_{ij}\beta + e_{ij}. \tag{5.1}$$

By definition, the MNE i chooses the region j, which exceeds the expected profits of all the other regions $l \in J$, with $l \neq j$. Assuming that the location choice equals

one for the region chosen by the MNE, and otherwise zero, leads to the following probability function (see Train 2009):

$$P_{ij} = \text{Prob}(\pi_{ij} > \pi_{il} | l \in J) = \text{Prob}(e_{ij} > z'_{il}\beta - z'_{ij}\beta + e_{il} | l \in J). \tag{5.2}$$

Applying a Gumbel type I extreme value distribution for the unobserved part of the error term $F(e_{ij}) = \exp(-\exp(-e_{ij}))$, with independently distributed error terms among the alternatives, allows to estimate a logit model.[16] Following McFadden (1973), a transformation of the distribution leads to the probability equation of the conditional logit:

$$P_{ij} = \frac{\exp(z'_{ij}\beta)}{\sum_{l=1}^{J} \exp(z'_{il}\beta)}. \tag{5.3}$$

5.3 Empirical analysis

5.3.1 Data and estimation design

The data set consists of information on 33 NUTS-2 regions listed in table 8.3 of the appendix. It is constructed by merging the basic population of the *IWH FDI Micro database* with regional data from Eurostat, the European Patent Office (EPO) and the OECD databases. The data set contains regional information on foreign subsidiary locations, which does not preclude the case, that MNE realise more than one investment decision (respectively subsidiary) in the selected region(s). The structure of this section is driven by the division of the dataset, as enterprise data are discussed in subsection 5.3.2 followed by a description of the regional data in subsection 5.3.3.

16 This distribution is the foundation of all logit approaches. See Train (2009).

5.3.2 Enterprise data

To gain insight into the importance of local factors in determining real decisions to invest in post-transition regions, micro data on FDI into East Germany, the Czech Republic and Poland from the population of the *IWH FDI Micro database* is used. The East German sub-sample of foreign investors is supplemented by information on West German investors, since West German investment played a crucial role in the transition process in East Germany (see chapter 3). Table 5.1 lists the available information obtained from the *IWH FDI Micro database*.

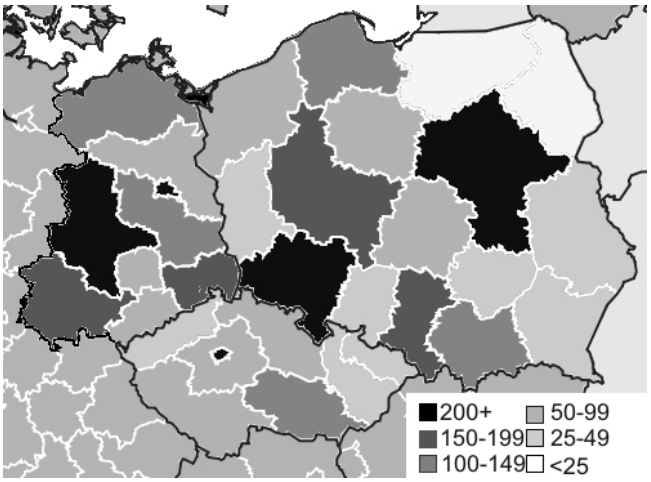
Table 5.1: Enterprise variables and their sources

Variable Name	Description	Source
Date of investment	Date of registration of the subsidiary in the register of commerce	IWH
Location of investment	Site where the subsidiary is registered	IWH
Branch of industry	Branch of industry according to NACE-1.1 classification	IWH
MNE's origin	Home country of the MNE	IWH

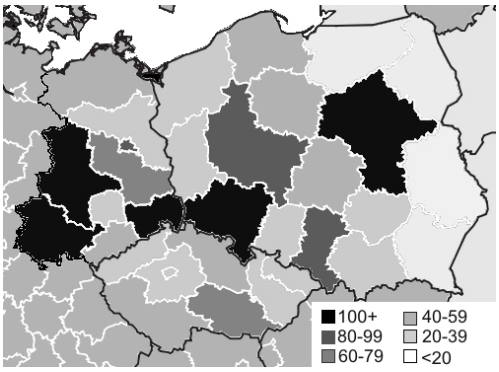
- Date of investment t: The date of investment is proxied by the date of registration of the subsidiary in the local register of commerce. Following Jindra (2011) and Spies (2010), it is assumed throughout the empirical analysis of this chapter that the investment decision was made the year before the subsidiary was entered in the register.
- Location of investment j: Each subsidiary of a MNE is allocated to a NUTS-2 region using the postal code of the subsidiary's registered address.
- Branch of industry k: This describes the industrial sector of the subsidiary according to the European Union's NACE 1.1. classification. This analysis focuses on the industrial production (NACE 1.1. Code 14-41)[17], wholesale, retail trade, transport (NACE 1.1. Code 51-64), financial intermediation and

17 Excluding construction.

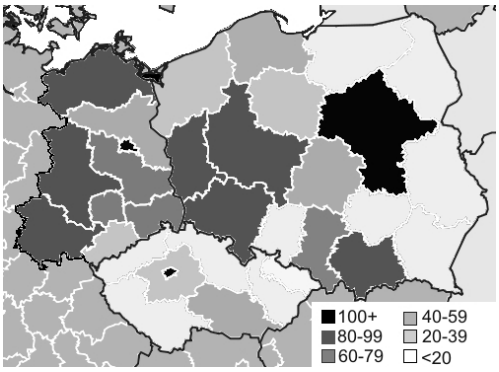
Figure 5.1: Spatial distribution of FDI per NUTS-2 region



Whole Sample



Industry



Services

real estate (NACE 1.1. Code 65-74), as well as sewage and waste disposal, media, utilities and other services (NACE 1.1. Code 90-93).

- MNE's origin: The country where the parent company of the subsidiary is registered.

Due to data availability reasons, which will be described in more detail in the following subsection, the analysis of investment decisions is restricted to a time period between 2000 and 2010. Hence, the sample contains 4,343 affiliates of MNEs, thereof 1,710 in East Germany, 710 in the Czech Republic and 1,923 in Poland. The agglomeration tendencies towards each capital region shown in figure 5.1 are mostly driven by a strong concentration of service FDI in the capital

regions, which account for around half of the national service FDI flows in each country.

Table 5.2: Distribution of foreign subsidiaries per country and branch

Investment location	Total	Industry NACE (14-41)	Service NACE (51-74 & 90-93)
East Germany	1,710	647	1,063
Czech Republic	710	316	394
Poland	1,923	774	1,149
Total	**4,343**	**1,737**	**2,606**

Source: *IWH FDI Micro database*.

As shown in table 5.2, around 40% of FDI goes to the industrial sector in each country. In terms of regional distribution of industrial FDI, figure 5.1 and table 8.3 show a more distributed pattern, indicating agglomeration in traditional industrial and developing high-tech regions, such as the regions around the cities of Dresden and Wroclaw as well as in the federal states of Thuringia and Saxony-Anhalt. Furthermore, figure 5.1 show that FDI flows to Poland and the Czech Republic are characterized by bias towards the West. FDI flows going to each eastern border region are relatively sparse, whereas the regions sharing borders with EU-15 countries attract more investment.

5.3.3 Regional data

For the econometric analysis regional information was added to the subsidiary-level data. As mentioned above, the sample was slightly reduced due to limited data availability. This reduction is mostly due to a limited availability of CEE regional statistics until the end of the 1990s. In order to maintain the quality of the regression results, all registrations before the year 2000 are omitted for this analysis. Furthermore, due to a restructuring of the NUTS-2 regions in East Germany in 2003, parts of the data for the regions Brandenburg-Nordost and Brandenburg-Südwest

are not available for the period before 2003. As a workaround, the missing data was calculated on the base of the relation between these two regions and the referring data of Brandenburg (NUTS-1).

Table 5.3: Summary of regional variables, their sources and expected impact on dependent variable

Variable	Description	Source	Expected impact
spec	Relative specialisation of region *j* in industry *k*	OECD/own calculation	+
herf	Herfindahl Index	OECD/own calculations	+
patent	Number of applied patents in region *j*	European Patent Office	+
capital	Dummy for capital region		+
wage	Compensation of Employees in industry *k* in 1,000 €	Eurostat	-
unemp	Unemployment rate in %	Eurostat	+
gdp	Market access (regional GDP in Mio. €)	Eurostat	+
mp	Market Potential (distance-weighted GDP of European markets)	Eurostat/own calculation	+
popdens	Population density in inhabitants/km^2	Eurostat	-
hrsto	Share of employees with a technical-scientific occupation	Eurostat	+
inf	Infrastructure-Index	Eurostat/own calculations	+
corp	Effective corporate tax rate in %	OECD	-
tax	Effective tax wedge in %	OECD	-
dist	Euclidean distance (km between capital of country of origin and major city in region *j*)	own calculation	+/-

In order to analyse the impact of **regional agglomeration** on a MNE's location choice, four measures are included in the regression. Firstly, the **relative specialisation**, $spec_{jk}$, measured by the share of employees in sector k of the total regional employment figure, accounts for the existence of intra-industry linkages prior to investment. This measurement goes beyond the specialisation of the regional labour market, since the size of the sectoral employment figures also incorporates the importance of sector k in region j.

Secondly, **supplier linkages** depend on a variety of inputs from suppliers. The regional economic diversity the region j is calculated by means of the Herfindahl Index, $herf_j$,

$$herf_j = \sum_{k=1}^{K} \left(\frac{\text{emp}_{jk}}{\sum_{l=1}^{K} \text{emp}_{jl}} \right)^2 \tag{5.4}$$

using the OECD's employment figures, emp_{jk}, from, $K = 31$, sectors specified by the NACE 1.1 Code (see Mukim and Nunnenkamp (2010) among others). As can

be seen from equation (5.4), a diversified economy in region j coincides with a low value in the Herfindahl Index.

Thirdly, the regional patent activity captures the technological performance and **potential knowledge spillovers** in region j. The patent applications collected by the European Patent Office are the basis for the calculation of the patent measurement depending on the origin of the inventors of the registered patents. In order to avoid double counts of multi-investor patents, the patent measurement refers to a fractional counting (Frietsch, Schmoch, et al. 2011). This implies that regional patent activity also depends on the amount of inventors per patent. Since the data of the European Patent Office provide patent data for the industrial sector, the patent measurement refers to the general patent activity in a region.

Finally, a dummy for **capital regions**, *capital*, controls for capital specific characteristics, capturing the influence of omitted agglomeration factors on the location choice decision (e. g. institutions of bilateral relations, like chamber of foreign trade, embassies etc.).

In order to analyse the impact of **regional efficiency seeking location factors on a MNE's location choice**, two measures were included in the regression. **Labour costs** in industry k in region j, $wage_{jk}$, are measured by compensation per employee. Data from Eurostat's labour Cost Survey, which are only collected every four years, are not appropriate for the purposes of this analysis especially as the survey did not include regional wage data from the EU's new member states until 2004. As outlined by López Rodríguez and Faíña (2007), this problem can be solved by calculating the regional wage level in different industries, w_{jk}, by using national account data and industrial employment figures to get a proxy for the *compensation per employee*. This variable allows for a differentiation of the wage

level across eight industrial sectors driven by the NACE 1.1 code.[18] Furthermore, the **unemployment rate** of a region, $unemp_j$, is used as an additional labour market factor for explaining location choice.

Market seeking, strategic asset seeking and institutional variables, which cover regional GDP, market potential, population density, a human capital measure for skilled labour, infrastructure, corporate tax, taxes on labour and the geographical distance between the MNE's country of origin and the region of investment were also included into the analysis. These latter variables are standard determinants to be included in location choice analyses and mainly serve as **control variables** in the estimation.

5.3.4 Empirical results

This section presents the results of the regressions described above. Firstly, the conditional logit estimates for the whole sample are shown in table 5.4. The first three columns of table 5.4 contain the regression results for each group of explanatory variables, whereas column 4 shows the regression results for the complete set of variables. Secondly, table 5.5 contains the regression estimates for the national and sectoral sub-samples. The first three columns of table 5.5 list the estimates for each country. The last two columns refer to the sample's division into two sectors: The industrial sector (Nace 1.1 Code 14-41) and the service sector (Nace 1.1 Code 51-74 and 90-93).

Regarding the **regional agglomeration factors** of the empirical analysis, in the complete sample, the significantly positive **specialisation coefficient** indicating intra-industry linkages is in-line with theory, implying that a region becomes more

18 The Polish sectoral wage rates could not be calculated for the year 1999 since the Polish sectoral employment figures have only been available since 2000. Hence, for the Polish investment decisions in 2000, an all-sectoral wage rate was used in order to extend sample size.

Table 5.4: Conditional logit for the whole sample and country combinations

Explanatory Variables	(1)	(2)	(3)	Whole sample (4)
lnspec	0.369***			0.341***
	(0.0238)			(0.0238)
lnherf	-1.183***			-0.550***
	(0.113)			(0.133)
lnpatent	0.264***			0.0203
	(0.0228)			(0.0286)
capital	1.838***			0.968***
	(0.0692)			(0.0959)
lnwage		1.355***		0.413***
		(0.0672)		(0.0729)
lnunemp		0.292***		0.275***
		(0.0760)		(0.0807)
lngdp			1.489***	0.778***
			(0.0334)	(0.0627)
lnmp			-0.0955	0.577***
			(0.147)	(0.179)
lnpopdens			0.177***	-0.204***
			(0.0344)	(0.0505)
lnhrsto			2.268***	0.762***
			(0.138)	(0.233)
lninf			0.155	0.348***
			(0.114)	(0.127)
lncorp			1.216***	1.171***
			(0.208)	(0.213)
lntax			0.329	-0.156
			(1.434)	(1.473)
lndist			-0.0385	-0.0482
			(0.0510)	(0.0499)
Investments	4,343	4,343	4,343	4,343
Log-Likelihood	-13375	-13777	-13419	-13186
Pseudo R^2	0.170	0.129	0.151	0.158

Source: *IWH FDI Micro database*.
Conditional Logit Estimation. Dependent Variable: Location choice for Region *j*.
Standard errors in parentheses. Significance level: ***p<0.01,**p<0.05,*p<0.1.
Country-Dummies in regression are not shown in the table.

attractive with increasing economic activities in the target sector of investment. In all national and sectoral sub-samples (see table 5.5) the sectoral employment share of the total workforce is also significantly positive. These results suggest that indeed a specialisation of the regional workforce in the sector of investment is positively associated with the location of FDI in post-transition countries (H 1a).

The coefficients for the **inter-industry linkages** represented by the Herfindahl Index are significantly negative for the whole sample and the sectoral sub-samples, and negative but insignificant among national sub-samples.[19] This implies that an

19 A high diversification does not necessarily exclude potential inter-industry linkages.

economic diversification seems to be beneficial for a region's competitiveness to attract FDI (H 1b). The third agglomeration variable - **potential for knowledge spillovers** measured as the number of patents applied for in region *j* - is also positively significant in the first estimation (column 1), but proves to be insignificant on the whole as well as in all national and sectoral sub-samples. This shift in significance can be explained by the fact that this agglomeration variable reflects the region's economic potential and is therefore in correlation with the regional GDP (see table 5.4), so that it turns insignificant as soon as the GDP is added to the analysis. The impact of knowledge spillovers as determinants for FDI location in post-transition countries is rather ambiguous (H 1c) and needs further consideration. The last variable concerning agglomeration effects, the dummy for **capital regions**, is mostly significantly positive. This implies that additional, unobserved characteristics for capital regions seem to drive the MNE's decision (H 1d). This could include institutions of bilateral relations.

Results of the **regional labour market factors** show, that, in the whole sample, the **wage rate** proves to be significantly positive in estimation (2) and remains significantly positive in the complete sample estimation. A deeper consideration is necessary when discussing the significantly positive influence of the wage rate level. Intuitively, a cost-seeking investment is deterred by a high sectoral wage rate. However, the results from recent studies on the impact of the wage rate on the location choice are ambiguous.[20] Guimarães, Figueiredo, and Woodward (2000) stress that the impact of the wages should be checked for other variables such as labour productivity, the skill level and the educational background of the workforce.

20 On the one hand, Basile, Castellani, and Zanfei (2008) found a negative impact of the wage rate, which was not significant among all models, while on the other hand Barrios, Goerg, and Strobl (2006) actually observed a positive influence of wage.

Looking at the wage rates of the countries in the sample (see table 8.4) it can be observed that, on average, the wage rate in East Germany is three times higher than the corresponding wages in the Czech Republic or Poland. This difference can hardly be explained by differences in the qualification of the regional labour force, represented by the share of employees with a scientific-technical occupation, since the proportions in East German and the Czech Republic are nearly identical. A possible explanation may be found by looking at differences in productivity and the endowment of capital; however, obtaining reliable information on this topic proves to be rather difficult. Paqué (2010) points out that labour productivity in Poland and the Czech Republic has so far only reached 35% and 38% of the German level respectively, while the productivity of the East German economy is between 75% and 84% of the average German labour productivity. In the case of the East German sample in our estimation a higher regional wage rate turns out to be significantly negative as expected in hypothesis H 2a. This indicates somewhat that FDI in East Germany is rather cost-sensitive, which can partly be explained by the comparatively high wage level in East Germany. Furthermore, FDI in the manufacturing sector proves to be more cost-sensitive than in the service sector. This explains that even in post-transition economies a higher regional wage rate in the sector of investment is not always negatively associated with the location FDI (H 2a can not be verified).

OECD and Eurostat (2008) hold that wages in subsidiaries of MNEs are often higher compared to domestic firms, because of MNEs' higher productivity due to its greater technological know-how. The wage effect seems larger for developing countries, where the technology gap between foreign and domestic firm is especially pronounced. Other empirical literature (e. g. Girma and Görg 2007) on the firm-level has indeed shown that wages in foreign subsidiaries are higher for both employees in the manufacturing and the service sector. This could imply wage spillover effects between MNEs' subsidiaries and the domestic enterprises, which

would arise an endogeneity problem. An increasing number of recent studies on the worker-level have challenged these results, however. They find, that there is a very small, if any, positive effect on individual workers income (OECD and Eurostat 2008). It seems that MNEs' subsidiaries do pay higher wages because - due to their higher productivity and greater technological know-how - they employ in general better educated personnel than domestic enterprises. When taking the single employers' level of education into account, however, there seems to be no difference in pay between MNEs' subsidiaries and local enterprises. Hence, the question of endogeneity can be neglected.

The effect of the **unemployment ratio** is ambiguous across sub-samples. The significantly positive coefficient in the complete sample shows that the availability of human capital in the region of investment is positively associated with the location of FDI in post-transition economies (H 2b). In combination with the finding that human resources seem to be more important for manufacturing sector FDI than for investments in the service sector, one could conclude that efficiency seeking factors for FDI are more important in industrial production than in services. Nevertheless, this result has to be interpreted carefully, since the analytical division into two sectors, services and manufacturing, is quite crude and does not account for the heterogeneous structure within the sectors themselves.

Regarding the control variables, in the entire sample, **market access** and **market potential** have a significantly positive impact and increase the location probability of FDI. The GDP's impact is also significantly positive for all sub-samples, while market potential only has a positive impact on a location's attractiveness for FDI from the manufacturing sector. In the East German sample the latter even shows a significantly negative impact which might be explained by its closeness to the economically powerful West European markets and the geographic distribution

of FDI in East Germany. This result leads to the conclusion that access to the immediate region seems to be more important for the location decision than the exporting possibilities from the chosen location to the major European markets. The population density as third market variable has a negative coefficient throughout the samples and partly highly significant so.

Despite its predominantly positive impact, the control for **labour skills** by means of the aggregate share of employees with a scientific-technical occupation appears to be insufficient to capture differences in productivity. Nevertheless, the results indicate that the educational qualifications of the regional workforce raises the location probability of FDI.

Table 5.5: Conditional logit for each country and branch

Explanatory	National Sub-samples			Sectoral Sub-Samples	
Variables	DE (5)	CZ (6)	PL (7)	Industry (8)	Service (9)
lnspec	0.511***	0.610***	0.162***	0.225***	0.170***
	(0.0531)	(0.0903)	(0.0380)	(0.0375)	(0.0358)
lnherf	-0.0510	-0.174	-0.254	-0.650***	-0.612***
	(0.401)	(1.051)	(0.343)	(0.208)	(0.186)
lnpatent	0.151	-0.119	0.0416	0.0432	-0.0198
	(0.0989)	(0.103)	(0.0377)	(0.0408)	(0.0408)
capital	0.399	1.350	0.655***	0.481***	1.187***
	(0.638)	(2.366)	(0.186)	(0.149)	(0.136)
lnwage	-0.431**	1.591***	1.121***	-0.387*	0.156
	(0.186)	(0.283)	(0.156)	(0.203)	(0.104)
lnunemp	0.896**	0.440	-0.405*	0.448***	0.0564
	(0.386)	(0.488)	(0.228)	(0.122)	(0.116)
lngdp	1.144***	3.016***	1.000***	0.961***	0.887***
	(0.219)	(0.798)	(0.111)	(0.0916)	(0.0921)
lnmp	-0.855*	-0.393	0.453	0.527**	0.262
	(0.488)	(1.640)	(0.527)	(0.257)	(0.263)
lnpopdens	-0.234	-0.684	-0.568***	-0.342***	-0.0932
	(0.190)	(0.580)	(0.221)	(0.0766)	(0.0743)
lnhrsto	1.442**	-0.984	-0.189	0.560*	1.376***
	(0.658)	(0.889)	(0.331)	(0.324)	(0.339)
lninfra	0.352	-0.422	0.743*	0.399**	0.142
	(0.510)	(0.945)	(0.384)	(0.192)	(0.191)
lncorp				1.381***	1.370***
				(0.344)	(0.276)
lntax				1.634	1.553
				(2.363)	(1.927)
lndist	-1.110***	-0.766***	-2.169***	-0.253***	0.0833
	(0.181)	(0.260)	(0.207)	(0.0785)	(0.0672)
Investments	1710	710	1923	1737	2606
Log-Likelihood	-3267	-1200	-4022	-5733	-7218
Pseudo R^2	0.362	0.413	0.391	0.083	0.214

Source: *IWH FDI Micro database*.
Conditional Logit Estimation. Dependent Variable: Location choice for Region *j*. Standard errors in parentheses: ***p<0.01,**p<0.05,*p<0.1. Country-Dummies used in columns ALL are not displayed.

The **infrastructure** coefficient for the whole sample is significantly positive, whereas the infrastructure's impact within each country is insignificant except in the Polish case. This result indicates that regional infrastructure investments can increase the attractiveness of the region itself and that of its direct neighbouring regions at the same time. Hence, the impact of infrastructure investments on the attraction of FDI appears to be rather on a national level rather than on a regional level. In contrast to the majority of location choice studies[21], the impact of the population density is predominantly negative; there is a significantly negative impact on the entire sample and for the industrial sub-sample. Nevertheless, the choice of the population density as a proxy for land prices has to be interpreted carefully.

The **regional proximity** to the MNE's headquarter does not seem to matter in the complete sample. Previous studies on single countries suggest that most investments occur in countries close to the MNE's country of origin and that the geographical proximity to the MNE's headquarter has a positive impact on the location choice (see, e. g., Crozet, Mayer, and Mucchielli 2004). The results of the national sub-samples in table 5.5 confirm these results. Nevertheless, in the complete sample, the distance measure has an insignificant impact. Hence, the impact of the geographic distance seems to depend from the choice of the sample as well as from the sectoral distinction. The significant negative sign in the industry sample can be explained by the transaction costs, which are higher in the manufacturing than in the service sector.

The results for the **fiscal policy** variables in tables 5.4 and 5.5 draw an ambiguous picture, since the impact of the corporate tax rate is significantly positive, while the impact of the tax wedge on labour is insignificant. These results are in-line with several other studies (see, e. g., Basile, Castellani, and Zanfei 2008), which

21 See e. g. Basile, Castellani, and Zanfei (2008) or Spies (2010) who have found an insignificant or even positive impact of population density on the location choice.

stress the importance of the provision of public goods for location decisions by foreign investors. This explanation serves only in part for this sample since the corporate tax rate accounts only for a small share of the federal tax revenue in the sample's countries. If business promotion and/or business related public services were directly financed by corporate taxes, the significantly positive effect of this taxation could be partly explained.

Tables 5.4 and 5.5 show also the log likelihood and Pseudo R^2 of the final model of each particular specification. Further, they report the number of observations included in the empirical analysis. Log likelihood can only be compared if the number of observation in the model concur. This is the case in specification (1) to (4), where log likelihood increases. This implies that log likelihood is maximised in specification (4). To check for the model's explanatory power, a predicted probability test has been applied. The share of correct predictions of the applied model is around 17%, which means that in almost one-fifth of the cases the model reproduced consistent results about the investment decisions of MNE's. A random selection would predict around 3% correct investment decisions. Thus, the applied empirical model improves this share due to the information value of relevant explanatory variables.

