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Who Goes East? The Impact of Enlargement on the Patterns of German FDI

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March 2006

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Who Goes East?
The Impact of Enlargement
on the Patterns of German FDI[1]

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February 2006

Abstract

Affiliates of German firms in Eastern Europe differ from those in the rest of the world. They have smaller sales and they employ more labor. Labor productivity is thus lower than in affiliates of German firms elsewhere. Moreover, multinational activity in Eastern Europe is mostly unilaterally whereas, for industrialized countries, bilateral FDI linkages dominate. In this paper, we aim at explaining differences in the activities of German multinational firms in Eastern and Western Europe. Do German firms engage in different activities in Eastern and Western Europe, i.e. do the types of affiliates differ? Or do smaller German parent firms particularly benefit from enlargement, i.e. do characteristics of the parents differ in a systematic way?

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1 Motivation

Affiliates of German firms in Eastern Europe differ from those in the rest of the world. They have smaller sales, and they employ relatively more labor. Table 1 shows that the transition countries of Central and Eastern Europe accounted for 7% of the foreign direct investment (FDI) of German firms abroad at the end of 2003. Their share in the numbers of employees (22.7%) and in the number of affiliates (15.7%) was significantly higher. Average sales per affiliate are only half of the value observed for developed countries. Labor productivity is thus lower than in affiliates of German firms elsewhere. Moreover, multinational activity in Eastern Europe is mostly unilateral whereas, for industrialized countries, bilateral FDI linkages dominate.

--- Insert Table 1 about here. ---

These new patterns of integration have raised an intense public debate on the costs and benefits of globalization in Germany – just as in many other developed countries. Eastern enlargement is often viewed as the key trigger of small and mid-sized firms into foreign markets, thus exposing the German economy and German workers to a new threat of international competition.

Policy discussions on the role of multinational firms in the new EU member states differ from those in the West. Although, as in the West, people fear adverse labor market effects of multinational activity, they do so for different reasons. Multinational enterprises (MNEs) may feel less committed to preserving employment than domestic firms, hence restructuring firms and laying off workers more easily. Although the overall employment effects of more MNE activity are likely to be positive, uncertainty and the need for a flexible adjustment of the labor market may increase. Also, if large foreign firms enter, this may put increased competitive pressure on the incumbent domestic firms.

Two key characteristics of multinational firms are thus central to the policy debate. The first is the size of firms. If small and mid-sized firms start investing abroad, globalization may affect also those firms of the Western economies that have previously not been able to relocate production. For the destination countries of FDI, large rather than small entrants may be a concern as large entrants may increase competitive pressure.

The second characteristic of multinational firms that is important to the policy debate is their labor intensity. If multinationals that invest in Eastern Europe are relatively labor intensive, this may have positive effects on the labor markets in the host economies, but these benefits may come at the expense of employment in the source countries of FDI.

In this paper, we document and explain differences with regard to the size and the labor intensity of German multinationals in Eastern and Western Europe. We argue that the observed differences can originate from three distinct sources.

First, foreign affiliates of multinational firms differ across countries because they perform different *functions*. If foreign affiliates are set up in order to save production costs in general and labor costs in particular, they are likely to be more labor intensive than their parents. If, however, foreign affiliates are set up in order to improve market access, differences in the labor intensity between the affiliate and the parent are likely to be less pronounced.

Second, differences in the size and in the labor intensity of the affiliate might reflect differences in *parent characteristics*. Recent models of multinational firm stress the impact of differences in productivity of the parent for the choice of entry (see, e.g., Helpman et al. 2004). According to these models, firms self-select into different groups of multinational firms. The most productive firms set up production facilities abroad and sell their products on the foreign market. The least productive firms stay at home and service only the domestic market. The size of firms in each group is country-specific. Thus, according to these models, countries with low entry barriers would host more and on average smaller foreign affiliates.

Third, irrespective of the purpose that a foreign affiliate serves and the productivity of the parent, differences in the *age* of affiliates may explain differences in the size of affiliates. Ceteris paribus, older firms tend to be larger than their younger counterparts. Finding that smaller affiliates are active in Eastern Europe might thus reflect the fact that multinational activity in Central and Eastern Europe started only in the 1990s.

An additional reason for differences in affiliate structures could be differences in factor endowments across countries. Even if affiliates in different countries perform the same functions, their labor intensities are likely to differ if countries have different factor endowments. For example, a pure sales outlet in a country with low labor costs is likely to be more labor intensive than a pure sales outlet in a country with high labor costs. However, we cannot test this effect of factor endowments because we cannot isolate it from the other influences mentioned above.

To explore why characteristics of German foreign affiliates in Eastern and Western Europe differ, we make use of a novel dataset provided by the Deutsche Bundesbank. For a couple of years now, the Bundesbank has provided external researchers with access to its firm-level database 'International Capital Links', which has detailed information on the foreign affiliates of German firms abroad (and on affiliates of foreign firms in Germany). The data start in 1989. Until recently, essentially no information on the German parent firms has been available. For the years 2002-2003, however, selected additional information has been provided on the German reporting firm. Hence we can use this additional information to obtain evidence on heterogeneity across parents.

The focus of this paper is on German data for two interrelated reasons. First, Germany is one of the largest investor in Eastern Europe. Almost one third of all FDI into the region comes from German firms. The second and third most important investors, the Netherlands and Austria, follow with shares of only 14 and 9%, respectively. Hence although we focus only on one source country of FDI, our analysis yet captures a significant share of FDI into Eastern Europe. Second, in contrast to evidence for other important source countries of FDI into Eastern Europe, firm-level data are available for German firms. Hence, we can disentangle the impact of affiliate and of parent characteristics, which would not be feasible using aggregated data.

This is not the first paper to study the activities of German firms in Eastern Europe. Earlier work has used mainly aggregated data. (For a survey of the evidence see Toubal (2004).) More recently, firm-level data have been used as well. First results of Becker et al. (2005) and Marin (2004) show that jobs in domestic and foreign plants of German firms are substitutes, but that total job losses through foreign direct investment are quite low. Buch et al. (2005) provide a detailed analysis of the determinants of German firms' foreign activities, but their research does not focus on differences between Eastern and Western Europe. They find that, overall, German FDI is mostly driven by the market access motive.

This paper differs from earlier research in two main regards. First, we focus on German FDI in Eastern Europe using data at different levels of aggregation. As earlier studies on German FDI, we use sectoral and aggregated data to obtain a broad picture of the determinants of multinational activity. However, these data do not allow the different determinants of affiliate characteristics to be disentangled. Hence the second innovation of this paper is that we use firm-level data to identify the factors that contribute to the systematic differences of German firms' foreign affiliates.

This paper has five main parts. In the following Part 2, we briefly review the theoretical literature on multinational firms. We discuss the implications of models that focus on the different functions that foreign affiliates can serve as well as on the implications of recent theoretical work emphasizing heterogeneity of parents. In Part 3, we provide a set of descriptive statistics. These provide an intuition why the patterns of German multinationals in Eastern Europe differ from those in the rest of the world. In Part 4, we study these patterns in a regression-based framework, using data aggregated by host country, sector-level data, and firm-level data. Part 5 concludes. We find that German firms expand into Eastern Europe both, in order to improve market access and in order to reduce production costs. The production cost motive is somewhat more important than for FDI activity in Western Europe. Contrary to expectations, multinational parents that are active in Eastern Europe are larger, on average, than the typical German multinational. Production in Eastern Europe is also relatively labor intensive.

2 Motives for Internationalization: Theoretical Background

Exploring the different motives for the internationalization of production has been an important theme in the literature on multinational firms in recent years. (See for surveys Markusen (2002) or Barba-Navaretti and Venables (2004)). This research has stressed two main reasons for setting up affiliates abroad: lowering production costs and lowering costs of market access. Below, we review the implications of these models. We also sketch implications of recent theoretical models which put emphasis on differences in parent characteristics to endogenously derive the decision to invest in a foreign country.

2.1 Production Costs versus Market Access

Evidence provided in Table 1 shows that affiliates of German firms in Eastern Europe differ from affiliates in other countries along some key dimensions. What is it that can explain these differences? One possible answer to this question lies in the different purposes that foreign affiliates can fulfill. In the literature, two main motives for setting up affiliates abroad are being distinguished.

