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Edited by
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Editorial

This supplement to Applied Economics Quarterly reports on the 68th Annual Meeting of the Association of German Economic Research Institutes (ARGE), which took place in Berlin on April 14, 2005. The topic was

"Can Germany stand up to international locational competition?"

Thomas Straubhaar (HWWA) and Rigmar Osterkamp (ifo Munich) were responsible for the conceptual preparation of the conference. The opening address was given by Lionel Fontagné (Centre d'Etudes Prospectives et d'Informations Internationales, Paris). Subsequent sessions were organized in the form of presentations, each followed by a discussant's statement. The following contributed to the conference: Wilfried Altzinger (Vienna University of Economics and Business Administration), Sascha O. Becker (Center for Economic Studies, University of Munich), Kilian Bizer (University of Göttingen), Ulrich Blum (IWH Halle), Christine Borrmann (HWWA Hamburg), Carsten Eckel (University of Göttingen), Peter Egger (ifo Munich), Lionel Fontagné (Centre d'Etudes Prospectives et d'Informations Internationales, Paris), Rolf Jungnickel (HWWA Hamburg), Dietmar Keller (HWWA Hamburg), Henning Klodt (IfW Kiel), Hans-Peter Klös (IW Cologne), Rolf Kroker (IW Cologne), Bernd Pfaffenbach (German Federal Ministry of Economics and Labor), Michael Pfaffermayr (University of Innsbruck), Tilmann Rave (ifo Munich), Tobias Seidel (Center for Economic Studies, University of Munich), Thomas Straubhaar (HWWA Hamburg), Ursula Triebswetter (ifo Munich). We would like to thank the organizers, Ralf Messer (DIW Berlin) and Hildegard Stahmer (HWWA Hamburg), and all the participants and attendees for their contributions.

Next year's annual meeting is scheduled for April 27, 2006, in Berlin and will deal with "The Effects of Globalization on National Labor Markets: Diagnosis and Therapy."

June 2005

Klaus F. Zimmermann
Rainer Winkelmann

Contents

Determinants of Location Choices by Multinational Firms: A Review of the Current State of Knowledge

By Lionel Fontagné* and Thierry Mayer**

Abstract

We provide in this paper a survey of recent empirical evidence concerning the determinants of location choices by multinational firms for their production affiliates. While the concerns about delocation / offshoring of manufacturing activities have been dominated by the belief that low production costs or taxes are the main drivers of attractiveness, the inspection of rigorous econometric work reveals that those "fear-factors" of location are largely dominated by the desire to be close to consumers and suppliers and to follow the choices of competitors.

JEL classifications: F12, F15

Keywords: Location choice, foreign direct investment multinational firms, tax competition, agglomeration.

1. Introduction

There has been growing concern in Europe regarding the attractiveness of European locations for mobile firms. This concern has grown in particular in large European countries enjoying high living standard, as a result of the fears of tax competition, social dumping, environmental competition, among other modalities of "unfair competition".

Outsourcing, offshoring and deindustrialization concerns fill the columns of our newspapers, and challenge the economic policies pursued by social-liberal or liberal-social governments. These policies have traditionally relied on the welfare state, a specialization on high quality goods, of diversified economies engaged in intea-industry trade. The welfare state would now be endangered, new competitors scrapping the markets, inter-industry trade and the associated costs of reallocation of resources, in particular the displacement of workers, coming back since the

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early 2000s. Last but not least, Europe itself has profoundly changed, with new members offering attractive low-cost location opportunities.

To put these concerns in a nutshell: Will Germany and France still have factories in a decade or so? The decline in the share of industry in total employment seems to be currently accelerated by the very forces of globalization, translating into a series of factories being dismantled, and at best relocated in low wages new eldorados, namely new Member states. Consequently, the civil society, as well as numerous commentators and politicians, would answer negatively to the above question. According to a poll conducted in October 2004, 70 percent of the French population considers offshoring to be a serious issue, and one French out of three is fearing an offshoring of its own job, in its family or among his friends. Similarly, Germany and France are the two European countries where citizens do consider that globalization has gone too far, according to the Eurobarometer survey.

The perception of these evolutions by economists is however not as alarming as the one of the civil society. First, they generally consider that if costs, taxation or pollution havens are possible determinants of the location of the firms, other determinants need to be taken into account. Second, economists argue that specialization and trade are the source of positive gains according to economic theory. Third a difference must be carefully made between the local effects of these evolutions, that can be large and painful in certain regions or on certain parts of the population, and the macroeconomic effects that remain negligible.

Basically, the argument is that unemployment is mainly the outcome of domestic policies, as shown by the differences in employment performances of different European countries (e.g. the UK versus Germany) facing similar constraints in terms of globalization. The recent series of reforms engaged in Germany will not put an end to offshoring and outsourcing practices, but it creates the economic framework favoring the adjustment of the German economy to the competitive pressures, hence promoting employment in the long run. The transitory price to pay, in terms of demand, could however be sizeable.

More fundamentally, given the cost differential between China and locations such as France or Germany (1.30 euro per hour to be compared with 28 euros within two identical production units, Fontagne and Lorenzi, 2005), the declining transaction costs at the world level, the high international mobility of firms, qualified labor and technology, why there are still factories in Germany remains a mystery within a perfect competition world, where firms would only be motivated by cost-reduction strategies.

More generally why high labor costs locations are actually holding a share of 80 percent in total outward FDI stocks of German firms, as well as in sales of their foreign affiliates (Buch et al., 2005) cannot be explained on the grounds of firms seeking low production costs to enhance their competitiveness. Chinese locations account for only 1 percent of German FDI, 2 percent of of affiliates

sales of German firms, and 3 percent of the employment abroad in German firms. As for the Eastern European locations, the corresponding figures are 4, 7 and 16 percent.

Regarding the relocation of activity, there is a first series of theoretical arguments, based on traditional approaches of the international economy, that is hardly convincing. Everybody has kept in mind the assessment of offshoring and outsourcing made by Gregory Mankiw "New types of trade deliver new benefits to consumers and firms in open economies. (. . .) The benefits from new forms of trade, such as in services, are not different from the benefits from traditional trade in goods. (. . .) When a good or service is produced at lower cost in another country, it makes sense to import it rather than to produce it domestically. (. . .) Although openness to trade provides substantial benefits to nations as a whole, foreign competition can require adjustment on the part of some individuals, businesses, and industries". (N. G. Mankiw, K. J. Forbes, H. S. Rosen, Testimony before the Joint Economic Committee, Washington D. C., February 10, 2004.). Would Germany take the opportunity of offshoring all productions for which a cheaper location is available abroad, then the bulk of German plants should be closed. Indeed, we do face here the traditional difference between absolute and comparative advantages: production costs are systematically higher in Germany than in China, but they are relatively cheaper in certain industries.

It is however hardly justifiable to analyze the location of activities on the simple basis of theories based on perfect competition. A more relevant framework must take into account imperfections in competition, highly mobile firms, transaction costs, and externalities between firms. This is why the statement opposed to Mankiw by the Senator Tom Daschle ("This is Alice in Wonderland economics!") seems justified, even if cruel.

What therefore needs to be clarified are the determinants of the location of mobile firms in an imperfectly competitive world, with transaction costs, externalities, public policies designed to interact with those decisions, differences in institutions, and last but not least the possibility of fragmenting the production process into independently located stages. The purpose of the current survey is to address these issues by considering a world in which location decisions matter if only because space matters. We accordingly view localized competition as a central component of location choices, which is a radical departure from the traditional competitive setting.

2. Theory Background

What are the determinants of the location choice made by a multinational firm for its production unit? How to reconciliate the empirical evidence of a complementarity between net exports and foreign presence, with the statements of the business community emphasizing low-cost locations seeking strategies? In order

to guide and structure our survey of the recent evidence in the literature, one first needs to consider what economic theory has to say about those determinants. To summarize, the relevant determinants of this choice can be broadly grouped under four different categories: 1) the demand that can be expected if a given location is chosen, 2) the production costs that would be faced here, 3) the intensity of competition, 4) the public policies designed to influence the location patterns and in particular regional policies.

2.1 Market Access and Spatial Competition

Note first that the level of trade costs among locations will be crucial in the strength of most determinants affecting the location choice. Consider first demand: In a perfectly integrated economy, choosing a region rather than another has no effect on the level of demand faced by a firm, because distance, borders and space more generally do not matter for trade flows. Locations will therefore not offer different characteristics in terms of demand, and this variable will not influence the choice. At the other extreme, if trade costs are very high, the firm chooses between isolated and quasi-autarkic "islands" in terms of demand, which means that only local demand will matter in the choice. Of course, the reality of trade costs is somewhere in a middle range, and the construction of the demand variable needs to take into account those accessibility issues so as to discount demand in remote locations accordingly. This is the approach known as the *market potential,* initiated by geographers (Harris, 1954) and rediscovered recently and more formally in theoretical and empirical work by economic geographers (Krugman, 1992, Hanson 2005, Fujita et al. 1999 notably).

The reasoning is very similar for the intensity of competition faced in each alternative location by the affiliate. With zero trade costs, space is meaningless, and each firm faces the same level of competition in all locations, which renders the number and location of competitors inconsequential for the location choice. With positive trade costs, distance isolates from competition, which means that firms will, everything else equal, try to avoid regions with a large number of establishments in their industry. This tendency to avoid proximity to competitors has been recognized for a long time in location theory (see Fujita and Thisse 2002, for an overview) and is often called the market crowding effect. There has been recent overwhelming evidence that space and distance in particular still matter a lot in trade flows even inside countries as integrated as the United States or France (see Wolf 2000 and Combes et al. 2005). It is therefore crucial to consider demand and competition forces in a correct way using the market potential and market crowding concepts.

2.2 Agglomeration

One of the most robust finding of the literature on location choice is the fact that firms "follow other firms". They flock in certain locations beyond what can be explained on the basis of traditional determinants of locations such as market size or costs. The first paper to establish rigorously this fact on individual data is Head et al. (1995), which shows that *location of Japanese affiliates in the United States is very largely driven by location of previous affiliates in the same industry.* This methodology has been replicated by a flow of papers since then (see Buch et al. 2005 for a recent survey of those papers), with a unanimous finding of large positive effect of those agglomeration variables. The reasons behind this behavior might be very diverse. It is very often argued that technological spillovers are the driving determinants of clusters of this type. However, any enduring variable that affects attractiveness without being controlled in the regression might be captured by an agglomeration variable, which after all only telling us what locations previous affiliates found attractive. Head et al. (1995) control for those omitted variables that are time invariant through location specific fixed effects.

However, agglomeration variables might also be correlated with time varying determinants of location. For instance, a shock in market potential in a country if not properly controlled, will attract competitors, and therefore the agglomeration variable will capture its effect. Head and Mayer (2004) investigated those issues by testing whether the agglomeration variables' effect was hampered by the inclusion of a proper market potential variable (as opposed to cruder measures of demand). The answer is that those agglomeration variables remain strikingly robust, which suggest that there impact does not come from an omitted variable bias linked to market potential.

An interesting potential alternative explanation comes from input-output linkages. Head et al. (1995), Head and Mayer (2004) among others have shown that *Japanese firms belonging to the same Kereitsu have a strong tendency to agglomerate.* This is probably due to needed proximity for enhanced trade in intermediate goods that occur within those networks of firms. The importance of input-output linkages in location decisions of multinational firms has also recently been emphasized in Smarzynska (2004) and Amiti and Cameron (2004), and is probably an important component in the agglomeration patterns of multinational firms.

2.3 Production Costs

Another set of determinants of location choices involves variables influencing *production costs* in the different locations. Labor costs are of course crucial in this respect and will be controlled for but there are other determinants of costs that have been proposed in the literature.

A recently popular hypothesis is that affiliates of multinational firms benefit from technological spillovers when locating near other affiliates in the same industry. If such spillovers exist, they can be expected to raise the attractiveness of places where the number of firms in the same industry is important for instance because proximity to competitors would increase productivity or reduce R&D costs due to the positive knowledge transmission from neighboring firms.

Note again that such forces can be at work only if space matters. Proximity to knowledge producers is valuable only if knowledge is hard to acquire over space. Distance-related frictions to knowledge transfers have been documented empirically in the literature using notably the location of patents' citation: Jaffe et al. (1993) and Peri (2005) showed that such frictions are large. Technological spillovers will therefore push firms to cluster in the same locations. This incentive will counterbalance the market crowding effect mentioned above, through which proximity intensifies competition and therefore reduces profits.

An additional feature of the market crowding effect and technological spillovers is that their intensity might depend upon the nationality of the surrounding competitors. For instance, competition intensity might be harder between firms from the same origin country, due to higher substitutability of the varieties produced.

2.4 Public Policy Measures

Another set of variables that are in fact related to costs of production concerns public policy in general and regional policy in particular. Indeed regional policies can take the form of direct production subsidies for targeted regions as is the case in France with the Prime d'Amenagement du Territoire. EU regional policy usually does not take the form of direct subsidies to the investor, but can have a similar indirect effect. Indeed, a large share of structural funds is used to finance public transport and communication infrastructure in peripheral areas, which might lead to a reduction in production costs and therefore be beneficial to foreign investors. Note also that some policy measures can affect market access in a substantial way, and therefore potentially raise (or decrease) attractiveness of a country / region. The above transport infrastructure case is an example, but trade agreements granting better access to large markets is another important one.

2.5 Synthetic Framework

To summarize, the expected profit from locating in country i for a foreign investor will be a function of the market potential of that region (MP_i), of the number of local and foreign firms in that region and surrounding ones (N_i), and the cost components, (C_i), itself consisting of various components, in particular labor costs and subsidies granted through regional policies. Market potential is expected to influ-

ence profits and therefore location probability positively, while high cost will have a negative influence on the probability for a region to be chosen. The influence of the number of firms is more complicated and is the result of the mentioned trade-off between agglomeration and dispersion forces. Naturally, the set of determinants just outlined is not exhaustive and it seems difficult to capture accurately all cost-related variables for instance in this type of work that should enter (C_i) in an empirical exercice. Fortunately, an easy way to deal (at least partly) with this empirical implementation problem, first proposed by Head et al. (1995) is to use fixed effects (α_i) for each alternative region *i* in the location choice set. This will ensure that all time-invariant characteristics of a department that make it attractive but are unobserved are nevertheless controlled for (for instance, the difference in skill composition of the labor force, the price of other inputs such as land, etc.). The expected profit yielded by location *i* for affiliate *a*, can therefore be described as:

$$\ln \Pi_i(a) = \alpha_i + \beta_1 \ln \mathrm{MP}_i(a) + \beta_2 \ln N_i(a) + \beta_3 \ln C_i(a) \quad (1)$$

The core of the empirical research on location determinants is an implementation of this equation, under various forms. Researchers estimate the influence of proxies for each of those variables using the individual firm location choice decision to estimate the relevant coefficient, using primarily the logit econometric model.

A last remark is in order here concerning the type of FDI for which equation (1) is relevant. A now traditional distinction is drawn between horizontal and vertical types of FDI (see Markusen, 2002 and Navaretti and Venables, 2004 for detailed exposition of this distinction).

The first type of FDI relates to firms "duplicating" their units of production in order to reduce trade costs to serve markets where access is most difficult.

The second one relates to firms dividing up their production process between countries according to different stages of production, for which countries have different comparative advantages.

Equation (1) has traditionally been used to study FDI of the horizontal-type. Because of its generality, it is however also relevant for vertical FDI. Suppose that firms are keeping design in the home country and locating actual production in another foreign country (the classical Helpman, 1984 case). Location of the production affiliate will also be a function of market potential and costs. *Even in the case of intermediate goods or semi-processed goods, market potential of the country for the affiliate seems relevant,* although it now principally consist of the locations and size of other affiliates in the same firm that use its output in later stages of production.