5.4 Discussion

The results on **agglomeration economies**, such as sectoral specialisation, a certain potential for supplier linkages and the potential for knowledge spillovers in a region show, that they belong to the most important pull factors for FDI in post-transition regions. Furthermore, the predominantly significant positive impact of the capital dummy shows that there are additional, unobserved - most probably institutional - agglomeration factors which drive FDI to the capital regions. This

supports the well established results for developed countries, which e. g. Basile, Castellani, and Zanfei (2008) find in their analysis on 50 NUTS-1 regions in France, Germany, Ireland, Italy, Spain, Portugal, Sweden and the UK or Crozet, Mayer, and Mucchielli (2004) show in their study on 92 regions in France.

For the post-transition economies Hilber and Voicu (2010) find in an analysis on 1,540 foreign-owned subsidiaries in Romanian regions between 1990 and 1997 that industry-specific and service agglomerations have a positive impact on location choice of MNEs while no evidence is found that diversity of the industry structure attracts FDI. They limit their analysis to Greenfield investments, however. Pusterla and Resmini (2007) use information on 4,103 subsidiaries in Bulgaria, Hungary, Poland and Romania during the 1990s on the NUTS-2 level and find a positive impact of agglomeration economies on FDI, too, focusing, however, like many other studies on the manufacturing sector. Concerning agglomeration economies the results show no differences in the impact on MNEs location choice for the post-transition regions. The results suggest that sectoral specialisation, diversification and economic and technological performance of the target region are important location factors for investors in post-transition regions, in the manufacturing as well as in the service sector.

In addition, the **efficiency seeking factors** prove to play an important role in the location of FDI in post-transition economies. In contrast to most existing studies on location choice into CEECs (see, e. g., Cieslik 2005; Pusterla and Resmini 2007) - but in-line with Hilber and Voicu (2010) - the estimates in this analysis show that higher wages do not *per se* distract investors. They can even have a positive impact as long as higher wages go along with offsetting factors such as high endowment of capital and higher productivity of the workforce, as found in this study for Poland and the Czech Republic. This underlines the importance of education for attracting FDI, especially regarding the economically more sustainable FDI in more advanced

sectors of the economy. The positive result for East Germany in this category suggests that East Germany's present and future could lie in the exploitation of competitive advantages and a highly educated and specialized workforce rather than in acting as the extended workbench for other, more industrialized countries.

These results suggest that FDI into post-transition regions is (no longer) only dominated by efficiency seeking behaviour, but - besides market seeking motives - also by strategic asset or capability seeking behaviour which seems especially true for East Germany and for the service sector, where obviously well equipped labour is an important location factor. These results are in-line with Chidlow, Salciuviene, and Young (2009) who find in a regional sample of 91 foreign subsidiaries in 2005, that knowledge seeking factors are among the most important drivers for FDI into Poland. Pusterla and Resmini (2007), however, find skills to have no effect on the probability of attracting FDI for the CEE region. Furthermore, the availability of labour in the region of investment is an important location choice factor in the complete sample, which supports results from Chidlow, Salciuviene, and Young (2009) and Pusterla and Resmini (2007). The influence of abundant human capital is especially positive in the manufacturing sector, which suggests that efficiency seeking determinants for foreign investments are more important in the industrial production than in the service sectors.

Finally, it seems that a country's position in the transition to industrialisation is important not only for the quantity but also for the structure of incoming FDI. Keeping factors reflecting the allocation of public goods, the educational background and productivity of the workforce in mind, it seems that countries finding themselves in different stages of the transition process attract FDI based on significantly different pull factors.

Since this analysis is based on a three-country data set, there is a potential for extending research into FDI pull factors to further regions, such as additional post-transition countries. Since the enterprise data contains information about the MNE's headquarter and the subsidiary, there is research potential in controlling the location decision of a MNE for bilateral trade and business relations or for investor's country of origin. Empirically, the estimation could be enhanced by bilateral data as well as by investor-specific variables to gain insight into the interaction between investor-specific and regional characteristics.

6 MNEs and regional R&D co-operation

This chapter is organised as follows: It gives a short overview of the current state of research and the data. Then, it empirically analyses regional R&D co-operation between foreign subsidiaries and indigenous partners in East Germany and the selected CEECs using a logit estimation approach. In a last section this chapter's results are discussed. This chapters' research questions are: Does a knowledge and technology transfer take place between the foreign subsidiaries and the domestic economy in post-transition Which firm- and region-specific determinants influence technological linkages between foreign subsidiaries and the host economy in post-transition economies? Is the probability for R&D co-operation higher if both, the region and the foreign subsidiary, are endowed with a high capacity to absorb and pass knowledge and technology?

6.1 Current state of research and hypotheses

The aim of this chapter is to contribute to the literature by investigating the determinants of R&D co-operation between the foreign subsidiaries of MNEs and enterprises in the region of location, thereby leading to a better understanding of which firm- and region-specific factors influence this co-operative behaviour.[22] Traditionally, research into the technological activities of the foreign subsidiaries of MNEs has concentrated on advanced economies. However, the institutional and economic changes in CEE and East Germany call for an investigation of

22 This chapter has been published in a similar expression as Gauselmann (2013).

the patterns in MNEs' technological co-operative behaviour in this particular region.

Chapter 4 shows that investment by MNEs in East European post-transition economies is dominated by market- and efficiency-seeking motives; the search for knowledge and technology is of secondary importance, but has gained increasing importance over time. Foreign and domestic technological activities - such as R&D, innovation and the exchange of knowledge and technology - are important factors in the post-transition countries' process of catching-up towards knowledge-based economies, which provide a basis for long-term sustainable economic growth (Fu, Pietrobelli, and Soete 2010; Perugini, Pompei, and Signorelli 2008). This chapter offers an analysis of 1,245 foreign subsidiaries based in Poland, Hungary, the Czech Republic, Slovakia, Romania and East Germany from the *IWH FDI Micro database*.

Until recently, literature has focused mainly on two aspects of technological linkages. One strand of literature is concerned with the impact of R&D co-operation on firm performance, focusing mainly on developed countries (Cassiman, Veugelers, and Zuniga 2010, Belderbos, Carree, and Lokshin 2004; Yamin and Otto 2004; Almeida and Phene 2004; Damijan, Kostevc, and Rojec 2010) and finds a positive impact on productivity and innovation. For example Belderbos, Carree, and Lokshin (2004) find that in Dutch firms R&D co-operation with competitors and suppliers improves the firm's performance and that customers and universities seem to be important sources of knowledge. Almeida and Phene (2004) examine the influence of external knowledge on innovation in subsidiaries in the U.S. semiconductor industry and find a positive impact on innovation from R&D linkages to host country firms, as do Cassiman, Veugelers, and Zuniga (2010) in the case of Belgian firms.

A second strand of literature deals with linkages between MNEs and various domestic partners in less developed economies (Giroud, Jindra, and Marek 2012; Gentile-Lüdecke and Giroud 2012; Jindra, Giroud, and Scott-Kennel 2009; Guenther, Stephan, and Jindra 2008b; Guenther, Jindra, and Stephan 2009; Santangelo 2009; Bucar, Rojec, and Stare 2009). Gentile-Lüdecke and Giroud (2012) focus on knowledge transfers from foreign subsidiaries to suppliers in the Polish automotive sector. They find a positive impact from the foreign subsidiary's autonomy and a negative impact on knowledge transfer to domestic suppliers from the foreign subsidiary's R&D intensity. Giroud, Jindra, and Marek (2012) investigate linkages between foreign subsidiaries and domestic suppliers and again find that the foreign subsidiary's autonomy and technological embeddedness are positively associated with knowledge transfer via supplier linkages.

Jindra, Giroud, and Scott-Kennel (2009) focus on linkages between foreign subsidiaries and domestic suppliers and customers using survey evidence on foreign subsidiaries in the CEE region. Their results show that the extent of knowledge and technology transfer via supplier and customer linkages is closely related to the foreign subsidiary's mandate, its technological capability and its internal technological networks. Santangelo (2009) focuses on local linkage creation in a peripheral region in Italy. She adds information on the knowledge-sourcing mandate of the foreign subsidiary to her investigation and finds empirical evidence that linkages are more likely if the MNE enters the market with a competence-creating strategy. She distinguishes between linkages with local suppliers, customers and research institutions as do Guenther, Stephan, and Jindra (2008b), who focus on foreign subsidiaries' technology and knowledge sourcing in East Germany and find, too, that a competence-augmenting strategy increases the likelihood of linkages. In addition, they find that regional factors are associated with the technology and knowledge sourcing of MNEs, depending on the kind of knowledge sources.

This chapter adds to the literature in several ways: First, it focuses on determinants of technological - that is R&D- co-operation between foreign subsidiaries and domestic firms, that is suppliers, customers, and research institutions in the region of investment. Second, it focuses on post-transition economies. It argues that the process of catching-up in post-transition regions can only be supported if a technological interaction between MNEs' subsidiaries and domestic enterprises succeeds. Third, it exploits firm-level data from a unique and very large data set, the *IWH FDI Micro database*. And finally, it adds information on the regional knowledge stock to the information on foreign subsidiaries' heterogeneity, as research on economic geography has emphasized the importance of the sub-national level when examining technological capabilities. MNE strategies in the CEECs have been the subject of former analyses. However, no cross-country research has yet combined the analysis of firm-level with regional determinants to find out more about the interaction of firm and regional characteristics on R&D co-operation between foreign and domestic enterprises.

Cantwell's technological accumulation theory explains the internationalisation of enterprises emphasising the capability increase within a MNE (Cantwell 1989) (see also chapter 2). In line with this notion, the accumulation of technology signals an economic advantage for the MNE (Cantwell and Piscitello 2000), including both the acquisition of new skills and the generation of new technologies (Cantwell 1989; Cantwell 1995; Cantwell 2000). Cantwell (Cantwell 1989; Cantwell 1995) argues that, on the one hand, successful MNEs, generate spillover effects in the location of investment, increasing knowledge. On the other hand, these MNEs benefit from the technological environment which develops in the affiliate's location (Cantwell and Iammarino 1998, Cantwell and Iammarino 2001, Cantwell and Iammarino 2003).

In other words, Cantwell and others (see e. g. Cantwell 1989 or Kogut and Chang 1991; Grant and Baden-Fuller 2004) argue that the investment in foreign R&D is also motivated by the desire to improve the MNE's access to technology and to augment its economic advantage by deriving benefit from the technological environment of the foreign location. Cantwell's theoretic approach is therefore founded on the assumption that technological activities are location- as well as firm-specific (Cantwell 1989; Cantwell 1995).

As already mentioned, there is increasing consensus in literature that linkages to customers, suppliers and research institutions are essential for the accumulation of knowledge in MNEs and MNE subsidiaries (Filippov and Duysters 2011). Thus, the evolution of subsidiaries is part of a MNE's global corporate strategy and the subsidiaries' decisions on which knowledge resources to access is influenced by the operational mandate within the MNE (Almeida and Phene 2004; Liu 2010 or Santangelo 2009). According to Cantwell (1995), the traditional organisation of the MNE with unidirectional transfer of knowledge from the headquarter to the foreign subsidiaries is being successively replaced. Foreign subsidiaries are increasingly tied into a so-called 'double-network' of internal and external linkages in order to transfer knowledge and technology (Cantwell 1995; Zanfei 2000). Internal and external networks can co-exist, reflecting dynamic interdependence and complementarity (Castellani and Zanfei 2006) and the expansion of a MNE's international internal networking increases the potential of transferring knowledge and technology (Cantwell 1995; Figueiredo 2011). The competence-creation and knowledge-accumulation of the foreign subsidiary depends to a large extent on the degree of decision-making authority in the subsidiary, but also on the embeddedness of its technological activities within the MNE (Cantwell and Mudambi 2000; Frost, Birkinshaw, and Ensign 2002;Grant 1996).

Applying these assumptions to R&D co-operation, it is hypothesised for post-transition economies that:

H 1a: A foreign subsidiary's mandate in terms of R&D is positively associated with R&D co-operation in the region of location.

H 1b: A foreign subsidiary's internal technological embeddedness is positively associated with R&D co-operation in the region of location.

Furthermore, Cantwell and others argue that co-operative behaviour is related to strategic entry motivations (Kuemmerle 1997; Cantwell and Mudambi 2005; Dunning and Lundan 2008). They suggest that the subsidiary's competence-seeking mandate increases linkages with the domestic economy (Cantwell and Mudambi 2000).

This leads to hypothesis 2:

H 2: A knowledge- and technology-seeking investment motive in the MNE is positively associated with the R&D co-operation of its subsidiary in the region of location.

When explaining MNEs' motives to internationalise R&D, the resource-based view of the firm suggests that the position of a subsidiary within the MNE network is assigned not only by the headquarters but also by the subsidiary's own technological capabilities (Birkinshaw, Hood, and Johnson 1998; Jindra, Giroud, and Scott-Kennel 2009) and by the host country's location-specific advantages (Doerrenbaecher and Gammelgaard 2006; Jindra, Giroud, and Scott-Kennel 2009). This implies that the subsidiary's capabilities differ at least to some extent from those of the headquarters, depending on the particular geographical and economic setting in which they are located (Birkinshaw and Hood 1998 and Teece, Pisano, and Shuen 1997).

Literature on R&D internationalisation has documented the finding that highly innovative regions attract more technology-seeking foreign R&D (Cantwell and Mudambi 2005; Dunning and Narula 1995; Kuemmerle 1999a; D'Agostino and Santangelo 2012). The location's knowledge base seems to be a key factor in the linkage behaviour of the subsidiary (Filippov and Duysters 2011). According to Cohen and Levinthal's concept of absorptive capacities, the firm's own knowledge capacity allows the firm to absorb knowledge which is generated by the knowledge base of a region (Cohen and Levinthal 1990; Cantner and Meder 2009).

These theoretical assumptions lead to the next hypotheses:

H 3a: A foreign subsidiary's high technological capacity is positively associated with R&D co-operation in the region of location.

H 3b: A high regional knowledge stock is positively associated with R&D co-operation in the region of location.

Furthermore, Cohen and Levinthal argue, that the regional knowledge base combines with the firm's own knowledge base to generate new knowledge (Cohen and Levinthal 1990; Cantner and Meder 2009), implying that the combination of a high regional knowledge stock and a foreign subsidiary's high technological capacity should stimulate R&D co-operation. Thus, an interaction between these two terms is hypothesised:

H 3c: A foreign subsidiary's high technological capacity combined with a high regional knowledge stock is positively associated with R&D co-operation in the region of location.

6.2 Data

6.2.1 Country composition and representativeness

The *IWH FDI Micro database* contains data from 1,245 firms with inward FDI (185 from the Czech Republic, 57 from Hungary, 216 from Poland, 128 from Romania, 30 from Slovakia, and 629 from East Germany) with a total of 295,424 employees.[23] The total data set contains 617 (49.5%) foreign subsidiaries in the manufacturing sector (NACE 14-41) and 628 (50.5%) in selected services (NACE 51-74 and 90-93). Not all firms provided information on all questions, hence the database is unbalanced.[24]

Table 6.1: *IWH FDI Micro database*: Country composition

	No. of subsidiaries	in %
East Germany	639	50.5
CEECs	616	49.5
Czech Republic	185	14.9
Hungary	57	4.6
Poland	216	17.3
Romania	128	10.3
Slovakia	30	2.4
Total	1,245	100

Source: Own calculations; *IWH FDI Micro database* 2009.

Chi2 tests are used to check for representativeness of the samples from East Germany and the CEECs, in comparison with the respective total population. Regarding the sample of multinational investors in East Germany, the sample distribution does not differ significantly from the underlying total population with regard to sectors (industry vs selected services). However, results show significant differences between sample and total population regarding the distribution of

23 In the East German sample very small subsidiaries (between one and 10 employees) were included, owing to the very fragmented structure of the East German economy.

24 See Guenther, Gauselmann, et al. 2011 for more detailed information.

regional (NUTS-2 level) and size. The regional sample deviation is driven mainly by the strong under-representation of enterprises located in Berlin. It is worth pointing out, that regional distribution was not part of the sample stratification. Furthermore, there is an under-representation in the sample of subsidiaries with over 250 employees.

In the CEE sample, significant differences in the distribution across the five countries are found due to the under-representation of Czech and Polish subsidiaries, and a corresponding over-representation of Hungarian, Slovakian and Romanian subsidiaries. For each individual country sample, no significant deviation regarding regions (NUTS-2 level) or sectors or size can be found (see chapter 3). In general, the results suggest that the basic population and its corresponding samples generate a reliable data set.

6.2.2 Descriptives

All in all, 29.6% (N=369) of the foreign subsidiaries in the data set co-operate with regional partners in the area of R&D; 15.8% of these belong to the manufacturing and 13.8% to the service sector.[25] The t-test shows that R&D co-operation between foreign subsidiaries and domestic partners in the region of investment is significantly more frequent in East Germany than in the selected CEECs.

Furthermore, R&D co-operation is significantly more frequent between foreign subsidiaries and regional research institution than between foreign subsidiaries and other regional partners (suppliers or customers). As discussed in chapter 4, foreign subsidiaries in East Germany assessed the potential for technological co-operation with research institutions higher, while those in the selected

25 The definitions of all technological activities (such as R&D and innovation), which are surveyed in the data set, follow OECD standards of the Oslo Manual (OECD and Eurostat 2008), see chapter 3.

Table 6.2: The *IWH FDI Micro database*: Foreign subsidiaries' R&D co-operation in total, in East Germany and in the CEECs, differentiated by R&D co-operation with regional suppliers, customers, and research institutions

	No. of subsidiaries	in %
Total R&D co-operation…	369	29.6
in East Germany	239	38.0
in the CEECs	130	21.1
of which is R&D co-operation with regional…		
suppliers	144	39.0
customers	119	32.2
research institutions	268	72.6
R&D co-ooperation in East Germany with regional…		
suppliers	90	37.6
customers	83	34.7
research institutions	183	76.6
R&D co-operation in the CEECs with regional…		
suppliers	54	41.5
customers	36	27.7
research institutions	85	65.4

Source: Own calculations; *IWH FDI Micro database* 2009.

CEECs assessed the potential for technological co-operation with other firms higher.

Co-operation is also significantly more frequent in the manufacturing branch than in selected services. In the manufacturing sector, most R&D co-operation is realised by foreign subsidiaries belonging to NACE 24, 25, 28 and 29.[26] In the service sector most R&D co-operation is realised by foreign subsidiaries belonging to NACE 51, 72 and 74.[27]

26 NACE 24: Manufacture of chemicals and chemical products, NACE 25: Manufacture of rubber and plastic products, NACE 28: Manufacture of fabricant metal products, except machinery and equipment, NACE 29: Manufacture of machinery and equipments.

27 NACE 51: Wholesale trade and commission trade, except of motor vehicles and motorcycles, NACE 72: Computer and related activities, NACE 74: other business activities.

Of those foreign subsidiaries that co-operated in the area of R&D, 14.4% (N=53) do not have any R&D employment and most of them co-operated with regional research institutions (9%; N=34).

6.3 Empirical analysis

Eurostat information on the knowledge stock and the population density of 52 NUTS 2 regions was added to the *IWH FDI Micro database*. Table 8.7 in the Appendix lists the 52 NUTS-2 regions included in the analysis.

6.3.1 Estimation approach and estimation design

The dependent variable measures whether or not a foreign subsidiary co-operates in the area of R&D with suppliers, customers and/or research institutions in the location region. The observed R&D co-operation of the foreign subsidiary i ($i = 1, ..., I$) can be regarded as the result of an unobservable decision process, where y_i denotes the R&D co-operation decision, x_i the individual characteristics, and ϵ_i are unobservable factors:

$$y_i = \mathbf{x_i'}\boldsymbol{\beta} + \epsilon_i. \tag{6.1}$$

Thus, the actual and observable R&D co-operation of foreign subsidiary i results from the firm's cost-benefit analysis and can be generally described using the random utility function, where two choices are provided (see Greene 2003). These choices are denoted by U_i^1 and U_i^0, with U_i^1 indicating the utility of R&D co-operation and U_i^0 the utility of no R&D co-operation.

Hence, the observed indicator R&D co-operation between foreign subsidiary and the regional enterprises equals 1 if $U_i^1 > U_i^0$ and 0 if $U_i^1 \leq U_i^0$. A common formulation of this relation is the linear random utility model,

$$\mathbf{U_i^1} = \mathbf{x_i'}\boldsymbol{\beta_1} + \epsilon_i 1 \tag{6.2}$$

and

$$\mathbf{U_i^0} = \mathbf{x_i'}\boldsymbol{\beta_0} + \epsilon_i 0. \tag{6.3}$$

The probability of R&D co-operation between foreign subsidiary i and regional enterprises can be interpreted as $Prob[U_i^1 > U_i^0]$. Then, if the foreign subsidiary's choice to co-operate with the regional enterprises in the area of R&D is denoted by $Y_i = 1$, it is

$$Prob[Y_i = 1 \,|\, \mathbf{x_i}] = Prob[U_i^1 > U_i^0] = Prob[\mathbf{x_i'}\boldsymbol{\beta} + \epsilon_i > 0 \,|\, \mathbf{x_i}]. \tag{6.4}$$

Following Greene (2003), a logit model for the estimation is applied in the analysis which is characterized by the equation

$$Prob(Y_i = 1 \,|\, x_i) = \frac{e^{x_i'\beta}}{1 + e^{x_i'\beta}}. \tag{6.5}$$

This leads us to the estimation design of the logit estimations.

The dependent variables:

- *Foreign subsidiaries' regional R&D co-operation*:

  The dependent variable is 1 if the foreign subsidiary co-operates in the area of R&D with suppliers, customers and/or research institutions in the region of investment. The dependent variable takes 0 for all foreign subsidiaries

that do not co-operate. The dependent variables of the East German and the CEE sub-sample are generated accordingly.

For the supplier sub-sample, the dependent variable is 1 if the foreign subsidiary co-operated with regional suppliers in the area of R&D. The dependent variable takes 0 for all foreign subsidiaries that do not co-operate. For the customer sub-sample, the dependent variable is 1 if the foreign subsidiary co-operated in the area of R&D with regional customers. The dependent variable takes 0 for all foreign subsidiaries that do not co-operate. Accordingly, for the sub-sample of research institutions, the dependent variable is 1 if the foreign subsidiary co-operated in the area of R&D with regional research institutions. The dependent variable takes 0 for all foreign subsidiaries that do not co-operate.

The explanatory variables:

- *Subsidiary's R&D mandate*: The variable shows the foreign subsidiary's mandate in terms of R&D. This is 1 if R&D related business function(s) were undertaken only or mainly by the subsidiary and 0 for all other cases.

- *Subsidiary's internal technological embeddedness*: The variable shows the foreign subsidiary's internal R&D co-operation. It is 1 if a foreign subsidiary co-operated in the area of R&D with its own headquarter or another enterprise of its own enterprise group and 0 for all other cases.

- *MNE's technology- and knowledge-seeking investment motive*: The variable is 1 if the strategic motive 'access to location-bound knowledge and technology' was important or very important for foreign investor; it is 0 for all other cases.

- *Subsidiary's technological capacity*: The variable is measeured by the foreign subsidiary's R&D intensity (share of R&D employment in total employment in the foreign subsidiary).

- *Regional knowledge stock on NUTS 2 level*: The variable is measured by the region's R&D intensity in the five years before the survey data collection (measured as mean of the share of R&D employment in total employment in the region in the time 2003-2008).

- *Interaction between the subsidiary's technological capability and the regional knowledge stock*

In order to control for the foreign subsidiary's heterogeneity, its size, year and mode of entry, the type of investor, a sectoral dummy and a dummy of the origin of the investor (EU-27 or other) were included as *control variables*. On the regional level, population density was added to the list. Table 6.3 provides an overview of variables, their sources, and the expected impact on the dependent variable.

Table 6.3: Summary of variables, their sources and the expected impact on the dependent variable

Variable Name	Description	Data source	Expected impact
Subsidiary's R&D mandate	foreign subsidiary's mandate in terms of R&D	IWH	+
Subsidiary's internal technological embeddedness	foreign subsidiary's internal R&D co-operation with headqurter or other enterprise unit	IWH	+
MNE's knowledge and technology seeking investment motive	importance of the investment motive "access to location-bound knowledge and technology" when MNE entered the market (very important/important)	IWH	+
Subsidary's technological capacity	subsidiary's share of the R&D employment in total employment	IWH	+
Regional knowledge stock	mean of the region's R&D employment in total employment 2003-2008 on NUTS 2 level	Eurostat	+
Interaction between subsidiary's technological capacity and regional knowledge stock	interaction between subsidiary's technological capability and regional knowledge stock	IWH/Eurostat	+
Population density	mean of region's population density 2003-2008 on NUTS 2 level	Eurostat	+
Subsidiary size	foreign subsidiary's number of employees	IWH	+
Year of entry	MNE's year of entry	IWH	-
Mode of entry	MNE's mode of entry: greenfield vs acquisition	IWH	-
Origin of investor	MNE's home country: EU-27 country vs other	IWH	-
Type of investor	foreign subsidiary's type of investor: financial investor vs other	IWH	+
Branch	foreign subsidiary's branch: industry vs selected services according to NACE	IWH	+/-

Source: Own calculations; *IWH FDI Micro database* 2009 and Eurostat.