According to the first motive for internationalization, firms internationalize production and become multinationals because they aim at reducing production costs. Hence these firms split up the production process and relocate labor intensive stages of production into countries richly endowed with labor. They take advantage of existing factor-price differentials between countries to relocate production across borders. Relocation of production takes place according to the comparative advantages of countries (Helpman 1984). Multinational firms that emerge in this framework are vertically integrated as they conduct different activities in

different locations. If factor-price considerations are behind the internationalization of production, we should see

o   one-directional FDI flows from capital-, management-, or human capital-rich (developed) countries to countries richly endowed with labor (developing countries)

o   activities of multinational firms that increase in the degree of dissimilarity in factor endowments between countries, and

o   multinational firms which have foreign affiliates specializing in different stages of production than their domestic headquarters.

A priori, considering the differences in factor endowments between Eastern and Western Europe, we might expect factor-price considerations to play a more important role for the expansion of German firms into Eastern compared to Western Europe. However, for countries richly endowed with labor, there is an additional driving force of internationalization. Before turning to the empirical evidence, we discuss the second motive for internationalization of production – market access.

According to the second motive for internationalization, multinationals are vehicles to overcome distance and to facilitate access to foreign markets (see, e.g. Krugman 1983, Brainard 1993, Markusen and Venables 1998, Markusen 2002). In this framework, firms have different channels for entering a foreign market. Each of these channels incurs different costs. A firm has the choice between producing at home and exporting final products to a foreign market (which involves variable 'distance costs') and producing abroad (which involves the additional fixed costs of setting up a second plant in the host country).

Firms thus face a trade off between producing abroad in order to maximize proximity to the customer or to concentrate production in order to exploit economies of scale. Multinational firms in this framework are horizontally integrated as they produce the same product in two plants. Parents and affiliates perform the same types of activity, and they differ only with respect to location. Moreover, the headquarter unit produces a so-called headquarter service, which embodies the specific advantage of the firm. This service can be used in both plants at the same time in a non-rivalry manner. If the market access motive is behind the internationalization of production, we should see

o   two-directional FDI flows as countries can be the home and the host of multinational firms at the same time

o   that activities of multinational firms increase in the degree of similarity of countries, and

o   multinational firms that conduct the same activities at home and abroad.

Distinguishing between production cost and market access driven FDI is important because the labor market implications differ. Since FDI driven by the market access motive takes place on a bilateral basis and since it helps expanding output markets, labor market implications are positive. Source-country labor market implications of FDI that is driven by the production cost motive, in contrast, are more likely to be negative. This type of FDI still

helps lowering costs and thus improving the overall competitiveness, but employment of low-skilled workers may fall if labor-intensive stages of production are moved to foreign countries.

Empirically, multinational activity is of course driven by production cost and by market access considerations. Hence by simply looking at a particular multinational firm, we cannot decide which of the two dominates. However, regression-based empirical methods help us to identify which of the different motives for internationalization is empirically more important. We will return to this issue in Part 4 below.

2.2 Firm Heterogeneity and the Choice of Entry

Theoretical work invoked so far helps explaining differences in affiliate structures through differences in the functions that these affiliates perform. The models work with the assumption that a representative firm exists. This assumption does not, however, square with the empirical evidence. Generally, the size distribution of firms is approximately log-normal (Cabral and Mata 2003). For foreign affiliates, the same distribution can be found (Buch et al. 2005). UNCTAD (2001) reports a strong concentration in outward FDI among parent firms. Even for the United States, which have a relatively diversified structure of foreign direct investment, the 50 largest parent firms account for more than half of total outward FDI stocks.

Firms are thus heterogeneous, and heterogeneity matters because large and more productive firms tend to expand internationally. In representative firm models, self-selection of firms into different groups is not an issue. Yet, self-selection might be the source of the different characteristics of German multinational firms' affiliates in Eastern and Western European countries. The heterogeneous firm model of Helpman et al. (2004), which is based on Melitz (2003), helps getting an intuition whether different characteristics of German firms' foreign affiliates mirror differences among their parents.

In Helpman et al. (2004), foreign direct investment (FDI) is assumed to be horizontal. The new feature of Helpman et al. (2004) is that the model assumes heterogeneity among firms with respect to their productivity. In the initial period, productivity is drawn by each firm from a common distribution. Depending on their productivity, firms then select themselves into groups, which differ in their choice of whether and how to supply the foreign market.

Selection into domestic and foreign markets depends on the fixed costs of entering each market. Producing and selling only domestically involves the lowest fixed costs, exporting involves fixed costs in an intermediate range, and investing abroad involves the highest fixed costs. The fixed costs of exporting can be thought of as the costs of setting up distribution networks. In addition, exporting to foreign countries involves (variable) iceberg transportation costs. Production abroad saves on these variable distance costs but involves higher fixed costs in the foreign country.

Country-specific fixed costs, price levels, and market size affect affiliates' characteristics. To see this, assume two identical foreign countries that differ only in the fixed costs of exporting and of setting up a new plant. The fixed costs are sufficiently low to allow production of some firms in both countries. For the most productive firms, it is profitable to produce in both countries. For less productive firms, it is profitable to produce in the country with lower fixed costs and to export to the other country. Even less productive firms export to both countries and still less productive firms export only to the country with the lower fixed costs of

exporting. The least productive firms produce only for the home country. Whether firms are domestic or international, or whether they engage in exports or in FDI, thus depends on their productivity relative to some critical productivity levels for each activity.

The different productivity levels determine the self-selection of firms into the different groups. The model also has implications for the patterns of multinational activity across countries. First, the smallest (least productive) firm that exports to the country with low fixed costs is smaller (less productive) than the least productive firm that exports to the country with high fixed costs. Second, more firms are active in the country with low fixed costs. Third, since the group of firms active in the country with low fixed costs includes smaller (less productive) firms, the average size (productivity level) is lower in this country. Hence there is a monotonic correspondence from parent productivity to affiliates' size. More specifically, lower average productivity translates into lower average size of affiliates in the country with lower fixed costs.

The model shows that differences in the fixed costs of entry and in the productivity of the parent can explain differences in affiliate characteristics in Eastern and Western Europe. Since the opening up of Eastern Europe has lowered fixed costs of entry in these countries, it may have allowed small and medium-sized German firms to produce internationally. These firms are, according to this model, the least productive. If smaller firms are active in Eastern Europe, their affiliates should be smaller too. If size is positively related to capital intensity, the model could also explain the different characteristics of Eastern and Western European affiliates without reverting to different functions of foreign affiliates.

3 Descriptive Statistics

Affiliates of German firms in Eastern Europe are smaller on average than their Western counterparts, and they employ relatively more labor. Are these differences in affiliate structures due to the different functions that these affiliates perform? Are they due to differences in parent characteristics? Or are they simply due to the fact that Eastern European affiliates are younger? In this section, we provide descriptive statistics based on a German firm-level dataset which provide a first answer to these questions. A detailed description of the data is given in the appendix.

3.1 Production Costs versus Market Access

To get a first intuition of the relative importance of the market access versus the production cost motive for internationalization, we look at the patterns of multinational activity across countries, at the sector patterns of German MNE activity, and at the sector classification of parents and affiliates.

As regards the patterns of multinational activity across countries, Table 2 shows that FDI into Eastern Europe is mostly unilateral whereas FDI among the more developed OECD countries is mostly bilateral. Hence there is relatively little FDI going from the Eastern European countries into the OECD region.

--- Insert Table 2 about here. ---

We next look at the sector composition of German firms' foreign affiliates to analyze whether affiliates in Eastern and Western Europe carry out different functions. Since factor intensities differ across sectors, we would expect to find differences in the regional patterns of sectoral investment if factor endowments matter for the locational choice.

Table 3 shows the sector composition of German parents and their foreign affiliates in Eastern and Western Europe. The group of Eastern European countries includes the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic, and Slovenia. The group of Western European countries, which we use for comparison, includes Austria, Belgium, Denmark, France, Italy, Luxembourg, the Netherlands, and the United Kingdom. We focus on this group of 'core' EU countries for two reasons. First, this is a group of countries which has factor endowments similar to those of Germany. For these countries, we expect a dominance of the market access motive. Second, the countries in core Europe are in similar geographical proximity to Germany as the new EU member states. Hence this choice of countries reduces the potential selection bias which might arise from differences in geographic distance.

