

Buch, Claudia M.; Toubal, Farid

Article

Economic Integration and FDI in Transition Economies: What Can We Learn from German Data?

Vierteljahrshefte zur Wirtschaftsforschung

Provided in Cooperation with:

German Institute for Economic Research (DIW Berlin)

Suggested Citation: Buch, Claudia M.; Toubal, Farid (2003) : Economic Integration and FDI in Transition Economies: What Can We Learn from German Data?, Vierteljahrshefte zur Wirtschaftsforschung, ISSN 1861-1559, Duncker & Humblot, Berlin, Vol. 72, Iss. 4, pp. 594-610, <https://doi.org/10.3790/vjh.72.4.594>

This Version is available at:

<https://hdl.handle.net/10419/99315>

Standard-Nutzungsbedingungen:

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

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

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

Terms of use:

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

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

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

Economic Integration and FDI in Transition Economies: What Can We Learn from German Data?*

By Claudia M. Buch** and Farid Toubal***

Summary: The opening up of Central and Eastern Europe has provided new investment opportunities for German investors. At the same time, importing capital from abroad can be an efficient mechanism towards increased factor accumulation for the accession states to the European Union. In this paper, we study the development of German FDI into the accession states from an aggregated, sectoral, and a firm-level perspective. We assess whether patterns of FDI into the transition economies confirm recent theories of FDI and whether we find evidence that the heterogeneity of firms matters for FDI decisions.

Zusammenfassung: Die Öffnung der mittel- und osteuropäischen Staaten hat deutschen Investoren neue Investitionsmöglichkeiten eröffnet. Gleichzeitig bietet der Import ausländischen Kapitals für die Reformländer einen Weg zu einer effizienten Faktorakkumulation. In diesem Papier untersuchen wir die Entwicklung deutscher Direktinvestitionen auf Basis aggregierter Daten, sektoral disaggregierter und firmenspezifischer Daten. Wir untersuchen ferner, ob das Muster der Direktinvestitionen den Implikationen von Theorien multinationaler Unternehmen entspricht. Unsere Ergebnisse zeigen, dass Unterschiede auf Firmenebene Auswirkungen auf die Struktur der Direktinvestitionen haben.

1 Motivation

During the past decade, the German economy has been facing two major changes: the reunification of East and West Germany and the opening up of Central and Eastern Europe. These developments have added to the general trend towards integration and globalization of markets that could be observed both at the European and at an international level. Obviously, these developments have had an immense impact on the investment opportunities of German firms. This integration process can be expected to be stimulated further as the accession states of Central and Eastern Europe eventually join the European Union.

While this integration process has affected German firms in many different regards, this paper looks into the implications of the integration of the accession states of Central and Eastern Europe for the foreign direct investment (FDI) of German firms. The purpose of this paper is to take stock of the developments that have been taken place so far and to show the changing patterns in German firms' FDI from three main angles. First, we will use aggregated data to analyze how the share of Eastern Europe in Germany's total FDI has

* This paper has partly been written while the authors visited the Research Centre of the Deutsche Bundesbank. The hospitality of the Bundesbank and access to the micro-database "International Capital Links" are gratefully acknowledged.

** Kiel Institute for World Economics and University of Tübingen, email: claudia.buch@uni-tuebingen.de

*** Kiel University, Department of Economics.

changed. Second, we will use sectorally disaggregated data in order to analyze whether the patterns of German firms' FDI into the accession states differ from the sectoral patterns of FDI into the current members of the European Union or into other emerging markets. Third, we will use firm-level data on German firms' foreign affiliates, which has kindly been provided by the Deutsche Bundesbank, in order to assess whether the determinants of investments into small versus large foreign affiliates differ. We will use these data as one test of recent theories of multinational firms.

The paper falls into five main parts. In the following second part, we will describe the changing structure of German firms' FDI both from an aggregated as well as from a sectoral perspective. In part 3, we will give a brief theoretical background on the expected effects of integrating the accession states of Central and Eastern Europe in general and the implications of integration for the structure of FDI in particular. Part 4 provides empirical estimates using gravity-type empirical equations explaining the size of activities of foreign affiliates of German firms. Part 5 concludes.

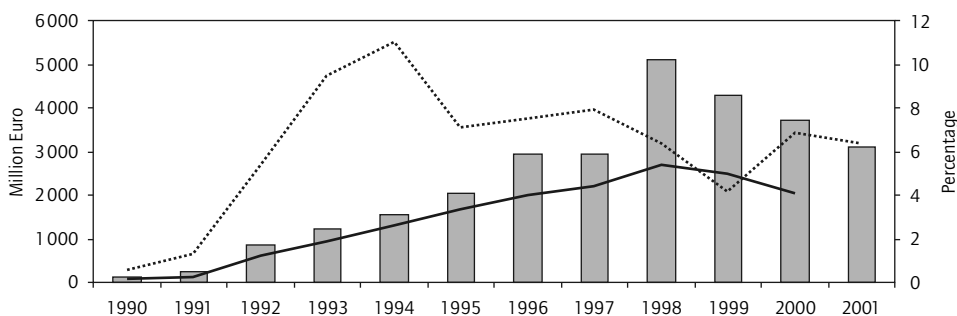
2 German FDI in Transition Economies: Stylized Facts

2.1 Trends in German FDI

Growing foreign direct investment has been a characterizing feature of the globalization process. The German economy is no exception in this regard. In the 1990s alone, gross annual outward FDI flows have increased from roughly 100 billion euro in 1990 to over 3,000 billion euro in the year 2001 (Figure 1). During the same period, the share of the reform states in Central and Eastern Europe in German FDI flows (stocks) has risen from practically zero during the 1980s to 6 to 7% (4 to 5%) at the end of the 1990s. In the years 1993 and 1994 alone, FDI into the accession states accounted for around 10% of German outward FDI. Hence, there has been a quite significant re-direction of Germany's outward

Figure 1

German FDI in Transition Economies of Middle and Eastern Europe¹



¹ Transition economies include the Baltic states, Bulgaria, the Czech Republic, Hungary, Poland, Romania, Russia, Slovenia, the Slovak Republic, and Ukraine. FDI flows are gross outward FDI flows; FDI stocks are gross outward positions of German FDI.

Source: www.sourceoecd.org

FDI to the transition economies. This re-direction is linked to the progress towards market economy in the accession states but also to the globalization of the German economy.