Other available regional variables such as regional GDP or GDP per capita, endowment with highly skilled human capital and private R&D expenditures in the referring NUTS-2 region were excluded from the analysis owing to the high correlation coefficients among them. At firm level, information on the innovative activities of the foreign subsidiary was not included because former studies have produced ambiguous results on the issue of whether causality runs from the foreign subsidiary's technological activities to technological co-operation or vice versa (see, e. g., Frost 2001 or Yamin and Otto 2004; Guenther, Stephan, and Jindra 2008b), which might lead to problems with endogeneity. A correlation table of the explanatory variables is included in the Appendix (table 8.6).

6.3.2 Empirical results

The results of the logit estimation for the whole data set are shown in table **??** (columns 4 and 5). Here, foreign subsidiaries can have one or more different types of R&D co-operation partners. The first three columns of table **??** contain the regression results for each group of explanatory variables. In order to control for regional and developmental differences, the sample was split into an East German and an CEE sub-sample (columns 6 and 7). Columns 8-10 contain the regression estimates for the sub-samples on R&D co-operation with each individual type of partner: regional suppliers, regional customers and regional research institutions (see table **??**).

Results (see table **??** and table **??**) show, that in the complete sample as well as in all (sub-)samples the **R&D mandate** of the foreign subsidiary is significantly positively associated with the probability of regional R&D co-operation (H 1a), as is the foreign subsidiary's **internal technological embeddedness** (H 1b). Thus, H 1a and H 1b cannot be rejected.

Table 6.4: Results of the logit estimation on foreign subsidiary's R&D co-operation in the region of location

Explanatory variables:	(1) baseline 1	(2) baseline 2	(3) baseline 3	(4) baseline 4	(5) whole sample
Subsidiary's R&D mandate	1.605***			1.625***	1.621***
	(0.211)			(0.216)	(0.217)
Subsidiary's internal technological embeddedness	3.666***			3.647***	3.648***
	(0.295)			(0.309)	(0.309)
MNE's knowledge and technology seeking investment motive	-0.113			-0.146	-0.145
	(0.195)			(0.201)	(0.201)
Subsidiary's technological capacity	2.425***			2.716***	2.426**
	(0.491)			(0.530)	(1.203)
Regional knowledge stock		0.231**		0.332**	0.324**
		(0.104)		(0.147)	(0.150)
Interaction between subsidiary's technological capacity and regional knowledge stock					0.207
					(0.773)
Population density		-0.000126		-0.000364***	-0.000372***
		(8.85e-05)		(0.000123)	(0.000128)
Subsidiary's size			0.360***	0.300**	0.299**
			(0.107)	(0.147)	(0.147)
Year of entry			-0.164	0.0122	0.0103
			(0.143)	(0.190)	(0.191)
Mode of entry			-0.495***	-0.203	-0.204
			(0.163)	(0.214)	(0.214)
Origin of investor (EU-27 dummy)			-0.581***	-0.707***	-0.703***
			(0.186)	(0.243)	(0.243)
Type of investor			0.275	0.423	0.419
			(0.345)	(0.423)	(0.424)
Branch			0.103	-0.0775	-0.0770
			(0.160)	(0.210)	(0.210)
Constant	-2.745***	-1.348***	-0.850	-2.814***	-2.797***
	(0.208)	(0.136)	(0.532)	(0.749)	(0.752)
Observations	959	959	959	959	959
Log likelihood	-354.55	-532.71	-516.89	-341.34	-341.31
Pseudo R^2	0.3374	0.0045	0.0341	0.3621	0.3622

Standard errors in parentheses

Source: Own calculations; *IWH FDI Micro database* 2009.

The importance of the MNE's strategic market entry **motive 'access to location-bound knowledge and technology'** is not significantly associated with regional R&D co-operation in the whole sample or in all sub-samples (H 2). Thus, H 2 can be rejected.

The foreign subsidiary's **technological capacity** is positively significantly associated with R&D co-operation in the region of location in the whole sample (H 3a). Thus, H 3a cannot be rejected. When considering the sub-samples, it is clear that the foreign subsidiary's technological capacity has a positively significant coefficient for the supplier, customer, and research institution sub-sample; there is no such impact in the regional sub-samples for East Germany or the CEECs, however.

The **regional knowledge stock** is also positively significantly associated with the probability of regional R&D co-operation (hence, H 3b cannot be rejected) and shows particular significance - with a positive sign - for the CEE sub-sample and for co-operation with customers and research institutions.

The hypothesis, that the **combination of the foreign subsidiary's high technological capability and the high regional knowledge stock in the region of investment** is positively associated with R&D co-operation with domestic enterprises in the region can be rejected (H 3c) as this variable does not show significant outcomes in any of the samples.

Table 6.5: Results of the logit estimation of foreign subsidiary's R&D co-operation in the region of location: sub-samples for R&D co-operation in East Germany, in the CEECs, and R&D co-operation with suppliers, with customers or with research institutions

Explanatory variables:	(6) EG	(7) CEE	(8) suppliers	(9) customers	(10) research institutions
Subsidiary's R&D mandate	1.699***	1.574***	2.136***	2.198***	1.485***
	(0.323)	(0.324)	(0.338)	(0.366)	(0.231)
Subsidiary's internal technological embeddedness	3.916***	3.592***	3.870***	3.983***	3.615***
	(0.565)	(0.391)	(0.384)	(0.427)	(0.318)
MNE's knowledge and technology seeking investment motive	0.300	-0.331	-0.251	-0.154	-0.166
	(0.281)	(0.321)	(0.287)	(0.312)	(0.215)
Subsidiary's technological capacity	3.346	1.703	2.848**	3.221**	2.497**
	(2.764)	(1.257)	(1.233)	(1.254)	(1.194)
Regional knowledge stock	0.0197	0.644**	0.320	0.431*	0.316**
	(0.451)	(0.267)	(0.202)	(0.221)	(0.159)
Interaction between subsidiary's technological capacity and regional knowledge stock	0.278	-0.372	-0.169	-0.627	0.00955
	(1.565)	(0.760)	(0.757)	(0.747)	(0.769)
Population density	-0.000338**	-0.00108**	-0.000295*	-0.000414**	-0.000355***
	(0.000162)	(0.000475)	(0.000163)	(0.000188)	(0.000137)
Subsidiary's size	0.488**	0.494**	0.334	0.331	0.295*
	(0.237)	(0.211)	(0.206)	(0.221)	(0.157)
Year of entry	0.382	-0.703**	-0.193	0.0910	0.0144
	(0.266)	(0.329)	(0.264)	(0.291)	(0.205)
Mode of entry	-0.303	-0.0732	-0.301	-0.0420	-0.168
	(0.297)	(0.342)	(0.300)	(0.327)	(0.230)
Origin of investor (EU-27 dummy)	-0.593*	-0.522	-0.642*	-0.710*	-0.731***
	(0.316)	(0.455)	(0.349)	(0.370)	(0.259)
Type of investor	-0.149	1.275**	0.0736	0.519	0.255
	(0.575)	(0.645)	(0.651)	(0.615)	(0.468)
Branch	-0.354	0.0202	0.0257	0.0458	-0.164
	(0.292)	(0.336)	(0.299)	(0.315)	(0.226)
Constant	-3.218***	-2.280*	-3.764***	-4.927***	-2.745***
	(1.212)	(1.206)	(1.040)	(1.150)	(0.796)
Observations	422	537	833	813	914
Log likelihood	-164.58	-154.04	-188.99	-166.02	-303.64
Pseudo R^2	0.3878	0.3853	0.4187	0.4132	0.3519

Standard errors in parentheses

Source: Own calculations; *IWH FDI Micro database* 2009.

Amongst the **control variables**, the estimates show that the foreign subsidiary's size is significantly positively associated with regional R&D co-operation. In the case of countries of origin this shows that foreign subsidiaries with headquarters

within EU-27 are less likely to co-operate with the regional economy in the area of R&D. There is no significant effect of a control variable on the origin of investors coming from developing or developed countries, a variable which was added to the analysis at a prior stage. This implies that proximity plays a greater role in the probability of R&D co-operation than economic and developmental discrepancies in FDI between home and host country. As a significant effect of the EU-27 control variable was found, this proximity might include not only geographical, but also institutional and cultural proximity as well as other factors (Boschma 2005). The variable on population density is significantly negatively associated with regional R&D co-operation - with a very low coefficient, however. This variable probably contains a capital-effect, which would imply that foreign subsidiaries outside the national capitals are more likely to co-operate in the area of R&D.

The foreign subsidiary's age, its mode of entry (Greenfield vs acquisition) and type of investor (financial investor vs others) as well as the sectoral differences do not seem to play a significant role in the foreign subsidiary's R&D co-operation behaviour in the region of investment. Prior to this analysis, it was controlled for sectoral dummies in the sectors NACE 24, 25, 28, 29, 51, 72, and 74 to check for R&D co-operation intensive sectors. No significant differences in outcomes on foreign subsidiaries of other sectors were found, however.

Results show also the log likelihood and Pseudo R^2 of the final model of each particular specification. Further, they report the number of observations included in the empirical analysis. Log likelihood can only be compared if the number of observation in the model concur. This is the case in specification (1) to (5), where log likelihood increases. This implies that log likelihood is maximised in specification (5). To check for the model's explanatory power, a predicted probability test has been applied. The share of correct predictions of the applied

model is around 85%, which means that in these cases the model reproduced consistent results about the investment decisions of MNE's. A random selection would predict around 50% correct investment decisions. Thus, the applied empirical model improves this share due to the information value of relevant explanatory variables.

6.4 Discussion

The analysis shows that the generation of new technology does play a role in MNEs locating in European post-transition economies. Furthermore, the results show that knowledge exchange is region- as well as firm-specific. There is indeed an interaction in technological activities taking place between the foreign subsidiaries and domestic markets, as 38% of foreign subsidiaries in East Germany and 21% in the selected CEECs did source and transfer knowledge and technology by R&D co-operation to and from the regional economy.

In support of the first argument, results reveal that the foreign subsidiary's **mandate in terms of R&D** is positively associated with R&D co-operation in the location region. The results of all the sub-samples confirm this positive impact. The outcomes with regard to the foreign subsidiary's mandate are in line with recent research on less developed economies which emphasizes the importance of the foreign subsidiary's autonomy for the creation of linkages or knowledge and technology exchange with the domestic economy (see, e. g., Guenther, Stephan, and Jindra 2008b). Focusing on foreign subsidiaries' linkages to suppliers in the CEE region, Giroud, Jindra, and Marek (2012), for example, find a positive influence of the subsidiary's mandate on technological business functions, while the level of autonomy in production and operational management has no significant influence. In addition, Jindra, Giroud, and Scott-Kennel (2009) show that the subsidiary's

mandate influences both the extent and the intensity of backward and forward linkages with the domestic environment - with positive signs as far as autonomy of the extent of backward linkages and the extent and intensity are concerned. Thus, the results suggest that the self-managed foreign subsidiaries are more likely to absorb and transfers knowledge to the host economy.

As far as the **foreign subsidiary's internal technological embeddedness** is concerned, results show a significantly positive impact on R&D co-operation throughout all samples. These results add to those of existing studies, as Jindra, Giroud, and Scott-Kennel (2009) reflect a negative impact of the foreign subsidiary's internal technological embeddedness on the extent of technological linkages with suppliers and customers, but a positive impact on the intensity of supplier and customer linkages. Giroud, Jindra, and Marek (2012), too, find a significant positive effect of the foreign subsidiary's internal technological embeddedness on supplier linkages. However, they find no significant effect on the extent of these linkages. These outcomes suggest that the potential for technological linkage is higher for foreign subsidiaries which are technologically embedded in the MNE's own knowledge base, and that there is indeed a relation between the foreign subsidiary's technological co-operation with its internal partners and its technological co-operation with external partners.

In the case of the **market entry motivation** the empirical evidence does not support the argument: results show no significant relation between the importance of the investment motive 'access to location bound knowledge and technology' and the probability of R&D co-operation. These results differ from Santangelo (2012), who finds that competence-seeking subsidiaries are better embedded with domestic actors. Guenther, Stephan, and Jindra (2008b) tested for a home-base-augmenting strategy of the foreign subsidiary and find that foreign subsidiaries following this strategy are more likely to source technological knowledge from the East German

economy. It seems then that the MNE's market entry motivation does play some role when explaining technological interaction between the foreign subsidiary and the domestic economy. In this analysis, however, the MNE's investment motive is not as strongly related to the foreign subsidiary's R&D co-operation behaviour as was assumed. This might be explained by a change in the foreign subsidiary's orientation over the period of its existence: It is possible that the MNE entered the market without a technology-seeking investment motive years ago, but may nonetheless tap into knowledge at present or vice versa. Furthermore, the foreign subsidiary may follow more than one investment strategy at a time, depending on the technological field of investment (Criscuolo, Narula, and Verspagen 2002; Guenther, Stephan, and Jindra 2008b).

From an empirical point of view, results of the impact of the **foreign subsidiary's technological capacity** are mixed. Giroud, Jindra, and Marek (2012) and Jindra, Giroud, and Scott-Kennel (2009) find in their research no significant effect of the foreign subsidiary's technological capability on the extent of linkages with suppliers, but do find a significant positive effect on the intensity of these linkages. In the case of linkages with customers Jindra, Giroud, and Scott-Kennel (2009) also find a positive significant effect of the foreign subsidiary's technological capability on linkages, but no significant effect on the extent of these linkages. Gentile-Lüdecke and Giroud (2012), however, in the example of the Polish automotive sector, find a negative relation between the subsidiary's R&D capability and knowledge transfer to domestic suppliers. The positive outcomes from this variable suggest that the foreign subsidiary's technological absorptive capacity influences its R&D co-operation behaviour positively, allowing it to augment and to pass on knowledge and technology.

According to the hypothesis, the **regional knowledge stock** was expected to be positively associated with foreign subsidiaries' R&D co-operation in the region

of location. For the whole sample and the CEE sub-sample, as well as in the case of customers and research institutions, significantly positive influence on the likelihood of regional technological co-operations was found. Empirical studies confirm that knowledge sourcing is influenced by the quality of knowledge sources. Filippov and Duysters (2011) find that subsidiaries accumulate knowledge and competences from interaction with their environment whereas universities and research centers serve as sources of knowledge, especially for R&D. Guenther, Jindra, and Stephan (2009) find empirical evidence that knowledge skills and technology are relevant to foreign subsidiaries located in CEE and East Germany. The results support Frost (2001) and March (1991) for example, in their suggestion that adaption and advancement of knowledge and technology might indeed be motivated by the host country's regional capabilities, as suggested by the positive coefficients of the region's knowledge stock in the analysis.

The **interaction** between the subsidiary's technological capability and the regional knowledge stock has not yet been empirically tested. However, the outcomes of this variable does not confirm the assumption, that the combination of these two conditions additionally increase the likelihood of R&D co-operation.

7 Conclusion

As FDI has a very important impact on the course of catching-up in (post-)transition regions, this thesis adds to the understanding of FDI attraction and activity in East Germany and selected CEECs. Drawing on Dunning's classification of investment motives and Cantwell's technological accumulation approach, the thesis applies different statistical and econometric approaches to the *IWH FDI Micro database*. Each chapter's contribution to the existing literature and the empirical results are summarised in the sections below. Further, this chapter offers policy advice for each empirical part of the thesis.

7.1 Results

7.1.1 Investment motives and assessment of location factors

This chapter empirically analyses the importance of MNEs' investment motives as classified by Dunning and MNEs' assessment of location factors in East Germany and the selected CEECs. This chapter's research questions are: Which strategic investment motives are important for foreign investors' decision to invest in European post-transition economies? Did the importance of these strategic motives change over time? How do foreign investors assess the quality of location factors on-site? Is there a match between the foreign investors' strategic

entry motivation and the assessment of the quality of corresponding location factors?

This chapter adds to existing empirical research by differentiating the analysis on investment motives according to theoretical considerations (Dunning and Lundan 2008) into market-seeking, efficiency-seeking, strategic asset/capability-seeking, and natural resource-seeking FDI. Furthermore, it considers firm heterogeneity when analysing these investment motives and the foreign subsidiaries' assessment of location factors in East Germany and the selected CEECs, such as time of entry, country of origin, and industry classification. Eventually, this chapter tries to find a match between the foreign investors strategic investment motivation and his assessment of the quality of the location factors on-site.

In summary, it can be concluded that, in the course of transition, East Germany has managed to improve its position within the international division of labour due to the quality of its location factors. Since the mid-'90s, East Germany has increasingly attracted investors who aim more at economies of scope and technological advantages than at cost advantages related to production factors and economies of scale. This is also reflected in the positive perception of the image of the region by technology-oriented MNEs. The survey suggests that foreign investors seeking cost advantages evaluate the supply of skilled labour less highly, which could be explained by an un-willingness among this group of investors to pay for skilled labour, assuming that labour costs increase with the level of qualification.

Results suggest a match between foreign investors seeking cost advantages and the comparatively positive assessment of the availability of investment incentives. There seems also to be a match between foreign investors seeking access to localized knowledge and technology, who assess the supply of labour on average more highly and rate the potential for technological co-operation with other enterprises

significantly better. By and large, this can be interpreted as a technological upgrading of the subsidiaries of MNEs in East Germany. This success could be jeopardized, however, by the potentially growing discontent among investors with the supply of skilled workers and graduates with university degree in East Germany.

Policy makers and economists need to ensure that the supply of qualified personnel in East Germany will be guaranteed in the future. For his reason, an expansion of existing international laws on labour mobility could significantly improve the supply of labour, especially for MNEs, since these can mobilise international human resources more easily than domestic firms. A further potential improvement in the supply of labour could lie in the education and training of low-skilled workers, since the availability of these has been assessed as good by investors. The protection of fiscal incentives concerning R&D and innovation might be an additional means of making East Germany more attractive as a worthwhile investment location.

The IWH's survey of foreign affiliates in the CEECs suggests that the most important strategic motive for FDI is based on the expectation that the investment allows the MNE to benefit from cost advantages in the region. In these countries, the largest cost advantages will stem from comparatively low wage-costs of rather well trained and educated employees. Even if labour productivity remains lower in the CEECs when compared with Western Europe, there appears to still remain a gap in unit labour costs. Rising wages do not appear to affect the strategic motives over the 20-year period, while access to localised knowledge and technology appears to have gained importance over time. This promising trend may however have reversed during the recent financial crisis.

Investors from emerging markets have a different view and appear to base their expectations on the possibility to diversify their production by investing into newly

emerging European production locations. The location advantages of access to domestic markets are nearly as important, and this is probably more related to the purchasing power of potential buyers than to the sheer size of the market in terms of number of buyers. This adds a dynamic perspective to the assessment of managers in the region, which may be rooted in the domestic growth rates that typically are above the rates in the West. The survey also suggests that there is a match between foreign investors seeking cost advantages and the quantitative supply of low qualification-workers and qualified employees, whereas there is a mismatch for trainees and junior employees with university degrees, the middle-ground in terms of qualification of employees.

Education is of substantial importance for the CEECs when trying to increase the share of high value added FDI activities. Policies should aim to improve the absorptive capacity of these countries by improving the quality of education and training programmes. Rather than technology-seeking investments, local market seekers and foreign investments trying to gain scale economies value local technological co-operation as important. This is a puzzling result that needs clarification in further research. What comes out consistently from the analysis is that technological co-operation appears to be valued more favourably with local firms than with local public and private science institutions. This can be taken as a clear message for economic policy. While the local economic community appears to be getting fit for the kind of technology-based growth needed to raise real wages and incomes, the former academy of sciences and universities appear to be still insufficiently transformed into competitive research centres in the region.

7.1.2 Regional determinants of MNEs' location choice

This chapter analyses the impact of regional determinants - agglomeration and efficiency- seeking factors in particular - on the location choice of MNEs into post-transition economies. By means of a conditional logit model on a sample of 4,343 subsidiaries over the 2000-2010 time period data from 33 regions in East Germany, the Czech Republic and Poland was compared. This chapters' research questions are: Which region-specific location factors influence foreign investment in European post-transition economies? Do these regional determinants differ depending on the country's level of transition? How important are regional agglomeration economies and efficiency-related determinants for the location choice of foreign investors in post-transition economies?

The analysis of this chapter adds to the empirical literature on foreign investors' location choice in several important aspects. While most empirical analyses regarding MNEs' location decision focus on developed countries, on one single country only and on the macro level, this chapter's analysis provides with a detailed benchmark on the regional (NUTS-2) level between three post-transition economies, East Germany, Poland, and the Czech Republic. Further, it focuses on the influence of agglomeration and regional transition specific determinants - efficiency seeking factors in particular - on foreign investors' location choice of FDI. In addition, it controls for sector-specific differences, owing to the heterogeneous character of manufacturing and service FDI. Most former analyses, however, focus on manufacturing plants only. And last, it exploits a data set of regional, sectoral and subsidiary-level data, while in former research variables have mainly been firm-specific, region-specific *or* industry-specific. This chapter's results are summarised below.

The results on agglomeration economies, such as sectoral specialisation, a certain potential for supplier linkages and the potential for knowledge spillovers in a region

show, that they belong to the most important pull factors for FDI in post-transition regions. For agglomeration economies, the results show no differences in the impact on MNEs' location choice for the post-transition regions and results on developed countries. The outcomes suggest that sectoral specialisation, diversification and economic and technological performance of the target region are important location factors for investors in post-transition regions, in the manufacturing as well as in the service sector.

In addition, the labour market factors prove to play an important role in the location of FDI in post-transition economies. In contrast to most existing studies on location choice into CEECs, the estimates in this analysis show, that higher wages do not *per se* distract investors. They can even have a positive impact as long as higher wages go along with offsetting factors such as high endowment with capital and higher productivity of the workforce, as found in this study for Poland and the Czech Republic.

This underlines the importance of education for attracting FDI, especially regarding the economically more sustainable FDI in more advanced sectors of the economy. The positive result for East Germany in this category suggests that East Germany's present and future could lie in the exploitation of competitive advantages and a highly educated and specialized workforce rather than in acting as the extended workbench for other, more industrialized countries. These results suggest that FDI into post-transition regions is (no longer) only dominated by efficiency seeking behaviour, but - besides market seeking motives - also by strategic asset or capability seeking behaviour which seems especially true for East Germany and for the service sector, where obviously well equipped labour is an important location factor. Furthermore, the availability of labour in the region of investment is an important location choice factor. The influence of abundant human capital is especially positive in the manufacturing sector, which suggests that efficiency

seeking determinants for foreign investments are more important in the industrial production than in the service sector.

Finally, it seems that a country's position in the post-transition to industrialisation is important not only for the quantity but also for the structure of incoming FDI. Keeping factors reflecting the allocation of public goods, the educational background and productivity of the workforce in mind, it seems that countries finding themselves in different stages of the transition process attract FDI based on significantly different pull factors.

Since this analysis is based on a three-country data set, there is a potential for extending research into FDI pull factors to further regions, such as additional post-transition countries. Since the enterprise data contains information about the MNE's headquarter and the subsidiary, there is research potential in controlling the location decision of a MNE for bilateral trade and business relations or for investor's country of origin. Empirically, the estimation could be enhanced by bilateral data as well as by investor-specific variables to gain insight into the interaction between investor-specific and regional characteristics.

7.1.3 MNEs and regional R&D co-operation

Drawing on Cantwell's technological accumulation approach, the analysis in this chapter investigates the determinants of R&D co-operation between multinational enterprises' foreign subsidiaries and enterprises in the region of location, thereby leading to a better understanding of the firm- and region-specific factors which influence this co-operation behaviour. A logit estimation on 1,245 foreign subsidiaries in East Germany, Poland, the Czech Republic, Romania, Slovakia, and Hungary is applied in this chapter. The corresponding research questions are: Does a knowledge and technology transfer take place between the foreign subsidiaries

and the domestic economy in post-transition? Which firm- and region-specific determinants influence technological linkages between foreign subsidiaries and the host economy in post-transition economies? Is the probability for R&D co-operation higher if both, the region and the foreign subsidiary, are endowed with a high capacity to absorb and pass knowledge and technology?