--- Insert Table 3 about here. ---

With regard to the sector of the parent, Table 3 reveals relatively small differences in the broad patterns of activities in Eastern and Western Europe. The manufacturing sector accounts for about 60-70% of the total activity. Services firms make up an additional 30-40%. This pattern is relatively similar for FDI stocks, affiliates' sales, and the number of employees. Using the capital of the affiliates as a measure of the relatively importance of sectors gives a different picture because of a dominance of financial services firms. These firms alone account for 42% of the capital of affiliates in Eastern Europe and an even higher 66% in Western Europe. Looking at the data at a more disaggregated level, differences and similarities between the two regions become apparent. In terms of FDI stocks, the electricity sector ranks second in both regions, accounting for about 15% of total FDI stocks. However, the most important sector is transport equipment in the East – for which the production cost motive is likely to be important – and financial services in the West – for which the market access motive is likely to be important.

With regard to the sector of the foreign affiliates, differences between the two regions become even more pronounced. Service sectors are much more important in Western Europe than in Eastern Europe with about 30% to 50% of the total. This holds regardless of what measure of activities we use. Again, if we look at FDI or affiliates' capital, the much greater importance of financial services in Western Europe drives this result. If we look at affiliates' sales, the wholesale sector, which is much more important in Western Europe, dominates. If we look at employment, wholesales and business services are more important in Western than in Eastern Europe. Thus, there are differences in the sector composition of the foreign affiliates, although not in the sector composition of the German parent firms, which might explain the differences in Table 1. Finally, holdings are more important to Western than for Eastern Europe.[2]

We also compare the sector classification of the German parent firm to the classification of their foreign affiliates at the firm-level. Table 4 provides a breakdown of the number of foreign affiliates that German parent firms maintain abroad by the sector of the investing firm and the foreign affiliate in Eastern Europe. The sector of the foreign affiliate is listed across the columns, and the sector of the German parent is listed down the rows.

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[2]   Weichenrieder (2005) analyzes the determinants of foreign holding firms established by German parent firms in detail.

--- Insert Table 4 about here. ---

The market access motive rules out foreign affiliates that conduct different activities as their parent firm. Thus, if the market access motive dominates, we would expect many entries on the diagonal *or* in the wholesale sector (sector 18). The production cost motive, in contrast, allows (although not necessitates) affiliates to be classified in a different sector. Thus, if affiliates and parent firm are *not* classified in the same sector, we can reject the market access motive. The converse is not true, however. If affiliate and parent are classified in the same sector, we cannot reject the production cost motive, because we know only the sector classification of firms but we know nothing about the actual activities that firms perform or the products they produce.

Table 4 shows that foreign affiliates in Eastern Europe are mainly classified in the same sector as the parent firm. This pattern is particularly pronounced in manufacturing. For service activities, there is also a close correspondence of the sector of the parent and of the affiliate. At the same time, there is also a relatively large number of service affiliates which are owned by manufacturing firms. Although this type of FDI takes place in a different sector, it is likely to be driven by the market access motive. About two-thirds (66 %) of all affiliates are classified in the same sector as their parent firm. Parent firms from manufacturing own mostly affiliates in the same sector (62.8%) or in wholesale (22.7%). Only 9.1% of all affiliates of manufacturing parent are classified in a different manufacturing sector. By and large, this confirms evidence for all affiliates of German firms (Buch et al. 2005).

3.2   Firm Heterogeneity and the Choice of Entry

The descriptive statistics presented so far provide preliminary information on the functions that affiliates might serve in different countries. They were based on the idea that different motives to enter a foreign country shape the differences between the foreign affiliates of German multinational firms. Yet, models with heterogeneous firms suggest that the interplay of firm heterogeneity and country characteristics might also generate the systematic differences between foreign affiliates in Eastern and Western Europe that we have presented in Table 1.

Differences in country-specific entry costs, price levels, and in market size yield country-specific critical productivity levels for the self-selection into the groups of domestic, export, and FDI firms.. Here, we only have information on FDI firms. To analyze whether firms' self-selection drives the differences of affiliates characteristics in Eastern and Western Europe, we thus look at the size distribution of German firms' affiliates in both regions.

--- Insert Figure 1 about here. ---

Figure 1 displays size distribution of all German parents, parents that own affiliates only in Eastern Europe, and parents that own affiliates only in Western Europe. We look at two criteria of firm size: sales and employment. These yield different results. While parents with affiliates in Western Europe are larger if size is measured in terms of parents' sales, parents with affiliates in Eastern Europe are larger if size is measured in terms of parents' employment. Applying the reasoning of Helpman et al. (2004), more productive firms are active in Western Europe – because higher productivity translates into higher sales, not higher employment. However, if employment is the preferable measure of size because, for instance

employment is a real measure while sales are a nominal measure, larger and thus more productive firms are active in Eastern Europe.

Finding different patterns according to different size measures, we cannot explain the differences across affiliates solely by self-selection of parents into the different groups. Hence the interplay of parent firm heterogeneity and country-specific fixed costs alone cannot explain differences of affiliates. Instead, firms that invest in Eastern and Western Europe differ with regard to their labor productivity. More specifically, the firms that invest in Eastern Europe have lower labor productivity than those that invest in Western Europe. In the context of the model by Helpman et al. (2004), this result could be taken as evidence for lower costs of entry into Eastern European markets. However, firms that invest in Eastern and Western Europe as well as their affiliates abroad also differ with regard to their capital intensities. Such differences in technologies are ruled out by this model. Hence differences in factor intensities suggest that affiliates in Eastern and Western Europe perform different functions.

In Table 5, we provide tests which show whether the differences in Figure 1 are statistically significant. It presents Kolmogorov-Smirnov tests of equality in size of parent firms than own affiliates in Eastern Europe and those that own affiliates in Western Europe. The tests confirm the results of Figure 1. Parents with affiliates in Western Europe are larger if measured in terms of sales and smaller if measured in terms of employment.

--- Insert Table 5 about here. ---

3.3 Summary of Descriptive Statistics

Overall, we find evidence for the importance of different motives for firms to engage in Eastern and in Western Europe. First, FDI into Eastern Europe is mostly unilateral. Activities of German multinational firms in Eastern Europe are much larger than Eastern European firms' activities in Germany. In contrast, with Western Europe, German multinational firms' activities are mostly bi-directional (see Table 2 and Buch et al. 2005). Second, the sector composition of FDI into the two regions differs. The most important difference is the importance of financial services for the West and transport equipment for the East. Third, the parent-affiliate structure for German firms shows that many foreign affiliates in Eastern and Western Europe are active in the same sector as the German parent. While this pattern is consistent with a proximity-concentration model, stressing the market access motive, it does not rule out the factor-proportion model, stressing production costs motives for internationalization. Fourth, firm-level heterogeneity in proximity-concentration models alone is not sufficient to explain the differences in affiliates' characteristics. In particular, different measures of size yield different conclusions about average and minimum productivity of affiliates in both regions. In sum, while there is somewhat greater evidence for the production cost motive for Eastern Europe, this is not overwhelmingly so.

4 Regression-Based Evidence

The descriptive statistics reported above have given a first impression of the motives of internationalization of German firms in different regions, but the overall picture has remained somewhat inconclusive. In this section, we present regression-based evidence that allows disentangling the different motives in a multivariate framework. We start using aggregated

and sector-level data. The empirical analysis is supplemented by firm-level regressions which allow taking parent characteristics into account.

4.1 Aggregated Data

We rely on an extended gravity equation that has been used frequently in the empirical literature on the determinants of multinational activity. For our purposes, the key variable is a similarity index. Our *similarity index* takes values between 1 and 0, and a higher score implies that countries are more similar.[3] The difference between the GDP per capita of Germany and the GDP per capita of the host country is used as a proxy for similarity in terms of skills and human capital. GDP per capita is highly correlated with countries' relative endowments with capital and, therefore, with the average capital intensity of production in a country. Since internationalization of activities decreases in the similarity in factor endowments if the production cost motive dominates, whereas internationalization increases in similarity in factor endowments if the market access motive dominates, a negative coefficient on this index is evidence in favor of the production cost motive. A positive coefficient, in contrast, is evidence in favor of the market access motive. The baseline equation that we estimate is

$$\log\left(FDI_{ijt}\right) = \beta_0 + \beta_1 \log\left(GDP_{jt}\right) + \beta_2 \cdot Similarity_{jt} + \beta_3 \cdot \log\left(Distance_{jt}\right) + \varepsilon_{ijt}$$

where FDI_{ijt} is foreign direct investment by sector i in country j in period t, and ε_{ijt} is an error term. The dependent variable, GDP and distance are given in logs, and the resulting coefficients can be interpreted as elasticities. A coefficient of, say, 0.6 on one of the logged explanatory variables (such as GDP) would imply that a 1% increase in this variables would trigger a 0.6% increase in the dependent variable (such as FDI).