At the same time, German outward FDI is not homogeneously distributed among the accession states. As can be seen in Figure 2, German FDI stocks are concentrated in a few Central European countries only. As is well known from the theoretical and empirical literature (Dunning 1993, Altzinger 1998), FDI is strongly influenced by geographical, cultural, and historical proximity. This is one of the reasons why the main recipients of German FDI have been the Czech Republic, Hungary, Poland, and the Slovak Republic.

Looking at potential determinants of FDI across countries, it is difficult to clearly link the magnitude of FDI to individual indicators. Figure 2a shows the magnitude of FDI into transition economies both from a German as well as from an aggregated perspective. In this Figure as well as in Figures 2b and 2c, countries are ranked by their total FDI stocks relative to GDP. Figure 2a shows, first of all, that German FDI accounts for around 50% of the FDI stocks in Hungary, the Czech Republic, and in the Slovak Republic. In these three countries, German FDI also accounts for more 5 to 10% of GDP. For other countries, such as Poland, German FDI is important but not as dominant when measured in relation to GDP. Measured in terms of the absolute amounts of FDI invested, however, Poland and Hungary are of roughly equal importance from the point of view of German investors. Another interesting piece of information that can be taken from Figure 2a when looking at FDI relative to GDP is that the ranking of countries differs for German and aggregated FDI. The Slovak Republic in particular has received more FDI from Germany than the aggregated figures would suggest, and the country ranks before Poland in relative terms.

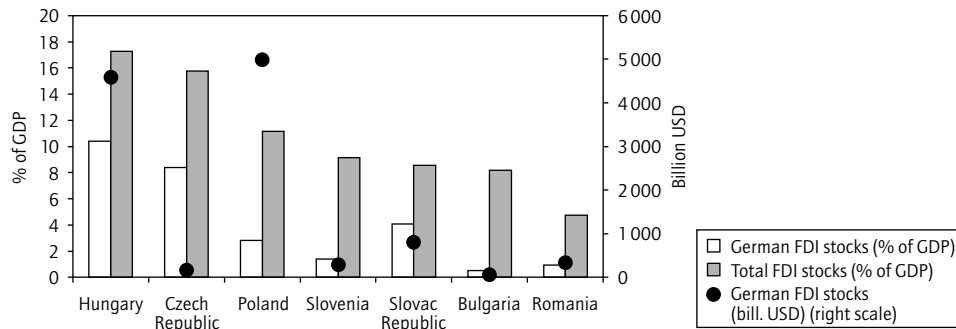
Relating the importance of FDI relative to domestic GDP to determinants of FDI such as market size and wages (Figure 2b) provides no clear patterns of correlation. In terms of overall market size, measured through GDP, one might expect that Poland has received most FDI. This pattern is indeed reflected in the magnitude of German FDI in absolute terms but it does not show up in the importance of aggregated FDI relative to GDP. Also, one might expect that low-wage countries would receive most FDI if firms use the accession states as locations for production. This, again, is not confirmed by the data. Countries like Bulgaria and Romania, which have comparatively low wages, have received the least FDI and Slovenia, which has relatively high wages, has received more FDI relative to GDP than these countries.

One variable, which relatively closely tracks the ranking of countries in terms of FDI over GDP, is the transition indicator published by the EBRD. This indicator is a summary measure of the core dimension of reform to well-functioning market economy. This variable declines continuously as one moves from countries with high FDI over GDP towards countries with low FDI stocks. Country risk is another indicator which resembles the ordering of countries quite closely, the exception between Slovenia, which has the lowest country risk in the region but only comes in with an average ratio of FDI over GDP. Interestingly, the share of the private sector relative to GDP gives only a relatively weak indication of how important FDI is for a given country.

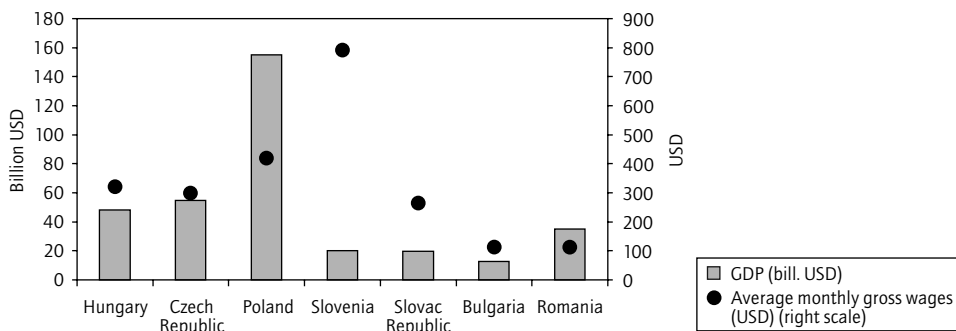
Figure 2

FDI and Indicators of Accession States 1999

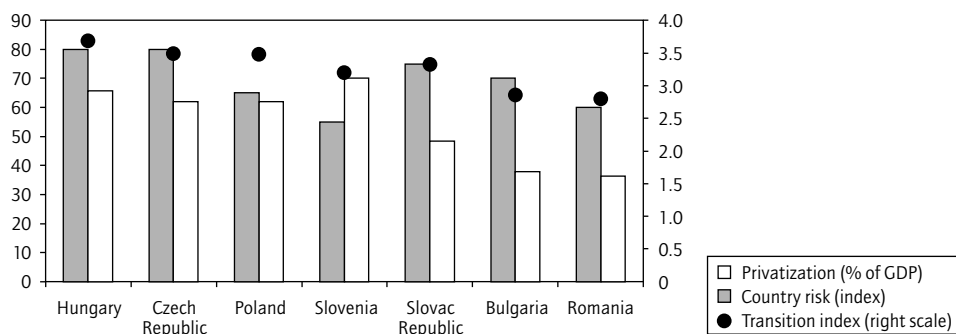
a) German versus aggregated FDI



b) GDP and monthly wages



c) Transition indicators



Sources: Bundesbank (2002); WDI (2002); UNICEF (2001); EBRD (2001); Euromoney (1999).