The analysis of this chapter adds to the empirical research on linkages between foreign subsidiaries and host economy in several ways: It focuses on technological (R&D) linkages with domestic suppliers, customers, and research institutions in post-transition economies, while former research mainly deals with supplier linkages in developing regions or - in terms of knowledge sourcing behaviour - focuses on industrial economies, like the U.S. or Western Europe. Furthermore, it adds information on the regional knowledge stock, owing again to the importance of the sub-national level, when regarding foreign subsidiaries' activities in the host economy. Again, the analysis of this chapter is based on data from the *IWH FDI Micro database*, which provides with information on foreign subsidiaries' technological activities in East Germany, Poland, Hungary, the Czech Republic, Slovakia, and Romania. This chapter's results are summarized below.

The ability of European post-transition countries to link with value-adding FDI and to raise their technological capabilities is an essential issue in guaranteeing increasing productivity and industrial up-grading in the long term (Narula and Guimón 2010). MNEs have located their general economic activities across regions and countries, especially in manufacturing and sales in the European regions. In recent years this internationalisation has more and more included R&D activities. R&D units which were organized mainly centrally at the headquarter in the past have now become further geographically dispersed at the subsidiary level (Narula and Guimón 2010). Thus, increased competition and technological complexity

encourages MNEs to relocate R&D investments and to co-operate with firms and institutions in the target location.

Finally, the regression results based on 2009 survey evidence show that firm- as well as region-specific determinants influence foreign subsidiaries' R&D co-operation with the regional economy. Results suggest that the foreign subsidiary's mandate in terms of R&D, its embeddedness in the MNE's internal knowledge base, its own technological capacity and the regional knowledge stock are particularly positively associated with these linkages. The outcomes of the interaction between the subsidiary's technological capability and the regional knowledge stock do not confirm the assumption, that the combination of these two conditions additionally increase the likelihood of R&D co-operation.

Results reveal that both the technological competences of the foreign subsidiary and the regional knowledge base are important if knowledge and technology transfer are to take place between incoming FDI and the host economy. Thus, governments ought to concentrate on policy tools that attract and reward technologically active foreign enterprises and support technological linkages with domestic firms. Technological catch-up is especially important in (post-)transition economies, not least in the CEECs where the domestic economy has had to deal only with the challenge of external competition until fairly recently and where technological upgrading has not yet been completed (Jindra, Giroud, and Scott-Kennel 2009; Dries and Swinnen 2004). Therefore the encouragement of inter-firm R&D co-operations could be an important policy strategy; the consideration of the importance of the domestic knowledge base should be another. As our results show, the technological capability and absorptive capacity of the domestic economy is positively associated with knowledge and technology transfer. Thus, the national education system and the endorsement of technological activities - such as R&D and innovation and

R&D co-operation - in domestic firms should form part of the governments efforts, too.

7.2 Concluding remarks

The evolution of technology-related investment motives into the CEECs and especially East Germany suggests that these regions are increasingly able to make economic use of their industrial history and the knowledge and technology they were able to adapt exactly because of their success in attracting foreign investors in the first place. It seems, further, that the European post-transition economies participate in the worldwide increase in service activities. On the one hand, the results of this thesis suggest that there is still potential for the attraction of further FDI and for technological interaction and transfer of knowledge between foreign and indigenous enterprises. On the other hand, however, they show, that the CEECs are not as detached from the technological development in industrialised economies as traditionally believed.

The European post-transition countries seem to catch up as target locations for knowledge and technology sourcing of MNEs. The regression results in the selected regions show little difference to the explanatory determinants of studies on developed countries. This suggests that the European post-transition countries are increasingly developing towards knowledge-based economies.

This seems especially true for the East German economy, where the foreign investors' search for knowledge and technology has considerably gained importance over time, location factors like the regional knowledge base and the market potential serve as pull-factors for FDI and the transfer of knowledge and technology between domestic and external enterprises succeeds. These outcomes reveal differences

within the considered regions and account for East Germany's very unique transition process.

8 Appendix

Table 8.1: Endowment with location advantages assessed by foreign investments in the CEECs, distinguished by host country

	Whole sample n=616	Czech Republic n=185	Hungary n=57	Poland n=216	Romania n=128	Slovakia n=30
	mean	deviation	deviation	deviation	deviation	deviation
Quantitative supply of labour						
Low qualification-workers	2.98	-0.00	0.08	-0.01	-0.01	-0.07
Apprentices (trainees)	2.67	-0.17**	-0.03	0.14**	-0.00	0.10
Junior employees with university degrees	2.53	-0.17**	0.29**	0.15**	-0.17**	0.08
Qualified employees	2.94	-0.04	-0.07	-0.06	0.12	0.14
Availability of state support						
Investment subsidies	2.31	0.11*	0.37***	0.10	-0.43***	0.01
Financial incentives for R&D and innovation	2.33	0.11	0.35**	0.24***	-0.58***	-0.05
Potential for technological cooperation						
Local public and private science institutions	2.80	0.22**	0.16	0.03	-0.36***	-0.03
Other local firms	3.05	0.05	0.10	-0.03	-0.12**	0.17*
Socio-cultural environment						
Culture on offer	3.03	0.13*	0.13	-0.02	-0.28***	0.29**
Supply of health services	2.81	0.39***	0.09	-0.27***	-0.22**	0.13
Supply of housing and accommodation	3.03	-0.12*	0.16	0.07	-0.07	0.15
No hostility against foreign workers	3.42	-0.01**	0.23**	-0.03	-0.02	0.25**
Supply of child-minding facilities	2.83	0.15**	0.07	-0.13**	-0.05	0.02
Image of the region in general	3.13	0.07	-0.19*	0.04	-0.05	0.00

Notes: Means are the average value given to each of the locational advantages on a scale ranging from 1 (very bad) to 4 (very good). Deviations are defined as difference between the average of the country-specific group of firms and the average of all other firms. * is significant at the .1 level, ** at the .05 level and *** at the .01 level.

Source: Own calculations; *IWH FDI Micro database* 2009.

Table 8.2: Endowment with location advantages assessed by foreign investments in the CEECs, distinguished by industry classification

	Whole sample	selected services (A)	manu-facturing (B)	(B) – (A)
	n=616	n=279	n=337	
	mean	mean	mean	deviation
Quantitative supply of labour				
Low qualification-workers	2.99	2.93	3.03	0.10*
Apprentices (trainees)	2.67	2.72	2.63	-0.09
Junior employees with university degrees	2.53	2.58	2.49	-0.09
Qualified employees	2.94	3.03	2.87	-0.16**
Availability of state support				
Investment subsidies	2.31	2.31	2.31	0.00
Financial incentives for R&D and innovation	2.33	2.36	2.31	-0.05
Potential for technological cooperation				
Local public and private science institutions	2.80	2.89	2.72	-0.17**
Other local firms	3.05	3.06	3.04	-0.02
Socio-cultural environment				
Culture on offer	3.03	3.18	2.91	-0.27***
Supply of health services	2.81	2.88	2.76	-0.12**
Supply of housing and accommodation	3.03	3.11	2.96	-0.15**
No hostility against foreign workers	3.42	3.41	3.43	0.02
Supply of child-minding facilities	2.83	2.82	2.84	0.02
Image of the region in general	3.13	3.19	3.09	-0.10*

Notes: Averages are the average value given to each of the locational advantages on a scale ranging from 1 (very bad) to 4 (very good). Deviations are defined as difference between the average of the manufacturing category and the average of the category selected services. * is significant at the .1 level, ** at the .05 level and *** at the .01 level.

Source: Own calculations; *IWH FDI Micro database* 2009. Results of the whole sample are presented in table 8.1.

Table 8.3: Regional location choice: The 33 NUTS-2 regions included in the dataset

ID	Country	NUTS-2	Region	Industry	Service
1	**East Germany**	**DE30**	**Berlin**	**81**	**523**
2	East Germany	DE41	Brandenburg - Nordost	39	40
3	East Germany	DE42	Brandenburg - Südwest	60	73
4	East Germany	DE80	Mecklenburg-Vorpommern	59	85
5	East Germany	DED1	Chemnitz	56	35
6	East Germany	DED2	Dresden	100	67
7	East Germany	DED3	Leipzig	28	60
8	East Germany	DEE0	Sachsen-Anhalt	115	91
9	East Germany	DEG0	Thüringen	109	89
10	**Czech Republic**	**CZ01**	**Praha**	**39**	**244**
11	Czech Republic	CZ02	Stredni Cechy	32	21
12	Czech Republic	CZ03	Jihozapad	50	17
13	Czech Republic	CZ04	Severozapad	35	13
14	Czech Republic	CZ05	Severovychod	44	19
15	Czech Republic	CZ06	Jihovychod	60	53
16	Czech Republic	CZ07	Stredni Morava	35	13
17	Czech Republic	CZ08	Moravskoslezsko	21	14
18	Poland	PL11	Lodzkie	41	45
19	**Poland**	**PL12**	**Mazowieckie**	**170**	**585**
20	Poland	PL21	Malopolskie	30	82
21	Poland	PL22	Slaskie	83	79
22	Poland	PL31	Lubelskie	16	9
23	Poland	PL32	Podkarpackie	12	12
24	Poland	PL33	Swietokrzyskie	22	10
25	Poland	PL34	Podlaskie	4	3
26	Poland	PL41	Wielkopolskie	92	97
27	Poland	PL42	Zachodniopomorskie	34	30
28	Poland	PL43	Lubuskie	21	10
29	Poland	PL51	Dolnoslaskie	111	93
30	Poland	PL52	Opolskie	25	13
31	Poland	PL61	Kujawsko-Pomorskie	53	20
32	Poland	PL62	Warminsko-Mazurskie	11	4
33	Poland	PL63	Pomorskie	49	57
Capital regions highlighted in blackface letters.				**1,737**	**2,606**

Table 8.4: Regional location choice: Descriptives of the secondary variables

Variable	East Germany	CZ	PL	Total
Relative Agglomeration	0.098*	0.070#	0.058#	0.0995
spec	(0.124)	(0.071)	(0.047)	(0.0962)
Diversification	0.148*	0.095#	0.122#	0.122
herf	(0.033)	(0.029)	(0.016)	(0.031)
Sectoral Wage	34.87*	15.44#	14.44#	22.65
wage	(15.82)	(12.76)	(9.754)	(16.26)
Human Resources	28.21*	28.80#	20.44#	24.59
hrsto	(4.143)	(7.540)	(3.357)	(6.367)
Unemployment Rate	16.53*	7.680#	15.02	13.70
unemp	(2.683)	(3.391)	(5.205)	(5.447)
Regional GDP	37794.4*	12194.4#	15425.0#	20742.6
gdp	(17903.3)	(6331.1)	(13185.8)	(17073.0)
Market Potential	14043.5*	13296.9#	10197.4#	11997.7
mp	(2400.1)	(2103.0)	(1660.4)	(2661.9)
Population Density	560.6*	420.5	129.1#	317.4
popdens	(1156.3)	(770.1)	(75.53)	(735.5)
Infrastructure-Index	0.889*	0.654#	0.740#	0.760
inf	(0.446)	(0.162)	(0.208)	(0.298)
Corporation Tax	39.81*	27.55#	23.73#	30.36
corp	(6.984)	(4.655)	(5.711)	(8.988)
Tax Wedge	52.99*	43.13#	42.17#	46.10
tax	(0.762)	(0.404)	(1.590)	(5.069)
Patents	183.85*	14.10#	4.683#	55.83
patents	(163.90)	(9.909)	(5.493)	(116.14)

*Note: Mean of the referring variable aboves and the corresponding standard error in parenthesis below. *=Significant mean difference compared to the Polish and Czech observations; #=Significant mean difference compared to the German observations. All tests refer to a 5% significance level. The mean and the standard error of the regional values are equally weighted over time, except for the relative agglomeration and wages, which are calculated on the base of the observation of the chosen investments.*

Table 8.5: Regional location choice: Correlation table of explanatory variables

	spec	herf	patent	wage	hrsto	unemp	gdp	mp	corp	taxw	popd	infra
spec	1											
herf	.388	1										
patent	.375	.751	1									
wage	.208	.663	.673	1								
hrsto	.340	.625	.592	.583	1							
unemp	-.030	.197	.221	.139	-.340	1						
gdp	.362	.790	.844	.689	.545	.226	1					
mp	.040	.035	.352	.316	.395	.076	.202	1				
corptax	.202	.432	.527	.425	.296	.055	.363	.320	1			
taxwed	.211	.561	.699	.614	.371	.383	.585	.570	.781	1		
popdens	.415	.776	.831	.593	.798	-.082	.695	.158	.342	.385	1	
infra	.386	.726	.867	.566	.566	.101	.767	.090	.327	.420	.903	1

Table 8.6: Regional R&D co-operation: Correlation table of explanatory variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Subsidiary's R&D mandate	1												
(2) Subsidiary's internal technological embedd.	0.0777	1											
(3) MNE's inv. mot. "technology seeking"	0.0085	0.0947	1										
(4) Subsidiary's technological capacity	0.1577	0.2032	0.1271	1									
(5) Regional knowldg. stock	0.0085	0.051	0.0037	0.0944	1								
(6) Interaction term	0.1531	0.1996	0.1132	0.8824	0.237	1							
(7) Population density	0.0317	0.0399	0.0093	0.1103	0.6298	0.2331	1						
(8) subsidiary's size	-0.0264	0.1855	0.0611	-0.1735	-0.1734	-0.1558	-0.1629	1					
(9) Year of entry	0.0681	-0.0857	-0.0119	0.0661	0.0115	0.0781	0.0213	-0.089	1				
(10) Mode of entry	-0.1303	-0.0743	-0.0193	-0.0485	-0.0106	-0.043	-0.0001	-0.136	-0.2542	1			
(11) Origin of investor	-0.0555	-0.0148	-0.0556	-0.1009	-0.1216	-0.1346	-0.1457	0.0051	-0.0581	0.0954	1		
(12) Type of investor	0.0465	-0.0297	-0.063	0.0226	0.0278	0.0406	0.0052	-0.027	0.166	-0.0925	-0.0634	1	
(13) Branch	-0.0022	-0.03	0.0214	0.1139	0.2602	0.1293	0.1915	-0.284	0.0819	0.0929	-0.0061	0.0297	1

Source: Own calculations; *IWH FDI Micro database* 2009.

Table 8.7: Regional R&D co-operation: The 52 NUTS-2 regions included in the dataset

East Germany
1 Berlin
2 Brandenburg-Nordost
3 Brandenburg-Südwest
4 Mecklenburg-Vorpommern
5 Chemnitz
6 Dresden
7 Leipzig
8 Sachsen-Anhalt
9 Thüringen

Hungary
10 Dél-Alföld
11 Dél-Dunántúl
12 Közép-Dunántúl
13 Közép-Magyarország
14 Nyugat-Dunántúl
15 Észak-Alföld

Slovakia
16 Bratislavský kraj
17 Stredné Slovensko
18 Východné Slovensko
19 Západné Slovensko

Czech Republic
20 Jihovýchod
21 Jihozápad
22 Moravskoslezsko
23 Praha
24 Severovýchod
25 Severozápad
26 Strední Cechy
27 Strední Morava

Romania
28 Bucuresti - Ilfov
29 Centru
30 Nord-Est
31 Nord-Vest
32 Sud - Muntenia
33 Sud-Est
34 Sud-Vest Oltenia
35 Vest

Poland
36 Dolnoslaskie
37 Kujawsko-Pomorskie
38 Lubelskie
39 Lubuskie
40 Lódzkie
41 Malopolskie
42 Mazowieckie
43 Opolskie
45 Podkarpackie
46 Podlaskie
47 Pomorskie
48 Slaskie
49 Swietokrzyskie
50 Warminsko-Mazurskie
51 Wielkopolskie
52 Zachodniopomorskie

Institut für Wirtschaftsforschung Halle
Halle Institute for Economic Research

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IWH FDI-Micro database

Representativeness survey 2009

Hungary, Czech Republic, Poland, Romania and Slovakia and East Germany (including West Berlin)

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Table of Contents

1. Representativeness of the East German sample

In the following section, the representativeness of the survey 2009 will be discussed for each population. The survey will be split into two groups; on the one hand East German enterprises having one or more multinational investor(s). On the other hand, we will consider the population of East German enterprises holding capital shares abroad. The representativeness analysis of the samples will be done by analyzing the employment size, the industry of the enterprises, the regional distribution and the ownership structure. In order to check the identity between the distribution of the sample and the population, a Chi-square-test will be applied. If the test statistics does not exceed the significance level of 5%, the null hypotheses will be rejected. In this case, one can assume that the sample is exposed to a different distribution compared to its population.

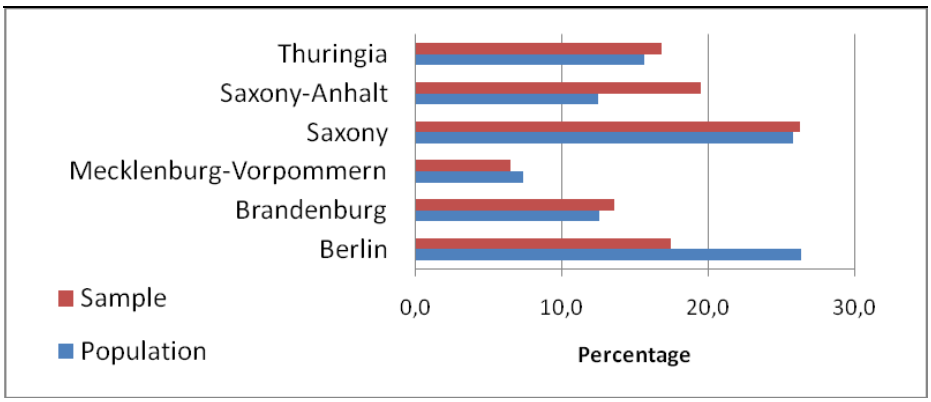
1.1 Investors in East Germany

1.1.1 Multinational investors

The majority of the enterprises with a multinational investor (see table A1 and graph 1) is located in Berlin (26.3%) followed by Saxony (25.7%), while the federal state of Mecklenburg-Vorpommern hosts only a share of 7.4% multinational investors. The states of Thuringia (15.6%), Brandenburg (12.5%), and Saxony-Anhalt (12.5%) account for the rest of the East German population with a multinational investor.

Compared to the population of East German enterprises with a multinational investor, the regional figures of the sample show that companies in Berlin are underweight (-8.9%), while the amount of enterprises in Saxony-Anhalt is overweight (+7.0%). The Chi-square-test indicates that the regional distribution of the sample differs significantly from the distribution of the population.

Graph 1: Regional distribution of East German enterprises with a multination investor

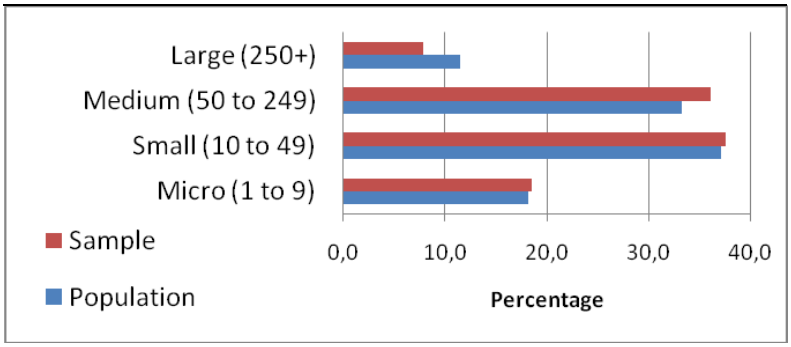


Source: IWH 2009

Following the regional distribution sorted by ROR[1], one can see that Berlin attracts most of the foreign investments, while the region of Altmark accounts for only 0.5% of the multinational affiliates in East Germany. Furthermore, the figures show distinct regional agglomerations (see table A2). In Saxony, nearly two thirds of the enterprises with a multinational investor are located either in the region around Dresden (Oberes Elbtal/Westerzgebirge, 8.2%) or in the region surrounding Leipzig (Westsachsen, 5.9%). In Thuringia, the same structure can be observed since Ostthüringen and Mittelthüringen account for 10% of the population and for 66% of the enterprises of the federal state. In Saxony-Anhalt, the regions around Halle/S. (4.5%) and Magdeburg (4.9%) host three quarter of the state's population. In Brandenburg and Mecklenburg-Vorpommern, the regions of the Havelland-Fläming (4.4%) and Westmecklenburg (2.4%) attract most of the regions' multinational investments. Compared to the population, the region of Berlin is underweight (-8.9%), while the region of Halle is overrepresented (+4.8%). The sample's deviation from its population is sufficient to reject the null hypothesis of an identical distribution.

The majority of the population of East German enterprises with a multinational investor is classified as a micro- or small-sized enterprise with less than 50 employees (see table A9 and graph 2). The shares of large companies and medium-sized enterprises account for 11.5% or 33.2% of the population, respectively. In comparison with the complete East German economy, the enterprises with a multinational investor are considerably bigger. In addition to the regional figures above, these figures indicate a structural impact of multinational companies investing in East Germany. In the sample, medium-sized enterprises are overweight (+2.9%), while large companies are underrepresented (-3.6%). According to the Chi-Square test statistics, the null hypothesis of an identical distribution can be rejected.

Graph 2: Distribution per employment size of East German enterprises with a multination investor.



Source: IWH 2009

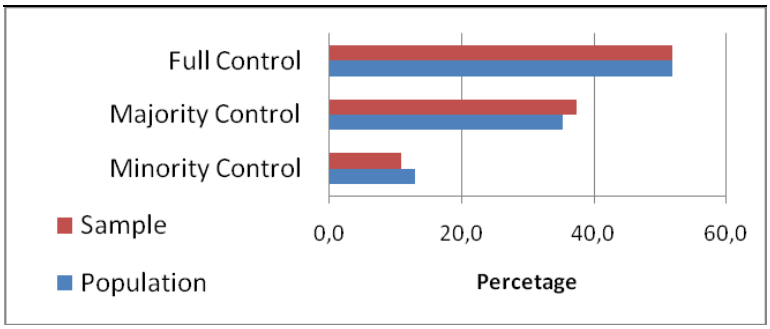
Most of the multinational affiliates (54.5%) belong to the service sector, while the rest (45.5%) of the enterprises are part of the industrial production. This distribution remains nearly identical in the sample. Hence, the corresponding null hypothesis cannot be rejected (see table A13). Considering the sectoral distribution sorted by the 2-digit WZ 2003 Code

[1] ROR is an abbreviation for Raumordnungsregionen, which divides East Germany into 23 regions.

(see table A14), the largest share of enterprises having a multinational investor belong to the sector of business service providers (WZ 2003 Code 74, 14.3%), followed by the wholesale sector (code 51) with a share of 10.9%. The sectors of metal processing (code 28, 6.5%) and mechanical engineering (code 29, 6.4%) are the strongest branches among the industrial production. Compared to the corresponding population, the sectors 25, 73, and 90 are overweight, while the sectors 74, 15, 72, and 22 are slightly underweight in the sample. According to these deviations, the assumption of an identical distribution is rejected.

The figures of the ownership structure depending on the capital share held by the investor, show that more than half of the East German enterprises with a multinational investor (51.8%) are absolutely owned by their investor (see table A21 and graph 3).[2] An additional share of 35.3% of the multinational investors hold a majority control over their affiliates in East Germany, while 12.9% of the investors hold a minority control. As the sample's deviation from its population is relatively small, the null hypothesis of an identical distribution cannot be rejected.

Graph 3: Distribution of East German enterprises with a multinational investor sorted by ownership structure.



Source: IWH 2009

1.1.2 Foreign Investors

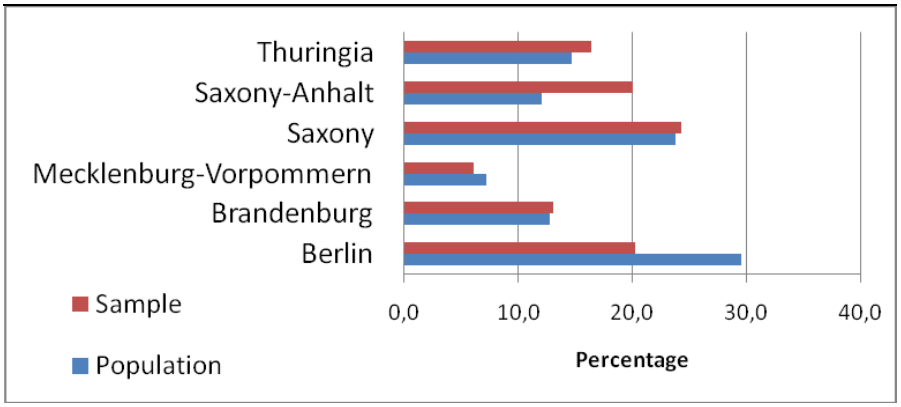
A population share of 29.5% of East German enterprises with a foreign investor is located in Berlin, followed by the federal states of Saxony (23.8%), Thuringia (14.7%), Brandenburg (12.8%), Saxony-Anhalt (12.0%), and Mecklenburg-Vorpommern (7.2%) (see table A2 and graph 4). In the corresponding sample of the survey, Berlin is underrepresented (-8.8%), while Saxony-Anhalt is overweight (+7.8%). These differences are enough to reject the null hypothesis of an identical distribution.