It is not only the production costs that matter: Geography of demand of supply is also important in this case, although most of the action might take place within the firm.

The remaining of this survey focuses on the balance between demand and supply motives, and how they are impacted by policy measures. We proceed as follows. Market access and productions costs motives are further examined in sections 2 and 3, while policy measures impacting the location of firms are examined in section 4. Section 5 concludes.

3. Market Access and Spatial Competition: The Evidence

Measuring market potential is not at all a trivial issue. As stated above, the market potential is a measure of discounted demand to be expected from locating in *i*. But how should demand in each place be measured and what should the discounting factor precisely be?

3.1 The Two Faces of Market Access

The first implementation, proposed by Harris (1954), was simply discounting the sum of local incomes by the inverse of distance. While this intuitive definition has some appeal in terms of ease of implementation, it seems rather insufficient. What about other barriers to trade, like tariffs and NTBs, differences in language, lack of knowledge of the foreign market that have proven to be important hindrances to trade? Also what about the differences between market potential of country *i* for a producer of shoes against a producer of computers? Those two problems can be solved quite easily by using apparent consumption at the industry level for the measure of local demand, and using gravity estimates of trade barriers for the measure of accessibility.

Another problem with the simple Harris' version of market access is harder to resolve. While Germany is one of the biggest markets in the world for most products, there might be very good reasons why firms don't all rush to locate there. Consider a new product, widely popular among consumers but not yet produced in Germany. If this product is not "too easy" to ship from foreign countries, Germany will attract a lot of entries in this new industry, because of the size of its market and the lack of initial competition. Entries will come both from new domestic producers and foreign investment. Has firms enter in the German market and start producing there, they exert two effects. First, this entry will tend to raise prices of factors used in this industry, as long as the factor supply curves are upward sloping. This will tend to reduce attractiveness. Second, new entrants in Germany, but also in surrounding market with good access to the German market, increase competition, and therefore make location in Germany less attractive for the next prospective entrants: *The market potential is a decreasing function of the number of competitors in each given market.* The functional form of MP_i needs to take into

account this competition effect, and is in fact therefore quite complex (see Head and Mayer, 2004) for an implementation.

3.2 Japanese FDI in Europe

Figures 1 and 2 are examples of such calculation of market potential taken from Head and Mayer (2005) for a specific industry in Europe for the different EU (12) regions for which data is available. Geographical centrality as well as local size are two important determinants of market potential.

Head and Mayer (2004) relate this measure of market potential to location choices of Japanese multinational firms in the EU. They find that market potential -either in its most structural form, or in more reduced form- is indeed a key driving determinant of those location choices, much more important than differences in labor costs or corporate taxes. Figure 3 synthetizes the impact of market potential as a driver of foreign investment.

It could be argued that those finding are only relevant in North-North FDI flows. That is demand is important for investment in rich countries whereas cost differences would be key for FDI directed towards emerging economies like China.

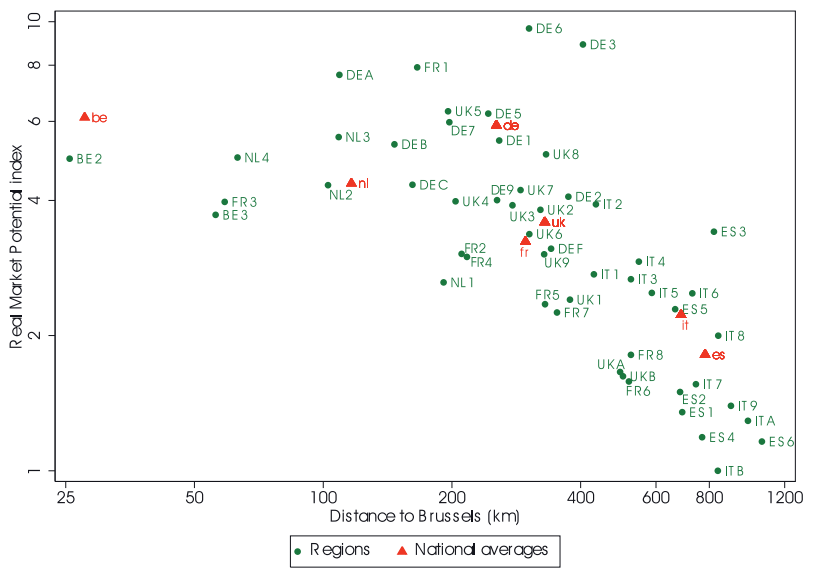


Figure 1: RMP vs Distance to Brussels, Electric Machinery, 1995, Brussels non plotted

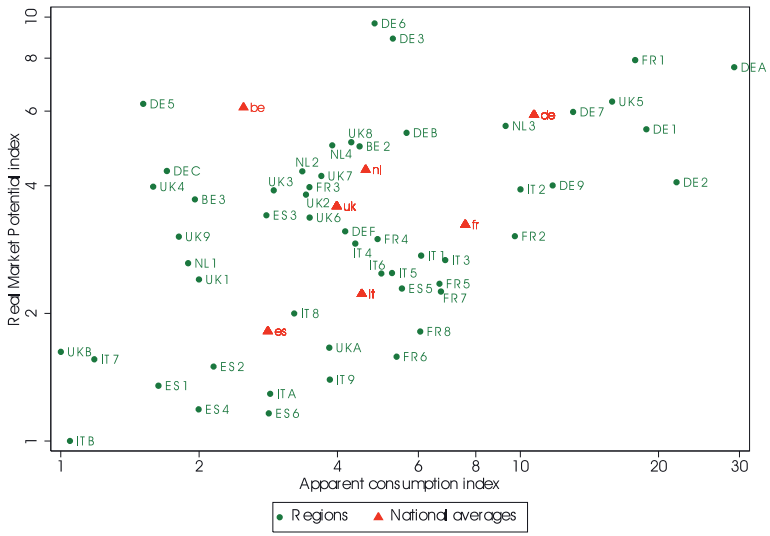


Figure 2: RMP vs Expenditure, Electric Machinery, 1995, Brussels (non plotted 13)

Figure 3: Japanese FDI Stock and Market Potential in EU Regions

3.3 Foreign Entries in Chinese Provinces

Understanding why firms invest in China is a key issue when one aims at assessing the respective role of market access and production costs. The share of foreign enterprizes in China is very large : 31 percent on average and twice this average in Guangdong (Amiti and Javorcik, 2005). In a limited number of sectors (actually 1 percent of the sectors) at least three quarters of the industrial output is realized by foreign firms. Low wages are general understood as a major determinant of FDI, foreign entries firstly aiming at benefiting from low cost and re-export within the more general framework of a process fragmentation. However, the presence of a huge and fast growing market should lead to an horizontal investment, namely a replication of production units in China.

To answer these questions, Amiti and Javorcik (2005) examine the relative importance of key determinants of foreign investment (of the change in the number of foreign firms present in a given province within a industry) in China: market size, factor costs, proximity of suppliers and lastly trade costs. Relying on data detailed at the industry (515 industries) and provincial (29 provinces) levels, they find that *market access and the proximity of suppliers are the main factors explaining inward FDI flows in Chinese provinces.* Doubling either of these factors leads to a 40 percent increase in the entry of foreign firms. These factors are particularly relevant for the local province where the entry takes place, due to the fragmentation of the Chinese market. We should carefully note however, that a Chinese location is not compared, here, to alternative locations outside China, and that production labor costs are not taken into account.

US data on the motivation of locating foreign affiliates in developing economies point out to a prominent market access motive: according to Mataloni (2004) 71 % of sales of US affiliates located in China are directed towards local customers in 2002. The corresponding figure is 87 % in India, and even a surprising 64 % in Mexico, a location that should host primarily vertical investment.

3.4 German Firms Locating Abroad

Most of the literature on the determinants of location choices of multinationals is traditionally based on US, Swedish, Japanese or even French data. Alternatively, one can rely on very large data set which however provide aggregated data for a large sample of countries. Accordingly, the profession was missing precise empirical evidence regarding the motivations of the firms leaving the largest European economy to locate abroad. Fortunately, a recent firm-level data set from the Deutsche Bundesbank has authorized to replicate such studies on the German firms. Two papers by Becker et al. (2005) and Buch et al. (2005) investigate the determinants of the activities of German multinationals using this newly available source of information. Both papers provide clear-cut answers to our questions.

Becker et al. will be considered below and we focus here on Buch et al., a paper stressing that the market access motive for internationalization is dominating. *German firms leave Germany and invest abroad mainly to better access to large foreign markets.*

Buch et al. (2005) use the firm level data either directly at the individual level, or aggregated into industries, or total flows to each destination market. These three levels of aggregation permit to refine the traditional conclusions regarding the determinants of location: individual entrepreneurs stress the cost advantage associated with foreign locations, while macroeconomic data points out to German firms mainly locating in high costs countries. The authors use two alternative measures of market access determinants: The GDP used in the majority of the literature, and market potentials more recently introduced on the basis of the new economic geography (Head and Mayer, 2004 for instance).

Using macro data, it appears that German firms mainly go abroad for the stake of acceding to large and developing foreign markets. This result is obtained using the traditional GDP variable, and confirmed using the newly introduced market potential. The outcome is clear cut: A one percent increase in the size of a given foreign market is associated with a one percent increase in the activity of the German firms in this location.

Using industry-level data, the previous dominance of the market access motive is confirmed, but the associated elasticity is highly dependent on the sector. It ranges from 0.5 in the Clothing industry to 1.6 for the Transport and equipment material. This does not come out as a surprise: In labor intensive industries producing items easy to ship abroad, the vertical nature of FDI is certainly dominant; in contrast, in the car industry, access to the local market is a key motivation. What usual assessments based on macro data tell us is simply that market access and cost determinants both matter, but that the most prominent one remains market access: Mercedes-Benz cars sold in Europe will not tomorrow be produced in Beijing.

Lastly, relying on individual firm data and introducing in the regressions firm-specific fixed effects in order to control for non observable characteristics of the German multinationals points out to the strong heterogeneity among firms. Still, market access remains a key determinant. The elasticity does shrink and turns out to be at most one quarter of the elasticity obtained with macro data. To put in in simple words, this difference means than up to three quarters of the increase of German presence in a foreign country is attributable to entries of new competitors, rather than to expansion of existing plants or affiliates.

4. Production Costs and Location: The Evidence

The first production costs at stake when a decision of (re)location is to be taken, are labor costs. Comparing China and Germany, or Bangladesh and France, is however hardly convincing as the real impact of costs differentials on the decision of location. Since any German firm easily invest in China, combine there Chinese wages with German productivity, and ship the output to high-living standard markets, one is forced to admit that, yes, production costs matter. However, producing in China and producing in OECD countries are two different stories and as already stressed, one might produce in China firstly to serve the local market. This is why an assessment of the impact of labor costs differentials on the location of firms has to be done on the basis of a comparison of truly substitutable locations.

4.1 Employment Substitution between Parent and Foreign Affiliates

Becker et al. (2005) use two panels of German and Swedish multinational firms to investigate this issue. They conclude that employment in foreign affiliates effectively substitutes for employment in the parent company. Such approach is valuable since Germany as well as Sweden firstly invest in the developed or transition economies, not in developing ones, and have recently recorded a surge in their outward FDI flows toward Central and Eastern European Countries (CEECs).

Hence, if it does not make sense competing with the Chinese on labor costs, how the competition of the new Member states impacts the labor market in old Member states through the relocation of activity is a key issue. As for the German firms, Becker et al. (2005) consider three regional grouping of destination country: industrialized economies, CEECs, and developing countries. The corresponding indicators are interacted with parent-specific variables, in order to identify to what extent the same determinants lead to different strategies of the parent company, depending on the location of the affiliate.

Broadly speaking, the first result is that *traditional gravity variables are powerful regressors in the estimated conditional logic model explaining the probability of the presence of an affiliate in a given destination country.* The size of the destination country, namely the GDP level, has a positive impact, while the distance between parent and affiliate act in the opposite way. The former impact is in the line with our previous remarks regarding the prominent impact of market size. The second effect is not trivial: in the perspective of an horizontal foreign direct investment (replication of units) motivated by a substitution of foreign presence to exports, the sign should be *positive.*

The second result refers to the role of the availability of skills in the destination country. On the whole, German firms do seek skill-abundant locations. More pre-

cisely, when a location choice has to be made among (low cost) skill-scarce countries, parents prefer locations where this scarcity is less stringent. There is also (weaker) evidence of skill seeking among skillabundant (high cost) locations, suggesting that German parents might well (re)locate skill intensive activities in high cost destination countries. But all in all, high costs (controlling for the availability of skills) is deterring entry of German firms.

Lastly, as for the social competition, Becker et al. (2005) find that a 1% additional wage gap between German locations and CEECs' ones, translates into 900 fewer jobs in Germany and 5,000 more jobs in affiliates abroad. Accordingly, if the strategy of competitive deflation currently pursued in Germany is hopeless regarding the cost gap with emerging economies such as China, it does make sense facing the new Eastern competitors with such policy; at least when the sign of the effect is concerned. Indeed, the magnitude of the impact remains limited in comparison with the 1954 thousands employees in Germany occupied by German multinationals: *a 20% additional wage gap between Germany and the CEECS would cut employment in Germany by only 1% in Germany* according to this estimation. Those recent estimates refine earlier findings that labor costs are not the main determinant of location choice although they might be found to have a statistically significant impact.

4.2 Is Regulation Deterring Inward FDI?

Among production costs, labor costs do not resume to differences in wages or differences in unit costs. Regulations on the labor market do matter, just because they make it more or less easy to rely on extra-hours worked, because they correspond to different degrees of flexibility according to hiring procedures, as well as to individual or collective dismissals. Such approach may help to solve the puzzle that foreign firms often invest in locations offering high wages, due to the positive relationship between the quality of labor and its compensation. Firms are relocating in certain industries in order to seek skills (Blomstrom, Fors and Lipsey, 1997; Marin, 2004)

Smarzynska and Spatareanu (2005) estimate a fixed effect (controlling for unobservable characteristics of the firms) logit model, which explains the decision of the largest 10,000 firms in Europe to be present or not in a given location, depending inter alia on its labor market regulations. The latter variable is considered in absolute terms, and also relatively to the home country of the investor. Alternative locations are 14 of EU15 countries, three new members (the Czech republic, Hungary, Poland), Bulgaria and Ukraine. Measures regarding the flexibility of the labor market rely on the Global Competitiveness report of the World Economic forum, as well as additional indicators compiled by the World Bank. Control variables regarding the host country are rather crude, too, and depart from the ones suggested by the new economic geography: Market size is proxied by the popula-

tion of the host country, notwithstanding its living standard (we are quite far here from the refinements of the market potentials). Labor costs are proxied by the average wage. Property rights and business taxation are also proxied in a rather crude way. One may of course challenge Smarzynska and Spatareanu (2005) results on the basis of the relative crudeness of such indicators, and additional research would be very useful in this field. However, the results are innovative and must be quoted.

In addition to a positive impact of the size of the population, as well as a positive impact of the average wage (a counterintuitive result already discussed), the key result is the fact that a more flexible labor market is increasing the probability of the presence in the host economy. Alternatively, the authors use a second specification addressing the size of the foreign locations, which confirms the previous findings and permits to quantify the impact of the regulations on the volume of investment: *comparing the regulated French economy with the deregulated UK, the authors find a 12 to 26 percent difference in the volume of investment, depending on the measure of the regulations.*

4.3 Social Dumping

The popular view of globalization is also associating foreign presence of multinationals with the fears of an exploitation of child labor. Factories of soccer balls have exemplified what very much sounds like a come-back of the labor conditions of the late 17th centuries, a time when a French influential Minister of Finance stressed that "Child idleness is the source of laziness for the rest of their life".