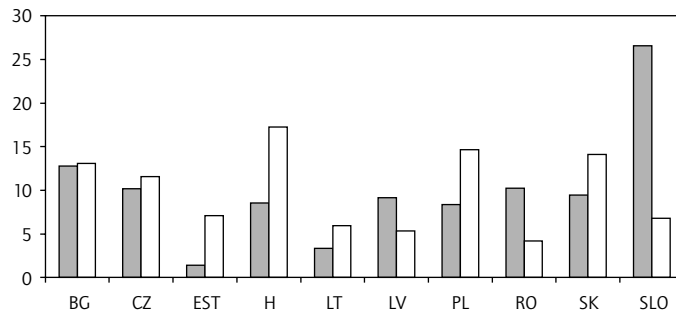
2.2 Sectoral Structure of German FDI

One reason why standard indicators of the attractiveness of countries for FDI paint no clear picture regarding aggregated FDI could be that these indicators are of different importance

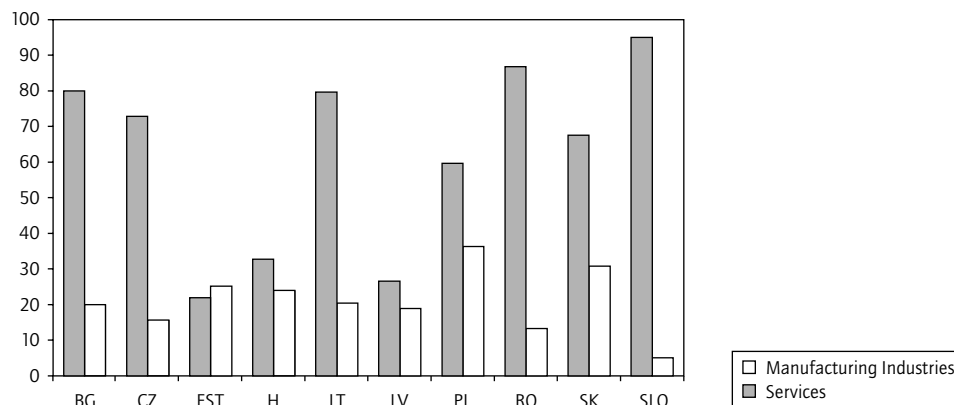
Figure 3

Sectoral and Regional Structure of German FDI 1999

a) % of total FDI in CEECs



b) % of total FDI in each country



Source: Toubal (2003).

for different sectors. Figure 3a and 3b thus provides information on the distribution of German FDI stocks across countries and allows identifying the geographical location of German investors at a sectoral level. The data are given as shares of the total average German FDI stocks in Eastern European countries for the period 1990 to 2000.

Figure 3a shows that, at a sectoral level, German FDI is concentrated in a few countries as the Czech Republic, Hungary, Poland, the Slovak Republic and Slovenia are the main recipients of German FDI. In manufacturing, these five countries account for more than 72% of the German stock of FDI, and their share in the stock of FDI in services is in a similar order of magnitude (78%). Within the manufacturing sector, the sectoral data reveal that German FDI is concentrated in only a few countries. For instance, the food processing industry is located mostly in Slovenia, while more than 60% of German FDI invested in Eastern European countries in the transport equipment sectors is invested in the Czech Republic and Hungary. Those countries have benefited from their highly trained and cheap labor force. They are also relatively close to Germany, which is relevant in a sector where transportation costs are important. Poland, in contrast, does not seem to have attracted

manufacturing foreign direct investment on a large scale. However, Poland is the main location of FDI in services, especially in the financial intermediation sector, and in the real estate and business activities, where it accounts for respectively 28% and 38% of the total FDI stocks in the region.

The Southern Eastern European countries, Bulgaria and Romania, have attracted mainly FDI in more traditional sectors, like the wood and wood product industry (26% of the German FDI stocks is located in Romania), the basic metal industry (45% in Romania), or the more capital intensive chemical industry (45% in Bulgaria). Here, both countries do take advantage from low labor costs and ready access to raw materials. The Baltic countries, particularly Estonia, lag far behind. They account for less than 10% of German FDI stocks in both the manufacturing industry and in services. Latvia dominates in the coke and refined petroleum products industry while Lithuania is the second most important destination of German FDI after Romania in the wood and wood product industry.

As seen in Figure 3b, German multinationals concentrate on few sectors when they choose a country. Except for Romania, German companies do not diversify between sectors. Germany has a relative strong position in the manufacturing industry. Except for Estonia, Hungary and Lithuania, where the electricity gas and water industry is predominant, the manufacturing sectors account for 60 to about 95% of the German FDI stocks. For example, 54% of the German stock of FDI invested in Bulgaria is going to the chemical industry while the coke and refined petroleum industry is the main manufacturing sector in Latvia. Almost all countries share the same feature concerning the services activities. Financial intermediation activities are the first receivers of German FDI, especially in Poland. In Hungary and the Slovak Republic the deregulation of the telecommunication industry explain why this sector succeed to attract a relatively large amount of German FDI.

3 FDI into Transition Economies: Theoretical Background

The previous section has shown that German FDI in the accession states of Central and Eastern Europe has not only grown considerably over the past decade, but that it also shows a quite heterogeneous dispersion across sectors and regions. In this section, we discuss theoretical models that can be used to explain these patterns.

Before discussing the theoretical literature on determinants of FDI, we will briefly review the overall institutional framework shaping the process of accession to the European Union that the transition economies are undergoing and the expected effects of integration on factor flows.

3.1 EU Accession and Economic Integration

Access to the European Union requires the full adaptation of the regulations of the Internal Market (Baldwin et al. 1997). *Inter alia*, this requires abolishing tariff and non-tariff barriers to free trade within Europe, adopting common external tariffs, and guaranteeing full mobility of labor, capital, services, and trade across Europe. Each of these steps can be expected to have a significant impact on the decision of firms to either locate their production in the accession states through FDI or to service the markets in Eastern Europe through trade.

When looking into the expected effects of EU membership for trade or FDI, it must be borne in mind that substantial adjustment of international economic relations between the accession states and the rest of the world, primarily the EU, has already taken place over the past decade. Harmonization of institutional and legal regulations between Eastern and Western Europe, for instance, has started in the mid-1990s. Trade integration has started even earlier with the adoption of the Europe Agreements in the early 1990s. These agreements ensured a relatively rapid liberalization of trade relations between Eastern and Western Europe. Other areas, such as the integration labor markets or of markets for short-term capital, have proceeded less rapidly. Most barriers to foreign direct investment in the accession states, in contrast, have been abolished relatively early. Even if foreign investors could in principle enter the accession states, progress with the privatization has been an important factor behind the timing of entry. The relatively large amounts of FDI into Poland's financial services sector, for instance, were made possible only when Poland started privatizing its banking sector in the late 1990s.

A further milestone towards the accession to the EU has been the Treaty of Maastricht of the year 1992, which not only established the guidelines for the introduction of a common currency in Europe but also established the intention to enlarge the Union. One year later, twelve accession states officially applied for membership in the European Union.¹ However, it took another four to six years until accession negotiations have actually started.