On a regional level following the ROR described above, the distribution is exposed to distinct differences, as the share of the region of Berlin (29.5%) is nearly 60-times larger than the share of the region of Altmark (0.5%) (see table A2). The agglomeration tendencies among enterprises with a foreign investor still can be observed, although they are not as pronounced as the ones observed among the enterprises with a multinational investor.

[2] The difference between direct and indirect is neglected for this representativeness analysis.

Hence, it seems to be attractive to conclude that agglomeration tendencies are stronger among investors coming from West Germany. In Saxony, the regions around Dresden (7.9%) and Leipzig (5.5%) are the driving forces of the federal state, while the regions of Ostthüringen (5.3%) and Mittelthüringen (4.5%) attract the majority of the foreign investments in the state of Thuringia. In Saxony-Anhalt, the regions around the cities of Halle/S. (4.3%) and Magdeburg (4.6%) account for three quarter of the federal state's FDI, while the regions of Havelland-Fläming (4.5%) and Westmecklenburg (2.4%) host the largest share of foreign investors in the state of Brandenburg or Mecklenburg-Vorpommern, respectively. In the sample, the region of Halle (+5.6%) is overrepresented at the expense of the share of Berlin (-9.3%). Due to the distributional difference between the sample and the population, the assumption of an identical distribution is rejected.

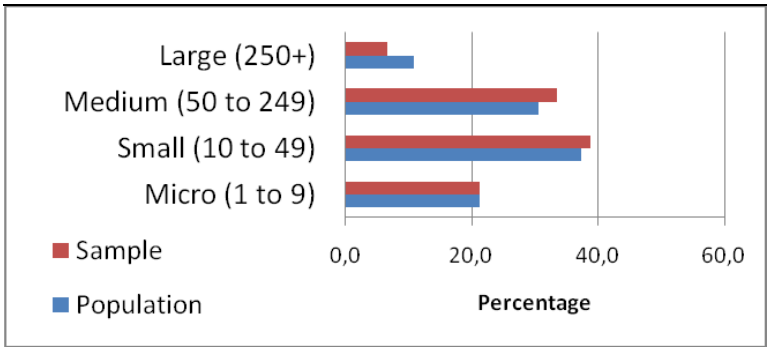
Graph 4: Regional distribution of East German enterprises with a foreign investor



Source: IWH 2009

Regarding the population of enterprises with a foreign investor ordered by employment size (see table A10 and graph 5), 37.4% of the firms are classified as small enterprises, followed by medium-sized firms with a share of 30.6% and large companies accounting for 10.8% of the population. In the sample, medium-sized firms are overweight (+2.9%) at the expense of large companies (-4.1%). Due to these deviations, the null hypothesis is rejected.

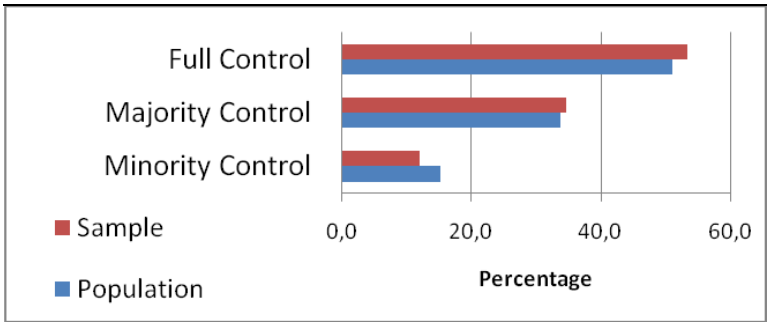
Graph 5: Distribution per employment size of East German enterprises with a foreign investor



Source: IWH 2009

Among East German enterprises with a foreign investor, a share of 57.9% belongs to the service sector, while 42.1% of the population's enterprises are part of the industrial sector. The deviation between the population and the sample is relatively small. Hence, the distributional difference can be neglected. The analysis of the sectoral distribution of foreign affiliates in East Germany basing on the 2-digit WZ 2003 Code (see table A15) leads to nearly the same results as the analysis of multinational affiliates, since business service providers (code 74, 15.6%) and the wholesale enterprises (code 51, 11.1%) account for the largest shares among East German enterprises with a foreign investor. The former one is underweight in the sample (-1.7%) in favor of the sector of metal production (code 28, +1.9%). The distributional differences lead to a rejection of the hypothesis of an identical distribution.

Graph 6: Distribution of East German enterprises with a foreign investor sorted by ownership structure



Source: IWH 2009

The distribution of FDI in East Germany sorted by the ownership structure (see table A22 and graph 6 shows that 33.4% of the foreign investors hold a majority control in East Germany. An additional share of 51.0% of the East German enterprises is even completely owned by its foreign investor. As the sample hardly deviates from the corresponding population, the assumption of an identical distribution is not rejected.

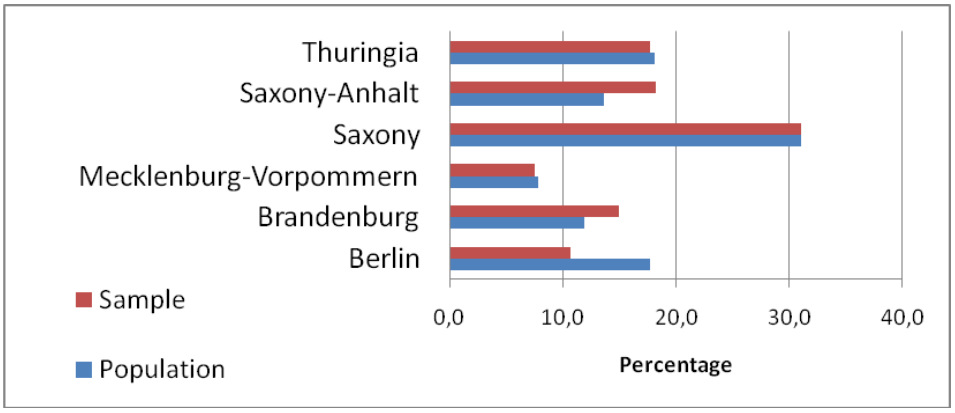
1.1.3 West German Multinational Investors

The population of East German enterprises with a West German investor indicates Saxony's dominant position in East Germany, as the federal state attracts 31.0% of the investments coming from West Germany (see table A5 and graph 7), followed by Thuringia (18.1%) and Berlin (17.7%). The federal states of Saxony-Anhalt (13.6%), Brandenburg (11.6%), and Mecklenburg-Vorpommern (7.8%) remain at the bottom of the chart. Within the corresponding sample, Berlin is underweight again (10.8%). Despite the sample's deviations, the null hypothesis is not rejected.

On a regional level, the regions around the cities of Dresden (Oberes Elbtal, 9.0%), Leipzig (Westsachsen, 7.0%) and Chemnitz (Chemnitz-Erzgebirge, 7.0%) attract the largest share of West German investments outside of Berlin (see table A6). In the sample, the regions of Halle, Oberes Elbtal and Prignitz-Oberhavel are overrepresented at the expense of the

regions of Berlin and Westsachsen. Nevertheless, the null hypothesis of an identical distribution is not rejected.

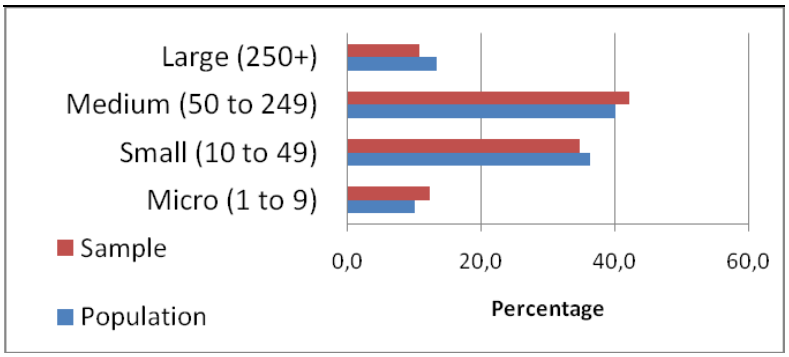
Graph 7: Regional distribution of West German multinational affiliates in East Germany



Source: IWH 2009

Among the East German affiliates of West German investors, more than 75% of the enterprises are classified as small or medium-sized (see table A11 and graph 8), while micro enterprises account for 10.0%. In the sample, micro and medium-sized enterprises are overweight (+2.2% and +2.0%) at the expense of large companies (-2.7%). The differences from the population are not sufficient to reject the assumption of an identical distribution.

Graph 8: Distribution of West German affiliates in East Germany sorted by employment size



Source: IWH 2009

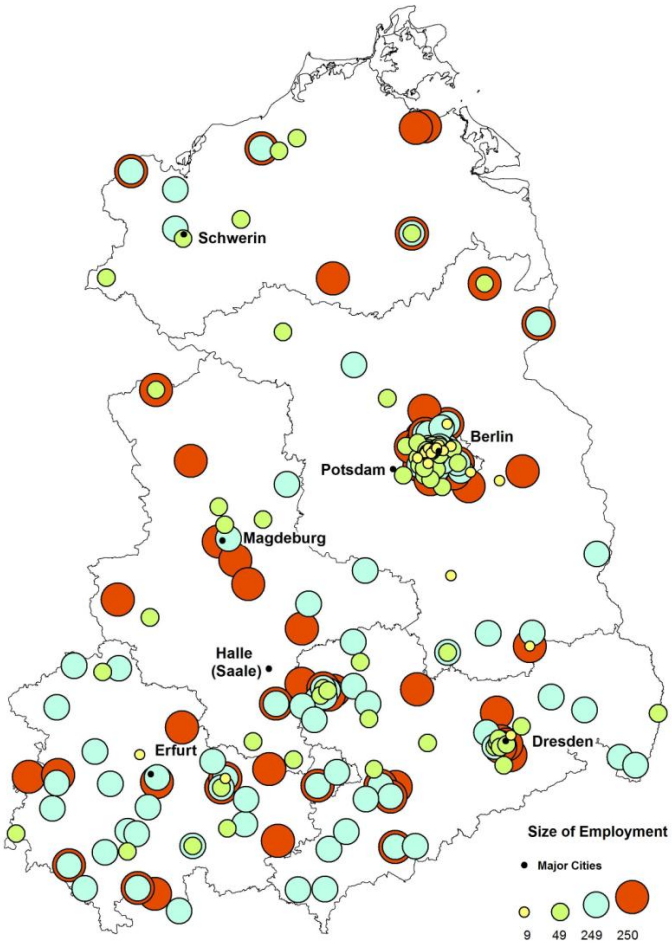
Contrary to the population of foreign affiliates, the majority of East German enterprises with a West German investor belongs to the industrial production (54.5%). This distribution hardly changes in the sample. Hence, the null hypothesis cannot be rejected (see table A17). In comparison to enterprises with a foreign investor, West German affiliates belonging to the sector of energy supply (WZ 2003 Code 40) are relatively (6.3% vs. 1.5%) and absolutely (64 vs. 42) more frequent in the population. Furthermore, a share of 9.0% is part of the sector of mechanical engineering (code 29), which is twice the corresponding share among foreign affiliates. In the sample, rubber production (code 25, +2.9%) is overweight. The Chi-Square test statistic leads to a non-rejection of the null hypothesis.

More than half (53.3%) of West German affiliates in East Germany are completely owned by their investor (see table A23). Beyond that, 38.5% of West German investors hold a majority on their affiliate. As the sample's distribution slightly differs from its population, the null hypothesis is not rejected.

1.2 East German Enterprises investing abroad

In the following section, we will discuss the representativeness of East German enterprises holding foreign direct investments. Compared to the amount of 2.710 enterprises, which are (partly) owned by foreign investors, only 316 East German firms hold capital shares outside of Germany. This figure indicates that only a small ratio of East German enterprises was able to get globally integrated. This conclusion is supported by the circumstances that a significant part of these companies is located in Berlin (including former West Berlin) and/or is partly owned by a multinational investor. Hence, the share of originally East German enterprises investing abroad is even smaller. 42.4% of the population of East German companies holding FDI are located in Berlin and were not necessarily exposed to the transition process (see table A7 and graph 9). Nearly two thirds of the remaining enterprises investing abroad can be found either in Saxony (19.3%) or in Thruringia (17.4%). In the sample, Berlin is underrepresented (-12.2%). Nevertheless, the null hypothesis of an identical distribution cannot be rejected.

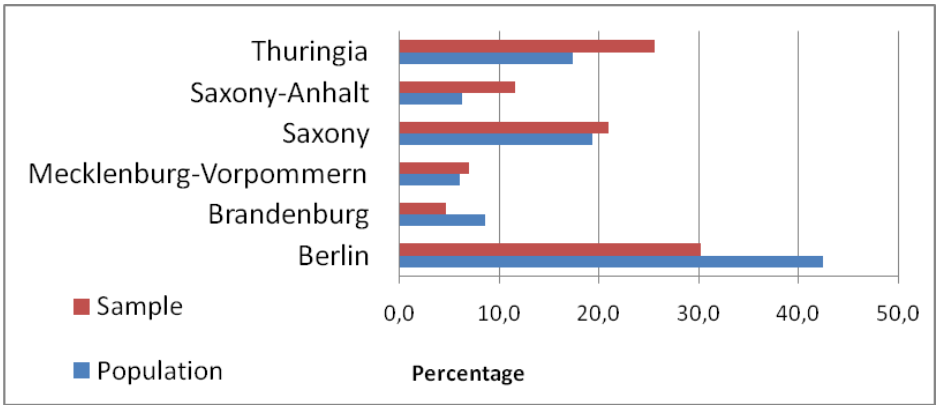
Graph 9: Regional distribution of East German enterprises investing abroad.



Source: IWH (2009)

On the regional level (see table A8), the regions of the Ostthüringen (7.2%) Westsachsen (7.6%) are the driving forces of the internationalization of the East German economy. These areas are followed by the regions of Oberes Elbtal/Osterzgebirge (5.1%), Magdeburg (3.2%) and Chemnitz/Erzgebirge (3.2%). The regional disparity is even more pronounced as among East German enterprises with a multinational investor. The sample deviation is too small to reject the assumption of an identical distribution.

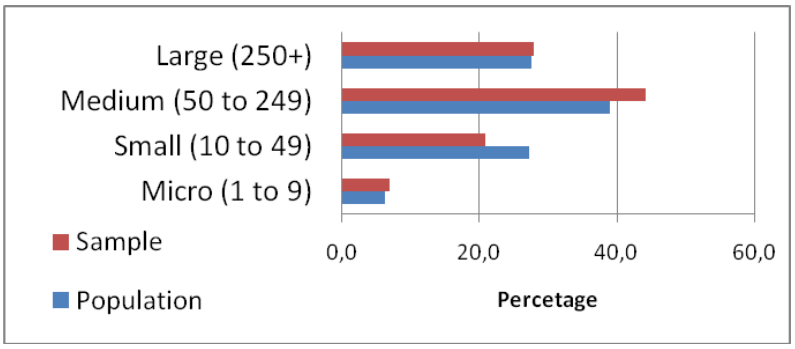
Graph 10: Regional distribution of East German enterprises investing abroad



Source: IWH 2009

In comparison to East German enterprises with a multinational investor, the companies investing abroad are significantly larger (see table A12 and graph 11), since medium-sized and large companies combine a population share of 38.9% or 27.5%, respectively. This figure might indicate that larger companies are more likely to be integrated into the global economy. In the corresponding sample, small enterprises are underweight (-6.3%) in favor of medium-sized companies (+5.3%). These deviations are not distinct enough to reject the null hypothesis of an identical distribution.

Graph 11: Distribution of East German enterprises investing outside Germany sorted by employment size.



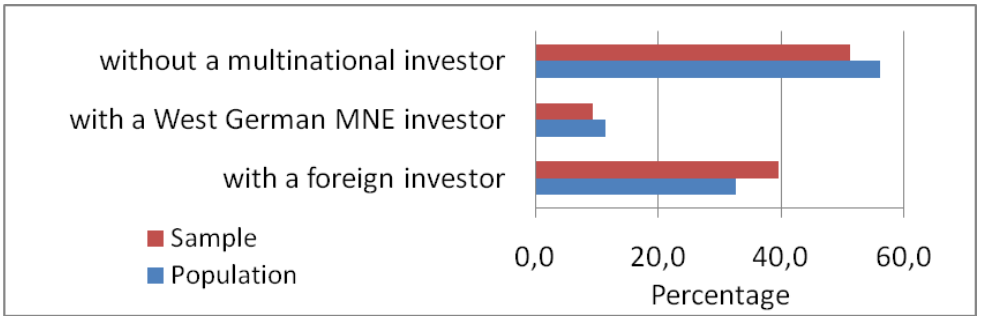
Source: IWH 2009

The majority (57.0%) of the East German enterprises investing abroad belongs to the service sector (see table A19). The null hypothesis of an identical distribution of the population and the sample cannot be rejected, as this relation remains constant in the sample. The sectoral distribution per 2-digit WZ 2003 Code shows that the largest share of East German companies holding FDI belongs to the sector of business service providers (code 74, 24.5%), mechanical engineering (code 29, 8.9%) and wholesales (code 51, 9.5%). Compared to the population, the chemical industry is overweight (code 24, +7.2%). The assumption of an identical distribution cannot be rejected.

Exactly two thirds of the East German companies holding FDI have the absolute control over at least one affiliate outside Germany (see table A24). Beyond that, an additional share of

25.8% of the East German enterprises with an investment abroad hold a majority control over one or more foreign affiliates. Compared to the population, East German enterprises holding a minority control outside Germany are overrepresented (+5.6%) in the sample. Despite this deviation, the null hypothesis cannot be rejected.

Graph 12: Distribution of East German enterprises holding FDI sorted by ownership structure



Source: IWH 2009

The analysis of the ownership structure of East German enterprises investing abroad shows that 56.0% of the enterprises are originally East German (see table A25 and graph 12), since 32.6% or 11.4% of these companies have either a foreign or a West German multinational investor, respectively. This figure would become even darker if enterprises from Berlin were excluded. Despite small deviations from the population, the assumption of an identical distribution of the population and the corresponding sample is not rejected.

2. Representativeness of the sample CEE countries

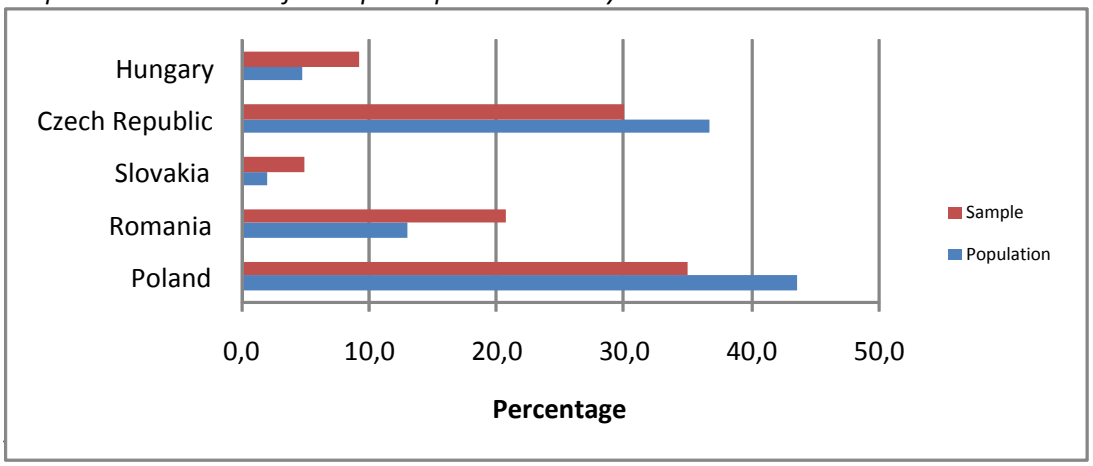
In the following chapter, the representativeness of the survey wave 2009 will be discussed for each population. The survey will be split into two groups; on the one hand Central-East European enterprises having one or more multinational investor(s). This analysis will be implemented for the complete set of CEE countries and within each country itself. On the other hand, we will consider the population of enterprises from Central East Europe holding capital shares abroad. This analysis will be applied only on the aggregate level of all CEE countries, since the population and sample size of enterprises investing abroad is very small within each country alone.

The representativeness analysis of the samples will be done by analyzing the employment size, the industry of the enterprises, the regional distribution and the ownership structure. In order to check the identity between the distribution of the sample and the population, a Chi-square-test will be applied. If the test statistics does not exceed the significance level of 5%, the null hypotheses will be rejected. In this case, one can assume that the sample is exposed to a different distribution compared to its population.

2.1 Inward (Investors in CEE countries)

The majority of the CEE enterprises attracting foreign direct investments are located in Poland (43.5%) and the Czech Republic (36.6%). Romanian (12.9%), Hungarian (4.9%) and Slovakian (2%) enterprises account for the rest of the population (see table B1 and graph13). In the sample, Czech Republic and Poland are underweight compared to the population (-6.6% and -8.5%), while Romania is overrepresented (+ 7.83%). Due to the deviations described above, the null hypothesis of an identical distribution can be rejected.

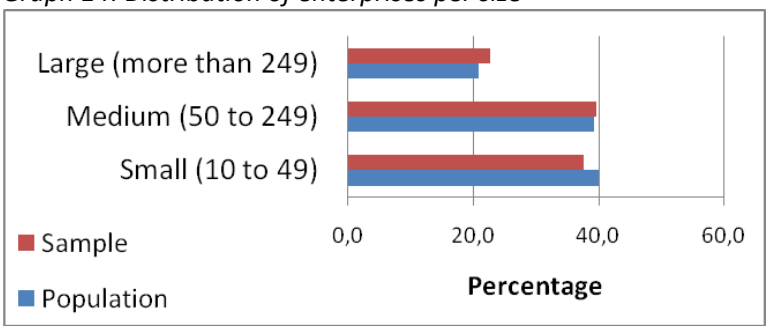
Graph 13: Distribution of enterprises per CEE country



With regard to the enterprise size measured by the employee figures (see graph 14 and table B2), we see that 40% of the enterprises with a foreign investor employ less than 50 individuals, while another 39.2% can be classified as medium-sized with an employment size between 50 and 249. Large enterprises account for a population share of 20.8%. The comparison between the sample and the population shows only a slight deviation. Small

enterprises are underweight by 2.3%, while large and medium-sized enterprises are overweight (+1.9% or +0.4%, respectively). Hence, the assumption of an identical distribution cannot be rejected. Even on the country level the deviations are relatively small (see tables B4-B8), since the largest deviation – of large Slovakian companies – sums up only to 4.3%. Due to the small deviations, any Chi-Square-tests does not lead to a rejection of the null hypothesis.

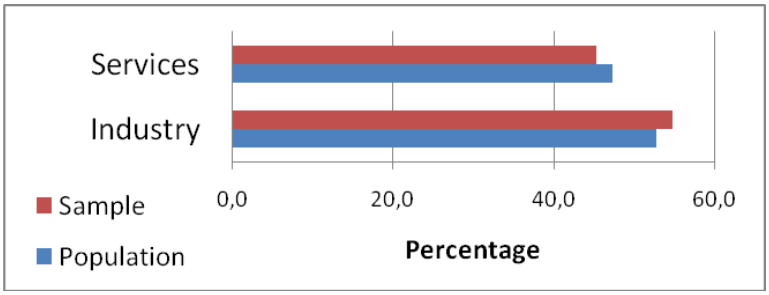
Graph 14: Distribution of enterprises per size



Source: IWH 2009

Among the enterprises having a foreign investor, 52.7% belong to the industrial sector, while the rest of the population (47.3%) is part of the service sector (sse graph 15 and table B3). This figure indicates the great importance of the industrial sector in CEE countries, especially in Romania, where 68.1% of the enterprises being invested in are part of the industrial sector. In the Czech Republic, whose GDP/capita is the largest within the country group of the survey, the industrial sector accounts for only 47.4%. The sample distribution differs only slightly from the corresponding sample since the industrial sector is slightly overweight by 2%. Due to the small deviation the null hypothesis cannot be rejected. On the country level, all null hypotheses are not rejected, indicating that the samples seem to represent the referring population quite well.