GDP is included to control for the size of countries, and we expect a positive sign. Distance is included to account for transportation and other distance-related costs, and we expect a negative sign.

We use four different measures of German firms' foreign activities: the sum of FDI stocks of all foreign affiliates, the mean of the FDI stock of the foreign affiliates, total affiliate sales, and the number of foreign affiliates. The distinction between FDI and the sales of foreign affiliates is important because affiliates sales are a more direct measure of the actual level of production of foreign affiliates than FDI. Splitting up the aggregated investment volume into the average foreign investment per affiliate and the number of affiliates that are active abroad provides information on the extensive and intensive margins of the adjustment to changes in exogenous variables such as market size or distance costs.

Although we have, in principle, information on the foreign activities of German firms in more than 200 host countries, we lack reliable time series for quite a few of these countries, mostly low-income countries. Therefore, the effective sample size is restricted to a little over 100 countries, including a large number of developing countries and emerging markets.

Estimating equation (1) gives the average effect of the exogenous variables on German outward FDI. We want to compare this effect with the (average) effect for a sample from Eastern European countries. We therefore additionally include interactions of all explanatory

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[3]   The index is calculated as one minus the ratio of abs (GDP per capita host – GDP per capita Germany) to max (GDP per capita host, GDP per capita Germany) .

variables with an Eastern European dummy. This dummy takes the value one if a country is a CEEC country and zero otherwise.

Table 6 presents the estimates. The gravity variables GDP and distance have the expected positive and negative signs. Their coefficients have a size comparable to those usually found in the literature. For distance, the negative effect is driven by the number of affiliates. The mean volume of FDI, in contrast, increases in distance.

--- Insert Table 6 about here. ---

The most important variable for our analysis is the similarity variable. The positive coefficient found for the full sample points to a dominance of market access considerations.

Moreover, our results suggest that the determinants of multinational activities do not differ significantly between Eastern Europe and the rest of the sample. There is only one significant difference for the Eastern Europe sub-sample: the interaction term effect of the similarity variable. This interaction term for mean FDI per affiliate is positive and significant, suggesting that affiliate size if measured in FDI is more strongly affected by similarity in Eastern Europe than the size of the average foreign affiliate.

4.2 Sector-Level Data

Next, we exploit the sector dimension contained in our dataset. Since sectors differ in their factor intensities, the motive for internationalization is likely to differ as well. Rather than aggregating the dependent variable for each country, we now retain the sectoral dimension of the data. Hence we have a panel which has a sector-country cross-section dimension. Table 7 shows results for each of the NACE sectors separately.

--- Insert Table 7 about here. ---

Country size is positive and significant for all sectors, except mining, wood, electricity and gas. There is a significantly larger effect of GDP for Eastern European countries in a number of sectors.

As regards similarity, there is a relatively distinct pattern of positive and significant coefficients across sectors. This, as has been argued above, would be evidence in favor of the market access motive for internationalization. Similarity is insignificant for three sectors (paper products and publishing, coke and petroleum products, non-metallic mineral products), and we find a significantly negative effect only for the production of transport equipment. As shown in Table 3, this is one of the sectors which have a significantly higher share in activities in Eastern Europe compared to Western Europe. As regards similarity, we find mostly insignificant differences of Eastern European coefficients. Thus, German firms on average do not pursue different internationalization strategies in the two regions. If the similarity coefficient for Eastern Europe differs significantly, it has the "wrong" positive sign. The market access motive would be even more important to Eastern Europe. In only two sectors, we find a significantly negative interaction term between similarity and our Eastern Europe dummy. These are the sectors wood products and furniture. This would be evidence in favor of the hypothesis that the production costs motive dominates for investment by these sectors in Eastern Europe.

Like the regressions using aggregated data, sector data reject significant differences of German multinational firms in Eastern Europe from their overall internationalization behavior. The market access motive dominates in almost all sectors, and it sometimes does so even more in Eastern Europe. This is in line with most of the evidence derived from analysis using aggregated data (Carr et al. 2001). According to the analyses using aggregated and sector data, different motives of internationalization are not the main reason for the differences in affiliate characteristics.

4.3   Firm-Level Evidence

So far, we have looked at differences in factor endowments across countries to discriminate between the two motives for going abroad. GDP per capita is, as was argued above, a proxy for the factor endowments of countries. Yet, there is a one-to-one correspondence of firm characteristics and factor endowments only if firms are symmetric. With heterogeneity and self-selection, the regression results using aggregated and sectoral data reported above thus provide only one part of the story. We therefore continue our analysis at the firm-level. We set up probit and tobit models to analyze firm-level determinants of firms that are active in Eastern Europe and of those that are active in Western Europe. The unit of analysis is the affiliate-parent pair. The dependent variable is set to one for each affiliate located in one of the eight countries in Eastern and Western Europe, respectively, and to zero otherwise. Overall, our sample comprises 12,129 pairs of German parents and their foreign affiliates. Data are for the year 2003 because information on the parents is contained in our dataset only since 2002. The number of observations used is the same in all regressions but the number of ones differs between the regressions analyzing Western and those analyzing Eastern European affiliates. Our dataset contains information on 1,378 affiliates of German firms in Eastern Europe and on 3,845 affiliates in Western Europe.[4] Thus, about 43% of all affiliates of German firms worldwide in our sample are located in one of the 16 countries in the two regions we analyze. The tobit model is set up in a similar way. Instead of a one for an affiliate located in Eastern (or Western) Europe, we use its size in terms of FDI as the dependent variable.

--- Insert Table 8 about here. ---

We explain the decision to invest in Eastern or Western Europe by several firm-level variables, a border dummy, and a set of dummies controlling for sector-specific fixed effects. We include three firm-specific variables. The age of the affiliate is included to account for the fact that younger firms are usually smaller in size. The size of the parent firm is included as a proxy for the productivity of the parent. The capital intensity of the parent and of the affiliate are included to check whether more labor-intensive parents are more likely to invest in Eastern Europe, which would be an indication that the production cost motive is important. We expect the *size* of the parent firm to influence the location decision. Smaller firms are more likely to engage in countries close to their home country if country-specific fixed costs to depend on distance. Thus, we expect a negative sign for both groups. As an additional proxy for size, we use the number of affiliates worldwide of a given parent. Moreover, political discussions in Germany stress the low barriers of entry in Eastern Europe which allow small and medium-sized firms to relocate their production to these countries. If this hypothesis was true, we would expect to find that being small increases the probability of investing in Eastern Europe.

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[4]   Note that these numbers are not comparable to those in Table 1 because we consider only a subgroup of eight countries in each region.

However, our results provide evidence against this hypothesis. If anything, we find that the size of the parent has a positive impact on the probability of investing in Eastern Europe. The coefficient on size is negative, in contrast, for the Western European countries. Results from the tobit model support this finding. Hence our findings suggest that parent characteristics matter in the sense that larger parents tend to set up affiliates in Eastern Europe. This is in line with our descriptive statistics in Figure 1.

Next, we are interested in whether *capital-labor-ratios* are important. If the production cost FDI motive dominates, we would expect firms which produce labor-intensive to be more prone to invest in Eastern Europe, where labor is more abundant and less expensive than in Germany or in Western Europe. In the Western European countries, in contrast, we would not expect firms to look for comparatively cheap labor. In these countries, the market access motive should rather dominate. Hence the capital-labor ratio of the parent firm should be negative in our Eastern Europe regression and insignificant for Western Europe. Although we find the negative sign in the Eastern Europe probit regression, the capital-labor ratio of the parent is not significant at the conventional levels of significance. Surprisingly, it is negative and significant for the Western European regression. One reason could be that the size of the parent and the capital-labor ratio are positively correlated.

The capital-labor ratio of the affiliate has a negative sign for the Eastern European sample and a positive sign for the Western European sample. This is consistent with the expectation that affiliates in Eastern Europe are relatively more labor intensive. Note that our empirical approach does not allow discriminating whether this is due to the different functions that they perform or due to differences in factor endowments of countries.