Within the relatively short time span of only a decade, there has thus been the potential for a rapid re-orientation of trade and capital flows and, to a lesser extent, of migration. This has helped to reduce the substantial disparities between Eastern and Western Europe in terms of labor productivity and per capita income, which could persist as long as legal barriers separated the two regions. Since the beginning of the reform process, there has been a substantial pressure towards equalization of relative prices across regions. From a theoretical point of view, this adjustment of relative prices across regions can be achieved either through increased foreign trade or through movements of factors of production, i.e. of capital and labor (Burda 2002).

In terms of the welfare implications of economic integration, the literature distinguishes between static and dynamic effects or between allocation and accumulation effects (Baldwin et al. 1997). Allocation effects, in turn, can arise through an increase in the volume of foreign trade (trade creation). If, in addition, it is assumed that competition is imperfect and/or that products are differentiated, there will be allocation effects due to the realization of scale economies and the provision of a greater variety of services and products.

These positive welfare implications of increased trade and integration are, however, unlikely to be shared by all countries to the same degree. Rather, the empirical foreign trade literature shows that patterns of foreign trade are to a large extent shaped by regional and cultural factors. Countries that are geographically close to each other trade significantly more compared to countries that are further apart (Buch et al. 2003a, Leamer und Levinsohn 1995). This implies *a priori* that countries at the core of Europe are more likely to gain from economic integration than countries located at the periphery.

¹ Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia, Cyprus, Turkey.

While the allocation effects of increased economic integration can be realized even if factor endowments do not change, realizing additional accumulation effects requires a greater capital stock to be built up. This shows the crucial role that FDI can play in terms of promoting sustained economic growth. Understanding the factors that drive FDI to the region, however, one needs to go beyond models that see differences in rates of return as major driving forces of integration. Rather, FDI decisions are driven by a complex interplay of factors, as shown by the New Trade Theory. This is an issue to which we turn next.

3.2 FDI and the New Trade Theory

The previous section has shown that factor accumulation and the expansion of the capital stock in the accession states can be expected to have positive implications for development and growth in these countries. Foreign capital can be particularly useful in this context since it now only augments the capital stock but also provides access to new technologies and superior management know-how.

Economic theory has advanced fairly rapidly in the past decade in terms of explaining the factors driving global capital flows in general and FDI in particular.² Traditionally, FDI decisions have been analyzed based on the eclectic paradigm (Dunning 1977), which distinguishes ownership, location, and internalization advantages (OLI) of foreign investments.

Ownership advantages are based on the concept of knowledge-based or firm-specific assets and can come in several forms. These advantages are associated with R&D, scientific and technical workers, human capital and product differentiation, but also with patents, blueprints, and other marketing assets like trademarks, reputations and brand name. These firm-specific assets, by they tangible or intangible, can confer a firm's cost advantages and market power sufficient to cover the costs of producing abroad.

The sources of *location advantages* depend on the type of multinational involved. Horizontal multinationals produce the same goods and services across countries. They invest abroad to avoid trade costs associated with exporting from the home plant to the foreign market. These trade costs can take the form of transport costs, tariffs, or quotas. Given the existence of plant-level scale economies, horizontal FDI is likely to arise when trade costs are high and when the host market is large. These location advantages differ for vertical multinationals, which geographically fragment their production process by stages. Vertical multinationals invest abroad in order to reduce the overall cost of production. Vertical FDI is thus likely to arise when these stages of production use different factor intensities and when countries have different factor endowments and/or factor-prices. It is also encouraged by low trade barriers. For instance, a vertical multinational may locate its R&D and skill-intensive activities in relatively skill abundant countries and carry out unskilled and labor-intensive activities in countries that are relatively abundant with unskilled labor.

The new trade theory, which essentially focuses on the ownership and location advantages, provides a more formal framework for analyzing FDI decisions than Dunning's eclectic

² For a survey of the literature see Markusen (1995).

paradigm. Part of this literature uses game theoretical approaches to explain the presence of multinationals by the existence of economies of scale and oligopolistic market structures (Horstmann and Markusen 1992, Brainard 1993, Raff and Srinivasan 1998, Raff and Kim 1999). A new stream of the literature, following Markusen et al. (1996) and Markusen and Venables (1998, 2000), integrates multinationals into general equilibrium models. In this endowment-based approach of FDI, the presence of multinational firms depends on a set of industry characteristics (such as factor intensities, increasing returns to scale, product differentiation), country characteristics (such as relative endowment differences and trade costs) and indirect factors (such as public and private infrastructure or legal systems (see, e.g., Markusen and Zhang 1999).

These models have different implications for the determinants of FDI. In Markusen and Venables (1998), for instance, the key variables for determining the presence of multinationals are transportation costs, plant and firm-level economies of scale, and market size. Asymmetry of countries in terms of relative factor endowments does not lead to vertical multinationals since these are excluded by assumption. Instead, multinationals become more and more important as countries become more similar in size and in relative factor endowments and as world income grows. In Markusen and al. (1996), the model is further refined with the formal introduction of horizontally and vertically integrated multinationals. Vertical multinationals dominate production when countries differ significantly in relative factor endowments but are somewhat similar in size. Horizontal multinationals dominate when the countries are similar both in size and in relative factor endowments and when trade costs are moderate to high.

Applying these considerations to the expected structure of FDI into the accession states and of German FDI in particular, the following picture emerges. The first important factor determining the structure of FDI is the size of the economies. Since the accession states are significantly smaller than Germany, one might expect that these markets are relatively unimportant from the point of view of German investors. At the same time, we have seen that significant shares of German FDI have gone into this region. This suggests that German investors might not have considered only the market potential of each individual country in making their investment decisions but rather the market potential of servicing other countries in the region or servicing the EU market through FDI in accession states. Toubal (2003) in fact proposes to consider the market potential associated with a specific location when analyzing determinants of FDI because this is the variable a multinational firm is mainly concerned with. This market potential is not only related to the domestic market but also to the markets of all the neighboring countries. Even inside a country, the domestic market is limited by transportation costs between the subsidiary and the various regional markets. Therefore, the market potential of a country is measured as the average of the output of all countries in the sample weighted by an inverse distance measure, which is derived on a region-to-region basis using transportation costs. His results show that the market potential has a substantial impact on German foreign direct investments.

Additionally, relative factor endowments can be expected to influence FDI decisions. If countries differ significantly in terms of their factor endowments, vertical FDI can be expected to prevail. If countries are similar in terms of their factor endowments, horizontal FDI becomes the prevalent mode of entry. In this regard, the accession states share similarities both with other emerging markets as well as with developed industrialized countries. As other emerging markets, the accession states have been relatively labor abundant, in

particular during the early stages of transition when capital stocks had to be rebuilt virtually from scratch. As other industrialized countries, the accession states have, at the same time, a relatively skilled labor force. Since differences in factor endowments have a differential impact on the FDI decisions of firms from different sectors, we would thus expect the sectoral structure of FDI to share similarities with developing and with developed countries.