Graph 15: Distribution of enterprises by industry



Source: IWH 2009

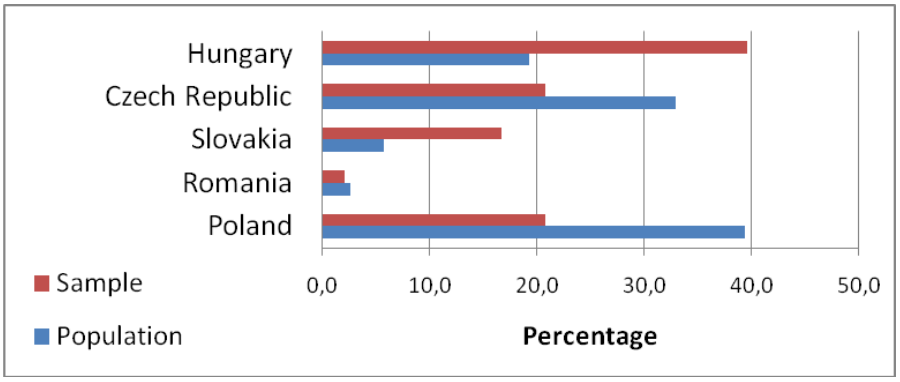
The sectoral distribution basing on the Nace 1.1 rev. classification (see Table B9) shows that the sample differs only slightly from its population. The largest deviations can be observed for companies belonging either to the metal processing industry (Nace 1.1 rev. Code 28, +1.5%) or the business services (Code 74, -1.8%). Hence, the assumption of an identical

distribution cannot be rejected on the aggregate country level. On the country level, only the identity of the Hungarian sample and population distribution can be rejected.

2.2 Outward (CEE enterprises investing abroad)

Focusing on the distribution of enterprises investing abroad (see graph 16 and table B10), we find that the majority of the enterprises with a foreign affiliate is located in Poland and the Czech Republic (39.4% and 33%, respectively). Compared to the inward population, Romania's sample share drops to 2.6%, while the sample share of Hungarian (from 4.8% to 19.3%) and Slovakian (from 2.0% to 5.8) enterprises increases.

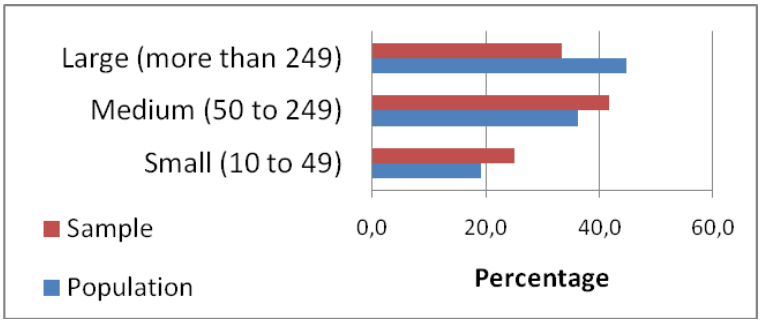
Graph 16: Distribution of outward enterprises per CEE country.



Source: IWH 2009

As the outward population is much smaller than the inward population, the sample distribution reacts sensitively on deviations from the referring population. In the sample, Polish and Czech enterprises are underweight (-18.4% or -12.2%, respectively), while Hungary and Slovakia are overweight (+20.3% or 10.9%, respectively). As the deviations between the distributions are quite large, the null hypothesis of an identical distribution is rejected.

Graph 17: Distribution of Outward enterprises ordered by size



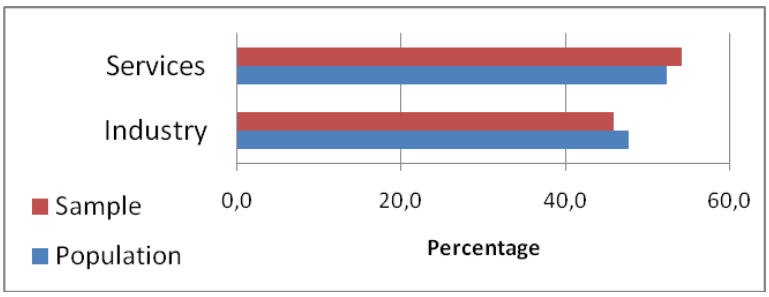
Source: IWH 2009

In comparison with the inward population, the distribution of the outward enterprises ordered by employment size (see graph 17 and table B11) describes a shift from small-scaled to large enterprises, since large companies account for almost half of the aggregate

population of enterprises investing abroad (44.7%); this is more than twice the share of the inward population. This increase is at the expense of the share of small enterprises holding FDI, which declines from 40% to 19.1% compared to the inward population. In the sample, large enterprises are underrepresented (-11.4%), while small and medium-sized enterprises are overweight (+5.9% and 5.5%, respectively). Despite these deviations, the assumption of an identical distribution cannot be rejected.

Among the enterprises of the outward population, 47.7% of the enterprises investing abroad belong to the industrial sector, implying a shift towards the service sector (see graph 18 and table B12). In the sample, the industrial sector is slightly underweight (-1.9%). Due to this small deviation the hypothesis of an identical distribution is not rejected.

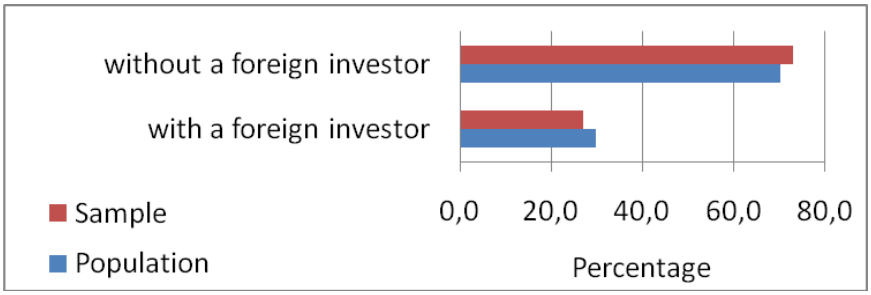
Graph 18: Distribution of Outward enterprises per industry



Source: IWH 2009

The analysis of the ownership structure of CEE enterprises investing abroad shows that 70.2% of the enterprises are originally located in the referring country (see table B13 & graph 19). The companies investing abroad have a foreign investor account for 29.8% of the population. Despite small deviations from the population, the assumption of an identical distribution of the population and the corresponding sample is not rejected.

Graph 19: *Distribution of CEE enterprises investing abroad per ownership structure*



Source: IWH 2009

As the population and the sample size are relatively small on the national level, the results of repetitiveness analysis for each country are not very robust. Hence, these results have been neglected. For example, among the Romanian enterprises meeting the Outward criteria only one company participated in the survey. Furthermore the participation ratio within the CEE countries differs distinctively, since the response ratio of Polish and Czech enterprises was

quite low (5.1% or 6.0%, respectively), while 27.6% of the contacted Slovakian enterprises took part in the survey.

Appendix

Part1: Eastern Germany

Table A1 Number of enterprises with a multinational investor per federal state

Enterprises per federal state	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
Berlin	979	26,3	110	17,4	166	-8,9
Brandenburg	467	12,5	86	13,6	79	1,1
Mecklenburg-Vorpommern	274	7,4	41	6,5	47	-0,9
Saxony	958	25,7	166	26,3	163	0,5
Saxony-Anhalt	464	12,5	123	19,5	79	7,0
Thuringia	581	15,6	106	16,8	99	1,2
Total	**3.723**	**100,0**	**632**	**100,0**	**632**	**0,0**
Chi-Square-Test	45,684					
DF	5					
Asymptotic significance	0,0000					

Source: IWH FDI-micro-database 2009

Table A2 Number of enterprises with a multinational investor per region (ROR)

Enterprises per region (ROR)	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
ALTMARK	20	0,5	2	0,3	3	-0,2
BERLIN	979	26,3	110	17,4	166	-8,9
CHEMNITZ-ERZGEBIRGE	185	5,0	32	5,1	31	0,1
DESSAU	93	2,5	21	3,3	16	0,8
HALLE/S.	167	4,5	59	9,3	28	4,8
HAVELLAND-FLÄMING	165	4,4	27	4,3	28	-0,2
LAUSITZ-SPREEWALD	121	3,3	25	4,0	21	0,7
MAGDEBURG	184	4,9	41	6,5	31	1,5
MECKLENBURGISCHE SEENPLATTE	48	1,3	7	1,1	8	-0,2
MITTELTHÜRINGEN	174	4,7	33	5,2	30	0,5
MITTLERES MECKLENBURG/ROSTOCK	85	2,3	11	1,7	14	-0,5
NORDTHÜRINGEN	68	1,8	9	1,4	12	-0,4
OBERES ELBTAL/OSTERZGEBIRGE	304	8,2	57	9,0	52	0,9
OBERLAUSITZ-NIEDERSCHLESIEN	132	3,5	17	2,7	22	-0,9
ODERLAND-SPREE	84	2,3	15	2,4	14	0,1
OSTTHÜRINGEN	202	5,4	41	6,5	34	1,1
PRIGNITZ-OBERHAVEL	57	1,5	10	1,6	10	0,1
SÜDTHÜRINGEN	137	3,7	23	3,6	23	-0,0
SÜDWESTSACHSEN	116	3,1	23	3,6	20	0,5
UCKERMARK-BARNIM	40	1,1	9	1,4	7	0,3
VORPOMMERN	53	1,4	10	1,6	9	0,2
WESTMECKLENBURG	88	2,4	13	2,1	15	-0,3
WESTSACHSEN	221	5,9	37	5,9	38	-0,1
Total	**3.723**	**100**	**632**	**100**	**632**	**0**
Chi-Square-Test	65,323					
DF	22					
Asymptotich significance	**0,0000**					

Source: IWH FDI-micro-database 2009

Table A3 Number of enterprises with foreign investors per federal state

Enterprises per federal state	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
Berlin	800	29,5	90	20,2	131	-9,3
Brandenburg	347	12,8	58	13,0	57	0,2
Mecklenburg-Vorpommern	195	7,2	27	6,1	32	-1,1
Saxony	644	23,8	108	24,3	106	0,5
Saxony-Anhalt	326	12,0	89	20,0	54	8,0
Thuringia	398	14,7	73	16,4	65	1,7
Total	**2.710**	**100,0**	**445**	**100,0**	**445**	**0,0**
Chi-Square-Test	38,274					
DF	5					
Asymptotic significance	0,0000					

Source: IWH FDI-micro-database 2009

Table A4 Number of enterprises with foreign investors per region (ROR)

Enterprises per region (ROR)	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
ALTMARK	14	0,5	1	0,2	2	-0,3
BERLIN	800	29,5	90	20,2	131	-9,3
CHEMNITZ-ERZGEBIRGE	114	4,2	21	4,7	19	0,5
DESSAU	69	2,5	16	3,6	11	1,0
HALLE/S.	117	4,3	44	9,9	19	5,6
HAVELLAND-FLÄMING	122	4,5	18	4,0	20	-0,5
LAUSITZ-SPREEWALD	91	3,4	19	4,3	15	0,9
MAGDEBURG	126	4,6	28	6,3	21	1,6
MECKLENBURGISCHE SEENPLATTE	32	1,2	3	0,7	5	-0,5
MITTELTHÜRINGEN	123	4,5	25	5,6	20	1,1
MITTLERES MECKLENBURG/ROSTOCK	61	2,3	7	1,6	10	-0,7
NORDTHÜRINGEN	44	1,6	4	0,9	7	-0,7
OBERES ELBTAL/OSTERZGEBIRGE	213	7,9	36	8,1	35	0,2
OBERLAUSITZ-NIEDERSCHLESIEN	97	3,6	12	2,7	16	-0,9
ODERLAND-SPREE	63	2,3	12	2,7	10	0,4
OSTTHÜRINGEN	144	5,3	29	6,5	24	1,2
PRIGNITZ-OBERHAVEL	43	1,6	2	0,4	7	-1,1
SÜDTHÜRINGEN	87	3,2	15	3,4	14	0,2
SÜDWESTSACHSEN	70	2,6	11	2,5	11	-0,1
UCKERMARK-BARNIM	28	1,0	7	1,6	5	0,5
VORPOMMERN	36	1,3	8	1,8	6	0,5
WESTMECKLENBURG	66	2,4	9	2,0	11	-0,4
WESTSACHSEN	150	5,5	28	6,3	25	0,8
Total	**2.710**	**100**	**445**	**100**	**445**	**0**
Chi-Square-Test	65,217					
DF	22					
Asymptotich significance	**0,0000**					

Source: IWH FDI-micro-database 2009

Table A5 Number of enterprises with a Western German investor per federal state

Enterprises per federal state	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
Berlin	179	17,7	20	10,7	33	-7,0
Brandenburg	120	11,8	28	15,0	22	3,1
Mecklenburg-Vorpommern	79	7,8	14	7,5	15	-0,3
Saxony	314	31,0	58	31,0	58	0,0
Saxony-Anhalt	138	13,6	34	18,2	25	4,6
Thuringia	183	18,1	33	17,6	34	-0,4
Total	**1.013**	**100,0**	**187**	**100,0**	**187**	**0,0**
Chi-Square-Test	9,587					
DF	5					
Asymptotic significance	0,0878					

Source: IWH FDI-micro-database 2009

Table A6 Number of enterprises with a West German investor per region (ROR)

Enterprises per region (ROR)	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
ALTMARK	6	0,6	1	0,5	1	-0,1
BERLIN	179	17,7	20	10,7	33	-7,0
CHEMNITZ-ERZGEBIRGE	71	7,0	11	5,9	13	-1,1
DESSAU	24	2,4	5	2,7	4	0,3
HALLE/S.	50	4,9	15	8,0	9	3,1
HAVELLAND-FLÄMING	43	4,2	9	4,8	8	0,6
LAUSITZ-SPREEWALD	30	3,0	6	3,2	6	0,2
MAGDEBURG	58	5,7	13	7,0	11	1,2
MECKLENBURGISCHE SEENPLATTE	16	1,6	4	2,1	3	0,6
MITTELTHÜRINGEN	51	5,0	8	4,3	9	-0,8
MITTLERES MECKLENBURG/ROSTOCK	24	2,4	4	2,1	4	-0,2
NORDTHÜRINGEN	24	2,4	5	2,7	4	0,3
OBERES ELBTAL/OSTERZGEBIRGE	91	9,0	21	11,2	17	2,2
OBERLAUSITZ-NIEDERSCHLESIEN	35	3,5	5	2,7	6	-0,8
ODERLAND-SPREE	21	2,1	3	1,6	4	-0,5
OSTTHÜRINGEN	58	5,7	12	6,4	11	0,7
PRIGNITZ-OBERHAVEL	14	1,4	8	4,3	3	2,9
SÜDTHÜRINGEN	50	4,9	8	4,3	9	-0,7
SÜDWESTSACHSEN	46	4,5	12	6,4	8	1,9
UCKERMARK-BARNIM	12	1,2	2	1,1	2	-0,1
VORPOMMERN	17	1,7	2	1,1	3	-0,6
WESTMECKLENBURG	22	2,2	4	2,1	4	-0,0
WESTSACHSEN	71	7,0	9	4,8	13	-2,2
Total	**1.013**	**100**	**187**	**100**	**187**	**0**
Chi-Square-Test	26,967					
DF	22					
Asymptotich significance	**0,2125**					

Source: IWH FDI-micro-database 2009

Table A7 Number of East German enterprises investing abroad per federal state

Enterprises per federal state	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
Berlin	134	42,4	13	30,2	18	-12,2
Brandenburg	27	8,5	2	4,7	4	-3,9
Mecklenburg-Vorpommern	19	6,0	3	7,0	3	1,0
Saxony	61	19,3	9	20,9	8	1,6
Saxony-Anhalt	20	6,3	5	11,6	3	5,3
Thuringia	55	17,4	11	25,6	7	8,2
Total	**316**	**100,0**	**43**	**100,0**	**43**	**0,0**
Chi-Square-Test	5,950					
DF	5					
Asymptotic significance	0,3111					

Source: IWH FDI-micro-database 2009

Table A8 Number of East German enterprises investing abroad per region (ROR)

Enterprises per region (ROR)	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
ALTMARK	3	0,9	0	0,0	0	-0,9
BERLIN	134	42,4	13	30,2	18	-12,2
CHEMNITZ-ERZGEBIRGE	10	3,2	1	2,3	1	-0,8
DESSAU	3	0,9	1	2,3	0	1,4
HALLE/S.	4	1,3	1	2,3	1	1,1
HAVELLAND-FLÄMING	7	2,2	1	2,3	1	0,1
LAUSITZ-SPREEWALD	9	2,8	1	2,3	1	-0,5
MAGDEBURG	10	3,2	3	7,0	1	3,8
MECKLENBURGISCHE SEENPLATTE	6	1,9	2	4,7	1	2,8
MITTELTHÜRINGEN	11	3,5	4	9,3	1	5,8
MITTLERES MECKLENBURG/ROSTOCK	4	1,3	0	0,0	1	-1,3
NORDTHÜRINGEN	6	1,9	0	0,0	1	-1,9
OBERES ELBTAL/OSTERZGEBIRGE	16	5,1	4	9,3	2	4,2
OBERLAUSITZ-NIEDERSCHLESIEN	7	2,2	0	0,0	1	-2,2
ODERLAND-SPREE	2	0,6	0	0,0	0	-0,6
OSTTHÜRINGEN	23	7,3	6	14,0	3	6,7
PRIGNITZ-OBERHAVEL	5	1,6	0	0,0	1	-1,6
SÜDTHÜRINGEN	15	4,7	1	2,3	2	-2,4
SÜDWESTSACHSEN	4	1,3	0	0,0	1	-1,3
UCKERMARK-BARNIM	4	1,3	0	0,0	1	-1,3
VORPOMMERN	2	0,6	1	2,3	0	1,7
WESTMECKLENBURG	7	2,2	0	0,0	1	-2,2
WESTSACHSEN	24	7,6	4	9,3	3	1,7
Total	**316**	**100**	**43**	**100**	**43**	**0**
Chi-Square-Test	23,274					
DF	22					
Asymptotich significance	**0,3864**					

Source: IWH FDI-micro-database 2009

Table A9: Number of East German enterprises with a multination investor per employment size

Enterprises per employment size	Population		Sample		Expected Sample Value	Deviation in %
	Frequency	%	Frequency	%		
Micro (1 to 9)	663	18,2	115	18,5	113	0,3
Small (10 to 49)	1.351	37,1	233	37,5	230	0,4
Medium (50 to 249)	1.210	33,2	224	36,1	206	2,9
Large (250+)	419	11,5	49	7,9	71	-3,6
Total	**3.643**	**100**	**621**	**100**	**621**	
Chi-Square-Test	8,63					
DF	3					
Asymptotic significance	**0,0346**					

Source: IWH FDI-micro-database 2009

Table A10: Number of East German enterprises with a foreign investor per employment size

Enterprises per employment size	Population		Sample		Expected Sample Value	Deviation in %
	Frequency	%	Frequency	%		
Micro (1 to 9)	562	21,3	92	21,2	92	-0,1
Small (10 to 49)	986	37,4	168	38,7	162	1,3
Medium (50 to 249)	806	30,6	145	33,4	133	2,9
Large (250+)	284	10,8	29	6,7	47	-4,1
Total	**2.638**	**100**	**434**	**100**	**434**	
Chi-Square-Test	8,09					
DF	3					
Asymptotic significance	**0,0442**					

Source: IWH FDI-micro-database 2009

Table A11: Number of East German enterprises with a West German investor per employment size

Enterprises per employment size	Population		Sample		Expected Sample Value	Deviation in %
	Frequency	%	Frequency	%		
Micro (1 to 9)	101	10,0	23	12,3	19	2,2
Small (10 to 49)	365	36,3	65	34,8	68	-1,6
Medium (50 to 249)	404	40,2	79	42,2	75	2,0
Large (250+)	135	13,4	20	10,7	25	-2,7
Total	**1.005**	**100**	**187**	**100**	**187**	
Chi-Square-Test	2,31					
DF	3					
Asymptotic significance	**0,5115**					

Source: IWH FDI-micro-database 2009

Table A12: Number of East German enterprises investing abroad per employment size

Enterprises per employment size	Population		Sample		Expected Sample Value	Deviation in %
	Frequency	%	Frequency	%		
Micro (1 to 9)	20	6,3	3	7,0	3	0,6
Small (10 to 49)	86	27,2	9	20,9	12	-6,3
Medium (50 to 249)	123	38,9	19	44,2	17	5,3
Large (250+)	87	27,5	12	27,9	12	0,4
Total	**316**	**100**	**43**	**100**	**43**	
Chi-Square-Test	0,96					
DF	3					
Asymptotic significance	**0,8108**					

Source: IWH FDI-micro-database 2009

Table A13 Number of enterprises with a multinational investor per branch

Enterprises per branch	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
Industry	1.694	45,5	280	44,3	288	-1,2
Service	2.029	54,5	352	55,7	344	1,2
Total	**3.723**	**100**	**632**	**100**	**632**	
Chi-Square-Test	0,365					
DF	1					
Asymptotic significance	0,5456					

Source: IWH FDI-micro-database 2009

Table A14 Number of enterprises with a multinational investor per sector (WZ 2003)

Enterprises per sector (WZ 2003)	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
10	2	0,05	1	0,16	0	0,1
13	1	0,03	1	0,16	0	0,1
14	31	0,83	7	1,11	5	0,3
15	137	3,68	16	2,53	23	-1,1
16	3	0,08	0	0,00	1	-0,1
17	49	1,32	9	1,42	8	0,1
18	9	0,24	1	0,16	2	-0,1
19	4	0,11	3	0,47	1	0,4
20	44	1,18	6	0,95	7	-0,2
21	63	1,69	16	2,53	11	0,8
22	99	2,66	10	1,58	17	-1,1
23	13	0,35	3	0,47	2	0,1
24	159	4,27	32	5,06	27	0,8
25	117	3,14	28	4,43	20	1,3
26	164	4,41	33	5,22	28	0,8
27	70	1,88	13	2,06	12	0,2
28	241	6,47	45	7,12	41	0,6
29	237	6,37	37	5,85	40	-0,5
30	27	0,73	2	0,32	5	-0,4
31	100	2,69	21	3,32	17	0,6
32	100	2,69	13	2,06	17	-0,6
33	137	3,68	25	3,96	23	0,3
34	82	2,20	8	1,27	14	-0,9
35	47	1,26	6	0,95	8	-0,3
36	63	1,69	12	1,90	11	0,2
37	43	1,15	10	1,58	7	0,4
40	106	2,85	20	3,16	18	0,3
41	10	0,27	3	0,47	2	0,2
45	0	0,00	0	0,00	0	0,0
50	0	0,00	0	0,00	0	0,0
51	407	10,93	64	10,13	69	-0,8
52	4	0,11	3	0,47	1	0,4
55	0	0,00	0	0,00	0	0,0
60	49	1,32	9	1,42	8	0,1
61	5	0,13	1	0,16	1	0,0
62	6	0,16	1	0,16	1	-0,0
63	106	2,85	15	2,37	18	-0,5
64	25	0,67	5	0,79	4	0,1
65	14	0,38	1	0,16	2	-0,2
66	7	0,19	1	0,16	1	-0,0
67	20	0,54	0	0,00	3	-0,5
70	0	0,00	0	0,00	0	0,0
71	0	0,00	0	0,00	0	0,0
72	164	4,41	21	3,32	28	-1,1
73	89	2,39	23	3,64	15	1,2
74	534	14,34	80	12,66	91	-1,7
80	0	0,00	0	0,00	0	0,0
85	0	0,00	0	0,00	0	0,0
90	41	1,10	14	2,22	7	1,1
91	0	0,00	0	0,00	0	0,0
92	64	1,72	10	1,58	11	-0,1
93	30	0,81	3	0,47	5	-0,3
Total	**3.723**	**100**	**632**	**100**	**632**	**0**
Chi-Square-Test	66,033					
DF	43					
Asymptotic significance	**0,0135**					

Source: IWH FDI-micro-database 2009

Table A15 Number of enterprises with a foreign investor per branch

Enterprises per branch	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
Industry	1.142	42,1	179	40,2	188	-1,9
Service	1.568	57,9	266	59,8	257	1,9
Total	**2.710**	**100**	**445**	**100**	**445**	
Chi-Square-Test	0,670					
DF	1					
Asymptotic significance	0,4132					

Source: IWH FDI-micro-database 2009

Table A16 Number of enterprises with a foreign investor per sector (WZ 2003)