Child "employment" in household activities by their parents is however a more accurate description of child labor in developing countries, than employment in foreign affiliates or sub-contractors of multinationals (Edmonds and Pavcnik, 2005). About 3 percent of children aged 5 – 14 are working for pay in developing countries, mostly in agriculture, where their parents are working too. In contrast to the previous limited record of participation in the market sphere, about two thirds of the same children participate to the domestic work in the household. Substitution effects are recorded among parents (entering in the market sphere) and children (replacing them in the domestic sphere).

Importantly, the percentage of active child is negatively correlated with the GDP per capita in the economy. Hence, one may argue that hosting foreign investment (what should translate in productivity gains in the host economy) would therefore alleviate, rather than strengthen, the participation of child labor. The same is true for the relationship between trade openness and child labor, that are proved to go in opposite directions. In addition, working conditions are often more satisfactory in the exporting sector than in the domestic sector in developing economies, even if working conditions are worse in the exporting sector than in alternative locations in the North.

4.4 Environmental Dumping

The traditional fears that integration among countries having different collective preferences regarding environment might turn into polluting activities relocating in the South has been largely exploited by environmentalists. Indeed, a simple model of specialization and trade points to a division of labor where the rich country chooses to protect environment and abandon polluting activities to the developing world (Copeland and Taylor, 2003). Noticeably, an alternative approach based on the traditional proportion factor theory would lead to opposite conclusions: polluting and capital intensive industries should flock in the North, not in the South. Lastly, with endogenous environmental policies, and collective preferences favoring environment protection in rich (and capital abundant) countries, both effects should go in opposite directions: tighter regulations deter location of polluting industries in the North, while the relative scarcity of capital deters it in the South.

In total, the answer can only be of an empirical nature. Empirical evidence of such causation remains however limited: Busse (2004) investigates five highly polluting industries and 119 countries: he fails to identify any evidence that industries facing above-average abatement costs would relocate in pollution havens, and translate into net exports of the host countries. The only exception is the Iron and steel industry.

Considering such results, the fears of race to the bottom on environmental regulations may well be exaggerated. One plausible explanation is the limited percentage of abatement costs in the polluting industries, limiting the impact of differences in regulations among alternative locations. For instance, the availability of capital, in polluting industries that are often also very capital intensive ones, or the price of energy might be more prominent determinants of location. Another plausible explanation is that abatement costs are very different among industries; hence, industries have individual characteristics that may well explain trade and abatement costs, leading to fallacious correlations in the available estimations. Levinson and Taylor (2004) point out these econometric issues and assess the impact of environmental regulations on intra-regional trade within the Nafta, for 130 manufacturing. They find that for the most regulated industries, the change in regulations has been a powerful determinant of the change in net exports over the period 1977 – 86. This is where relying on FDI data rather than trade data might be relevant. Eskeland and Harrison (2003) test for the relationship between Pollution abatement cost and inward FDI for Mexico, Morocco, Cote d'Ivoire and Venezuela. Results point once again to the fact that market size is the main determinant of FDI. *Pollution abatement costs are insignificant in most cases.* Also FDI is largely found to be more energy efficient and use cleaner types of energy than local firms.

Another potential econometric problem is related to the correlation between environment protection and the quality of institutions. Certainly, countries facing

high corruption and collapsing administrations do not tend to invest massively in providing a regulation aimed at protecting their environment. Accordingly, one should control for institutions when assessing the pollution haven hypothesis (Smarzynska and Wei, 2001). We will investigate more in depth this issue of institutions below.

4.5 Gains to Cultural Proximity

A last dimension of cost reduction strategies in location decision that has rarely been investigated in the literature is the choice of a region for which the investor has large knowledge about in terms of business practices, skills and culture of workers… For instance, a German investor locating a production plant in France might find the Eastern regions of the host country to be attractive because a large portion of workers speak German as a second language, and have a larger common set of common cultural traits and work attitudes with German citizens than workers from other parts of France. Such "familiarity" with local conditions of business practices would certainly be considered an advantage, at least in the first stages of investment in the country. Those advantages can counter-balance disadvantages of the Eastern regions, notably in terms of market access to national demand. Indeed this determinant seems to be of some importance in the investment decision. As can be seen in figure 4 (made with data from Crozet et al. 2004), regions close to Germany in France attracted a disproportionate share of German investors over the 1985 – 1995 period with respect to the GDP share of those regions. Similarity in cultural traits seems to be a far from negligible advantage in hosting regions, a result that can be related to the impact of distance on FDI flows in gravity like regressions like Wei (2000) or Stein and Daude (2001). Again, this cost advantage is compared with market access features of the region by the investor, and Crozet et al. (2004) show that if distance to the home country actually matters a great deal in the first years of investment, the effect seems to diminish drastically across time, while the impact of market access increases. This suggests that a learning process is at work with firms acquiring more knowledge on how to operate efficiently in the country over time, rendering proximity to the home country less necessary.

5. Public Policies and Location: The Evidence

What are the policy instruments that have been shown to "work" empirically in terms of attracting foreign investments? Among the commonly proposed list, taxes, subsidies and institutions usually rank very high. We briefly survey results about those determinants.

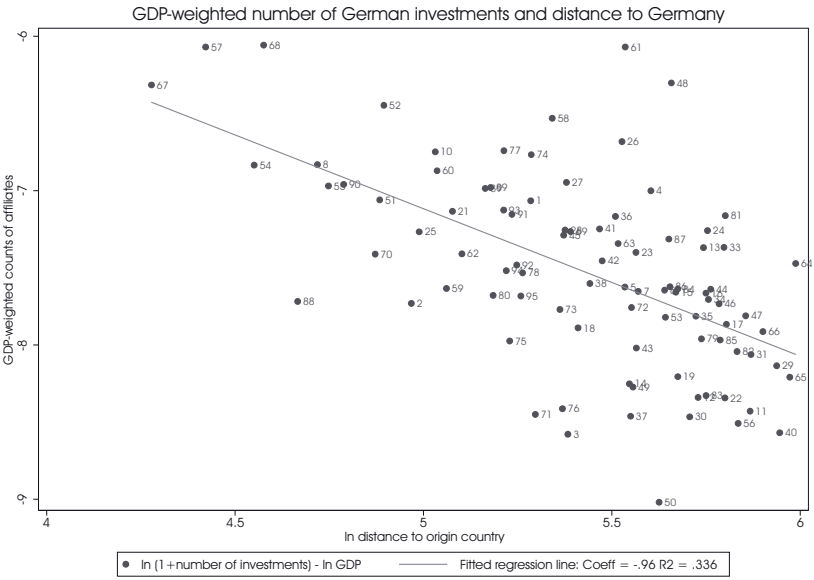
5.1 Corporate Taxes and Other Forms of Investment-promotion Policies

Among policy measures impacting the location of activity, corporate taxes are generally considered as a powerful driver of firms decisions. Partial evidence based on the large presence of multinationals in the Irish economy having offered appealing taxation schemes to foreign firms up to the reform adopting a 12.5 % rate, as well as the declining average tax rate of business in Europe have raised the fears of tax competition. Indeed, as apparent in Figure 5, the corporate tax rates in the Western world seem to present a very clear picture of convergence over the last 20 years. More recently, the enlargement of the EU to countries having on average low corporate tax rates, or even no corporate tax, have reinforced these fears.

Economic theory provides mixed arguments: Mobile firms should locate where tax rates are the lowest, leading to an equilibrium with a zero tax rate in a frictionless perfect equilibrium world (Wilson, 1999). This is why "Tax policies are obviously capable of affecting the volume and location of FDI" (Gordon and Hines, 2002). However, transaction costs, distance to markets, public goods available in the alternative locations may translate into equilibria where the center imposes larger tax rates than the periphery. Also, multinationals can optimize their taxation using transfer prices, hence be present in attractive and central places, while paying their taxes in remote fiscally attractive locations offering location rents (Haufler and Wooten, 1999, Baldwin and Krugman, 2004).

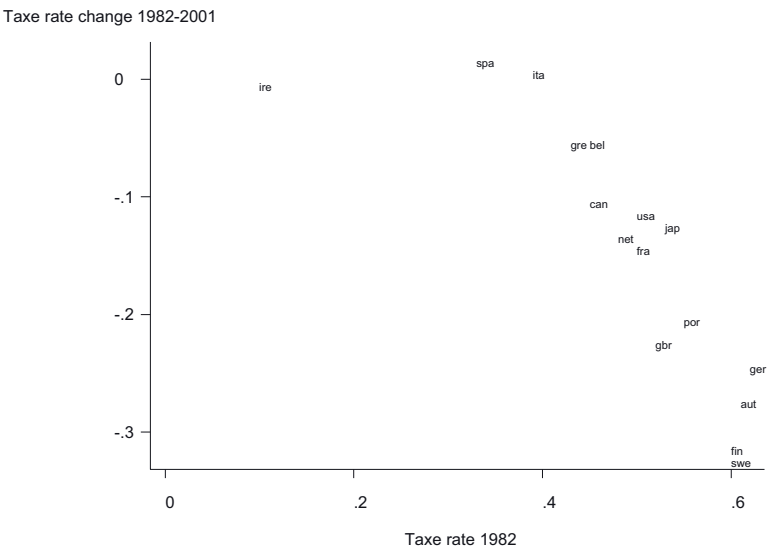
In contrast to the mixed evidence provided by the theory, and thus to the convincing arguments that in an imperfect competition framework firms would be insensitive to tax differentials among alternative locations, the empirical literature points to clear-cut results. Tax differentials matter. The next and more fundamental question is: How large is the effect? A meta-analysis of the empirical literature conducted by Mooij and Ederveen (2003) and treating more than 350 point estimates, finds an average semi-elasticity of FDI to tax rates around –3.

It has been suggested that, since firms arbitrate not only between foreign locations but also between foreign and domestic locations, tax *differentials* should be considered. This is done by Benassy-Quere et al. (2005a), who address this issue by focusing on the impact of tax schemes (exemption versus credit) on the decisions taken by multinationals. Using a panel of 11 OECD countries over 1984 – 2000 and bilateral FDI data, they show that positive tax differentials deter FDI inflows, even when gravity factors and other economic geographyrelated variables are controlled for. In addition this impact is non linear, large differences having a more than proportional discouraging effect when the investor originates in a creditscheme country. Lastly, FDI reacts asymmetrically to tax differentials, high taxation rates discouraging FDI inflows more than low ones do encourage them. The bottom line seems to be that, since market potentials or the provision of public goods matter, the solution of the tax competition game is not a zero tax rate, while the incentive to harmonize tax rates falls essentially on countries having high rates.



Source: Crozet et al. (2004).

Figure 4: Location of German Production Affiliates in France, 1985 – 1995



Source: Constructed from Devereux et al. (2002).

Figure 5: Statutory Corporate Tax Rates in Major Developed Countries

The impact of subsidies emerging from the literature is much more mixed (and also much scarcer due to lower access to good quality information on such investment-promotion measures). Crozet et al. (2004) study individual location choices of 3902 affiliates of multinational firms over the 1985 – 1995 period. An important part of the work is focused on assessing the impact of French and European regional policies through the inclusion of investment incentives and structural funds in the location choice model. Results point to very disappointing impacts of both types of measure on the actual choices of investors. On the other hand, agglomeration economies seem to be very important, and it is observed in particular that the foreign investors have a very strong tendency to follow the location choices of French firms in the same industry. Even if important agglomeration economies might constitute a favorable ground for effective regional policies, the evidence for France is very negative: There is no significant, either in statistical or economic terms, rise in the attractiveness of French departements when investing there is associated with grants from public authorities.

It should be noted that the story is different with uncoordinated subsidies. Head et al. (1999) show some evidence of competition tournaments taking place between states in the USA.

5.2 FDI and Institutions

A recent stream of the literature has focused on how FDI reacts to the quality of institutions in the host country. While its methods are not unchallenged (see Rodrik, 2004), the literature estimating the impact that institutions have on economic development has been enormously influential. Initiated by Daron Acemoglu and co-authors (see IMF, 2003 and Acemoglu et al., 2004, for recent surveys), a stream of results has shown that improving such institutions as the protection of civil and property rights, the level of economic of political freedom and the level of corruption tend to be associated with higher prosperity. Endogeneity of institutions to economic development has been the main question of interest here, and the ingenious use of historical determinants of institutions as instruments showing that causality runs the right way has shown that improving institutions favorable to investment is a possible and desirable policy for poor countries.

Not surprisingly, thus, a number of authors have also studied the link between institutions and FDI. Such link could be seen as one channel through which institutions promote development in the modern era. Indeed, good institutions are supposed to exert their positive influence on development through the promotion of investment in general, which faces less uncertainty and higher expected rates of return. Because FDI is now a very large share of capital formation in poor countries (UNCTAD, 2004), the FDI-promoting effect of good institutions might be the most important channel of their overall effect on growth and development.

There are several reasons why the quality of institutions may matter for attracting FDI. One is rooted on the results of the growth literature: By raising productiv-

ity prospects, good governance infrastructures may attract foreign investors. A second reason is that poor institutions can bring additional costs to FDI. This can be the case of corruption for instance (Wei, 2000). A third reason is that FDI yields sunk costs; making it is especially vulnerable to any form of uncertainty, including uncertainty stemming from poor government efficiency, policy reversals, graft or weak enforcement of property rights and of the legal system in general. A number of authors have empirically studied the impact of institutions on FDI, generally within the framework of gravity models where FDI bilateral flows or stocks essentially depend on GDP or population in the source and / or the host country, and on the distance between both countries (see Eaton and Tamura, 1994, for an early application of the gravity model to FDI). Wheeler and Mody (1992) found the first principal component of 13 risk factors (including bureaucratic red tape, political instability, corruption and the quality of the legal system) to have no significant impact on the location of US foreign affiliates. However the index also included factors like the living environment of expatriates or inequality which are not directly related to the quality of institutions. Later studies by Wei (1997, 2000) pointed out corruption as a significant impediment to inward FDI, with both a strong statistical and economic impact. This result has been challenged by Daude and Stein (2001) who point out the high collinearity between their measure of corruption and GDP per capita, which can lead to spurious results when GDP per capita is not included in the equation. Using a wider range of institution variables, they nevertheless show inward FDI to be significantly influenced by the quality of institutions. More specifically, five out of six governance indicators provided by Kaufman et al. (1999) are shown to matter: Political instability and violence, government effectiveness, regulatory burden, rule of law and graft. Only the voice and accountability indicator appears to be a non significant determinant of FDI. Further regressions, using International Country Risk Guide and La Porta et al. (1998) indicators, show risk of repudiation of contracts by government, risk of expropriation and shareholder rights to matter.

Bénassy et al. (2005b) also use the gravity specification to study the effect of institutional distance between the host and the source country on FDI. For instance, it is possible that corruption in the host country is less an impediment to FDI inflows when corruption is also quite high in the source country and investors are used to deal with it in the home country.

More generally, if institutions are dependent on economic and social history (including the colonization era), then one could observe more FDI, other things equal, amongst countries displaying relatively similar institutions. Indeed, Globerman and Shapiro (2002) find that US multinationals are more likely to invest in countries whose legal systems are rooted in English Common Law.

6. Conclusion

The growing concern over the attractiveness of European locations for mobile firms, as a result of a race to the bottom taking the form of tax competition, social dumping or environmental competition, is hardly justified on the grounds of the actual geographical structure of the foreign presence of German, French or Swedish firms. On the contrary, these firms are massively present in high income, high labor costs locations, suggesting a foreign presence mainly driven by the access to large and rich markets. This is not the whole story however: Outsourcing and offshoring are increasing, and vertical investment is taking benefit of worldwide cost differentials, as economic theory predicts it should. The balance between market access motives and low-cost seeking motives is very much (and very logically) depending on the industry considered: The clothing industry (low-cost seeking) and the car industry (market access) exemplify these differences.