Finally, trade costs are an important factor influencing the choice between vertical and horizontal FDI. Generally, the lower trade costs, the less important is horizontal FDI. The reason for this is that firms face declining variable costs of shipping goods to foreign markets as trade costs fall and thus decide to save on the fixed costs of market entry in the form of FDI. Now, it might be argued that most of the adjustment with respect to trade integration has already taken place during the past decade and that not much change can be expected with regard to falling trade costs during the years to come. This argument neglects, however, that trade is not only impeded by direct costs in the form of tariffs and quotas but that indirect barriers to trade integration are also important. To the extent that trade across borders will be eased if, for instance, border controls are relaxed, we can expect to see falling trade costs. This, in turn, is likely to lower the incentives of firms to engage in FDI relative to exports. However this is not supported by the data as German FDI has substantially increased in the nineties.

These considerations show that the implications of the New Trade Theory help explaining patterns of FDI in transition economies.

Generally, these models are based on the decision of identical, symmetric companies. This symmetry assumption allows analyzing a representative firm in each country in order to derive implications for aggregate FDI. One way to test these models empirically has been to derive gravity models, which have proven very useful in explaining patterns of international investments (see, e.g., Carr et al. 2001 and Egger 2004). Most empirical applications, however, are based on macroeconomic or aggregated data. There are only a few studies on FDI that use firm-level data (Andersson and Fredrikson 2000, Head and Ries 2001). One of the main findings of this literature is that gravity-type equations are useful tools to describe determinants of FDI. Large geographic distance in particular, can be an effective barrier to foreign direct investment, just as it is for foreign trade.

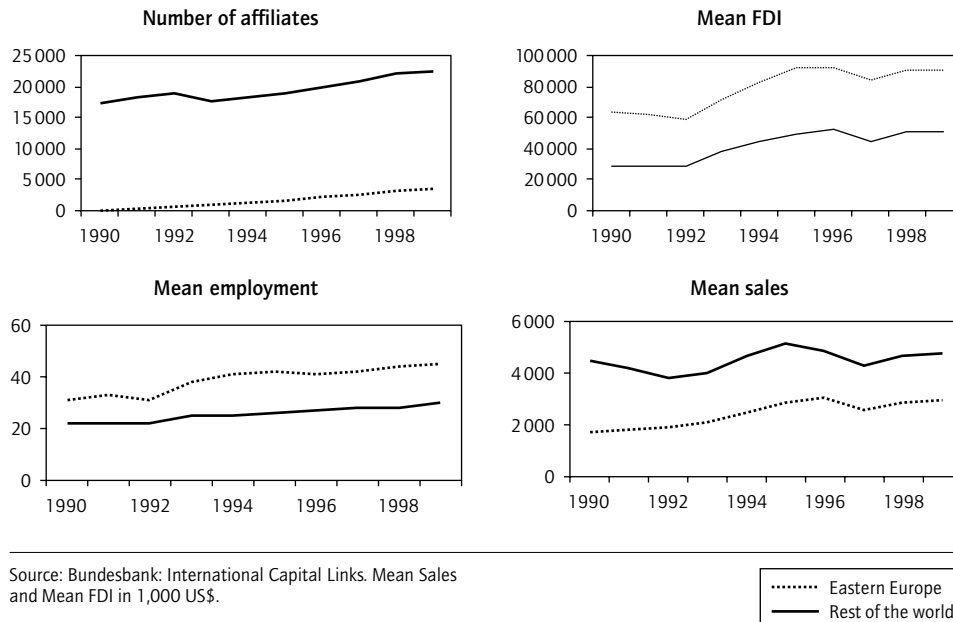
One aspect that has been ignored in much of the empirical literature on FDI in transition economies is the possibility that firms of different size might react differently to changes in the determinants of FDI. However, as argued recently by Helpman et al. (2003), firm heterogeneity plays an important role in shaping the internationalization of firms. Hence, in the following section, we will present regression-based empirical evidence on determinants of the size of foreign affiliates of German firms.

4 German FDI in the Accession States: Firm-Level Evidence

4.1 Firm-Level Evidence on German FDI

The analysis so far has shown that German firms' FDI has not only been increasingly directed towards the accession states of Central and Eastern Europe but that the sectoral structure of FDI has also changed quite significantly. In this final step of the analysis, we

Figure 4

Characteristics of Firms in Accession States

study FDI decisions at the level of the individual foreign affiliate. For this purpose, we use data drawn from the micro-database “International Capital Links” of the Deutsche Bundesbank. This database provides a detailed breakdown of the foreign assets and liabilities of German firms. Generally, the dataset allows analyzing different measures of foreign activities of German companies. FDI is often used as proxy for the internationalization of production because of its relative broad availability. Data for FDI include direct and indirect foreign direct investment (*Mittelbare und unmittelbare über Holding gehaltene Direktinvestitionen*) of German firms abroad. This variable gives the sum of equity capital of the foreign affiliate, capital reserves, and retained earnings, which is held by a German company. In addition, we look at the sales of foreign affiliates and the level of their employment. The data are usually more difficult to obtain. All data are end-of-period stocks.

Comparing characteristics of firms in accession states and non-accession states shows quite significant differences (see Figure 4). In terms of the total number of affiliates, the accession states have shown the most significant increase during the past ten years. Whereas the number of affiliates increased from around 100 in 1990 only to more than 3,500 in 2000 in the accession states, affiliates in non-accession states increased from 17,000 to a little over 23,000. Hence, affiliates in Central and Eastern Europe account for an increasing fraction of German firms’ foreign affiliates. While, in 1990, these affiliates accounted for 1% of the total, this number has increased to 14% in the year 2000. Moreover, affiliates in accession states have smaller FDI and sales on average but a larger number of employees as compared to the rest of the sample. This reflects both the relatively small market potential in these countries and the fact that production is relatively more important than distribution, as the latter requires less input of labor per unit of output.