Table 9 looks uses the capital intensity of the affiliate as the dependent variable. We present four different specifications, using different measures for the size of the parent. Also, we include dummy variable for three regions, the previously used Central European countries, core Europe, as well as a second group of reform states, including Belarus, Bulgaria, Romania, Russia, and Ukraine. Results show a clear and positive link between the size of the parent and the capital intensity of the affiliate. We obtain the expected negative signs for the two groups of Central and Eastern European countries (where affiliates are more labor intensive) as well as a positive sign for core Europe (where affiliates are less labor intensive). Also, more capital intensive parents tend to have more capital intensive affiliates.

--- Insert Table 9 about here. ---

Returning to Table 8, we expect the *age* of an affiliate to affect its size. It is a long-established fact that older firms are larger (Evans 1987, Cabral and Mata 2003). Yet, we might have difficulties to find this relationship in our data for two reasons. First, we do not know the exact age of each affiliate since we can trace individual affiliates only since 1996. Hence we cannot distinguish affiliates that were established already before 1996 from those that were established in 1996. Second, in Eastern Europe, the nature of the privatization process might distort the typical relationship between age and size. In many Eastern European countries, large-scale privatization has gained steam only in the second half of the 1990s. This holds particularly for public utilities and the banking sectors, i.e. for sectors in which German firms are quite active (Table 3). This can explain why we find a negative correlation between size and age in the tobit regressions for the Eastern European sample (see Table 8). For the Western European sample, in contrast, we find the expected positive correlation.

Finally, we include a *border* dummy variable at the level of the German state, which is set at one if a German state and a foreign country share a border and to zero otherwise. The border dummy drops out of the East European probit specification because of colinearity. The border dummy perfectly predicts investment behavior for some East German states. To share a border increases the probability to invest in the neighboring country and the size of the establishment.

5   Summary and Conclusions

The size and the labor intensity of foreign affiliates in Eastern Europe are focal points of discussions on the risks and benefits of foreign direct investment. In the West, people fear adverse labor market consequences of an increasing amount of FDI into labor intensive foreign affiliates. These consequences might be particularly adverse if not only large firms relocate production but if also small and mid-sized firms start investing abroad. In the East, entry of foreign firms raises fears of greater labor market instability and greater competition for the incumbent firms.

In this paper, we have started from the observation that characteristics of foreign affiliates of German firms in Eastern and Western Europe indeed differ. On average, affiliates in Eastern Europe are smaller and employ more labor. Interpreting these differences and drawing conclusions with regard to potential labor market impacts, however, requires disentangling three different reasons for differences in affiliate structures.

First, affiliates in Eastern Europe might be more labor intensive than their Western counterparts because German firms fragment their production process and locate labor-intensive stages in the relatively low-wage Eastern European countries. We find that, for some manufacturing sectors, the production cost motive for internationalization is indeed important. Overall, however, regressions using aggregated data show that a large part of German FDI into Eastern Europe is driven by the market access motive.

Second, differences in parent characteristics have an impact on differences in the structure of foreign affiliates. Contrary to expectations voiced in the public debate, we find the size of the parent to have a positive impact on the probability of investing in Eastern Europe. Size has a negative impact on the probability of investing in core Europe, in contrast. This contradicts the common perception that Eastern enlargement has been a key trigger of small and mid-sized firms into foreign markets. It is rather the larger parents that are active in Eastern Europe.

Third, differences in factor intensities of the parent affect the probability of investing abroad. Yet, more labor intensive parents as compared to the average German multinational tend to be active in Eastern *and* Western Europe. This is in line with the public policy debate regarding activity in the East – but the finding regarding firms active in Western Europe is probably surprising.

Fourth, we find that the age of the affiliate has a significant impact on its size. Older affiliates in Eastern Europe tend to be smaller while older affiliates in Western Europe tend to be larger than their younger counterparts. While the correlation between age and size in Western Europe meets expectations, the negative correlation in Eastern Europe is likely to be

influenced by the nature of the transformation process. The start of large-scale privatization in the mid-1990s may particularly affect our results.

Overall, the aim of our paper has been to provide a detailed account of the patterns of specialization and investment in Eastern Europe, using firm-level data from Germany as an important source country of FDI. In future work, it would be interesting to cross-check these results with comparable datasets from other countries. Our data have also not allowed studying the self-selection of firms into export versus FDI firms. Having firm-level information on FDI and exports would be highly desirable to test implications of recent theoretical models more directly.

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7   Data Appendix

The Deutsche Bundesbank has been carrying out annual full sample surveys on direct investment stocks pursuant to the Foreign Trade and Payments Regulation (Außenwirtschafts-verordnung) since 1976. The data base used in this paper was compiled solely for academic research purposes, and it goes back to 1989. (For details see Lipponer 2002a, 2002b, or Deutsche Bundesbank 2003.) Time series for individual enterprises, however, are available only from 1996 to 2003. For semi-aggregated data (by country or sector), data are available for the years 1989–2003.

The data base contains mainly those data from the foreign affiliates' balance sheets that are needed to calculate direct investment stocks. The data contain only limited information about the reporting firm, i.e. about the German headquarters (or, in the case of FDI in Germany, about the foreign parent). Essentially, with regard to the German investor, information is restricted to the sector in which the firm is active. Similar sectoral information is available for the foreign affiliate. Since the year 2000, the data also contain information about the reporting firm such as its turnover, assets, or employment.

In the period October 1993 through February 2002, German enterprises had to report their international capital links if the balance sheet total of the foreign affiliates exceeded €5 million (for minority participation rights subject to reporting requirements). In the case of majority participation rights as well as branches and permanent establishments, foreign affiliates reported whether their balance sheet total was more than €500,000. Indirect participating interests had to be reported if a "dependent" foreign affiliate had a holding of 10% or more in another enterprise. Since March 2002, a uniform reporting threshold of 3 million euro has been in place.

Table 1: Regional Breakdown of Activities of German MNEs, 2003

CEECs = Central and Eastern European Countries (Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Macedonia, Poland, Romania, Russian Federation, Serbia and Montenegro, Slovak Republic, Slovenia, Ukraine)

	FDI stocks (€mn)	Affiliate sales (€bn)	Employees (1,000)	Number of affiliates (total)	FDI (%)	Affiliate sales (%)	Employees (%)	Number of affiliates (%)
Total	665,839	1,352.9	4,498	22,551	100.0	100.0	100.0	100.0
Developed Countries	574,110	1,081.8	2,753	16,189	86.2	80.0	61.2	71.8
European Union	300,961	571.6	1,619	10,167	45.2	42.2	36.0	45.1
United States	224,037	356.0	766	3,396	33.6	26.3	17.0	15.1
Other	49,113	154.3	368	2,625	7.4	11.4	8.2	11.6
Transition Countries	46,474	139.9	1,021	3,533	7.0	10.3	22.7	15.7
CEECs	34,866	98.8	722	2,583	5.2	7.3	16.1	11.5
China	7,278	24.4	160	566	1.1	1.8	3.5	2.5
Other	4,330	16.7	139	384	0.7	1.2	3.1	1.7
Developing countries	45,255	131.2	724	2,830	6.8	9.7	16.1	12.5
Latin America	20,382	47.3	288	1,051	3.1	3.5	6.4	4.7
Asia	20,551	68.2	331	1,395	3.1	5.0	7.4	6.2
Other	4,322	15.8	105	384	0.6	1.2	2.3	1.7

Source: Authors' calculations based on the database MIDI (*International Capital Links*) provided by the *Deutsche Bundesbank*.

Table 2: OECD Countries as Sources and Destinations of FDI

CEECs includes the Czech Republic, Poland, and the Slovak Republic; Core EU includes Austria, Denmark, France, Germany, Italy, the Netherlands, and the United Kingdom; Other Europe includes Finland, Greece, Portugal, Sweden, and Switzerland, Oother OECD includes Australia, Canada, Japan and Korea.