Accordingly, if the family picture of highly integrated OECD countries is comforting, notwithstanding the difficult situation of a limited number of footloose industries, the movie is somewhat frightening when one lists the determinants potentially deterring investment and location in our European economies: Wage differentials, tax differentials, regulatory burdens, environmental-friendly attitudes of governments, and so forth. Hence the fears of a locational competition, especially with new Member states, putting at risk our social compromises and our specialization based on high costs of production.

The empirical evidence surveyed in this paper provides elements to structure the related arguments. Those are articulated around two major results.

- *First result:* Market access is a powerful attractor of firms. To put it in simple words, factories follow the clients, and do flock where the better access to regional demand is available. This has two immediate implications. On the one hand, Europe is still a huge market justifying to locate plants there. On the other hand, Europe and in particular the Eurozone will suffer from being a low-growth and limited-opportunities area, where locating will become less and less attractive, on the margin, as the gap with growth rates in the rest of the world becomes structural. One can hardly have a 1 to 2 percent growth rate and retain factories producing for markets doubling every 8 years, as China is today. And when foreign firms decide to enter the Chinese market, they do locate where they find the largest market potential within China.
- *Second result:* Costs differentials do however also matter. Wage differentials have been proved to impact somehow the location of German firms. With trade integration continuing and ensuring that peripheral low-cost countries are less and and less undesirable locations in terms of market access, core countries with differentially high corporate tax rates will hardly be able to resist a convergence towards low rates offered by neighboring countries. Labor market regulations impact FDI, as well as environmental policies do impact the location of firms, when sectoral characteristics are properly taken into account in the estimations.

How to combine these two types of results into a full-fledged appraisal of the current locational competition is not an easy task. We do face for the first time in modern economic history a situation where the most promising markets are at the same time locations offering dramatically low-costs. Wages are stuck to the low average productivity of the host economies, while the mobility of the technology within the firm makes it possible to produce there with a decent productivity. Confronted to such a new framework, and considering the need to maintain their market shares in high-wage countries, firms have a strong incentive to fragment their production process, splitting the value added chain among the various locations of their subsidiaries. On this front, no hope should be placed in competing on wages or labor costs. Better take benefit from this situation and let domestic firms invest abroad in order to reinforce their efficiency.

There is a second front however. Arguably, the Single European market remains a valuable place to do business. Despite a sluggish macroeconomic environment, one of the largest pool of consumers is still located there, and locations near these consumers have to be selected, since space still hinders trade flows to a very large extent. The key issue for Germany, France or Italy is that new and appealing locations are available within this large market, combining low labor costs, the proximity of efficient suppliers, and low corporate taxation (with some exceptions). Last but not least, leaving the congested locations in Germany or France, to accede new locations offering agglomeration economies but still limited competitive pressure, is reinforcing the cost argument.

Should we care about this new competition? The answer is in the newspapers, on the page "industry", where a litany of relocation of activities is offered. What precedes suggest that the reasonable difference in costs with these locations (as compared with China) advocates for adjustment policies in order to avoid a further acceleration of the phenomenon. The recent social conflicts in the German car industry point out to the perceived accuracy of such policies at the micro-economic level. The German car industry would recover its competitiveness and avoid relocations abroad by reducing the wage bill. Indeed, the impact cannot be contested: it will work. The problem is the magnitude of the effect: We have seen that the impact on the decision of locating jobs in Germany rather than in the CEECs will be homeopathic, given the negotiation margins sociably acceptable. A more keynesian view would stress the negative impact on demand and hence on the size of the market of such policies.

The sensitivity of the public opinion to those issues is typically the result of a sluggish macroeconomic environment, where low growth, low employment and deflationary pressures make it more difficult to cope with necessary adjustments. If a competition for location exists, providing an appealing macroeconomic environment to firms is certainly the best policy. Of course drastically reducing corporate tax rates would help, of course cutting labor costs would limit the differential with the new Members, but none of these policies will durably increase the market potential in Europe, nor provide a decisive competitive advantage to our firms.

The kind of market positioning of exporting countries such as Germany, France or Sweden is on top quality products, integrating innovations either in terms of technology, design, longstanding experience: Overall, half of EU15 exports are currently top quality products, while only one third of the world market is in top quality products. Our efforts should be directed towards the reinforcement of such advantages. Combining a Euroland growth rate comparable with the US rate, together with a reinforcement of the European market positions in high-end products, is probably the best way to ensure that locational competition will no longer be an issue.

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Developing a Political Agenda for Sustainable Economic Growth in Germany

By Hans-Peter Klös and Rolf Kroker*

Abstract

Germany has been caught in a severe structural economic crisis for years now. The paper discusses how the economy can move back to a sustainable higher growth path. Employing an augmented neoclassical growth model it identifies six growth drivers – corporate investment, public investment, unemployment, human capital, total taxes, fiscal deficit – and deduces six growth scenarios up to 2024 including stagnation, halted downturn, German supply-side politics and a look at the US, UK and Sweden. The scenarios show that Germany's real potential output could again grow by 2.5 percent in the medium term if Germany implements necessary reforms. The international comparison indicates that there are varying functional reform equivalents for more growth and wealth so that politicians have options. Political-economic considerations suggest that the conditions are in favor of reform.

JEL classifications: D 78, E 61, O 11

Keywords: Economic policy reforms, growth, international comparison

1. The Problem and the Design of the Paper

Germany is in a severe structural economic crisis. Unemployment is at a post-war high. Public debt has violated the Maastricht Treaty for four years in a row. Since 1993, Germany's economic growth rate has never exceeded the EU average. During most years Germany even figured as the EU's tail light. The three year stagnation of real GDP between 2000 and 2003 was a post-war record. In spite of the recovery in 2004, expectations for the current year are subdued and forecasts have recently been revised downwards. The production potential which reflects the medium-term growth perspectives presently merely grows by 1 to 1.5 percent annually and according to some observers even less (Brandholz / Flaig / Mayr, 2005).

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Although other industrial countries also suffered from rising oil prices, the New Economy bubble bust and global uncertainty in the wake of September 11th, the paralyzing economic effects lasted longer in Germany than anywhere else and caused significant wealth losses. Had Germany at least been able to keep up with the growth rate in Europe (EU-15 without Germany), its real GDP per capita would now be 11 percent higher.

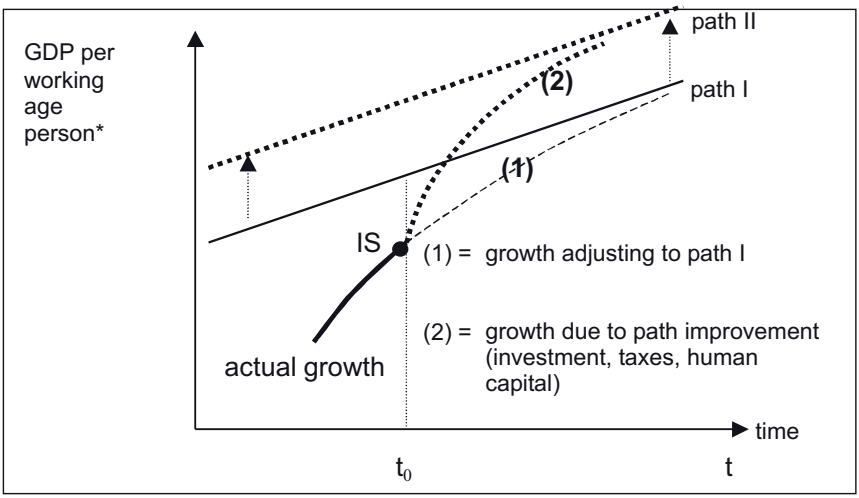
Economic growth is not an end in itself. It rather serves to increase the wealth of nations, minimize distributional conflicts and secure social peace. When incomes stagnate or increase only slowly, the number of losers from reforms which cut vested rights grows. This evokes defensive reactions and threatens the reform process (Heinemann, 2000; Grömling, 2001). Germany illustrates this well. After launching its labor market reforms the Schröder government was promptly punished by voters in regional elections. Since politicians do not make decisions independent of possible voter reactions, a reform standstill now looms. The impact of these constraints is all the stronger the more politicians fail to explain the need for the reforms to put the economy on a higher growth path which in the mid- and long-term will benefit everyone.

The guiding question of the article is how Germany can raise its wealth permanently by moving to a higher growth path. Economic growth is, therefore, used as key indicator and a catch-all variable for economic success as well as for successful reforms. If Germany succeeds in reaching a higher and sustainable growth path, it will have solved a number of core problems in its commodity markets, system of corporate governance, labor market and social safety net because growth results from the combination of the productive factors – not starts with them as suggested by the phrase: "We need more growth to create jobs." The more efficiently the factors of production are combined, the higher the growth potential. In addition, growth is an operationable target so that the effects of reforms can be quantified.

The following analysis combines a quantitative approach with aspects of economic policy. It follows several steps. Chapter 2 identifies the key determinants of economic growth (growth drivers) and quantifies their contribution to growth. Chapter 3 develops growth scenarios for Germany over the next 20 years on the condition that the growth drivers regain certain values. Based on the results Chapter 4 designs building blocks of a reform agenda. Because reforms which make sense in the medium and long run are not necessarily enacted if they create undesired short-term effects, Chapter 5 assesses the probability of a persisting reform standstill and describes delaying and distributive aspects of reforms which influence the political-economic chances of reforms. Chapter 6 concludes with an economic policy outlook.

2. Determinants of Economic Growth (Growth Drivers)

Chart 1 depicts the growth model used in this analysis. It explains real GDP per working age person. In a given setting path I represents the equilibrium growth rate at the outset (steady-state equilibrium). Along this path the economy grows with the rate of technological progress. As long as the economy has not reached the steady-state equilibrium (IS), it adjusts as shown by the dashed line (1). A change in the economic framework moves the long-term growth path to a different level (path II). During the following years the growth rate changes as per-capita GDP moves closer to the equilibrium path. The speed of convergence indicates the speed with which the distance to the new equilibrium decreases by one half (half-life period or Barro-rate; Barro / Sala-i-Martin, 1992a).



* logarithmic scale.

Source: Institut der deutschen Wirtschaft Köln.

Chart 1: Standard Diagram of Growth in the Model

An upward shift of the equilibrium path (path II) additionally stimulates the economic dynamic because a higher equilibrium level has to be reached (dotted line (2)). The growth process is, therefore, separated into two components, the path growth and the adjustment growth. According to neoclassical theory labor and real capital are the key growth determinants (Solow, 1956; Swan, 1956). The new growth theory adds human capital (Becker, 1964; Mincer, 1958) to the Solow model (Mankiw / Romer / Weill, 1992).

To develop quantitative growth scenarios, we use the numeric specification of growth determinants which the German Council of Economic Experts (CEE) pre-

sented in the article "Determinants of economic growth in industrial countries: an analysis with panel data" (SVR, 2002). In this analysis the CEE employs a panel approach and examines the single growth factors and their quantitative impact in 17 OECD countries between 1966 and 1999 (Box 1). Within the framework of this human capital-augmented neoclassical model the following regression coefficients are estimated for the variables (Table 1). The signs of the coefficients correspond with the theoretically expected direction of the effects.

Table 1

Estimated Results of the CEE-Model

Variable	Coefficient	*t*-Value
GDP delayed	0.66**	11.27
Corporate investment	0.12**	2.96
Population growth	–0.06	–0.85
Human capital	0.10(*)	1.89
Government investment	0.08**	3.65
Total taxes	–0.13*	–2.02
Budget deficit	–0.002	–1.48
Standardized unemployment rate	–0.062**	–4.36

(*), *, **: significant at the 10-, 5- and 1-percent level, respectively.

Source: Council of Economic Experts (SVR, 2002).

Box 1

The CEE Growth Model

In order to eliminate country-specific factors the model accounts for changes of the growth factors and measures their effects on the growth of GDP per working age person. In addition, it assumes that the country-specific factors do not change. The CEE then calculates 5-year averages for various parameters since 1960 and their change rates. The effects on GDP growth are estimated in a panel regression using a two-stage least squares method. The analysis employs data from the OECD Economic Outlook and average school years from the Barro-Lee database. Several different models are tested. Growth in the 1990s then is decomposed by using the following model:

The CEE model explains growth per working age person. The explanatory variables (growth drivers) are previous-period growth (delayed GDP) and gross capital formation in the corporate sector in percent of GDP. In addition, the model observes the growth of the population aged 15 – 64 years and incorporates a common factor for the growth of technical know-how and the depreciation rate. With reference to the Solow model its value is set at 5 percent. The third observed growth driver is human capital in terms of average school years, the fourth government capital formation relative to GDP, the fifth the taxes and social security ratio, the sixth the budget deficit in percent of GDP and the seventh the standardized unemployment rate according to the ILO

definition. The regression adds a constant which is interpreted as time effect. The variables were chosen for the following reasons:

Private investment: Capital formation by firms determines the strength of private capital accumulation. Neoclassical growth theory and even more so the new growth theory assume that capital accumulation determines wealth, in the former the level of the growth path, in the latter even the growth rate itself. If there is more capital per worker, then workers can produce more with a given technology.

Population growth: The effect of a growing population is that the available capital per person shrinks. This restrains per-capita growth in a similar way as depreciation reduces the real capital stock. However, per-capita GDP not only matters relative to the working age population but also to total population. If the working age population grows while the overall population remains unchanged, then GDP per worker decreases, but GDP per person increases because the share of the working-age population increases.

Human capital: Estimations of human capital usually use the number of years individuals spent in education and training as proxy (Mincer, 1958). The problem is that they only measure quantities like the achieved degree or the number of school years. Qualitative aspects as in the PISA study are left out because of the lack of historical data. Empirical results indicate that the quantitative indicators significantly influence economic growth.

Government investment: Goverment investment – for example, in infrastructure projects – leads to a higher growth path. Public infrastructure by itself raises private capital accumulation because of the complementarities between the public and the private capital stock. Government expenditure on consumption, on the other hand, has a negative effect on growth because it ‚crowds out' investment.

Tax and social security burden: A growing tax burden impairs corporate investment and incentives (Barro / Sala-i-Martin, 1992b). Under equal conditions this leads to a reduction in the profitability of capital and the utilization of available resources and thus to a loss of growth. Since indirect taxes mainly burden consumption, direct taxes performance and capital formation, a shift from direct to indirect taxes affects growth positively.

Government debt: High public debt and deficits significantly slow the growth rate. One reason is that rising interest rates crowd out private investment. Another reason is that deficits kindle the expectation of future tax raises and thereby dampen the willingness to invest and perform in the present already.

Structural unemployment: Rigidities and inflexibilities of the labor market lead to structural unemployment. The available employment potential cannot be utilized, rising labor costs and structural labor shortage decrease the marginal product of real capital. As a result, corporate investment and the number of employed relative to the size of the population shrink. Both effects also reduce production per capita.

In order to test the accuracy of this model in regard to recent developments in Germany, we apply it to German and US data and compute them for the last 15 years. We picked the US in spite of the downturn in the aftermath of September 11th because it apparently performed better than Germany in terms of GDP growth

and might thus serve as a benchmark. The decomposition of the different growth rates shows that the model proves to be a good predictor (Table 2). For the five-year averages 1990 – 1994 and 2000 – 2004 it estimates that GDP per worker rose by 24.2 percent in the US and 11.3 percent in Germany. In reality, GDP grew by 20.7 percent in the US and 14.2 percent in Germany. An important reason for the lower US growth momentum relative to the excellent parameter values could be that the more energy-intensive US economy was hit harder by rising oil prices. Furthermore, the collapse of the New Markets probably played a bigger role in the US since the sector's share of GDP is much larger than in Germany.

The decomposition shows that America's higher growth in the 1990s was mainly generated by the rise in corporate investment and the strong fall of the unemployment rate. In particular by significantly improving these two indicators the US economy succeeded in accumulating a higher capital stock and employ a larger share of the labor force. In comparison to Germany these two growth drivers alone accounted for about 9.3 percentage points of GDP growth during the 1990s. In Germany the decrease in public investment had a particularly strong effect.