The firm-level evidence also allows studying the size of an individual affiliate in a given host country, rather than aggregated FDI. The empirical equation that we estimate for this purpose is given by:

$$\log(FDI_{ij}) = \beta_0 + \beta_1 \log(GDP_j) + \beta_2 \log(dist_j) + \beta_3 (control\ variables_j) + \varepsilon_{ij} \quad (1)$$

where subscripts i, j denote the foreign affiliate, the host country, respectively. The control variables comprise the size of the multinational, GDP per capita, a common-border dummy variable, a proxy for country risk, a freedom index, dummies for capital controls and multiple exchange rates, and an EU and a CEEC dummy variable. We will return to the exact definitions of these variables and their expected effects below.

The dependent variable (FDI) as well as GDP, GDP per capita, distance, and risk are entered in logs. Hence, the resulting coefficients can be interpreted as elasticities. We run this regression for each of the years 1990 to 2000 individually. This allows studying changes in the determinants of FDI over time. The main reason why we do not estimate a full-fledged panel model is that the codes of the companies have been changed each year before 1996. Hence, we cannot trace a particular foreign affiliate through the ten years under study. Also, the number of foreign affiliates on which we have information has doubled during the observation period from 10,847 entries for the year 1990 to 21,285 entries for the year 2000.

In terms of explanatory power, our regressions explain on average 15% of the variation in the size of firms' foreign affiliates. That stems from the fact that we have not included any firm-specific explanatory variables. Yet, we indirectly account for the size of the reporting company by including the number of its foreign affiliates worldwide as an explanatory variable. This variable *size* is always positive and significant (Table), which implies that companies that maintain more foreign affiliates also have foreign affiliates which are of above-average size.

With regard to the remaining explanatory variables, our analysis is restricted to macroeconomic determinants of FDI (for similar approaches see Wheeler and Mody 1992, Barrell and Pain 1996, or Lipsey 1999). While the reporting requirements of the Bundesbank are quite encompassing with regard to the specifics of the foreign affiliate, little information is provided on the reporting firm itself. Essentially, the information on the reporting firm is restricted to the sector in which it is active, and we thus include a full set of sectoral dummies in all equations (results not reported).

Generally, FDI can be expected to respond to variables such as market size and market development, geographical, cultural and economic distance between countries, the degree of macroeconomic stability, and the degree of regulations of countries. We capture these factors as follows:

Gross Domestic Product (GDP) controls for market size, and it is measured in current USD. GDP data have been obtained from the 2002 CD-ROM "Global Development Indicators" of the World Bank. We expect this variable to influence positively German FDI outward stocks. Results in fact confirm these expectations: with the exception of the first four years under study, GDP has a positive and significant effect on the size of German firms' foreign affiliates. In addition, we control for the income level of the host countries. Here, the ex-

Table

Determinants of the Size of the Foreign Affiliate

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Size	0.013*** (20.41)	0.014*** (17.65)	0.015*** (20.21)	0.014*** (20.42)	0.013*** (22.44)	0.010*** (18.73)	0.009*** (19.61)	0.009*** (20.83)	0.007*** (22.20)	0.005*** (16.13)	0.004*** (13.91)
Log GDP	-0.021 (0.99)	-0.009 (0.50)	-0.020 (1.18)	-0.003 (0.18)	0.033*** (2.66)	0.053*** (4.43)	0.072*** (6.20)	0.110*** (9.23)	0.111*** (10.44)	0.107*** (9.15)	0.103*** (9.78)
Log GDP per capita	0.103** (2.24)	0.072 (1.28)	0.007 (0.15)	0.136*** (2.94)	0.082* (1.90)	0.050 (1.35)	0.023 (0.66)	0.051* (1.73)	0.096*** (3.04)	0.056 (1.62)	0.062* (1.86)
Log distance	-0.110*** (3.11)	-0.074** (2.32)	0.018 (0.72)	-0.019 (0.80)	-0.027 (1.26)	-0.001 (0.02)	0.021 (1.03)	0.006 (0.32)	0.010 (0.50)	-0.034 (1.29)	0.033 (1.61)
Common border	-0.253*** (4.60)	-0.091* (1.68)	-0.069 (1.37)	-0.074 (1.46)	-0.155*** (3.28)	-0.039 (0.89)	-0.035 (0.85)	-0.094** (2.36)	-0.095** (2.45)	-0.154*** (4.01)	-0.122*** (3.13)
Log risk	0.741*** (4.16)	0.500*** (2.75)	0.252* (1.80)	-0.130 (0.98)	-0.074 (0.50)	0.553*** (4.38)	0.831*** (5.73)	0.202 (1.34)	0.082 (0.94)	0.200 (1.32)	0.326** (2.15)
Freedom	-0.150*** (6.65)	-0.156*** (6.97)	-0.156*** (7.28)	-0.088*** (4.45)	-0.115*** (6.07)	-0.097*** (5.52)	-0.050*** (3.06)	-0.043*** (3.14)	-0.018 (1.34)	-0.022 (1.62)	0.006 (0.47)
Capital controls	0.005 (0.09)	0.272*** (3.80)	-0.222*** (3.26)	-0.054 (0.71)	-0.233*** (3.15)	0.018 (0.29)	0.020 (0.32)	-0.181*** (4.37)	-0.147*** (3.39)	-0.194*** (3.77)	-0.232*** (3.84)
Multiple exchange rates	0.869*** (8.87)	0.636*** (6.50)	0.668*** (7.40)	0.412*** (5.34)	0.525*** (6.69)	0.872*** (10.40)	0.856*** (10.83)	-0.278 (1.05)	0.215 (0.79)	-0.242 (1.43)	-0.146 (0.97)
EU	-0.329*** (3.43)	-0.350*** (3.94)	-0.220*** (5.06)	-0.213*** (4.53)	-0.371*** (8.27)	-0.303*** (7.16)	-0.242*** (5.85)	-0.253*** (6.17)	-0.234*** (5.71)	-0.408*** (5.64)	-0.256*** (6.21)
CEEC	-1.027*** (5.71)	-1.174*** (7.85)	-0.834*** (7.55)	-0.651*** (6.90)	-0.707*** (8.64)	-0.363*** (4.74)	-0.236*** (3.36)	-0.338*** (5.60)	-0.213*** (3.70)	-0.380*** (4.76)	-0.215*** (3.79)
Constant	3.379*** (4.80)	3.807*** (5.48)	5.055*** (7.39)	5.521*** (8.09)	6.152*** (9.37)	3.284*** (5.95)	1.882*** (3.22)	4.411*** (8.45)	4.479*** (13.43)	4.950*** (10.45)	3.866*** (7.99)
Observa- tions	10,847	11,590	13,172	13,190	16,673	16,726	17,859	19,034	20,260	19,008	21,285
R squared	0.18	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.15	0.13	0.13

OLS estimates. Dependent variable (FDI) and the explanatory variables GDP, GDP per capita, distance, and risk are in logs.