Source \ Destination	Total source = 100%						Total destination = 100%					
	CEECs	Core EU	Other Europe	USA	Other OECD	World	CEECs	Core EU	Other Europe	USA	Other OECD	World
Australia	n.a.	25.74	-0.02	53.65	7.78	1.65	n.a.	1.53	-0.01	5.09	1.85	2.03
Austria	15.95	36.84	6.74	8.02	2.02	0.70	9.41	0.56	0.64	0.20	0.12	0.52
Canada	0.20	17.37	1.34	48.83	2.86	4.23	0.12	2.43	1.17	10.90	1.60	4.77
Czech Republic	35.20	13.48	2.50	1.95	0.21	0.29	0.62	0.01	0.01	0.00	0.00	0.02
Denmark	1.96	25.01	11.59	17.09	5.43	0.55	2.98	0.99	2.85	1.08	0.85	1.35
Finland	0.75	37.65	30.01	15.07	1.81	0.40	0.93	1.21	6.00	0.77	0.23	1.10
France	1.00	30.74	5.11	25.16	9.44	3.39	10.27	8.19	8.48	10.71	10.04	9.10
Germany	2.81	36.23	5.61	27.69	3.91	7.39	31.38	10.50	10.12	12.82	4.53	9.90
Greece	n.a.	20.98	0.03	0.00	0.00	0.14	n.a.	0.08	0.00	0.00	0.00	0.12
Italy	1.21	39.31	8.04	11.23	1.93	1.72	5.17	4.36	5.56	1.99	0.86	3.79
Japan	n.a.	17.71	0.92	50.59	7.36	1.89	n.a.	3.04	0.99	13.86	5.04	5.86
Korea	1.76	7.74	0.26	28.20	4.84	0.44	1.08	0.12	0.03	0.72	0.31	0.54
Netherlands	1.97	29.86	6.71	25.89	3.50	9.84	14.10	5.53	7.74	7.66	2.59	6.33
Poland	3.20	25.97	6.20	9.37	-0.05	0.52	0.08	0.02	0.02	0.01	0.00	0.02
Portugal	n.a.	8.56	0.18	2.63	0.30	0.31	0.49	0.09	0.01	0.05	0.01	0.37
Slovak Republic	51.43	21.13	1.39	0.00	0.17	0.07	0.44	0.00	0.00	0.00	0.00	0.01
Sweden	n.a.	43.90	10.60	18.79	1.76	1.86	n.a.	3.33	5.00	2.28	0.53	2.59
Switzerland	1.06	34.33	2.06	23.10	3.80	2.78	5.74	4.81	1.80	5.18	2.13	4.79
United Kingdom	0.24	43.06	4.79	30.00	4.23	10.56	5.04	23.93	16.57	26.63	9.39	18.97
United States	n.a.	36.16	6.54	0.00	18.05	21.37	12.15	29.32	33.03	0.00	58.43	27.68

n.a. = not available

Source: OECD Foreign Direct Investment Statistics (2003).

Table 3: Sectoral Breakdown of Activities of German MNEs in Eastern and Western Europe, 2002

	Eastern Europe								Western Europe							
	Sector classified with respect to German parent				Sector classified with respect to foreign affiliate				Sector classified with respect to German parent				Sector classified with respect to foreign affiliate			
	FDI stocks	Affiliate sales	Affiliate employment	Affiliate capital	FDI stocks	Affiliate sales	Affiliate employment	Affiliate capital	FDI stocks	Affiliate sales	Affiliate employment	Affiliate capital	FDI stocks	Affiliate sales	Affiliate employment	Affiliate capital
	(€mn,%)	(€bn,%)	(1000,%)	(€bn,%)	(€ mn,%)	(€bn,%)	(1000,%)	(bn,%)	(€ mn,%)	(€bn, %)	(1000,%)	(bn,%)	(€mn,%)	(€bn,%)	(1000, %)	(bn,%)
Eastern Europe																
Total	33,519.8	96.4	657.7	139.5	33,519.8	96.4	657.7	139.5	331,078	458.4	1,234.8	2,756.1	331,078	458.4	1,234.8	2,756.1
Manufacturing	70.6	67.8	64.9	38.4	66.7	62	66.8	34.9	59.3	62.3	57.6	23.2	19.2	35.2	44.8	6.4
Food products	3.9	5.9	3.7	2.3	3.7	4.6	4.1	2.1	2.8	3.3	2.4	1.1	1.3	1.5	2.1	…
Textiles	1.2	1.3	2.9	…	…	…	3.0	…	…	1.3	…	…	…	…	…	…
Paper & publishing	1.4	1.4	1.9	…	1.3	1.2	1.8	…	3.4	1.4	1.8	1.3	…	…	1.1	…
Chemicals	3.4	3.2	2.6	1.5	3.3	2.3	2.1	1.3	14.3	10.9	8.9	5.2	6.9	8.7	7.1	2.0
Rubber & plastics	3.1	3.0	3.4	1.4	2.7	2.7	3.4	1.6	1.1	2.0	2.9	…	…	1.4	2.3	…
Non-metallic minerals	5.9	3.0	3.9	2.9	6.0	3.0	4.0	2.7	2.7	1.4	2.4	…	…	1.2	2.2	…
Basic metals	3.1	2.3	3.9	1.4	2.9	1.9	4.0	1.2	1.9	4.0	6.5	…	…	2.5	4.5	…
Machinery	4.3	3.5	4.1	1.9	2.9	2.4	3.8	1.1	3.1	5.9	8.0	1.1	1.4	3.5	6.4	…
Electrical & optical equipment	7.4	7.0	11.4	4.6	5.8	6.2	12.5	2.7	5.2	7.1	10.8	2.4	2.8	4.5	7.0	…
Transport equipment	20.0	22.6	15.4	9.2	21.1	21.6	16.1	8.3	8.2	19.7	9.3	4.8	1.7	5.9	8.2	…
Electricity	15.4	11.9	7.4	10.6	14.3	11.8	7.3	11.2	15.2	4.1	1.7	4.7	2.0	3.8	1.8	1.2
Construction	…	1.3	1.8	…	…	1.2	1.6	…	…	…	1.1	…	…	…	1.0	…
Services	28.3	31.6	34.6	61.4	31.0	37.7	32.6	61.3	40.3	37.2	42.0	76.6	43.7	64.2	54.2	79.6
Wholesale	7.6	18.6	15.1	6.3	10.3	24.8	14.7	6.6	6.7	18.5	15.6	2.7	10.5	44.7	26.8	3.9
Transport & communication	7.4	5.6	7.5	8.5	7.6	6.0	8.0	9.2	5.6	8.2	11.3	5.6	1.3	8.6	11.0	1.4
Financial services	8.3	3.8	6.8	42.0	7.4	2.8	5.8	38.8	23.5	6.4	8.5	66.4	26.8	6.2	6.0	72.3
Business services	3.9	2.8	3.4	3.9	5.3	3.6	2.1	6.1	4.0	3.2	4.8	1.7	4.7	3.9	8.8	1.9
Holdings	n.a.	n.a.	n.a.	n.a.	1.9	…	…	3.6	n.a.	n.a.	n.a.	n.a.	36.9	…	…	13.9

Shares below 1% of the total are not disclosed because of confidentiality reasons.
Source: Authors' calculations based on the database MIDI (*International Capital Links*) provided by the *Deutsche Bundesbank*.

Table 4: Number of Foreign Affiliates in Eastern Europe by the Sector of the Parent Firm and Sector of the Affiliate, 2003

Sector parent	Sector foreign affiliate																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	5																	3						d
2		14							d	4						d	d	3						
3	d		92															29				3		
4				35						d			d	d				13				d		
5					8					d					d		3					5		
6						42												8				6		3
7																		7						
8		d						53	3				d			d		60		d		d	d	d
9								d	61		d		d	5				15						d
10		8							d	102						d		3				d		4
11				d					4	d	102	5	d	3				36				5		
12					d	d		11	3		9	66	d	4				59				3		
13				d							3	4	110	10				44				7	5	d
14									d				7	107	d			18		6	4	8	d	d
15											d				27							d		
16													d			84		d		d		3		13
17		d								d	d		3				27	5				4		
18	d		12	5	5	d	d	3	6		12	3	18	4	6	d	d	219		d	d	37		4
19																			d					
20						d								d						66	d	3		8
21			d															d		d	125	52		d
22	d		5	d	d						8	6	8	d	d	d	d	24	d	d	7	215		7
23	5		3	5	d	d			4	d	4	5	4	d	3	d		9		d		17	21	4

d = undisclosed for confidentiality reasons, Sectoral classification: 1 = agriculture, hunting, fishing and forestry, 2 = mining and quarrying, 3 = manufacture of food products, beverages and tobacco, 4 = manufacture of textiles, textile products, leather and leather products, 5 = manufacture of wood and wood products, 6 = manufacture of pulp, paper, paper products, publishing and printing, 7 = manufacture of coke, refined petroleum products and nuclear fuel, 8 = manufacture of chemicals, chemical products, and man-made fibres, 9 = manufacture of rubber and plastic products, 10 = manufacture of non-metallic mineral products, 11 = manufacture of basic metals and fabricated metal products, 12 = manufacture of machinery and equipment n,e,c,, 13 = manufacture of electrical and optical equipment, 14 = manufacture of transport equipment, 15 = manufacture of furniture and manufacturing n.e.c., 16 = electricity, gas and water supply, 17 = construction, 18 = wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods, 19 = hotels and restaurants, 20 = transport, storage, and communication, 21 = financial intermediation, 22 = real estate, renting and business activities, consulting, 23 = education, waste management, research and development, public administration and defence and compulsory social security, 24 = holdings.