Table 2

Decomposition of Growth in the CEE Model

– percentage change 1990 – 94 / 2000 – 04 –

	D	**US**
Actual growth in percent	14.2	20.7
Explained growth in percent	11.3	24.2
Contribution to the explained GDP growth per working age person in percentage points		
GDP delayed	10.4	11.7
Corporate investment	–2.0	3.9
Population growth	0.7	–0.3
Human capital	0.3	0.2
Government investment	–4.1	–0.6
Total taxes	0.3	–0.4
Budget deficit	–0.1	0.5
Standardized unemployment rate	–2.0	1.4
Time effect	7.8	7.8

Source: SVR, 2002; Institut der deutschen Wirtschaft Köln.

To sum up, the econometrically estimated CEE model well reflects the economic growth in the US and Germany between the five-year periods 1990 – 1994 and 2000 – 2004. In the US the growth rate is slightly overestimated, in Germany slightly underestimated. The chosen explanatory variables, therefore, appear suited

to forecast the economic momentum for the coming years and are used in the next chapter.

3. Scenarios of Economic Growth in Germany up to 2024

The CEE model not only well explains the variations in the economic performance of different countries, it also principally offers the possibility to develop and quantify empirically supported "real visions" and to design a quantitative framework for a consistent and encompassing reform agenda for stimulating Germany's dynamic forces. In this chapter, the determinants observed by the CEE are condensed in six growth drivers[1]. Table 3 shows their development in Germany between 1985 and 2004 (some data only go up to 2003).

Table 3

Development of the Growth Drivers in Germany since 1985[1]

	Corporate investment	Government investment	Unemployment	Human capital	Taxes	Budget balance
	in percent of GDP		in percent	number of school years	in percent of GDP	
1985 – 1989	17.8	2.6	6.4	8.98	37.0	–1.2
1990 – 1994	20.7	2.8	6.3	9.48	35.2	–2.6
1995 – 1999	19.7	2.0	8.8	9.57	37.5	–2.6
2000 – 2004	17.6	1.7	8.6	9.75	36.3	–3.1

[1] Five-year averages.

Source: OECD; Barro-Lee database; Institut der deutschen Wirtschaft Köln.

Corporate investment as a percentage of GDP rose from 17.8 percent to 20.7 percent at the beginning of the 1990s, then decreased to 19.7 percent at the end of the decade and now stands at 17.6 percent. Part of this decline was due to the great need for investments directly after German unification which expired thereafter. More recently investment further decreased mainly because of adverse investment conditions in Germany. Government investment even fell to presently 1.7 percent of GDP. The unemployment rate as defined by the ILO has risen from 6.4 percent to 8.6 percent, the deficit has grown steadily and the tax and social security burden increased until the late 1990s but has recently been slightly lower. Human capital shows a slight improvement.

[1] "Population growth" is eliminated since even a pro-natalistic policy would not radically raise fertility rates in the next two decades.

Already in the 1990s, the deterioration of the growth drivers depressed wealth and growth. The worsening of the investment ratio, the rising unemployment rate and the distorted budgetary balance shifted the steady-state growth path downwards (Chart 1). In the CEE model annual growth per working age person, therefore, only amounted to 1.2 percent over the last decade. Without this home-made deterioration of the growth drivers an annual growth rate of 2 percent could have been expected. Thus, if the deterioration of the growth drivers could be brought to a halt and further negative path effects could be avoided, the downturn of the growth rates would end and real incomes would improve.

If, on the other hand, the negative trends continued and the growth drivers further deteriorated, the heavy burden on German growth performance would accelerate. However, there are alternative options. Comparisons with other countries and a look back at recent economic history shows that Germany has realized completely different numerical values of the growth drivers before and can, therefore, do so again. The basic question is which consequences alternative values for the main growth drivers would have in terms of growth rates and real GDP. Therefore, several scenarios are calculated. They differ only in that over a period of 15 years the growth drivers are assigned different initial values which are then kept unchanged until the end of the forecast period. The scenarios are:

Scenario 1: "Stagnation"

The first scenario estimates the outcomes if the values of the growth drivers continue to deteriorate at the same rate as they did in Germany over the last years. It is called "stagnation" and describes the development if Germany undertakes no further reforms. In this case the downturn of the growth drivers would proceed.

Scenario 2: "Halted downturn"

The second scenario calculates the development of the growth rates if the downturn of the growth drivers during the 1990s is stopped and they keep their 2000 – 2004 values. This scenario would already require urgently needed reforms.

Scenario 3: "German supply-side politics"

The third scenario assumes that the target values of the growth drivers continually improve over the next 15 years and then reach the values of 15 years ago from today. As a result the downturn until 2000 – 2004 will be replaced by an upturn of the growth drivers at the end of which their values will be the same as 15 years ago from today.

Scenario 4 – 6: "A look at other countries"

The final three scenarios examine how Germany's per-capita GDP would change if the growth drivers developed with the same dynamic as in the US, Sweden and the UK during the 1990s. This approach and the country sample is chosen for three reasons. First, a look abroad gives real-life examples of different growth performances with different values in the growth drivers which may suggest a

specific institutional setup. This might help to escape the criticism of pursuing a "Nirvana-approach" built on unrealistic assumptions for revitalizing German growth. Second, choosing Anglo-Saxon countries and a Scandinavian country avoids the impression of a bias toward a specific societal model. Third, taken together, the three foreign country scenarios can serve as a reality check for Germany's growth targets.

Table 4 shows the development of the growth drivers in these countries between 2000 – 2004 and 1990 – 1994. To exclude accidental variations only 5-year averages and their differences are compared. One finding is that the countries followed different policy approaches. While the US stepped up corporate investment, Sweden focused on human capital improvement and the UK on enhancing the viability of the labor market. The six scenarios lead to different developments of the growth drivers. Thus they outline different roads – functional reform equivalents – to spur growth and raise wealth in Germany over the next 20 years. While the US focused on promotion of corporate investment, Sweden concentrated on human capital improvement and balancing the budget and the UK on fighting unemployment and budget imbalances.

Table 4

The Growth Drivers

– change in percentage points –

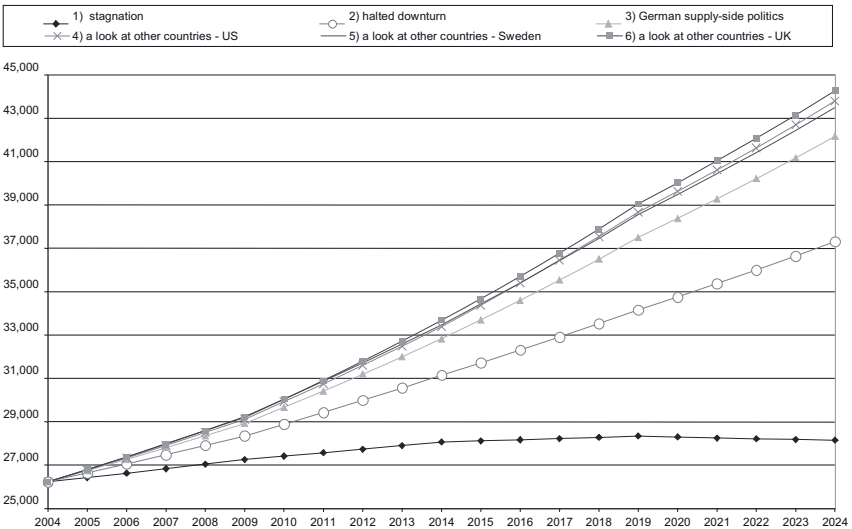
	D	**US**	**S**	**UK**
	annual average per period			
	2000 – 2004 / 1990 – 94	2000 – 2004 / 1990 – 94	2000 – 2004 / 1990 – 94	2000 – 2004 / 1990 – 94
Corporate investment[1]	–3.1	4.6	2.6	1.2
Government investment[1]	–1.2	–0.2	–0.8	–1.0
Unemployment[2]	–2.3	1.4	1.5	4.3
Human capital[3]	0.3	0.3	1.8	0.6
Total taxes[4]	0.9	–0.9	–2.3	–2.7
Budget deficit[1]	–0.5	2.2	9.8	5.5

[1] in percent of GDP.
[2] standardized unemployment rate in percent.
[3] change in the number of average school years.
[4] taxes and social security contributions in percent of GDP.
+ improvement, – deterioration of the growth driver.

Source: Institut der deutschen Wirtschaft Köln.

The values of the growth drivers in the scenarios are then inserted in the CEE model to estimate the 5-year average growth rates of GDP per working age person. Finally the rates are adjusted by including demographic changes to calculate per-capita GDP. The results show that per-capita GDP in real values nearly stagnates

in scenario 1. This indicates that if the present trends of the growth drivers remain unchanged, Germany's wealth will stall over the next 20 years. Real per-capita GDP will only increase by 1,900 euros. If the downturn is halted, it will increase by 11,100 euros. A return to supply-side politics will raise per-capita GDP by 15,900 euros. If Germany regains the values of the growth drivers as happened in the foreign countries, its GDP per capita will increase by between 17,300 euros and 18,000 euros over the next 20 years (Chart 2).



Source: Institut der deutschen Wirtschaft Köln.

Chart 2: Real GDP per capital in the Growth Scenarios
– in euros –

Interestingly four of the five reform scenarios show relatively similar results. Average annual growth varies between 2.4 percent (scenario 3) and 2.6 percent in the US and UK scenarios (Table 5). This suggests that there is more than one road to growth and wealth. There seem to be functional equivalents between the main growth drivers which implies that "varities of capitalism" (Esping-Andersen, 1990) can lead to comparable growth. The scenarios with higher growth rates reveal the long-term power of pro-growth policies and their significance in shaping the living standard. In 2024, GDP per capita is 14,000 euros higher in the supply-side scenario and even 16,000 euros higher in the UK scenario than in the stagnation scenario, the living standard in terms of disposable income is up by between 9,000 to 10,000 euros per capita.

Table 5

Real GDP per capita in Germany

– average annual change, in percent –

Scenario	Stagnation	Halted downturn	German supply-side politics	USA	Sweden	UK
2000 – 2004 / 2020 – 2024	0.3	1.7	2.4	2.6	2.5	2.6

Source: Institut der deutschen Wirtschaft Köln.

4. From Stress to Reform

Growth scenarios like those developed in the previous section have to be translated into a coherent reform agenda to be accessible for economic policy. In order to reduce the complexity of this task, it is necessary (1) to identify the main reasons for the poor German growth performance in the past decades (stress factors), (2) to group the stress factors into growth areas on the basis of the growth drivers of the CEE model, and (3) to develop policy measures (reform clusters) within the growth areas. Table 6 shows the interaction between stress factors, growth areas and reform clusters as used in this section.

Table 6

Stress Factors, Growth Areas and Reform Clusters

Stress Factors	Growth Areas	Reform Clusters
• Persistent labor market imbalances	• Unemployment / employment / population	• Mobilizing employment
• Inefficient education systems	• Human capital formation / R&D	• Enhancing human capital formation
• Insufficient investment	• Corporate Investment / public investment	• Stimulating investment
• Unsound public finances	• Tax burden / budget balance	• Consolidating public budgets

For a detailed list of sub-stressors and policy measures see IW (2005).

Ad 1: The stress factors are grouped in four categories, to each of which a bulk of different sub-stressors is attributed. Sub-stressors of the persistent German labor market imbalance are structural change, job export, working-time reductions, high wage- and non wage-labor costs and up to 2004 generous unemployment benefits. The inefficient education system results in a stagnating human capital formation, massive shortfalls in students competencies as measured by international literacy

surveys, low fertility rates among academics due to long years of education and a gap in regard to graduation rates of science and engineering students. Investment has suffered from excessive marginal tax rates, overregulation and high government debt. Finally, unsound public finances have been fuelled by high social spending, enormous transfers to Eastern Germany, the costs of unemployment and early retirement and cooperative instead of competitive federalism.

Ad 2: These stress factors can be matched with the growth drivers of the CEE model. In order to reduce their complexity, the drivers are grouped into four growth areas which follow the concept of a neoclassical production function. Unemployment / employment / population comprises the production and growth factor labor, while corporate and public investment reflects the production factor non-cash capital. In the concept of the new growth theory human capital / R&D is the central determinant of total factor productivity and of the efficiency with which labor and capital are employed in the production process. The fourth growth area, tax burden / budgetary balance, reflects the conjecture that sustainable growth cannot materialize without intertemporal sustainability and intergenerational fairness on the expenditure side of the public and parafiscal budgets.

Ad 3: Corresponding to the classification of the growth areas, the policy approaches are also combined in four main reform clusters: employment mobilization, human capital formation, investment stimulation and budget consolidation. Employment-mobilizing reforms aim to improve the quantitative utilization of labor. The goal of reforms regarding the human capital formation is to increase productivity. Policies to stimulate investment serve the creation of new production facilities and non-cash capital formation. Finally, budget consolidation is a prerequisite for regaining room for investment.

The policies assigned to the reform clusters specify the road map for necessary reforms to regain economic strength in Germany. A core element to mobilize employment is a strictly employment-oriented wage policy for years, which means that productivity gains due to the shedding of submarginal workers cannot be distributed to employees in wage bargaining. Other indispensable elements include a reduction of the tax wedge and the extension of annual and life-time working time to control unit labor costs and raise competitiveness, a relaxation of labor market rigidities to raise the employment-population ratio, especially among low-skilled people, policies which improve the work-life balance and address the problem of low fertility rates and, last not least, a labor-market oriented immigration policy to mitigate the labor supply shortages in the wake of shrinking birth-cohorts.

Reforms to enhance human capital formation should focus on a strong, early start for children and concentrate on expanding pre-school and full-day primary school education. The vocational training system should be modernized to allow for more upward flexibility. Tertiary education should be made more attractive for women to improve the graduation rates in general and particularly in engineering and science. Quality competition should be introduced in schools and universities

by relieving them from the bureaucratic corset, granting them autonomy with respect to financing and student and teacher selection and the introduction of standards and evaluation. To the same end, public subsidies should be redirected from the providers to the demanders of educational services in tertiary and secondary schooling. Elite promotion would then be part of the competitive process and further enhance technological performance.

Stimulating investment has to be a core element of economic policy because Germany suffers from corporate and private underinvestment in domestic gross fixed capital as well as in human capital which impairs the growth potential and leads to "capital-scarcity unemployment" (H.Giersch). Therefore, employment-oriented wage policies and a reduction of the tax-wedge are again on the agenda. Tax reforms which make the system more transparent and efficient are a must to spur growth without hurting equality principles. Red tape should be cut and entrepreneurship encouraged to create new growth dynamics. On all federal levels more government expenditure should go into investment and less in social spending and privatization should create more incentives for private investment.

The fourth reform cluster, budget consolidation, is a cross-sectional task for all government agencies and levels. Reforms should include the mentioned tax reforms, a reduction of subsidies which preserve uncompetitive structures and the application of generational accounting techniques to detect sustainability gaps in the pay-as-you-go social security systems. The federal system should be made more competitive and a reform of the horizontal and vertical fiscal equalization system should reward above average growth, instead of taxing it away.

Summing up, the reform clusters focus on measures suited to stimulate the growth drivers of the CEE model, whose impact on growth can be estimated. The results as displayed in table 1 give a 'quantitative feeling' of how the reforms might pay off in terms of additional GDP per capita and highlight the opportunity costs of foregone production in case of a reform deadlock. Such a long-term perspective might help ease reform reluctance among voters, motivate politicians not to falter when polls are unfavorable and encourage corporate stakeholders to support inevitable change.