*, **, *** significant at 10%, 5%, and 1% level, respectively. White-heteroscedasticity robust standard errors have been used, and robust t-statistics are given in parentheses. Sectoral dummies are included.

Source: Authors' calculations.

pected effect is not clear *a priori*. Firms might, on the one hand, invest into markets where labor costs are low (horizontal FDI). On the other hand, firms might be interested in investing into markets where the purchasing power of the population is high, i.e. in countries with high per capita income. Our results provide somewhat greater support for the second effect to be at work although GDP per capita is not significant in all of the equations.

Greater *distance* as measured by geographical distance in km is expected to lead to lower stocks of FDI abroad.³ Greater distance could be an impediment to FDI because it leads to

3 The data have been taken from www.wcrl.ars.usda.gov/cec/java/capitals.htm. Distances are calculated with the following formula where lat_i and $long_i$ are respectively latitude and longitude of Berlin and lat_j and $long_j$ those of the main economic center of country j (usually its capital).
 $dist = 6,370 * \arccos(\cos(lat_i/57.2958) * \cos(lat_j/57.2958) * \cos(\min(360 - \text{ABS}(long_j - long_i), \text{ABS}(long_j - long_i))/57.2958) + \sin(lat_i/57.2958) * \sin(lat_j/57.2958))$.

higher communication and information costs and restricts face-to-face communication and networking. Moreover, a greater distance also reflects differences in culture, language, and institutions, which is also likely to decrease FDI. In contrast to these expectations, we find that distance has an insignificant impact on FDI in most of the equations (with the exception of the first two years under study). One reason for this is the fact that we include dummies for EU members and accession states (*EU* and *CEEC*). These are countries that are geographically close to Germany and which attract relatively large amounts of FDI. One might thus argue that the expected sign of these two dummy variables is positive since the creation of a single market and the process of economic integration with Eastern Europe should have promoted cross-border entry. We find the opposite sign instead: both dummies are highly significant and negative throughout the period under study. In interpreting these coefficients, it is important to bear in mind that the dependent variable in our regressions is the size of the individual foreign affiliate, not aggregated German FDI. Hence, the negative coefficients imply that German firms set up smaller foreign affiliates in countries of the EU and the CEECs, *ceteris paribus*. Assuming that smaller foreign affiliates are being set up by smaller domestic firms, one could thus argue that the integration process in Europe has particularly stimulated the cross-border expansion of smaller firms.

The presence of a *common border* is included as an alternative proxy for distance costs. The expected coefficient of this 0/1-dummy would be positive for aggregated FDI since foreign activities are generally higher in neighboring countries to which economic, political, cultural and personal relations are much more intense. In contrast to this expectation, however, we find a negative effect of the border dummy. The interpretation of this effect again points to the importance of distinguishing effects of a common border on aggregated FDI from the effects on the size of foreign affiliates. The negative border effects could thus be due to the fact that firms set up smaller foreign affiliates on average in nearby countries because it is profitable to do so even for smaller units. Set-up costs of establishments in remote countries, in contrast, might be too high for small affiliates. If this explanation was correct, then the negative effect of distance on FDI that is typically found in aggregated data must be due to a decline in the number of affiliates as distance increases which overcompensates the size effect of the average single affiliate. Buch, Kleinert and Toubal (2003) in fact provide evidence that supports this conclusion.

In addition to market size and the distance between markets, we include a couple of variables which are intended to capture stability and regulations. *Risk* as a composite index of country risk, is the political risk index taken from various issues of *Euromoney*. This risk index has a higher score when country risk is small. Since lower risk should encourage FDI, the expected coefficient is positive. *Freedom* is an index running from 1 through 7, whereby a value of 1 indicates the highest degree of political freedom and liberty. The data have been obtained from Freedom House (www.freedomhouse.org). As companies are expected to be drawn to countries with a more liberal environment, we expect to find a negative link between freedom and FDI. Two variables are included to capture the severity of regulations on cross-border capital flows. *Capital controls* is a 0/1-dummy, which is set equal to one if countries impose controls on cross-border financial credits. In addition, we control for the presence of regimes of *multiple exchange rates*. Both dummy variables are expected to enter with a negative sign.⁴

⁴ The data are based on the IMF's "Annual Survey of Exchange Rate Restrictions". Data prior to 1996 have kindly been provided by Gian-Maria Milesi-Ferretti, data after 1996 have been obtained from the IMF publications.

Results for the proxies for stability and regulations are largely in line with expectations, although these variables are not significant in all equations. The *risk* and *freedom* variable, for instance, tend to have a positive and negative impact on the size of foreign affiliates, respectively. Hence, higher risk and less freedom are negatively related to investment sizes. Also, the dummies for current and capital account restrictions have relatively consistent signs, i.e. the presence of *capital controls* lowers the size of FDI while countries that maintain *multiple exchange rates* receive more FDI.

5 Summary of Results

Recent discussions on the driving forces and the effects of globalization have focused around the activities of multinational firms. An improved understanding of the activities of multinationals and of FDI is indeed the key to assessing the welfare implications of worldwide economic integration. This paper has dealt with a relatively small and yet potentially insightful aspect of globalization: the foreign direct investment of German firms in the accession states of Central and Eastern Europe.

This case study is interesting for two reasons. First, the accession states are a group of countries, which has, up until a little bit more than a decade ago, been shut off almost completely from international capital markets. Hence, in order to generate and sustain economic growth, these countries have been in the need to importing capital from abroad in order to rebuild their capital stocks. Second, Germany as an important potential investor is located in close geographical reach to these countries. Since geographic distance is typically found to be an important determinant of international investment positions, we would thus expect German FDI to be of particular importance for these countries.

Our empirical analysis has indeed confirmed that substantial amounts of German FDI have streamed into the accession states over the past decade. FDI into the accession states has taken an increasing share of German outward direct investment. However, the location of German multinationals in the accession states has also followed a relatively uneven pattern. While for some countries like Hungary, the Czech and the Slovak Republic, and Poland, German FDI is quite important, German investors do not take such a dominant role in other countries. The uneven allocation of German FDI across countries found in the aggregated figures is also confirmed when looking at the data from a sectoral point of view. Some sectors cluster almost exclusively in certain countries. This shows that it is not transition and economic integration per se that have motivated German investors to invest in countries formerly secluded from the rest of the world by the “iron curtain”. Rather, investors select countries according to factor endowments, the legal environment, and the geographic distance to important markets.