Source: Authors' calculations based on the database MIDI (*International Capital Links*) provided by the *Deutsche Bundesbank*.

Table 5: Kolmogorov-Smirnov Test of Equality: Size of Parent Firms Owning Affiliates in Eastern versus in Western Europe

The Kolmogorov-Smirnov test (KS-test) determines whether two datasets differ significantly. The KS-test has the advantage of making no assumption about the distribution of data. The null hypothesis is equality of both distributions. In the first line results are presented of a one-sided test that evaluates whether parents that own affiliates only in Eastern Europe are smaller than parent that own affiliates only in Western European. The maximal difference in the cumulative distributions is positive, thus the null of equality is not rejected against the alternative hypothesis that parents owning affiliates in Eastern Europe are smaller with respect to employment. Rejected at the one percent level of significance is equality of both distributions against the alternative that parents with affiliates only in Western Europe are smaller with respect to employment. This result is given in line two. Taken together we can reject equality of both distributions at the one percent level of significance.

Smaller group	Difference	p-value
Size criteria	Log employment	
Parents with affiliates only in Eastern Europe	0.0011	0.999
Parents with affiliates only in Western Europe	– 0.3184***	0.000
Combined K-S	0.3184***	0.000
Size criteria	Log sales	
Parents with affiliates only in Eastern Europe	0.111***	0.000
Parents with affiliates only in Western Europe	0.000	1.000
Combined K-S	0.111***	0.000

Table 6: Regression Results Aggregated Data

The baseline regression that we estimate is: $\log(Y_{it})=\alpha_0 + \beta_1 X_{it} + \beta_2 X_i + t + \varepsilon_{it}$, where Y_{it} is the activity German multinationals in country i at time t, X_{it} are the time-varying explanatory variables for country i (GDP, similarity index, etc.), X_i are the time invariant explanatory variables for country i (distance), t is the time fixed effect, and ε_{it} is the error term. Results reported in this Table have been obtained using the cross-sectional time-series linear model using feasible generalized least squares (XTGLS) in Stata. This command allows estimation in the presence of AR(1) autocorrelation within panels and cross-sectional correlation and/or heteroscedasticity across panels. Dependent variables (with the exception of the sales-ratio), GDP, and distance are in logs. *Sales* are total sales of German firms' foreign affiliates, including intra-firm sales. Data are aggregated over all affiliates of German firms in a particular host country. *Number of affiliates* is the total number of affiliates in a given host country. Data for 1995–2001; a full set of time dummies is included in all regressions (not reported). Absolute values of the z-statistic are given in parentheses: *, ** and *** indicates significant at the 10%, 5%, and 1% levels, respectively.

	Volume of FDI	Mean FDI	Sales of foreign affiliates	Number of affiliates
Log GDP	0.66***	0.23***	0.62***	0.47***
	[16.77]	[9.95]	[19.41]	[21.68]
Similarity	3.03***	0.67***	3.48***	2.36***
	[11.16]	[4.24]	[16.16]	[15.50]
Log distance	–0.17**	0.09**	–0,07	–0.18***
	[2.42]	[2.15]	[1.22]	[4.28]
Log GDP * Eastern Europe	–0,12	–0,13	0,06	0,15
	[0.42]	[0.82]	[0.23]	[0.81]
Similarity * Eastern Europe	–1,52	3.84*	–0,04	–3,69
	[0.53]	[1.93]	[0.01]	[1.22]
Log distance * Eastern Europe	0,57	0,4	–0,11	–0,35
	[0.55]	[0.70]	[0.12]	[0.54]
Constant	–3.64***	1.89***	–9.56***	–6.75***
	[3.33]	[2.94]	[11.07]	[11.66]
Observations	1138	1138	1159	1181
Number of key	107	107	107	108

Table 7: Regression Results Sectoral Data

Results reported in this Table have been obtained using an feasible generalized least squares estimator which accounts for the presence of AR(1) autocorrelation within and cross-sectional correlation and/or heteroscedasticity across panels. The dependent variable (sales of foreign affiliates), GDP, and distance are given in logs. Data have been aggregated at a sectoral level, i.e. the data set contains one entry per sector and host country per year. We use data for the years 1990–2001. Sectors are defined following NACE. All regressions include a full set of time dummies. Robust t-values in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

	Agriculture	Mining	Food	Textiles	Wood	Paper & printing	Petroleum	Chemicals	Plastics	Non-metallic minerals
Log GDP	0.14*	–0.01	0.43***	0.37***	0.07	0.87***	1.03***	0.80***	0.86***	0.66***
	[1.84]	[0.11]	[10.10]	[8.42]	[0.63]	[13.15]	[13.00]	[21.65]	[14.89]	[14.18]
Similarity	3.90***	4.14***	0.64**	1.29***	4.50***	0.00	0.1	1.93***	0.78***	–0.11
	[8.10]	[7.21]	[2.23]	[4.27]	[4.74]	[0.00]	[0.22]	[7.46]	[2.58]	[0.36]
Log distance	0.87***	0.1	–0.83***	0.09	0.72***	–0.38***	–0.21*	0.1	–0.61***	–0.86***
	[4.38]	[0.80]	[10.73]	[1.29]	[3.04]	[4.27]	[1.75]	[1.44]	[7.08]	[11.62]
Log GDP * Eastern Europe	–1.2	0.76***	0.22*	0.1	0.1	0.21	0.31	0.2	0.70***	0.55***
	[1.64]	[3.98]	[1.85]	[0.31]	[0.40]	[0.62]	[0.57]	[1.51]	[5.04]	[3.24]
Similarity * Eastern Europe	52.25*	–0.18	3.21**	–4.68	–14.19***	–0.37	–11.72	0.82	–0.94	4.51***
	[1.82]	[0.04]	[1.99]	[0.96]	[4.48]	[0.04]	[1.41]	[0.35]	[0.20]	[2.62]
Log distance * Eastern Europe	3.6	–2.59***	–0.77*	–0.16	0.27	–0.73	–0.73	–0.56	–2.54***	–2.03***
	[1.59]	[3.32]	[1.79]	[0.13]	[0.31]	[0.55]	[0.35]	[1.06]	[5.78]	[3.59]
Constant	–3.37*	7.09***	4.50***	–1.36	–1.89	–11.06***	–14.82***	–10.86***	–9.17***	–1.25
	[1.70]	[4.05]	[4.84]	[1.27]	[0.76]	[6.19]	[7.63]	[11.57]	[5.91]	[0.95]
Observations	304	408	493	617	292	396	363	809	463	422
Number of groups	42	56	56	66	38	48	47	81	53	54

	Metals	Machinery	Electrical machinery	Transport equipment	Other manu-facturing	Construction	Wholesale	Transport & communication	Financial services	Business services
Log GDP	0.70***	0.84***	0.74***	1.15***	0.29***	0.33***	0.75***	0.48***	0.64***	0.78***
	[12.32]	[17.12]	[15.15]	[13.16]	[4.36]	[5.55]	[20.99]	[10.54]	[12.01]	[18.61]
Similarity	1.13***	1.66***	2.03***	–0.94**	1.47***	3.11***	3.20***	2.08***	3.88***	2.57***
	[3.64]	[5.43]	[6.66]	[2.55]	[4.19]	[9.18]	[13.95]	[8.84]	[11.22]	[9.55]
Log distance	–0.47***	–0.39***	–0.12	–0.46***	0.04	0.17*	–0.10*	–0.25***	–0.16*	–0.30***
	[5.67]	[5.96]	[1.64]	[4.76]	[0.38]	[1.77]	[1.75]	[4.38]	[1.91]	[4.56]
Log GDP * Eastern Europe	0.40**	–0.25	0.25	0.28	0.47***	0.65***	0.41**	0.17	0.39**	0.44**
	[2.25]	[1.24]	[1.51]	[1.44]	[3.28]	[7.06]	[2.09]	[1.02]	[2.09]	[2.32]
Similarity * Eastern Europe	3.92	12.05**	5.24**	–1.15	–5.39***	7.35*	–4.75	–3.77	–9.42**	–6.54**
	[0.72]	[1.99]	[2.26]	[0.38]	[3.06]	[1.67]	[1.19]	[1.09]	[2.46]	[2.16]
Log distance * Eastern Europe	–1.58***	0.77	–0.89	–0.64	–1.39***	–2.34***	–1.25*	–0.62	–1.12*	–1.35**
	[2.60]	[1.03]	[1.56]	[0.85]	[2.70]	[8.64]	[1.75]	[1.13]	[1.81]	[1.98]
Constant	–4.67***	–9.19***	–8.30***	–18.74***	–1.16	–2.96*	–8.87***	–1.78	–5.85***	–9.41***
	[2.97]	[7.98]	[7.28]	[9.28]	[0.67]	[1.96]	[10.25]	[1.55]	[4.14]	[8.14]
Observations	578	616	719	377	388	488	958	830	719	690
Number of groups	60	60	72	52	48	60	96	94	80	79