5. The Political Economics of Reforms

Policymakers usually do not only and possibly not even primarily look at long-term effects. Since they want to be reelected, short- and medium-term effects play an equally important role in the political arena. Expected distribution effects also matter in the reform process. One has to ask, therefore, 1) whether there is a 'reform automatism' which overrules politicians' reluctance to reform, 2) whether there are J-curve-effects which defer the harvest of reform benefits, and 3) whether there are adverse distribution effects which fuel public resistance to reforms. All three questions are elaborated below.

5.1 Reform Automatism: How Likely is Persisting Stagnation?

When using the stagnation scenario as reference to deduce reform dividends, a crucial question is how realistic such a scenario is. There is some evidence that the probability of 20 years of stagnation is slight. The political economy of reforms (Avenir Suisse /HWWA, 2004) teaches that a substantial erosion of the sources of wealth evokes counterforces which in the end prevent a downward spiral and crossing a 'point of no return.' An analysis by the IMF of the reform determinants in 17 OECD countries between 1975 and 1998 (IMF, 2004) carves out a number of stylized facts of reforms. The study develops structural policy indicators in five areas: the financial sector, international trade, labor markets, selected product markets and the tax system. The main conclusions are:

- A succession of bad years acts as reform driver. Recessions increase the pressure for reform. It can, therefore, be assumed that extended low growth increases the ability to undertake reform. Three years of lagging growth seem to be a critical threshold for reforms because the costs of the status quo become obvious and the number of losers grows. As a result the willingness to accept reforms spreads. Ongoing stagnation, therefore, encourages necessary reforms of the labor and product markets and the tax system. The political rationale is that as the crisis becomes more palpable and harms an increasing number of individuals, politicians can act as "saviors in need" and count on broad support while opposition by the short-term losers becomes less important (Donges / Freytag, 2004).
- Reforms in other countries increase the probability of reforms in Germany. Positive reform outcomes abroad strengthen the willingness for reforms at home. Countries learn from the experience of other countries which perform better and by adopting successful reform policies. Benchmarking and peer pressure also amplify the learning effects (Eichhorst et al., 2004)
- Reforms in one area increase the probability of reforms in other areas (cross-area spillovers). For example, a liberalization of product markets reveals deficits in the labor market when unemployment rises and employment shrinks so that the pressure for labor market reforms also increases. If the product market reforms increase the dynamics of the economy, new jobs are created which often do not fit into the corset of anachronistic labor market structures thus raising the pressure to deregulate the market. The IMF finds a delayed, positive correlation between reforms of the product and labor markets.

5.2 Delaying Aspects: Are J-curve Effects Inevitable?

In the short run, market-based reforms can lead to contractive effects because their gains only materialize gradually. Such initial effects are presumably all the higher, the more private households worry about the effects. A representative sur-

vey by the Association of German Banks (2004) shows that Germans presently do not lack the will to, but the trust in reforms. If politicians successfully convince voters of the significance and dividends of the reforms, avoid design flaws and soothe the public's expectations, short-term contractive effects will likely be small or non-existent. Communication and skill in crafting the reforms, therefore, have real effects in the short run and influence voters' willingness to support the reform effort.

A look at the US, Sweden and the UK shows that delaying effects (J-curve effects) indeed played a role at the outstart of reforms for up to 3 years in the case of Sweden but that there were no similar effects in Germany during the 1980s (1 year). An important reason for the delay was the high inflation expectation in each country. At the beginning of the reforms the UK, Sweden and the US, therefore, had to apply monetary breaks to stabilize the price level and lower inflation expectations. As a result all three countries initially had to battle a pronounced timing inconsistency problem (Kydland / Prescott, 1977). In Germany the situation was different in 1982 because the inflation rate was relatively low. Thus, in the case of the UK, Sweden and the US the J-curve effect is to a large degree explained by the necessary monetary policy measures to reduce the inflation expectation. At present this problem does not exist in Germany. The inflation rate is low and expectations do not have to be altered to successfully pursue structural reforms.

In addition, policymakers often have to wrestle with a credibility problem for which they are all too often themselves responsible. The economic actors intially do not trust the political change of mind and stay on the sidelines. The long-term viability of a market-friendly change of course has to be regarded as especially problematic if the political priorities of the opposition diverge from those of the government and the election outcomes are uncertain. In this case the adopted policies can easily be reversed so that the reform measures will hardly trigger positive results in the short run. However, even under this aspect the conditions for quick positive effects are rather favorable. German politicians presently do not have much political capital, but voters are not able to alter the policy options by exchanging the ruling parties. They have to assume that if elected the opposition will, on the whole, stick to the adopted course. This suggests that the desired behavioral changes will indeed take place quickly and that the reform gains will surface early.

5.3 Distributional Aspects: Does a Rising Tide Lift All Boats?

Aside from delayed effects, distributional aspects can also stand in the way of pro-growth reform policies. If reforms increase the average real income per capita, this does not mean that the rising tide lifts all boats. It is possible, even probable that income inequality will grow. Politicians up for reelection will take this into account. It is useful, therefore, to look at the post-reform trend of inequality measures in the surveyed countries to gain some empirical clues for the distributive

effects. The analysis uses the Gini-coefficient, the P90 / P10 ratio and the share of low-income-households (see Box 2). The results in detail:

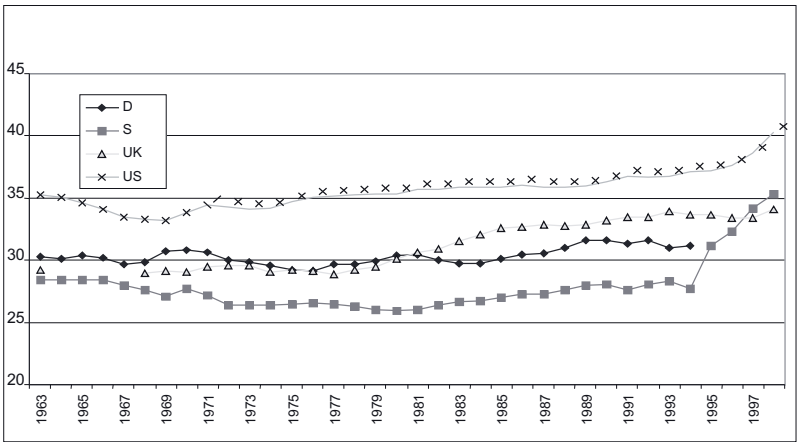
- For Germany, Sweden and the US, none of the inequality measures indicates a spike in income inequality immediately after the reform process was launched (US 1981, Sweden 1991, Germany 1982 / 83).
- In Germany, the Gini-coeffient even decreased at the outset and rose only slightly in the second half of the 1980s. In the US, inequality only increased in the later course of the 1990s. The same holds true for Sweden where the Gini-coefficient remained relatively constant before it shot upwards in 1995. However, in the US as well as in Sweden the reforms were already paying off in the form of strong economic growth when the increase in income inequality set in.
- The P90 / P10 ratio and the share of low-income households confirm these findings overall. In the US, the two measures were even lower in the mid-90s than in the mid-80s. In Sweden, the share of low-income households rose from 5.3 to 6.4 percent but remained on a comparatively low level.
- In Germany, the share of low-income households developed somewhat differently than the Gini-coefficient. The former increased by 3 percentage points between the mid-80s and the mid-90s. However, the share of low-wage workers continues to be low in Germany relative to other countries.
- For the UK, the measures draw a different picture. During the Thatcher era (1979 – 1990), the Gini-coefficient rose from 29.5 to 33.2 percent after almost no change during the previous decade. The relation between the highest and the lowest income decile (P90 / P10 ratio) also indicates growing inequality. In the mid-90s the income of an individual in the top decile was 4.1 times the income of an individual in the bottom decile. Finally, the share of low-wage workers significantly increased over a decade.

The distribution effects of reforms are not unambiguous. While there is evidence that in the UK reforms were linked with a strong increase of income dispersion and that some demographic groups suffered not only in relative but also in absolute terms, Sweden and even the US did not experience such undesired effects. This holds true for Germany during the 1980s.

Box 2

Indicators for the Development of Income Inequality

Gini-coefficient [1]



[1] The Gini-coefficients of the University of Texas Inequality Project (UTIP) estimate household income inequality on the basis of market (pre-tax, pre-transfer) income. The coefficients are computed from a regression relationship between the Deininger and Squire inequality measure and the UTIP / UNIDO wage inequality measure, controlling for the source characteristics in the Deininger and Squire dataset, industrial employment in percent of total employment, urbanization and population growth.

Source: University of Texas, 2004.

Comparison of the Income Deciles

	Level of P90 / P10 ratio	Change of P90 / P10 ratio	
	mid-1990s	mid-1970s / mid-1980s	mid-1980s / mid-1990s
D	3.7	n.a.	0.4
S	2.7	–0.2	0.1
UK	4.1	0.5	0.5
US	5.5	0.8	–0.2

Source: Förster, 2000, p. 75.

Share of Low-income Households[1]

	mid-1980s	mid-1990s	change mid-1990s / mid-1980s
		in percent	
D	6.4	9.4	46.9
S	5.3	6.4	20.8
UK	6.9	10.9	58.0
US	18.3	17.0	–7.1

[1] Less than 50 percent of median household income.

Source: Förster, 2000, pp. 94 f.

6. Conclusion

Our analysis shows that higher growth is not out of reach for Germany. There is no natural law which decrees that the weak trend growth of the production potential in the past has to continue in the future. Supply-side reforms could again raise the annual growth rate of the production potential to 2.5 percent. The analysis of the growth drivers and a look at other countries also show that there is more than one road to more employment, growth and wealth. Politicians thus have options. Sweden focused its reforms on enhancing human capital, the UK on labor market reforms and the US on stimulating investment. There is no road to success, however, without active fiscal consolidation.

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Developing a Political Agenda for Sustainable Economic Growth in Germany

Comment

By Kilian Bizer*

Abstract

Germany's low growth rates over the last decades are disturbing. Why is growth so slow and what can be done about it are the questions asked by *Klös* and *Kroker.* Their answer is based on the growth factors as suggested by Germany's Council of Economic Experts including labour mobility, corporate and public investment, balanced fiscal budget as well as human capital formation. These driving factors explain much of the slack in growth in the past. A persistent and significant change in these will bring about more growth in the future. If the authors are correct, Germany's federal government took the right turn by introcuding their agenda 2010 to increase growth and employment.

JEL classifications: D 78, E 61, O 11

Keywords: Economic policy reforms, growth, international comparison

1. Introduction

Low growth of GDP, low growth of production potential, high and persistent unemployment, an increasing wedge between net wages and gross payments, increasing public deficit – Germany's economy suffers from several structural problems. The paper of *Klös* and *Kroker* argues that such structural problems can be solved by supporting certain driving factors of growth. According to traditional growth theory labor and real capital are crucial. In the light of modern growth theory, human capital should be considered as well. Based on this, the authors ask how Germany can be put on a path to higher growth focussing solely on a measure easily quantified though not entirely undisputed: growth in GDP. One could ask, whether happiness is not a better indicator as growth might be misleading about

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the quality of life within a society (Layard 2005). One could also argue that sustainability includes more than economic growth as there could be ecological limits undetected by societies (Daly and Cobb 1989). And one could suggest that better indicators exist than growth in GDP as it includes defensive costs not really increasing output such as traffic accidents etc. All these critical points may be correct if general objectives of a society are discussed, but as the focus of the authors is explicitly on detecting what type of policy can solve the problem of slow economic growth, these points can be neglected for the time being. In other words: If growth is the problem, what can be done to increase it in Germany?

2. Varieties of Growth Paths

Following Germany's Council of Economic Experts the authors suggest a variety of growth drivers, among them corporate and public investment, population growth, human capital, tax and social security burden, government debt and structural unemployment. The authors argue that these growth drivers are responsible for most of Germany's growth in the past and, therefore, will be for growth in the future. Any growth oriented policy should take into account these driving factors. Such a recommendation raises expectations: The analysis should suggest which factors are the most important ones to give hints to politicians. But the authors continue by setting up growth scenarios with a time horizon of the next 20 years. The scenarios include one of stagnation, in which the growth drivers deteriorate at the same rate as in the past, one of halted downturn with growth drivers at current levels, one of supply side reforms, which increases the levels of growth drivers to values of the early 1990s. Finally, three scenarios reflect changes of growth drivers in the UK, Sweden and the US on Germany to determine the effect these values would have on German growth.

One of the most interesting results of this paper is, that most of the reform scenarios bring about similar increases of income per capita even though growth rates change from 0.3 percent in "stagnation" to 1.7 percent in "halted downturn", and finally 2.4 percent in "supply side reform". If Germany would reach values of growth drivers either of Sweden, the UK, or the USA, growth would remain near the supply-side scenario. The authors take this result to indicate that there is more than one way to successful growth policy. "Varieties of capitalism" (Esping-Andersen, 1990) as a form of institutional set-up will bring about different results in growth over time but differences will probably not lead to abandoning institutional set-ups (Hall and Soskice 2001). As interesting as such a result may be, the conclusion goes far beyond what is backed by the approach. Hall and Soskice 2001 compare various systems of capitalism. Such systems consist of institutions formed historically in reaction to certain social problems. One of the problems of such institutions is their effect on growth. As they usually serve also another purpose, such as social security, fairness or peace, their negative impact on growth in the

short run might be justified by economic stability in the long run. If institutions evolve around such conditions then they are not interchangeable, or to put it more clearly, it is difficult to adjust Germany's tax and social security rate to the levels achieved in the UK or the US as it reflects preferences about social stability and not only impacts on growth. As the authors focus on growth, they are well-justified to conclude that varieties of institutional arrangements can all bring about growth if applied adequately. But they should not conclude that an adoption of Swedish, British or US-American values of growth drivers could be achieved by the German institutional setup. And generally speaking, policy reform always includes a change of the institutional setup in order to remedy failures of the past.

3. The Agenda 2010

The reform scenarios lead to building blocks for reform. Though not really conclusive in the flow of the argument, the authors suggest that policy reform originates always from stress. The higher awareness of structural problems, the sooner the electorate accepts reforms. And the lower growth, the higher is general awareness. Of course, it is easy to make politicians responsible for any lack of awareness of the general public, but politicians – in the light of political economics – raise awareness only on points which serves their general objective to be re-elected. Under such circumstances economists should not argue in favour of higher moral standards for politicians but should be aware of the incentive situation these politicians face.

The authors suggest that policy reform should take place in four reform clusters: employment mobilization, human capital formation, investment stimulation and budget consolidation. They disregard that these reform clusters are interdependent: If the government chooses to stimulate investment by cutting taxes they worsen chances of budget consolidation. If the government chooses to support human capital formation by investing in universities, the deficit increases as well. And even employment mobilization is not easy to achieve without further costs. The theoretical analysis raised the expectation, that the authors would suggest which reform cluster brings about highest growth impacts, but there is no answer to that.

Looking at the four reform clusters, it appears that the Germany's federal government did everything right by introducing the agenda 2010 focussing on social security reform, labor markets as well as other growth supporting policies such as the corporate tax reform. Even the government's family policy although costly appears favourable as it increases labour mobility of women, especially mothers. The question is, how do these policies affect growth drivers? The answer is unknown as data on the effect of these reforms are largely unavailable. Despite the initial efforts to develop growth drivers, there is little gained from such an analysis once actual and recent policy reforms are to be evaluated.

The authors approach to look at policy reforms in the short, medium and long run in order to assess relevance for politicians to adopt such policies is to be applauded. Also their explicit regard of distributional effects is important as politicians will be under pressure to justify any regressive effects. But more generally, reform policies do not emerge because problems exist – or only in a naïve world. Reform policies are suggested by politicians who hope to secure their re-election. At times there will be reforms even if no problem exists, but politicians hope to appear as bringing solutions. Sometimes actual problems will be solved. And sometimes problems will remain because politicians fear to loose the next election if they begin to work on the problem.