We have used a detailed firm-level dataset to shed more light at the determinants of the size of the individual foreign affiliate. This regression-based evidence has revealed a couple of interesting patterns in the data: First, firm heterogeneity matters for foreign investment decisions. As a general rule, firms with more foreign affiliates also maintain affiliates of above-average size. Second, variables capturing proximity between countries often have a different impact on the size of the foreign affiliate than on aggregated FDI. More specifically, firms tend to set up small foreign affiliate in geographically close countries. Third, the process of economic integration in Europe has particularly promoted the cross-border

activities of smaller foreign affiliates. Both, in the EU countries and in the accession states, firms maintain smaller foreign affiliates than in countries outside Europe.

References

- Altzinger, W. (1999): Is FDI Becoming a Substitute for Exports? Empirical Evidence of Austria's Integration with Eastern Europe. *EMERGO*, 6 (1), 86–98.
- Andersson, T. and T. Fredriksson (2000): Distinction Between Intermediate and Finished Products in Intra-Firm Trade. *International Journal of Industrial Organization*, 18, 773–792.
- Baldwin, R. E., J. F. François und R. Portes (1997): The Costs and Benefits of Eastern Enlargement: The Impact on the EU and Central Europe. *Economic Policy*, 24, 125–176.
- Barrell, R. and Pain, N. (1996): An Econometric Analysis of US Foreign Direct Investment. *Review of Economics and Statistics*, 78, 200–207.
- Brainard, S. L. (1993): *A Simple Theory of Multinational Corporations and Trade with a Trade-off between Proximity and Concentration*. NBER Working Paper No. 4269. Cambridge, MA, National Bureau of Economic Research.
- Buch, C. M., J. Kleinert und F. Toubal (2003a): *The Determinants of German FDI: New Evidence from Micro-Data*. Bundesbank Discussion Paper 09-03. Frankfurt a. M.
- Buch, C. M., R. Kokta und D. Piazzolo (2003b): Foreign Direct Investment in Europe: Is There Re-Direction from the South to the East? *Journal of Comparative Economics*, 31 (1), 94–109.
- Buch, C. M. und D. Piazzolo (2001): Capital and Trade Flows in Europe and the Impact of Enlargement. *Economic Systems*, 25, 183–214.
- Burda, M. C. (2002): *Factor Mobility, Income Differentials, and Regional Economic Integration*. Mimeo. Humboldt Universität. Berlin.
- Carr, D. L., J. R. Markusen und K. E. Maskus (2001): Estimating the Knowledge Capital Model of the Multinational Enterprise. *American Economic Review*, 91 (3), 693–708.
- Deutsche Bundesbank (2002): Kapitalverflechtungen mit dem Ausland. Statistische Sonderveröffentlichung 10. Frankfurt a. M.
- Dunning, J. (1977): Trade, Location of Economic Activities and the MNE: A Search for an Eclectic Approach. In: P.-O. Hesselborn, B. Phlin und P.-M. Wijkman (eds.): *The International Allocation of Economic Activity*. London, MacMillan, 395–418.
- Dunning, J. (1993): *Multinational Enterprises and the Global Economy*. Wokingha Addison.
- EBRD (2001): *Transition Report 2001*. European Bank for Reconstruction and Development. London.
- Egger, Peter (2004): On the Problem of Endogenous Unobserved Effects in the Estimation of Gravity Models. *Journal of Economic Integration* (forthcoming).
- Euromoney (1999): *Euromoney Magazine*, several editions.
- Head, K. and J. Ries (2001): Overseas Investment and Firm Exports. *Review of International Economics*, 9 (1), 108–122.
- Helpman, E., M. J. Melitz und S. R. Yeaple (2003): *Export versus FDI*. NBER Working Paper No. 9439. Cambridge, MA, National Bureau of Economic Research.
- Hille, H. und T. Straubhaar (2001): The Impact of the EU-Enlargement on Migration Movements and Economic Integration: Results of Recent Studies. In: OECD (eds.): *Migration Policies and EU Enlargement: The Case of Central and Eastern Europe*. Paris, 79–100.

- Horstmann, I. and J. Markusen (1992): Endogenous Market Structures in International Trade (Natura Facit Saltum). *Journal of International Economics*, 32 (1/2), 109–129.
- Leamer, E. E. and J. Levinsohn (1995): International Trade Theory: The Evidence. In: Grossman, G. and K. Rogoff (eds.): *Handbook of International Economics*. Vol. III. Amsterdam, Elsevier, 1339–1394.
- Lipsey, R. E (1999): *The Location and Characteristics of US Affiliate in Asia*. NBER Working Paper No. 6876. Cambridge, MA, National Bureau of Economic Research.
- Markusen, J. (1995): The Boundaries of Multinational Enterprises and the Theory of International Trade. *Journal of Economic Perspectives*, 9 (2), 169–189.
- Markusen, J. and A. Venables (1998): Multinational Firms and the New Trade Theory. *Journal of International Economics*, 46 (2), 183–203.
- Markusen, J. and A. Venables (2000): The Theory of Endowment, Intra-Industry, and Multinational Trade. *Journal of International Economics*, 52 (2), 209–234.
- Markusen, J., A. Venables, D. Konan and K. Zhang (1996): *Unified Treatment of Horizontal Direct Investment, Vertical Direct Investment, and the Pattern of Trade in Goods and Services*. NBER Working Paper No. 5696. Cambridge, MA, National Bureau of Economic Research.
- Markusen, J. and K. Zhang (1996): Vertical Multinationals and Host-Country Characteristics. *Journal of Development Economics*, 59, 233–252.
- OECD (2001): Trends in Migration Flows in Central and Eastern Europe. In: OECD (eds.): *Migration Policies and EU Enlargement: The Case of Central and Eastern Europe*. Paris, 33–50.
- Raff, H. and K. Srinivasan (1998): Tax Incentives for Import-Substituting Foreign Investment: Does Signaling Play a Role? *Journal of Public Economics*, 67, 167–193.
- Raff, H. and Y. H. Kim (1999): Optimal Export Policy in the Presence of Informational Barriers to Entry and Imperfect Competition. *Journal of International Economics*, 49, 99–123.
- Toubal, F. (2003): *The Location of German Multinationals in Eastern European Countries*. Mimeo. Kiel University. Kiel.
- The World Development Indicators (2002): CD-ROM.
- Wheeler, D. and A. Mody (1992): International Investment Location Decisions: The Case of U.S. Firms. *Journal of International Economics*, 33, 57–76.
- World Bank (2002): *World Development Indicators*. Washington, D.C. (CD-ROM).