Table 8: Regression Results Firm-Level Data

Central and Eastern European countries = Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic, and Slovenia. Core Europe = Austria, Belgium, Denmark, France, Italy, Luxembourg, the Netherlands, and the United Kingdom.

|	Central and Eastern European Countries				Core Europe			
	Probit		Tobit		Probit		Tobit	
Turnover parent	0.00	0.01***	0.44***	0.37***	0.00	–0.01***	–0.01	–0.331***
	[0.82]	[3.69]	[2.90]	[2.69]	[0.91]	[3.89]	[0.13]	[4.46]
Log capital intensity of the parent	–0.01		0.14		–0.01*		0.02	
	[1.29]		[0.66]		[1.84]		[0.13]	
Log capital intensity of the affiliate		–0.06***		–3.54***		0.07***		1.89***
		[8.61]		[9.70]		[6.69]		[10.27]
Total number of affiliates of	–0.01	–0.01	–1.40***	–0.48**	–0.02	–0.02**	–0.56***	–0.44***
parent	[1.36]	[0.92]	[5.69]	[2.14]	[1.29]	[2.00]	[4.14]	[3.77]
Affiliate older than 1996			–2.18***	–3.69***			1.78***	2.20***
			[4.25]	[7.08]			[6.33]	[8.28]
State border			27.31***	25.07***	0.60***	0.58***	11.63***	10.15***
			[16.00]	[15.72]	[19.06]	[19.09]	[23.02]	[22.27]
Constant			–9.96	–26.81***			–8.25	1.70
			[1.39]	[4.94]			[1.42]	[0.58]
Observations	8194	7754	8269	7793	8261	7789	8269	7793

Table 9: Determinants of the Capital Intensity of the Affiliate

The dependent variable is the capital-labor ratio of the foreign affiliate. The Table presents results of OLS regressions for the year 2003, using robust standard errors. CEEC1 = Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic, and Slovenia. CEEC3 = Belarus, Bulgaria, Romania, Russia, and Ukraine. Core Europe = Austria, Belgium, Denmark, France, Italy, Luxembourg, the Netherlands, and the United Kingdom.

	(1)	(2)	(3)	(4)
Turnover parent	0.05***			
	[7.65]			
Assets parent		0.06***		
		[7.67]		
Employment parent			0.06***	
			[7.67]	
Dummy CEEC1 = 1	-0.32***	-0.30***	-0.29***	-0.30***
	[10.79]	[10.66]	[10.31]	[10.58]
Dummy CEEC2 = 1	-0.36***	-0.32***	-0.31***	-0.31***
	[6.38]	[6.31]	[6.12]	[6.11]
Dummy Core Europe = 1	0.10***	0.10***	0.10***	0.09***
	[5.26]	[5.63]	[5.39]	[5.18]
Total number of affiliates	-0.06***	-0.06***	-0.07***	0,01
	[5.29]	[5.70]	[5.95]	[0.87]
Log capital-labor ratio parent	0.07***	0	0.05***	-0,01
	[6.82]	[0.62]	[5.48]	[1.54]
Constant	-2.82***	-0.86***	-2.67***	-0.63*
	[7.28]	[2.62]	[7.03]	[1.89]
Observations	6209	7241	7135	7252
R-squared	0.08	0.08	0.08	0.07

Figure 1: Size Distributions of Foreign Affiliates of German Multinational Firms in Eastern and Western Europe, 2003
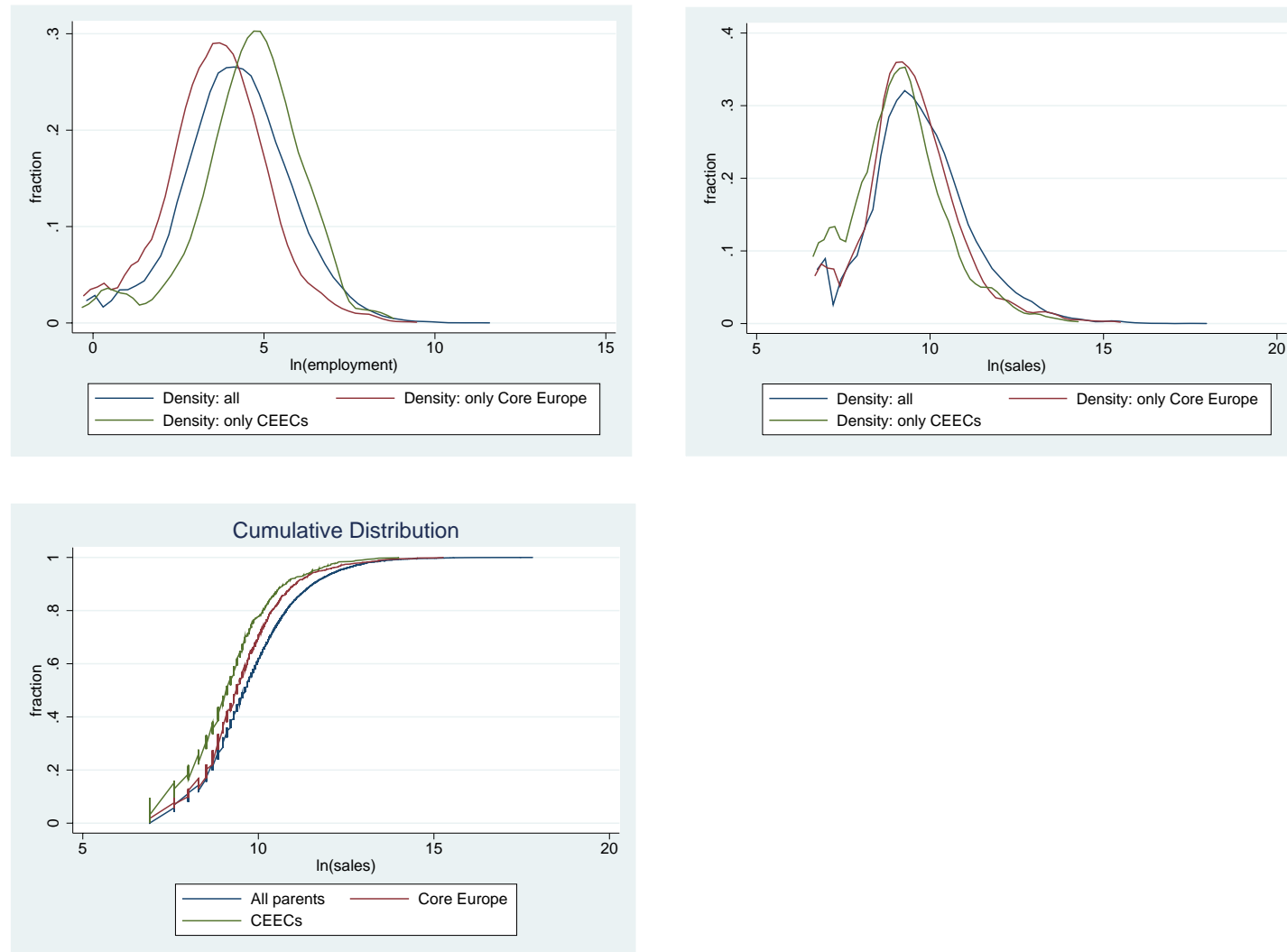
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