Looking again at the agenda 2010 the coalition of Socialdemocrats and the Greens tackled serious problems and even if *Klös* and *Kroker* do not analyse individual reform projects, they certainly support the general direction of the reforms. Their answer to the question of how to reach more growth is to adopt reform policies aiming on increasing investment and labour mobility as well as human capital, and reducing the tax wedge as well as public debt. With the exception of public debt, all of these growth drivers are addressed by the agenda 2010 even though success is slow and the extent of reforms might be still insufficient. In order to be fair to politicians, economists should concede that they can give little indication what level of reform will be actually sufficient. In this regard, *Klös* and *Kroker* are by no means alone, but joined by our entire profession.

4. Conclusion

The authors argue that growth drivers such as investment, public debt, structural unemployment and human capital formation determined actual growths rates in the past. Based on some estimations, the authors propose that Germany can find back to higher growth rates if it adopts policies supporting these growth drivers. Unfortunately no answer is given on the relative importance of these growth drivers, i.e. is it reasonable to support human capital formation by financing universities even if this increases public debt? The problem for German politicians is not simply to recognize what is generally a good economic policy, but rather what reform option is the most urgent and the most helpful in being re-elected. Economists should never fall into the trap of demanding higher standards of behaviour from politicians, but rather accept the institutional incentives relevant for their actions. Pro-growths reforms, that is the central message of *Klös* and *Kroker,* are not only possible, but can be achieved by a variety of choices as long as they support the growth drivers.

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Welfare Effects of Capital Mobility with Rigid Wages

By Tobias Seidel*

Abstract

Under the assumption of flexible goods and factor markets, globalisation exhibits welfare gains for all participating countries. This paper analyses the effects of downwards rigid wages on the volume of capital flows and welfare. In a stylised model where capital is the only channel towards a convergence of factor prices, I find that wage rigidity yields excessive capital flows and unemployment. This results in reduced welfare compared to a world with flexible wages. Workers who should be protected by the rigid wage bear the entire welfare loss themselves. For Home, autarky should be preferred to integration. The target region of capital exports, however, benefits from these excessive capital inflows by higher wages and a higher welfare level. The bottom line of this discussion is not to fight market forces by avoiding wage cuts through rigid wages but rather compensate workers through wage subsidies.

JEL classifications: F15, F21

Keywords: Capital mobility, rigid wages, welfare

1. Introduction

Globalisation is not a new phenomenon. However, since the Fall of the Iron Curtain and the integration of China in the world economy industrialised countries are confronted with a more severe competition from low-wage economies. But many economists and politicians claim that globalisation promises welfare gains. However, this result depends on the crucial assumption that goods and factor markets are flexible. Several studies like Krugman (1995), Nickell (1997) or OECD (1994) argue that this is not the case for all countries. Especially continental European economies are characterised by a lower potential for wage adjustments. This paper analyses the effects of rigid wages if market integration takes place via capital movements only.

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There are basically three channels that work in the direction of factor price equalisation: trade, migration and capital movements. This paper focuses on the latter mechanism only. In fact, the results that have been achieved in trade and migration models with rigid wages can be affirmed in this framework as well.[1] In a simple capital allocation model with two countries and one good, I show that unemployment results as a residual adjustment mechanism and national output declines. Also capital movements are pathologically higher than with flexible wages implying an inefficient capital allocation.[2] The welfare loss is borne by workers in the rigid wage country only. It would thus be preferable for this economy not to integrate. Workers in the foreign economy, however, benefit by excessive capital imports that boost labour productivity. If in addition to rigid wages a distorting capital tax is implemented in the rigid wage country, unemployment increases further and so do welfare losses. The bottom line of this analysis is that it is not advisable to prevent market forces from working. This article provides an argument in favour of a different way to protect workers in industrialised countries against the forces of globalisation, for example by paying wage subsidies.

There is a large literature on the question whether forces of globalisation or skill-biased technological change is the main determinant for lower labour demand. Krugman and Lawrence (1993) and Lawrence and Slaughter (1993) are supporting the latter explanation whereas Wood (1995) argues that the forces of globalisation via manufacturing imports from low-wage countries are mainly responsible. In contrast to the paper by Wood, this paper does not consider trade, however, but rather the link via capital markets in a one sector economy. The relevance of capital movements for labour market outcome was shown by Becker et al. (2004) in a recent study. By using the FDI database of the German Bundesbank, they found that German and Eastern European manufacturing workers are substitutes and that a wage increase in Germany has a positive effect on the creation of jobs in Eastern European countries and vice versa.[3]

The outline of the paper is as follows: I provide first a short overview of capital markets liberalisation, namely the recent development of FDI as an indication for capital mobility. Then, labour markets in Europe and North America are compared to justify the central assumption that wages are more rigid in several continental European states. In chapters 4 to 6, a simple model will be set up to analyse welfare effects and the impact of rigid wages on the volume of capital movements in both the flexible and the rigid wage case. Chapter 7 discusses the effects of a distorting capital tax, chapter 8 concludes and discusses some policy implications.

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1 See Brecher (1974), Davis (1998) and Sinn (2005) for a discussion of a Heckscher-Ohlin model with rigid wages. Sinn (2004a) analyses rigid wages in the presence of migration.

2 The expression "pathological" goes back to Sinn (2005) who discusses the impact of rigid wages on the volume of trade. He finds that the rigid wage country specialises too much and is characterised by an excessive trade volume from a welfare perspective.

3 See also Marin et al. (2002) and EEAG (2005), chapter 2, for a discussion.

2. The Development of Capital Mobility

Before World War I capital flows had already reached very high levels. These were only achieved again by the end of the 20th century.[4] What is unprecedented, though, is the boom of foreign direct investment (FDI). Inflows on a globally aggregated level were seven times higher in 2000 than in 1990. As a share of gross fixed capital formation, FDI quadrupled in the same time span and accounted for 20 percent in 2000. Figure 1 illustrates this development.

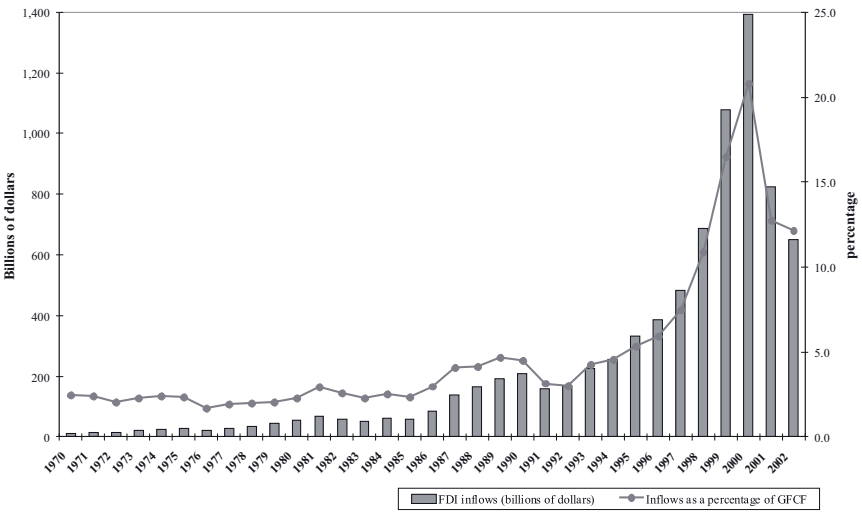


Figure 1: FDI Inflows and Share in Gross Fixed Capital Formation (GFCF)

This is a clear indication of globalisation of capital markets. Investors do not wear blinders to focus on national markets only but rather search for investment opportunities around the world. Of course, some regions are more attractive than others. But the sharp increase in FDI flows is reflected on a disaggregated scale as well. FDI inflows to Central Eastern European Countries (CEEC) have grown from literally zero around 1990 to three billion US-$ which is equivalent to 18 percent of gross fixed capital formation in this region.[5] This development was to a large extent driven by German engagement. In 1999, German investors owned one quarter of the inward FDI capital stock in the eight Eastern European EU Member countries.[6] According to a survey by the Institute of the German Economy (2002), nearly 60 percent of German firms that employ between 100 and 5000 people have

4 Sachs and Warner (1995).

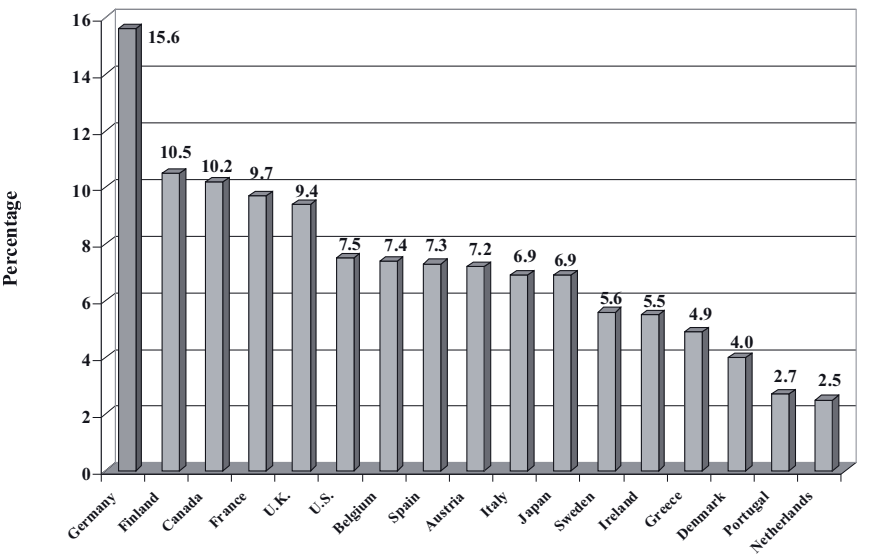
5 Of course, the boom in Eastern Europe was only possible as the Iron Curtain came down.

6 UNCTAD FDI Database.

invested abroad. Moreover, Marin et al. (2002) find strong evidence that a large share of FDI is vertical. This is supported in a survey by the German Chamber of Trade and Commerce (2003), where German firms stated that the main reasons for relocation are labour costs and taxes. These impressive figures arouse suspicion that domestic labour markets must face adjustment pressures from increased international competition.

3. Labour Market Institutions and Outcome

Labour market developments can be roughly divided into two groups. While the United States, for instance, have experienced growing wage income inequality without a significant increase in unemployment rates, continental European states like Germany are confronted with a trend growth of unemployment since the 1970s and no significant change in relative wages.[7] There is a large literature on the underlying reasons for this pattern. Most studies explain this by differences in labour market flexibility in connection with a decreasing relative demand for (low-skilled) labour. If wages cannot react to shifts in relative labour demand or supply, then unemployment is the residual adjustment mechanism. If they can an increase of relative wages results.



Source: OECD (2003), p.151.

Figure 2: Unemployment Rates of the Low-Educated[8], 2001

7 OECD (1996). See also Nickell (1997) and EEAG (2004).

8 Below secondary education.

There are basically two sources of wage rigidity – statutory minimum wages and benefit systems. According to OECD (1994), there is evidence that benefit payments of the welfare state are responsible for wage inflexibility and thus unemployment in the lower income distribution. Benefits determine a reservation wage under which market wages cannot fall. Germany is an example for very high unemployment rates among the low-educated, which comprises people with less than a secondary education, as Fig. 2 shows. It ranks first with 15.6 percent followed by Finland, Canada, France and the U.K. with around 10 percent. This pattern is not too surprising if one thinks of the very generous enlargement of the German benefit system since the 1970s. Social welfare payments increased by 450 percent between 1970 and 2000 whereas industrial wages increased by 350 percent "only" during the same time.[9]

The other source of wage rigidity is minimum wages set by the government.[10] The crucial question, though, is whether these minimum wages are binding. The U.S. having a long tradition of wage floors pays very low minimum wages and only 1.5 percent of full-time employees receive that wage. In Luxembourg or France, however, these statutory wages are higher and around 15 percent of full-time workers receive these payments.[11] Both benefit payments and statutory minimum wages produce the same outcome if they prevent wages from adjusting to the market clearing level.

4. The Model

In the model, I distinguish between flexible and rigid wage settings. By rigid wages, I mean that wages might rise but that they cannot fall below the prevailing level. Two countries, denoted by H (Home) and F (Foreign), are endowed with different capital-labour ratios $k^j = \frac{K^j}{L^j}$, $j \in \{H, F\}$. I assume that the labour force is of equal size in both countries, but Home possesses more capital than Foreign. Hence, $k^H > k^F$. Capital is understood as real rather than financial capital depicting the long run allocation. Both countries only produce one good with the same constant returns to scale technology that can be characterised by a neoclassical production function with the usual properties. Relative price changes are faded out, since the price of the good is set to unity in both regions. Output in country j is denoted by $Y^j = f(K^j, L^j)$. The production function exhibits positive but decreasing marginal returns, $f_K^j > 0$, $f_L^j > 0$ and $f_{KK}^j < 0$, $f_{LL}^j < 0$. The cross derivatives are positive, $f_{KL}^j > 0$, $f_{LK}^j > 0$, reflecting labour and capital to be complements in the production process. Due to perfect competition factors are paid their marginal products, $f_K^j = r^j$ and $f_L^j = w^j$. Since both countries produce the good with the

9 Sinn (2004a).

10 See OECD (1998) for a discussion.

11 EUROSTAT (2004).

same constant returns to scale technology, marginal products, and hence factor prices, can be expressed as functions of the capital-labour ratio k^j alone.

$$w^j = \lambda(k^j) \quad \text{with} \quad \lambda' > 0 \tag{1}$$

and

$$r^j = \mu(k^j) \quad \text{with} \quad \mu' < 0 \tag{2}$$

The higher the capital-labour ratio, the more productive workers and hence, the higher the wage rate will be. The opposite is true for capital. From the relative endowments in the respective countries we can then derive factor prices directly. As $k^H > k^F$, we know that $w^H > w^F$ and $r^H < r^F$. The situation in autarky, when no capital movement is possible, is presented in Fig. 3. Rigid wages have no influence on the outcome in autarky since they do not have to adjust downwards and thus, are not binding. The width of the box reveals the world capital endowment, $K^W = K^H + K^F$. Home is endowed with $H\bar{K}$, whereas Foreign owns $\bar{K}F$ units of capital. The marginal productivity curves are plotted for given labour forces, $\bar{L}^H$ and $\bar{L}^F$ respectively. They are identical and homogeneous of degree zero. Home's GDP can now be shown by the integral of $f_K^H(\bar{L}^H)$ between the boundaries H and $\bar{K}$. This is the value of the output for given K and L. With welfare being linearly dependent on output, an increase in output always implies a welfare gain and vice versa. According to Euler's Theorem we know that $pY = f_K K + f_L L$. With $p = 1$, $Y - f_K K = f_L L$ reflects labour income, represented by the area ACr_0^H. Capital income is made up by $r_0^H C\bar{K}H$. The same analysis applies to Foreign. Workers share the income DEr_0^F while capital owners earn $Dr_0^F F\bar{K}$.

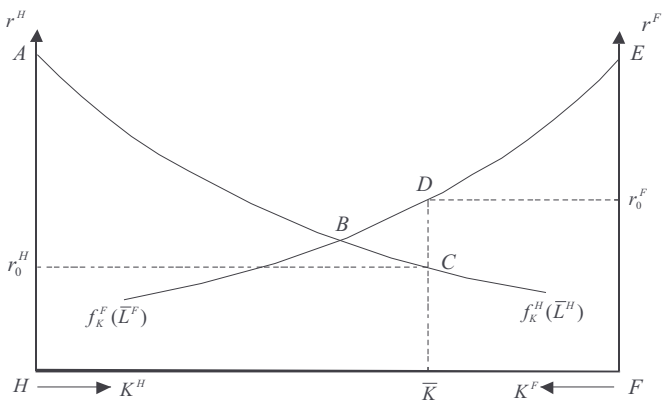


Figure 3: Autarky

5. Integration with Flexible Wages

In this section, I allow capital to be mobile internationally whereas workers are bound to be immobile. Capital owners in Home now have an incentive to employ their capital in Foreign because the marginal return is higher there. Under the assumption of full employment factor prices have to adapt since marginal productivities change. Capital exports of Home will reduce the capital-labour ratio in this region with the labour force remaining fully employed. According to (1) and (2), w^H falls and r^H rises. The opposite is true for Foreign. An increasing relative factor endowment boosts the marginal productivity of labour und depresses the marginal productivity of capital. Assuming flexible markets, factor prices converge. This process continues until interest rates are equal in both countries, i. e. until capital owners do not have an incentive to relocate their capital any more. From equation (2) we know that r can only be equated if the capital-labour ratios are equal in both jurisdictions. Hence, wages must be equal in both countries as well. This is illustrated in Fig. 4.