Enterprises per sector (WZ 2003)	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
10	2	0,07	1	0,22	0	0,2
13	1	0,04	1	0,22	0	0,2
14	16	0,59	4	0,90	3	0,3
15	100	3,69	9	2,02	16	-1,7
16	3	0,11	0	0,00	0	-0,1
17	40	1,48	8	1,80	7	0,3
18	7	0,26	1	0,22	1	-0,0
19	3	0,11	2	0,45	0	0,3
20	36	1,33	3	0,67	6	-0,7
21	50	1,85	13	2,92	8	1,1
22	66	2,44	6	1,35	11	-1,1
23	10	0,37	2	0,45	2	0,1
24	127	4,69	27	6,07	21	1,4
25	81	2,99	16	3,60	13	0,6
26	111	4,10	23	5,17	18	1,1
27	55	2,03	11	2,47	9	0,4
28	180	6,64	38	8,54	30	1,9
29	146	5,39	21	4,72	24	-0,7
30	25	0,92	1	0,22	4	-0,7
31	76	2,80	16	3,60	12	0,8
32	84	3,10	9	2,02	14	-1,1
33	99	3,65	20	4,49	16	0,8
34	60	2,21	6	1,35	10	-0,9
35	36	1,33	5	1,12	6	-0,2
36	47	1,73	10	2,25	8	0,5
37	27	1,00	5	1,12	4	0,1
40	42	1,55	6	1,35	7	-0,2
41	6	0,22	0	0,00	1	-0,2
45	0	0,00	0	0,00	0	0,0
50	0	0,00	0	0,00	0	0,0
51	300	11,07	48	10,79	49	-0,3
52	0	0,00	0	0,00	0	0,0
55	0	0,00	0	0,00	0	0,0
60	35	1,29	7	1,57	6	0,3
61	2	0,07	0	0,00	0	-0,1
62	5	0,18	0	0,00	1	-0,2
63	86	3,17	12	2,70	14	-0,5
64	16	0,59	2	0,45	3	-0,1
65	5	0,18	1	0,22	1	0,0
66	2	0,07	1	0,22	0	0,2
67	10	0,37	0	0,00	2	-0,4
70	0	0,00	0	0,00	0	0,0
71	0	0,00	0	0,00	0	0,0
72	131	4,83	11	2,47	22	-2,4
73	66	2,44	18	4,04	11	1,6
74	424	15,65	62	13,93	70	-1,7
80	0	0,00	0	0,00	0	0,0
85	0	0,00	0	0,00	0	0,0
90	20	0,74	10	2,25	3	1,5
91	0	0,00	0	0,00	0	0,0
92	43	1,59	6	1,35	7	-0,2
93	29	1,07	3	0,67	5	-0,4
Total	**2.710**	**100**	**445**	**100**	**445**	**0**
Chi-Square-Test	68,011					
DF	42					
Asymptotic significance	**0,0067**					

Source: IWH FDI-micro-database 2009

Table A17 Number of enterprises with a West German investor per branch

Enterprises per branch	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
Industry	552	54,5	101	54,0	102	-0,5
Service	461	45,5	86	46,0	85	0,5
Total	**1.013**	**100**	**187**	**100**	**187**	
Chi-Square-Test	0,017					
DF	1					
Asymptotic significance	0,8949					

Source: IWH FDI-micro-database 2009

Table A18 Number of enterprises with a West German investor per sector (WZ 2003)

Enterprises per sector (WZ 2003)	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
10	0	0,00	0	0,00	0	0,0
13	0	0,00	0	0,00	0	0,0
14	15	1,48	3	1,60	3	0,1
15	37	3,65	7	3,74	7	0,1
16	0	0,00	0	0,00	0	0,0
17	9	0,89	1	0,53	2	-0,4
18	2	0,20	0	0,00	0	-0,2
19	1	0,10	1	0,53	0	0,4
20	8	0,79	3	1,60	1	0,8
21	13	1,28	3	1,60	2	0,3
22	33	3,26	4	2,14	6	-1,1
23	3	0,30	1	0,53	1	0,2
24	32	3,16	5	2,67	6	-0,5
25	36	3,55	12	6,42	7	2,9
26	53	5,23	10	5,35	10	0,1
27	15	1,48	2	1,07	3	-0,4
28	61	6,02	7	3,74	11	-2,3
29	91	8,98	16	8,56	17	-0,4
30	2	0,20	1	0,53	0	0,3
31	24	2,37	5	2,67	4	0,3
32	16	1,58	4	2,14	3	0,6
33	38	3,75	5	2,67	7	-1,1
34	22	2,17	2	1,07	4	-1,1
35	11	1,09	1	0,53	2	-0,6
36	16	1,58	2	1,07	3	-0,5
37	16	1,58	5	2,67	3	1,1
40	64	6,32	14	7,49	12	1,2
41	4	0,39	3	1,60	1	1,2
45	0	0,00	0	0,00	0	0,0
50	0	0,00	0	0,00	0	0,0
51	107	10,56	16	8,56	20	-2,0
52	4	0,39	3	1,60	1	1,2
55	0	0,00	0	0,00	0	0,0
60	14	1,38	2	1,07	3	-0,3
61	3	0,30	1	0,53	1	0,2
62	1	0,10	1	0,53	0	0,4
63	20	1,97	3	1,60	4	-0,4
64	9	0,89	3	1,60	2	0,7
65	9	0,89	0	0,00	2	-0,9
66	5	0,49	0	0,00	1	-0,5
67	10	0,99	0	0,00	2	-1,0
70	0	0,00	0	0,00	0	0,0
71	0	0,00	0	0,00	0	0,0
72	33	3,26	10	5,35	6	2,1
73	23	2,27	5	2,67	4	0,4
74	110	10,86	18	9,63	20	-1,2
80	0	0,00	0	0,00	0	0,0
85	0	0,00	0	0,00	0	0,0
90	21	2,07	4	2,14	4	0,1
91	0	0,00	0	0,00	0	0,0
92	21	2,07	4	2,14	4	0,1
93	1	0,10	0	0,00	0	-0,1
Total	**1.013**	**100**	**187**	**100**	**187**	**0**
Chi-Square-Test	46,572					
DF	40					
Asymptotic significance	**0,2202**					

Source: IWH FDI-micro-database 2009

Table A19 Number of East German enterprises investing abroad per branch

Enterprises per branch	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
Industry	136	43,0	17	39,5	19	-3,5
Service	180	57,0	26	60,5	24	3,5
Total	**316**	**100**	**43**	**100**	**43**	
Chi-Square-Test	0,215					
DF	1					
Asymptotic significance	0,6427					

Source: IWH FDI-micro-database 2009

Table A20 Number of East German enterprises investing abroad per sector (WZ 2003)

Enterprises per sector (WZ 2003)	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
10	0	0,00	0	0,00	0	0,0
13	0	0,00	0	0,00	0	0,0
14	0	0,00	0	0,00	0	0,0
15	9	2,85	1	2,33	1	-0,5
16	0	0,00	0	0,00	0	0,0
17	3	0,95	0	0,00	0	-0,9
18	0	0,00	0	0,00	0	0,0
19	0	0,00	0	0,00	0	0,0
20	1	0,32	0	0,00	0	-0,3
21	6	1,90	0	0,00	1	-1,9
22	9	2,85	1	2,33	1	-0,5
23	2	0,63	0	0,00	0	-0,6
24	14	4,43	5	11,63	2	7,2
25	7	2,22	0	0,00	1	-2,2
26	2	0,63	1	2,33	0	1,7
27	4	1,27	2	4,65	1	3,4
28	14	4,43	1	2,33	2	-2,1
29	28	8,86	3	6,98	4	-1,9
30	2	0,63	0	0,00	0	-0,6
31	8	2,53	2	4,65	1	2,1
32	12	3,80	1	2,33	2	-1,5
33	17	5,38	2	4,65	2	-0,7
34	2	0,63	0	0,00	0	-0,6
35	1	0,32	0	0,00	0	-0,3
36	5	1,58	2	4,65	1	3,1
37	3	0,95	1	2,33	0	1,4
40	3	0,95	1	2,33	0	1,4
41	0	0,00	0	0,00	0	0,0
45	9	2,85	0	0,00	1	-2,8
50	1	0,32	0	0,00	0	-0,3
51	30	9,49	5	11,63	4	2,1
52	0	0,00	0	0,00	0	0,0
55	3	0,95	0	0,00	0	-0,9
60	0	0,00	0	0,00	0	0,0
61	1	0,32	0	0,00	0	-0,3
62	1	0,32	0	0,00	0	-0,3
63	6	1,90	0	0,00	1	-1,9
64	1	0,32	0	0,00	0	-0,3
65	1	0,32	0	0,00	0	-0,3
66	0	0,00	0	0,00	0	0,0
67	3	0,95	0	0,00	0	-0,9
70	1	0,32	0	0,00	0	-0,3
71	1	0,32	0	0,00	0	-0,3
72	18	5,70	1	2,33	2	-3,4
73	8	2,53	2	4,65	1	2,1
74	71	22,47	10	23,26	10	0,8
80	1	0,32	1	2,33	0	2,0
85	1	0,32	0	0,00	0	-0,3
90	1	0,32	0	0,00	0	-0,3
91	1	0,32	0	0,00	0	-0,3
92	3	0,95	1	2,33	0	1,4
93	2	0,63	0	0,00	0	-0,6
Total	**316**	**100**	**43**	**100**	**43**	**0**
Chi-Square-Test	32,816					
DF	41					
Asymptotic significance	**0,8151**					

Source: IWH FDI-micro-database 2009

Table A21 Number of enterprises with a multinational investor per ownership structure

Enterprises per ownership structure	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
Minority Control (< 50%)	269	12,9	40	10,8	48	-2,1
Majority Control (50-99.99%)	736	35,3	138	37,3	131	2,0
Full Control (100%)	1.080	51,8	192	51,9	192	0,1
Total	**2.085**	**100,0**	**370**	**100,0**	**370**	
Chi-Square-Test	1,673					
DF	2					
Asymptotic significance	**0,4333**					

Source: IWH FDI-micro-database 2009

Table A22 Number of enterprises with a foreign investor per ownership structure

Enterprises per ownership structure	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
Minority Control (< 50%)	214	15,2	29	12,1	37	-3,1
Majority Control (50-99.99%)	475	33,8	83	34,6	81	0,8
Full Control (100%)	717	51,0	128	53,3	122	2,3
Total	**1.406**	**100,0**	**240**	**100,0**	**240**	
Chi-Square-Test	1,854					
DF	2					
Asymptotic significance	**0,3957**					

Source: IWH FDI-micro-database 2009

Table A22 Number of enterprises with a West German investor per ownership structure

Enterprises per ownership structure	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
Minority Control (< 50%)	55	8,1	11	8,5	11	0,4
Majority Control (50-99.99%)	261	38,4	55	42,3	50	3,9
Full Control (100%)	363	53,5	64	49,2	69	-4,2
Total	**679**	**100,0**	**130**	**100,0**	**130**	
Chi-Square-Test	0,962					
DF	2					
Asymptotic significance	**0,6181**					

Source: IWH FDI-micro-database 2009

Table A24 Number of East German enterprises investing abroad per ownership structure

Enterprises per ownership structure	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
Minority Control (< 50%)	22	7,6	5	13,2	3	5,6
Majority Control (50-99.99%)	75	25,8	10	26,3	10	0,5
Full Control (100%)	194	66,7	23	60,5	25	-6,1
Total	**291**	**100,0**	**38**	**100,0**	**38**	
Chi-Square-Test	1,794					
DF	2					
Asymptotic significance	**0,4077**					

Source: IWH FDI-micro-database 2009

Table A25 Number of East German enterprises investing abroad per ownership structure

Enterprises per ownership structure	Population		Sample		Expected Sample	Deviation in %
	Frequency	%	Frequency	%		
with a foreign investor	103	32,6	17	39,5	14	6,9
with a West German MNE investor	36	11,4	4	9,3	5	-2,1
without a multinational investor	177	56,0	22	51,2	24	-4,8
Total	**316**	**100,0**	**43**	**100,0**	**43**	
Chi-Square-Test	0,981					
DF	2					
Asymptotic significance	**0,6124**					

Source: IWH FDI-micro-database 2009

Part 2: CEE countries

Table B1 Distribution of enterprises per CEE country FDI Inward

Enterprise per CEE country	Population		Sample		Expected Sample	Deviation (in %)
	Frequency	in %	Frequency	%		
Poland	3.208	43,5	216	35,1	268	-8,5
Romania	954	12,9	128	20,8	80	7,8
Slovakia	151	2,0	30	4,9	13	2,8
Czech Republic	2.700	36,6	185	30,0	226	-6,6
Hungary	356	4,8	57	9,3	30	4,4
Total	**7.369**	**100**	**616**	**100**	**616**	
Missing	0					
Chi-Square-Test	95,542					
DF	4					
asymptotic Significance	**0,0000**					

Source: IWH FDI-micro-database 2009

Table B2 Distribution of enterprises ordered by enterprise size FDI Inward

Industry per employment size	Population		Sample		Expected Sample	Deviation (in %)
	Frequency	in %	Frequency	in %		
Small (10 to 49)	2.945	40,0	232	37,7	246	-2,3
Medium seized (50 bis 249)	2.891	39,2	244	39,6	242	0,4
Large (more than 249)	1.533	20,8	140	22,7	128	1,9
Total	**7.369**	**100,0**	**616**	**100,0**	**616**	
Missing	0					
Chi-square-Test	1,936					
DF	2					
asymptotic Significance	**0,3799**					

Source: IWH FDI-micro-database 2009

Table B3 Distribution of enterprises ordered by industry FDI Inward

Enterprise per industry	Population		Sample		Expected Sample	Deviation (in %)
	Frequency	in %	Frequency	in %		
Industry	3.882	52,7	337	54,7	325	2,0
Services	3.487	47,3	279	45,3	291	-2,0
Total	**7.369**	**100,0**	**616**	**100,0**	**616**	
Missing	0					
Chi-square-Test	1,016					
DF	1					
asymptotic Significance	**0,3135**					

Source: IWH FDI-micro-database 2009

Tables B4: Distribution of enterprises in Poland ordered by enterprise size, FDI Inward[3]

Country/size of enterprise	Population		Sample		Expected Sample	Deviation (in %)
	Frequency	in %	Frequency	in %		
PL Small	1.215	37,9	80	37,0	82	-0,8
PL Medium Seized	1.310	40,8	88	40,7	88	-0,1
PL Large	683	21,3	48	22,2	46	0,9
Total	**3.208**	**100,0**	**216**	**100,0**	**216**	
Missing						
Chi-Square-Test	0,128					
DF	2					
asymptotic Significance	**0,9378**					

Source: IWH FDI-micro-database 2009

Tables B5: Distribution of enterprises in Romania ordered by enterprise size, FDI Inward

Country/size of enterprise	Population		Sample		Expected Sample	Deviation (in %)
	Frequency	in %	Frequency	in %		
RO Small	376	39,4	46	35,9	50	-3,5
RO Medium Seized	381	39,9	54	42,2	51	2,3
RO Large	197	20,6	28	21,9	26	1,2
Total	**954**	**100,0**	**128**	**100,0**	**128**	
Missing						
Chi-Square-Test	0,648					
DF	2					
asymptotic Significance	**0,7234**					

Source: IWH FDI-micro-database 2009

Tables B6: Distribution of enterprises in Slovakia ordered by enterprise size, FDI Inward

Country/size of enterprise	Population		Sample		Expected Sample	Deviation (in %)
	Frequency	in %	Frequency	in %		
SK Small	35	23,2	6	20,0	7	-3,2
SK Medium Seized	52	34,4	10	33,3	10	-1,1
SK Large	64	42,4	14	46,7	13	4,3
Total	**151**	**100,0**	**30**	**100,0**	**30**	
Missing						
Chi-Square-Test	0,271					
DF	2					
asymptotic Significance	**0,8732**					

Source: IWH FDI-micro-database 2009

Tables B7: Distribution of enterprises in the Czech Republic ordered by enterprise size, FDI Inward

Country/size of enterprise	Population		Sample		Expected Sample	Deviation (in %)
	Frequency	in %	Frequency	in %		
CZ Small	1.202	44,5	82	44,3	82	-0,2
CZ Medium Seized	1.009	37,4	69	37,3	69	-0,1
CZ Large	489	18,1	34	18,4	34	0,3
Total	**2.700**	**100,0**	**185**	**100,0**	**185**	
Missing						
Chi-Square-Test	0,009					
DF	2					
asymptotic Significance	**0,9954**					

Source: IWH FDI-micro-database 2009

[3] The amount of INWARD and OUTWARD enterprises does not sum up to the number of enterprises in the total population or the sample, respectively, because a small number of enterprises is included in both populations.

[4] The selected CEE countries in the sample are abbreviated by CZ=Czech Republic, HU=Hungary, PL=Poland, RO=Romania, SK=Slovakia.

Tables B8: Distribution of enterprises in Hungary ordered by enterprise size, FDI Inward

Country/size of enterprise	Population		Sample		Expected Sample	Deviation (in %)
	Frequency	in %	Frequency	in %		
HU Small	117	32,9	18	31,6	19	-1,3
HU Medium Seized	139	39,0	23	40,4	22	1,3
HU Large	100	28,1	16	28,1	16	0,0
Total	**356**	**100,0**	**57**	**100,0**	**57**	
Missing						
Chi-Square-Test	0,054					
DF	2					
asymptotic Significance	**0,9736**					

Source: IWH FDI-micro-database 2009

Table B9 Distribution of enterprises ordered by Nace Rev. 1.1 Classification

Enterprises per sector (NACE 1.1. Rev)	Population		Sample		Expected Sample	Deviation (in %)
	Frequency	%	Frequency	%		
01	0	0,0	0	0,0	0	0,0
02	0	0,0	0	0,0	0	0,0
10	1	0,0	0	0,0	0	0,0
11	6	0,1	1	0,2	1	0,1
13	1	0,0	0	0,0	0	0,0
14	53	0,7	5	0,8	4	0,1
15	444	6,0	34	5,5	37	-0,5
16	10	0,1	1	0,2	1	0,0
17	145	2,0	14	2,3	12	0,3
18	109	1,5	7	1,1	9	-0,3
19	42	0,6	6	1,0	4	0,4
20	113	1,5	7	1,1	9	-0,4
21	103	1,4	4	0,6	9	-0,7
22	146	2,0	13	2,1	12	0,1
23	12	0,2	1	0,2	1	0,0
24	207	2,8	19	3,1	17	0,3
25	324	4,4	32	5,2	27	0,8
26	259	3,5	20	3,2	22	-0,3
27	113	1,5	13	2,1	9	0,6
28	511	6,9	52	8,4	43	1,5
29	364	4,9	33	5,4	30	0,4
30	24	0,3	2	0,3	2	0,0
31	254	3,4	19	3,1	21	-0,4
32	86	1,2	10	1,6	7	0,5
33	87	1,2	6	1,0	7	-0,2
34	182	2,5	16	2,6	15	0,1
35	49	0,7	6	1,0	4	0,3
36	168	2,3	10	1,6	14	-0,7
37	50	0,7	4	0,6	4	0,0
40	167	2,3	13	2,1	14	-0,2
41	28	0,4	4	0,6	2	0,3
45	0	0,0	0	0,0	0	0,0
50	0	0,0	0	0,0	0	0,0
51	1720	23,3	138	22,4	144	-0,9
52	0	0,0	0	0,0	0	0,0
55	0	0,0	0	0,0	0	0,0
60	201	2,7	19	3,1	17	0,4
61	8	0,1	0	0,0	1	-0,1
62	7	0,1	1	0,2	1	0,1
63	175	2,4	23	3,7	15	1,4
64	70	0,9	6	1,0	6	0,0
65	30	0,4	7	1,1	3	0,7
67	17	0,2	0	0,0	1	-0,2
70	0	0,0	0	0,0	0	0,0
72	200	2,7	9	1,5	17	-1,3
73	45	0,6	5	0,8	4	0,2
74	660	9,0	44	7,1	55	-1,8
85	0	0,0	0	0,0	0	0,0
90	93	1,3	8	1,3	8	0,0
91	4	0,1	0	0,0	0	-0,1
92	61	0,8	3	0,5	5	-0,3
93	20	0,3	1	0,2	2	-0,1
Total	**7.369**	**100,0**	**616**	**100,0**	**616**	**0**
Missing						
Chi-Square-Test	39,835					
DF	43					
asymptotic Significance	**0,6094**					

Source: IWH FDI-micro-database 2009

Table B10 Distribution of enterprises per CEE country FDI Outward

Enterprise per CEE country	Population		Sample		Expected Sample	Deviation (in %)
	Frequency	in %	Frequency	%		
Poland	198	39,4	10	20,8	19	-18,5
Romania	13	2,6	1	2,1	1	-0,5
Slovakia	29	5,8	8	16,7	3	10,9
Czech Republic	166	33,0	10	20,8	16	-12,2
Hungary	97	19,3	19	39,6	9	20,3
Total	**503**	**100**	**48**	**100**	**48**	
Missing						
Chi-square-Test	26,538					
DF	4					
asymptotic Significance	**0,0000**					

Source: IWH FDI-micro-database 2009

Table B11 Distribution of enterprises ordered by enterprise size FDI Outward

Enterprises ordered per size	Population		Sample		Expected Sample	Deviation (in %)
	Frequency	in %	Frequeny	in %		
Small (10 to 49)	96	19,1	12	25,0	9	5,9
Medium seized (50 to 249)	182	36,2	20	41,7	17	5,5
Large (more than 249)	225	44,7	16	33,3	21	-11,4
Total	**503**	**100,0**	**48**	**100,0**	**48**	
Missing	0					
Chi-Square-Test	2,673					
DF	2					
asymptotic Sicnificance	**0,2628**					

Source: IWH FDI-micro-database 2009

Table B12 Distribution of enterprises ordered by industry FDI Outward

Enterprises ordered by industry	Population		Sample		Expected Sample	Deviation (in %)
	Frequency	in %	Frequency	in %		
Industry	240	47,7	22	45,8	23	-1,9
Services	263	52,3	26	54,2	25	1,9
Total	**503**	**100,0**	**48**	**100,0**	**48**	
Missing	0					
Chi-Square-Test	0,068					
DF	1					
asymptotic Significance	**0,7942**					

Source: IWH FDI-micro-database 2009

Table B13 Distribution of enterprises per ownership structure, FDI Outward

Enterprises per ownership structure	Population		Sample		Expected Frequency	Deviation in %
	Frequency	%	Frequency	%		
with a foreign investor	150	29,8	13	27,1	14	-2,7
without a foreign investor	353	70,2	35	72,9	34	2,7
Total	**503**	**100,0**	**48**	**100,0**	**48**	
Missing	0					
Chi-Square-Test	0,172					
DF	1					
asymptotic significance	**0,6784**					

Source: IWH FDI-micro-database 2009

Institut für Wirtschaftsforschung Halle
Halle Institute for Economic Research

The IWH is member of the Leibniz-Gemeinschaft

IWH-FDI-Micro-Database

Questionnaire

Survey 2009

In East Germany (including Berlin)

2. Round Services

3. Round Manufacturing

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I. Part of the questionnaire

Note: The first part of the survey deals with locational factors and ownership structure of your enterprise.

1. Please let me now your position in your enterprise.

Position

2. Please evaluate the socio-cultural surrounding at your enterprise's location currently. Please choose between very good, good, poor, very poor

	Quality
Availability of local cultural activities	
Availability of local health care	
Availability of local housing	
Personal safety of expatriates and foreign personnel	
Availability of child care	
General image of the region	

3. Please evaluate the quantitative labour supply at your enterprise's location currently. Please choose between very good, good, poor, very poor

	Quality
Supply with unskilled labour	
Supply with skilled labour	
Supply with apprentices and trainees	
Supply with junior employees with univesity degree	

4. Please evaluate the supply with government grants and subsidies at your enterprise's location in Eastern Germany currently. Please choose between very good, good, poor, very poor

	Quality
Availability of wage subsidies	
Availability of investment incentives (government grants or tax incentives)	
Availability of investment credits (KfW)	
Availability of government guarantees	
Possibility for special depreciations	
Availability of fiscal incentives concerning research & development and innovation	

5. Please evaluate the potential for technological cooperation with the following partners at your enterprise's location in Eastern Germany currently. Please choose between very good, good, poor, very poor

	Quality
Cooperation potential with universities and other public research institutes	
Cooperation potential with other enterprises (customers, suppliers, competitors)	

6. Does your enterprise have one or more investor(s) with headquarter in foreign countries?

Note: A foreign investor is either a direct shareholder with a minimum of 10 percent equity in your enterprise or constitutes the ultimate owner of your enterprise with a minimum of 25 percent indirect ownership. Foreign shareholders are not limited to enterprise groups, but also include physical persons, foundations, financial investors located abroad.

	Yes, one	Yes, more than one	No
Foreign investor			

⇨ If you answered „Yes", please continue with question 7.

6.1 May I ask again? We have Information from the year 2008, showing that your enterprise has one or more investor(s) with headquarter in foreign countries, is this current?

Yes	
No	

⇨ If you answered „No", please continue with question 14(if Inward/Outward, otherwise quit the interview).

7. In which country does your foreign investor have its headquarter?

	Country
Headquarter of foreign investor	

8. Does your enterprise have West German multinational shareholders?

Note: A West German multinational is either a direct shareholder with a minimum of 10 percent equity in your enterprise or constitutes the ultimate owner of your enterprise with a minimum of 25 percent indirect ownership. A West German multinational enterprise has its headquarter in Western Germany (not including Berlin) and at least one foreign subsidiary.

	Yes	No
West German multinational shareholder		

⇨ If you answered „Yes", please continue with question 9.

8.1 May I ask again? We have Information from the year 2008, showing that your enterprise has one or more West German investor(s), is this current?	
Yes	
No	
⇨ If you answered „No“, please continue with question 14(if Inward/Outward, otherwise quit the interview).	

Note: The following questions deal with your foreign or Western German investor. In case your enterprise has more than one foreign or Western German investor, the following questions refer to the investor, who holds the most shares or voting-rights in your enterprise today.

9. Please indicate the type of foreign investor in your enterprise. Please choose one option.

Note for the Interviewer: A multinational enterprise group is composed of different units in Eastern Germany*, the home country and has at least one affiliate in one more country. A national enterprise group is composed of different units in the home country, however, its only foreign unit is your enterprise. An individual entrepreneur is composed of only one unit in the home homecountry and its only foreign unit is your enterprise. Financial investors include banks, investment and venture capital fonds.*

Multinational enterprise group	
National enterprise group	
Enterprise (single entity)	
Individual or family	
Financial investor	
Others	

10. Please indicate the year of entry of your foreign or Western German investor into your enterprise.	
Entry of foreign investor	

11. Please indicate what describes best the initial entry mode of your foreign investor.

	Yes	No
New foundation of a legally independent enterprise		
Partial acquisition of a legally independent and already existing enterprise		
Acquisition of a legally independent and already existing enterprise by the majority		

12. From your point of view: How important were the following strategic motives for your foreign investor's decision to invest in your enterprise? Please choose between not at all important, not important, important and very important.

	Importance
Access to a foreign market	
Use of cost advantages related to labour, capital, or land	
Use of economies of scale (to produce lager amounts of the same product)	
Use of economies of scope (to implement product differentiation)	
Access to location-bound knowledge and technology	
Access to location-bound natural resources	

13. Please indicate whether the following business functions are currently undertaken either by your enterprise or by your foreign investor. Please choose between: only by your enterprise, mainly by your enterprise, mainly by your foreign investor or only by your foreign investor (*Options on enquiry: Neither by your enterprise nor by your foreign investor* and *By your enterprise and your foreign investor in equal parts*) .

Note for the interviewer: Strategic Management refers to development, planning and implementation of your enterprise's aims and orientation. The planning interval for strategic management covers usually two to five years. Operational Management (or short-term planning) includes activities geared towards the day-to-day operations of the company. Marketing entails not only advertisement activities but also all activities within the company which aim at increasing the demand for the product (e.g. search for markets, changes to the product according to the preferences of the customers, etc.). Acquisition and Supply includes all input factors required for the production of your enterprise's goods and services. Research and Development refers to experimental development, i.e. systematic creative work to broaden existing knowledge, to gain general applicable insights as well as the use of such knowledge for development of new products, services, and processes.

	Only by your enterprise	Mainly by your enterprise	Mainly by your foreign investor	Only by your foreign investor	*Neither by your enterprise nor by your foreign investor*	*By your enterprise and your foreign Investor in equal parts*
Strategic Management						
Operational Management						
Marketing						
Acquisition and Supply						
Research and Development						

II. Part of the Questionnaire

Note: The second part of the survey deals with your enterprise's investment abroad.

14. Did your enterprise undertake foreign direct investment?

Note to the interviewer: Foreign direct investment involves the acquisition of a minimum of 10 per cent of equity in an existing legally independent enterprise abroad or the creation of a legally independent subsidiary/affiliate under your own control abroad. We do not refer to foreign direct investment undertaken by any of your own foreign investor.

	Foreign direct investment
Yes	
No	

⇨ If you answered „Yes", please continue with question 15.

14.1 May I ask again? We have Information from 2008,telling that your enterprise undertook foreign investments, is this current?)

Yes	
No	

⇨ If you answered „No", please continue with question 22(if Inward/Outward, otherwise quit the interview).

15. Please indicate the year in which your enterprise undertook the first foreign direct investment.

	Year
First foreign direct investment	

16. Please indicate the type of foreign direct investment undertaken by your enterprise.

	Yes	No
New foundation of a legally independent affiliate		
Initial investment in a legally independent and already existing enterprise		
Acquisition of a legally independent and already existing enterprise by the majority		
Follow-up investment in already existing affiliates of the enterprise		

17. How important were the following strategic motives for your enterprise to undertake foreign direct investment? Please choose: not at all important, not important, important, very important.

Access to a foreign market	
Use of cost advantages related to labour, capital, or land	
Use of economies of scale	
Use of economies of scope	
Access to location-bound knowledge and technology	
Access to location-bound natural resources	

18. Regarding foreign affiliates established by your enterprise: Do they work at an upstream, downstream or the same stage as your enterprise in the production process of your final product or service?

Note for the interviewer: A foreign affiliate at an upstream stage could for example be a supplier of raw material, intermediate input, or service for the production of the final product or service at your enterprise. A foreign affiliate at a downstream stage could be responsible for the sale or distribution of the final product or service produced by your enterprise. It could also operate in an industry that uses your final product or service as an intermediate input. A foreign affiliate at the same stage in the production process produces a final product or delivers a service in the same way as your own enterprise just for a different market.

	Yes	No
Foreign affiliate working at an upstream stage		
Foreign affiliate working at a downstream stage		
Foreign affiliate working at the same production stage		

19. Please list the country(ies) in which foreign affiliates working at an upstream stage are located.

	Country(ies)
Foreign affiliate working at an upstream stage	

20. Please list the country(ies) in which such foreign affiliates working at an downstream stage are located.

	Country(ies)
Foreign affiliate working at an downstream stage	

21. Please list the country(ies) in which such foreign affiliates working at the same production stage are located.

	Country(ies)
Foreign affiliate working at the same production stage	

III. Part of the questionnaire

The following part of the survey deals with research and development in your enterprise. Research and development refers to experimental development to gain general applicable insights as well as the use of such knowledge for development of new products, services, and processes.

22. Did your enterprise undertake any own research and development (R&D) or did it issue any contracts to external research and development providers in the period from 2007 to 2009?

Research and development	2007 until 2009
Yes	
No	

⇨ If you answered „No“, please continue with question 26.

23. How many of your enterprise’s employees work in the area of R&D currently?

Note: The number of employees entails full and part time employees, however, no internships, leasing workers or temporary personnel.

	Currently
Number of R&D employees	

⇨ If you answered „no“ to question 6, please continue with question 25.

24. Which impact did the strategic behavior of your foreign investor have on the number of R&D employees? Did the number of R&D employees…

increase	
decline	
Or did it have no direct effect	

⇨ If you answered „no“ to question 14, please continue with question 26.

25. Which impact did your enterprise's foreign direct investment have on the number of R&D employees? Did the number of R&D employees…

increase	
decline	
Or did it have no direct effect	

26. Did your enterprise participate in any R&D co-operation with other enterprises or organizations in the period from 2007 to 2009?

Note: R&D cooperation does involve an active participation of your enterprise in projects jointly undertaken for example with related units of your enterprise group, other non-affiliated enterprises, or non-commercial institutions. This does not imply that participating parties extract an economic value from this cooperation. Pure contracts without any active participation of your enterprise are not considered as cooperation.

R&D cooperation	2007 until 2009
Yes	
No	

If you answered „No", please continue with question 28.

27. With which of the following partners did your enterprise co-operate in the area of R&D?
More multiple choice possible

	Yes	No
Your headquarter or own enterprise group		
Local suppliers not part of your enterprise group		
Foreign suppliers not part of your enterprise group		
Local customers not part of your enterprise group		
Foreign customers not part of your enterprise group		
Local research institutions		
Foreign research institutions		

IV. Part of the questionnaire

Note: This part of the survey deals with innovation. Innovations should be new to your enterprise, not necessarily to the market. A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness, or other functional characteristics. The innovation can be undertaken by your enterprise alone or in cooperation with any other partner.

28. Did your enterprise implement any product innovation(s) in the period from 2007 to 2009?

Note for the interviewer: Purely aesthetic modifications of products (such as colour, style, and packaging) are no product innovation. The pure sale of an innovation that was neither developed nor produced in your enterprise does not constitute a product innovation

Product innovation(s)	2007 until 2009
Yes	
No	

⇨ If you answered „No“, please continue with question 32.

29. Please approximate the share of new or significantly improved products in your enterprise's total sales in 2009 until now.

	2009
Share of new or significantly improved products in total sales (in %)	

⇨ If you answered „no“ to question 6, please continue with question 31.

30. Which impact did the strategic behavior of your foreign investor have on the share of improved products in total sales in your enterprise? Did the share of improved products in total sales…

increase	
decline	
Or did it have no direct effect	

⇨ If you answered „no“ to question 14, please continue with question 32.

31. Which impact did your enterprise's foreign direct investment have on the share of improved products in total sales of your enterprise? Did the share of improved products in total sales…	
increase	
decline	
Or did it have no direct effect	

V. Part of the questionnaire

Note: The last part of the survey deals with selected general key figures of your enterprise.

32. How many employees do currently work in your enterprise?

Note: The number of employees entails full and part time employees, however, no internships, leasing workers or temporary personnel.

Note to the interviewer: Please indicate the number of all persons defined above as headcount.

	Currently
Number of employees	

⇨ If you answered „no" to question 6, please continue with question 34.

33. Which impact did the strategic behavior of your foreign or western German investor have on the number of employees in your enterprise? Did the number of employees…	
increase	
decline	
Or did it have no direct effect	

⇨ If you answered „no" to question 14, please continue with question 35.

34. Which impact did your enterprise's foreign direct investment have on the number of employees in your enterprise? Did the number of employees…	
increase	
decline	
Or did it have no direct effect	

35. Please indicate the share of employees in your enterprise who carry out tasks for which an university degree is required.

	Share (in %)
Employees carrying out tasks requiring an university degree	

36. How high is he expected total turnover of your enterprise for 2009?

Note for the interviewer: If your enterprise is a Bank,, the total turnover it the sum of gross interest and commission income from own- and commission business. If your enterprise is an insurance, the total turnover corresponds with contributors taking.

	2009
Expected total-turnover (Euro)	

⇨ If you answered „no“ to question 6, please continue with question 38.

37. Which impact did the strategic behavior of your foreign investor have on the total turnover of your enterprise? Did the total turnover…

increase	
decline	
Or did it have no direct effect	

⇨ If you answered „no“ to question 13, please continue with question 37.

38. Which impact did your enterprise’s foreign direct investment have on the number of employees in your enterprise? Did the total turnover…

increase	
decline	
Or did it have no direct effect	

39. Please estimate the share of exports on the total sales of your enterprise in 2009.

	2009
Share of exports on total sales (in %)	

40. Please estimate the share of inputs(s.a. mining, intermediates) on the total sales of your enterprise in 2009.

Note for the interviewer: Including all purchased from other establishments and facilities: raw materials and supplies, commodities, contract work, foreign service, rents, leases, other costs-(including advertising and representative costs, travel expenses, commissions, royalties, porto-and postage charges, insurance premiums, audit, consulting and legal fees, bank charges, contributions to the chambers and trade associations)

	Share on the total sale (%)
Inputs	

41. Please estimate the share of imports on total intermediate inputs in your enterprise in 2009.	
	2009
Share of imports on total intermediate inputs (in %)	

Thank you very much for your participation in the survey!

BRICS:	Five major emerging economies: Brazil, Russia, India, China and South Africa
BvD:	Bureau van Dijk
CATI:	Computer assisted telephone interviews
CEE:	Central Eastern Europe, Central Eastern European
CEECs:	Central Eastern European countries
CZ:	Czech Republic
EPO:	European Patent Office
EU:	European Union
FDI:	Foreign Direct Investment
GDP:	Gross Domestic Product
HU:	Hungary
IAB:	Institute for Employment Research
IWH:	Halle Institute for Economic Research
KFW:	Reconstruction Loan Corporation
MNE:	Multinational Enterprise
NACE:	Statistical classification of economic activities in the European Community
NUTS:	Nomenclature of Territorial Units for Statistics / Nomenclauture des Unités Territoriales Statistiques
OECD:	Organisation for Economic Co-operation and Development
PL:	Poland
R&D:	Research and Development
RO:	Romania
ROR:	Raumordnungsregionen
SK:	Slovakia
wiiw:	Vienna Institute for International Economic Studies
WZ:	German classification of sectors of economy
ZEW:	Centre of European Economic Research

Table 8.8: List of abbreviations

BRICS:	Five major emerging economies: Brazil, Russia, India, China and South Africa
BvD:	Bureau van Dijk
CATI:	Computer assisted telephone interviews
CEE:	Central Eastern Europe, Central Eastern European
CEECs:	Central Eastern European countries
CZ:	Czech Republic
EPO:	European Patent Office
EU:	European Union
FDI:	Foreign Direct Investment
GDP:	Gross Domestic Product
HU:	Hungary
IAB:	Institute for Employment Research
IWH:	Halle Institute for Economic Research
KFW:	Reconstruction Loan Corporation
MNE:	Multinational Enterprise
NACE:	Statistical classification of economic activities in the European Community
NUTS:	Nomenclature of Territorial Units for Statistics / Nomenclauture des Unités Territoriales Statistiques
OECD:	Organisation for Economic Co-operation and Development
PL:	Poland
R&D:	Research and Development
RO:	Romania
ROR:	Raumordnungsregionen
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wiiw:	Vienna Institute for International Economic Studies
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9 Statements and CV

Lebenslauf

Persönliche Daten

Geburtstag	02.08.1974
Geburtsort	Tübingen, Deutschland
Familienstand	verheiratet (geb. Besenthal), zwei Kinder

Berufliche Tätigkeit

5/2009-heute	wissenschaftliche Mitarbeiterin in der Abteilung Strukturökonomik des IWH
08/2007-4/2009	Elternzeit
02/2006-07/2007	wissenschaftliche Mitarbeiterin in der Abteilung Strukturökonomik des IWH
11/2004-01/2005	Elternzeit
09/2002-10/2004	wissenschaftliche Mitarbeiterin in der Abteilung Arbeitsmarkt des IWH

Ausbildung

2002	Abschluss des Studiums an der WWU Münster, Thema der Magisterarbeit: Tripartistische Bündnisse im Rheinischen Kapitalismus am Beispiel Konzertierte Aktion und Bündnis für Arbeit
1998-1999	Studium am Institut d'Etudes Politiques Grenoble, Frankreich
1995-1998	Studium der Politikwissenschaft, Wirtschaftspolitik und Englischen Philologie Westfälische Wilhelms-Universität Münster
1995	Abitur Carlo-Schmid-Gymnasium, Tübingen

Liste der Kapitel der Dissertation, Publikationsstatus und Beiträge der Autoren

Kapitel 1:

Introduction

Das Kapitel entstand in alleiniger Autorenschaft. Andrea Gauselmann hatte die Idee zu dieser Dissertation und sie hat das übergreifende Konzept der Dissertation erarbeitet. Im ersten Kapitel der Dissertation stellt sie dieses Konzept vor. Andrea Gauselmann bereitete relevante Daten zur Bedeutung von FDI im Untersuchungsraum auf und interpretiert diese, um die Relevanz und die Motivation des Themas der Dissertation aufzuzeigen. Sie leitet die für die Arbeit übergreifenden und erkenntnisleitenden Forschungsfragen ab und gibt einen Überblick über die Analyseschritte und die erkenntnisleitenden Forschungsfragen der einzelnen Untersuchungsschritte.

Andrea Gauselmann 6.12.2013

Kapitel 2:

General theoretical framework

Das Kapitel entstand in alleiniger Autorenschaft. Andrea Gauselmann hat dieses Kapitel konzipiert und erarbeitet. Andrea Gauselmann erläutert in diesem Kapitel die relevanten theoretischen Ansätze. Sie zeigt auf, dass die empirischen Analyseschritte zu Investitionsmotiven, zu der Bedeutung von Standortfaktoren, im Speziellen der Einfluss von agglomerations- und transformationsspezifischen Standortfaktoren, sowie zum Austausch von Wissen zwischen ausländischen und einheimischen Unternehmen in den europäischen Post-Transformationsregionen von theoretischen Annahmen und Konzepten abgeleitet sind.

Andrea Gauselmann 6.12.2013

Kapitel 3:

The IWH FDI Micro database

in einer ähnlichen Fassung erschienen als
Jutta Günther, Andrea Gauselmann, Philipp Marek, Johannes Stephan and Björn Jindra: An Introduction to the IWH FDI Micro database, Schmollers Jahrbuch/Journal of Applied Social Science Studies, 131. Jahrgang, Heft 3, 2011, S. 529-546. Hrsg.: Rat für Sozial- und Wirtschaftsdaten.
Die Zeitschrift ist auf der Handelsblatt Zeitschriftenliste (VWL) und hat einen Impact-Faktor von 0.1.

Der Artikel entstand auf Anfrage eines der Herausgeber der Zeitschrift Schmollers Jahrbuch, Prof. Dr. Joachim Wagner von der Leuphana Universtät Lüneburg, an Andrea Gauselmann. Das Konzept entstand zu gleichen Teilen von allen beteiligten Autoren. Andrea Gauselmann erarbeitete den Teil über die Verfügbarkeit von Daten zu multinationalen Unternehmen in Deutschland und den mittelosteuropäischen Ländern. Sie verfasste die Beschreibung des Datensatzes hinsichtlich der einzelnen Jahreswellen, der Grundgesamtheit, der Segmentierung des Datensatzes, der Implementierung der Erhebung und der einzelnen Teile des Fragebogens.
Der Text wurde der Zielsetzung und dem Gesamtkonzept der Dissertation angepasst.

Andrea Gauselmann 6.12.2013

Jutta Günther 06.12.13

Johannes Stephan 12.12.13

Björn Jindra 6/12/13

Philipp Marek 6.12.13

Kapitel 4.1:

Investment motives and assessment of location factors: East Germany

in einer ähnlichen Fassung erschienen als
Andrea Gauselmann und Björn Jindra: Multinationale Investoren in den Neuen Ländern: Wandel der Motivlage und differenzierte Wahrnehmung der Standortqualität. Wirtschaft im Wandel 6, 2010, pp. 281-288.

Andrea Gauselmann hatte die Idee zu dieser Analyse und konzipierte die Studie. Der Stand der Forschung und die erkenntnisleitenden Analyseschritte wurde von Andrea Gauselmann erarbeitet. Andrea Gauselmann bereitete die zugrundeliegenden Daten auf, führte die empirischen Analysen durch und interpretierte die Ergebnisse der Studie. Björn Jindra hat mit kritischen Kommentaren und redaktionellen Anmerkungen die Arbeit am Manuskript begleitet.
Der Text wurde der Zielsetzung und dem Gesamtkonzept der Dissertation angepasst.

Andrea Gauselmann 6.12.2013 Björn Jindra 6/12/13

Kapitel 4.2:

Investment motives and Assessment of location factors: Central East European Countries

in einer ähnlichen Fassung erschienen als
Andrea Gauselmann, Johannes Stephan und Mark Knell: What drives FDI in Central-Eastern Europe? Evidence from the IWH-FDI-Micro database. Post-Communist Economies, Vol. 23, No. 3, 2011, pp. 343-357.
Die Zeitschrift ist ISI-gelistet, Impactfactor 0,459 (2011); in der Handelsblattliste (VWL) wird die Zeitschrift mit dem Punktwert 0,05 geführt. Sie steht auf der EconLit Liste der American Economic Association.

Die Idee und das erste Konzept dieser Studie wurden von allen drei Autoren gleichermaßen entwickelt. Das Konzept wurde von Andrea Gauselmann hinsichtlich der einzelnen empirischen Analyseschritte maßgeblich weiterentwickelt, insbesondere in Hinblick auf die statistische Abweichung des Antwortverhaltens unter Berücksichtigung der Unternehmensmerkmale der ausländischen Investoren. Die erkenntnisleitende theoretische Anbindung und Einordnung in die Literatur wurden von Andrea Gauselmann erarbeitet. Andrea Gauselmann bereitete die zugrundeliegenden Daten auf und führte die empirischen Analysen durch. Andrea Gauselmann interpretierte die Ergebnisse der Studie, ordnete diese in den Stand der Literatur ein und führte gemeinsam mit Johannes Stephan die Endredaktion des Beitrages durch.
Der Text wurde der Zielsetzung und dem Gesamtkonzept der Dissertation angepasst.

The first idea and conceptualisation of this analysis has been generated collaboratively between the three authors. The concept has been significantly developed further by Andrea Gauselmann, especially concerning the statistical deviation of the responses when considering foreign investors' heterogeneity. The theoretical derivation of the analysis and the state of the art has been contributed by Andrea Gauselmann. Andrea Gauselmann prepared and processed the underlying data and generated the empirical analyses. Andrea Gauselmann interpreted and discussed the analysis' results and arranged the final text of the contribution with Johannes Stephan.
The text has been modified to suit the purpose and the structure of the dissertation.

Andrea Gauselmann 6.12.2013

Andrea Gauselmann

L. Stephan

Johannes Stephan
12.12.13

Mark Knell

Kapitel 5:

Regional determinants of MNEs' location choice

in einer ähnlichen Fassung erschienen als
Andrea Gauselmann und Philipp Marek: Regional determinants of MNE's location choice in transition economies. Empirica, Vol. 39, No. 4, pp.487-511.
Die Zeitschrift ist ISI-gelistet, Impactfactor 0,459 (2011); in der Handelsblattliste (VWL) wird die Zeitschrift mit dem Punktwert 0,25 geführt. Sie steht auf der EconLit Liste der American Economic Association.

Die Idee und das Konzept dieser Studie wurden von beiden Autoren gleichermaßen erarbeitet. Andrea Gauselmann verfasste die erkenntnisleitende Analyse mit Literaturüberblick und Einordnung in den Stand der Forschung. Andrea Gauselmann leitete aus den der Dissertation zugrunde liegenden theoretischen Konzepten den Fokus der Analyse auf agglomerationsspezifische und effizient- bzw. transformationsspezifische Faktoren ab und leitete testbarer Forschungshypothesen ab. Philipp Marek bereitete die Daten auf. Andrea Gauselmann arbeitete bei der empirischen Analyse mit. Die Interpretation der Ergebnisse der empirischen Untersuchungsschritte und die Diskussion der Ergebnisse in Bezug auf Resultate anderer relevanter Studien übernahm Andrea Gauselmann.
Der Text wurde der Zielsetzung und dem Gesamtkonzept der Dissertation angepasst.

Andrea Gausel 6.12.2013
Andrea Gauselmann

6.12.13
Philipp Marek

Kapitel 6:

MNEs and regional R&D co-operation

in einer ähnlichen Fassung erschienen als
Andrea Gauselmann: R&D co-operation in European post-transition economies, IWH Discussion Papers, Vol. 4, 2013, pp. 1-29.
Außerdem angenommen als Untersuchungsteil im EU-Projekt "Growth-Innovation-Competitiveness: Fostering Cohesion in Central and Eastern Europe (GRINCOH)" des 7. Rahmenprogrammes, Arbeitspaket 2 "International context of cohesion: the role of trade and FDI", Task 4 "The role of inward FDI in CEECs' production and innovation networks".

Das Kapitel entstand in alleiniger Autorenschaft. Die Idee zu dieser Studie hatte Andrea Gauselmann. Sie konzipierte die Studie und erarbeitete die Einordnung in die Literatur und den Stand der Forschung. Sie verfasste die erkenntnisleitende theoretische Motivation und formulierte die Forschungshypothesen. Andrea Gauselmann bereitete die Daten auf und führte die empirischen Analysen durch. Die Interpretation der Ergebnisse und die Diskussion der Ergebnisse in Bezug auf Resultate anderer relevanter Studien übernahm Andrea Gauselmann.
Der Text wurde der Zielsetzung und dem Gesamtkonzept der Dissertation angepasst.

Andrea Gauselmann 6.12.2013

Kapitel 7:

Conclusion

Das Kapitel entstand in alleiniger Autorenschaft. Andrea Gauselmann stellte in diesem Kapitel die wissenschaftlichen Beiträge der einzelnen Kapitel heraus. Anhand der Ergebnisse der empirischen Analyseschritte der Dissertation beantwortete sie die Forschungsfragen. Sie zeigte, dass die in der Theorie diskutierten Faktoren (die Investitionsmotive, die Standortfaktoren sowie der Austausch von Wissen zwischen ausländischen und einheimischen Unternehmen) tatsächlich zur Erklärung der Ansiedlung von ausländischen Unternehmen und damit für den wirtschaftlichen und technologischen Aufholprozess in den europäischen Post-Transformationsregionen von Relevanz sind.

Andrea Gauselmann 6.12.2013

Erklärungen

(1) Hiermit versichere ich, dass ich die vorliegende Dissertation selbstständig und ohne unerlaubte fremde Hilfe angefertigt und außer den im Literaturverzeichnis sowie in den Anmerkungen genannten Hilfsmitteln keine weiteren benutzt habe.

(2) Hiermit versichere ich, dass die Dissertation in dieser oder ähnlicher Form an keiner anderen Hochschule einer Doktorprüfung unterzogen oder zur Begutachtung vorgelegt wurde.

(3) Hiermit versichere ich, dass ich keine Vorstrafen habe und keine Ermittlungsverfahren gegen mich anhängig sind.