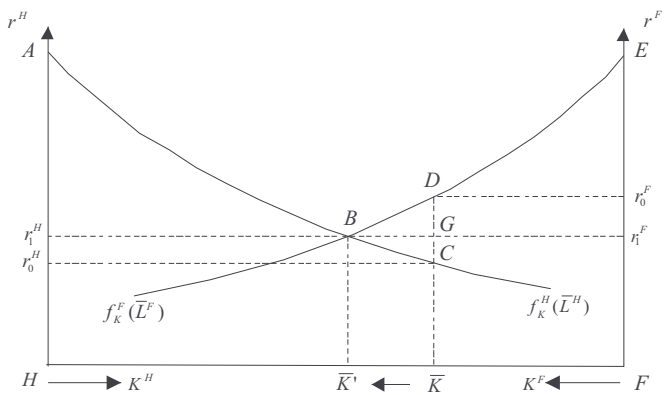


Figure 4: Integration with Flexible Wages

The relocation of capital to Foreign is depicted by the movement from $\bar{K}$ to $\bar{K}'$. At this distribution of world capital endowment on the two regions marginal productivities of capital equate for given labour forces (B). World GDP and thus welfare increase by BCD from $ACDEFH$ to $ABEFH$. Thus, the prevailing sub-optimal welfare level could be improved through factor mobility. But what effect do capital movements have on distribution and national income? Home's GNP[12] has grown to $ABG\bar{K}H$, an increase by BCG. This part falls to capital income, additionally to the redistribution from Home's labour income $r_1^H BCr_o^H$. Thus, capital income has increased to $r_1^H G\bar{K}H$ and labour income has fallen to ABr_1^H. It is clear

12 Part of Home's income is now earned in Foreign.

that the wage rate must have decreased with the labour force being constant and fully employed. Also, it must be stated that capital now earns its return partly in Home ($r_1^H B\bar{K}'H$) and partly in Foreign ($BG\bar{K}\bar{K}'$). Foreign's GNP[13] also increased, namely from $DEF\bar{K}$ to $BEF\bar{K}G$. In this case, however, the welfare gain accrues to labour. In addition, the capital return in Foreign declines, i. e. that there is additional redistribution from capital to labour of the size $Dr_0^F r_1^F G$. Capital income exactly loses this amount and earns $Gr_1^F F\bar{K}$.

To sum up, capital mobility yields factor price equalization and welfare gains if relative endowments differ between the two countries in autarky. However, the factor that is relatively scarce in each country will bear the losses because it becomes less scarce in the integrated world. The relatively abundant factor, however, wins as it becomes scarcer. Since these gains overcompensate for the losses of the other factor, there are net welfare gains from integration of capital markets of the Kaldor-Hicksian type.

6. Integration with Rigid Wages

What happens if the borders are opened for capital flows, but the wage rate in Home cannot fall? We have seen above that factor prices can be expressed as a function of the capital-labour ratio k alone. If Home maintains its high wage – the autarky wage level – then the capital-labour ratio must not change. But since capital cannot be prevented to leave the country, k^H can only be kept constant if parts of the labour force become unemployed. Say, if 10 percent of the capital stock relocates, 10 percent of the labour force has to become unemployed to keep k^H constant. Fig. 5 illustrates this relationship.

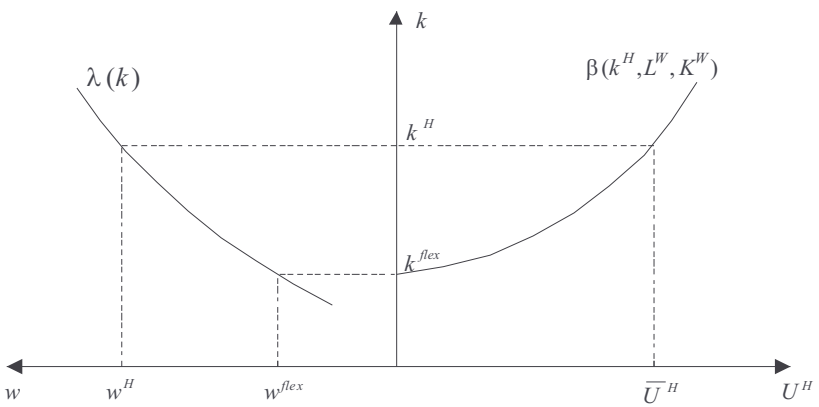


Figure 5: Relation between Wages, Relative Endowments and Unemployment

[13] Part of Foreign's GDP is now earned by Home.

The left part of the diagram shows the relation between the wage rate and the relative factor endowment k. The more capital available per worker the more productive labour can be and, due to perfect competition, the higher the wage rate. Thus, the slope of $\lambda(k)$ must be negative. The right part illustrates the relationship between relative endowments and unemployment in Home. Unemployment is a function of Home's capital-labour ratio, the aggregated global labour force and the aggregated global capital stock. The more unequal the capital-labour ratios and the more unequal the factor endowments in absolute terms are, the higher the unemployment in Home to keep the relative endowment and the minimum wage rate constant. It becomes clear that for rigid wage countries which are significantly smaller or whose capital-labour ratio is much higher than in the flexible wage country, it can happen that the entire labour force needs to be unemployed in order to keep the global capital-labour ratio on the national level. For small countries, this is just impossible. This underlines the pressure on national labour markets with rigid wages if markets integrate.

Capital exports from Home create a downwards pressure on wages. With flexible factor markets wages will fall to w^{flex} in line with k. This implies zero unemployment as can be read from the right part of Fig. 5. If Home's autarky wage level is rigid, however, capital exports generate unemployment of $\bar{U}^H$. Relative endowments in Foreign converge to Home's level k^H and so do factor prices. The equilibrium with rigid wages is still characterised by factor price equalisation and the same relative factor endowments in both jurisdictions.

A numerical example might illustrate this: Let Home be endowed with 1200 units of capital and 1000 units of labour. Foreign possesses 720 units of capital and also 1000 units of labour. Hence, $k^H = 1.2$, $k^F = 0.72$, and $k^{flex} = 0.96$. Each of these endowments imply different wage rates, $w^H > w^{flex} > w^F$. If Home's wage rate should be kept constant, relative endowments have to be equated to 1.2 in both countries. Again, this implies that factor prices are equated as well.

$$k^W = \frac{K^H + K^F}{L^H + L^F - U^H} = k^H = k^F = 1.2$$

$$k^W = \frac{1200 + 720}{1000 + 1000 - U^H} = k^H = k^F = 1.2$$

$$U^H = 400$$

In this example, 40 percent of the labour force has to become unemployed in order to equate both countries' relative endowments to the autarky level in Home.

What are the welfare implications for both countries if Home maintains its high wage level? For this purpose, it is helpful to use the box diagram again. Starting from C and D in Fig. 6, which reflect the autarky equilibria in Home and Foreign, capital leaves Home, represented by the movement to the left on the horizontal axis. In line with capital exports, employment is reduced in Home. For every unit

of capital that leaves the jurisdiction, $\frac{1}{k^H}$ workers lose their job to keep Home's relative endowment constant. As a consequence, unemployment prevents an increase of the marginal productivity of capital in Home. f_K^H shifts downwards, since labour is no longer constant. For every unit of capital less labour will be available if unemployment reduces employment and thus decreases the marginal return to capital. The shifting stops at the point where both marginal productivity curves intersect at the prevailing interest rate in Home, namely B'. Since interest rates are equated at $r_0^H = r_2^F$, we know that relative endowments must be equal and so must be wages.

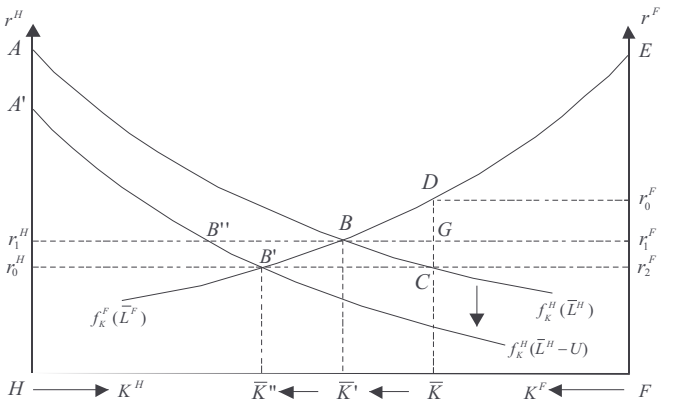


Figure 6: Capital Mobility and Rigid Wages

Starting from autarky, Home's GNP shrinks to $A'B'C\bar{K}H$. This is an intuitive result since unemployment is generated in Home. But Foreign can even increase its income by $B'DC$ rather than just BDG in the flexible wage scenario. Foreigners now earn $B'EF\bar{K}C$. From Home's welfare perspective, autarky should be preferred to market integration.

Result 1: Rigid wages in Home generate unemployment if capital mobility is introduced. This leads to welfare losses. Thus, autarky implies a higher welfare level than capital market integration. Foreign, however, benefits from Home's wage rigidity in terms of higher income.

The intuition for this result is that workers in Foreign will become even more productive than in the flexible wage world because more capital is imported compared to the reference situation. This can be seen from Fig. 6 as well. With flexible wages $\bar{K}\bar{K}'$ units of capital will cross the border and will be employed in Foreign. With wages being downwards rigid, however, the volume of capital exports in-

creases to $\bar{K}\bar{K}''$. Hence, the convergence process is extended artificially until the capital return in Foreign has fallen to Home's level and the wage rate in Foreign has increased to the level in Home. Autarky factor prices in Home will become world factor prices.

Result 2: The volume of capital exports to the labour abundant country will be higher with rigid wages relative to a flexible wage scenario in order to achieve a global capital labour ratio that is equal to Home's autarky endowment. This ensures factor price equalisation at Home's autarky level.

Who bears the welfare loss? Comparing the rigid wage equilibrium with autarky it becomes clear that Home loses output of the magnitude $ACB'A'$. This part of GDP used to be labour income in autarky. Due to wage rigidity and capital market integration it is partly lost, namely $ABB'A'$, and partly redistributed to workers in Foreign, $B'BC$. In Home, the income position of capital owners is unchanged, only workers lose through unemployment. The bottom line is that the people who should be protected against the forces of globalisation will nevertheless bear the welfare loss themselves.

Result 3: Workers who should be protected from the forces of globalisation by downwards rigid wages nevertheless bear the entire welfare loss themselves through unemployment.

7. A Distorting Tax on Capital

So far we have assumed that unemployed workers either receive no income as in Davis (1998) or get unemployment benefits which are raised in a lump-sum fashion. This section examines the effect of a distorting tax instrument as an alternative to finance these benefits. Let us start from equilibrium B' with taxes being either zero or at the same absolute level in both countries. Hence, no distortions occur at this point. Now, the government in Home imposes a unit capital tax τ, depicted by DG in Fig. 7. Capital now has to earn the interest rate plus the tax rate. Since the net return in Foreign is initially higher than in Home, capital will relocate from Home to Foreign until the net marginal returns are identical in both regions again. The relocation implies a shift of the tax burden onto labour. The capital-labour ratio falls and so do wages. The latter, however, is assumed not to be possible. In order prevent the marginal productivity of labour from falling, (more) unemployment emerges. The incentive for capital to flee the country that has been imposed a tax is kept upright until the last unit of capital left the region if wages are defended to the end. C will be the corner solution as illustrated in Fig. 7.[14]

Concerning welfare, the picture is clear. Home's income shrinks to zero whereas Foreign's labour force benefits from the excessive inflow of capital which boosts its productivity. In the new equilibrium, the world interest rate (which is equal to

[14] A proof can be found in the Appendix.

the national interest rate in Foreign) has settled down to r_4^F. Hence, capital income is earned in Foreign only and amounts to $HCr_4^F F$. Workers in Foreign share CEr_4^F.

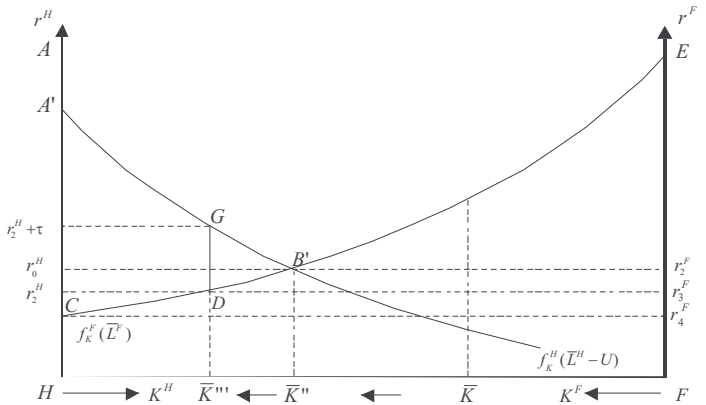


Figure 7: The Impact of a Capital Tax

Result 4: A distorting capital tax will yield a larger welfare loss if wages are downwards rigid. Since unemployment prevents an increase of the return to capital, more capital will be driven out of the country. Home's welfare loss is thereby increased.

Of course, this result is far away from being a true picture of reality. However, it impressively illustrates the catastrophic impact of rigid wages if distorting tax instruments are in place. This delivers a strong argument in favour of implementing non-distorting tax regimes.

8. Conclusions and Policy Implications

This paper has shown that capital mobility yields welfare losses for a country that prevents its high wages from adjusting downwards. Capital exports of Home which is relatively abundantly endowed with that factor of production may make this adjustment necessary since domestic labour productivity is reduced at a given employment level. Unemployment, however, keeps both the relative endowment and wages in Home constant. The consequence is excessive capital exports which will equate Foreign's factor prices to Home's autarky level. The welfare loss is even larger if Home implements a distorting tax on capital. This loss is entirely borne by workers in Home who should be protected from the forces of globalisation through rigid wages. Although the employed model is stylised and captures the long run perspective only, the results demonstrate that a country cannot fight global market pressures without (immense) welfare losses. Not integrating in the world economy implies a higher welfare level given rigid wages.

Assuming homogeneous labour and wages to be rigid at the prevailing level might be too simplistic. However, it is easy to reinterpret the results when these assumptions are relaxed. Firstly, if wages are allowed to be cut at least a little, unemployment would be lower and the results are less extreme with regard to capital exports and welfare losses. Secondly, wage rigidity is especially prevalent for the lower wage distribution. With heterogeneous labour, only a part of the labour force would be affected and this would also yield less extreme results. The qualitative statements, however, do not change.

What policy implications arise from this discussion? Two directions of policy recommendations come to mind: the first is protectionism, the second more flexibility in the labour market. Barriers to trade and factor mobility would certainly reduce the pressure from international competition. However, the potential welfare gains associated with the internationalisation of local markets are forsaken. Therefore, following the latter option is more advisable. The dilemma, however, is that the free play of market forces may lead to tremendous social problems because wages might drop below socially accepted levels in industrial countries.

The dilemma could be solved in two steps that must be implemented at the same time. Firstly, statutory minimum wages and benefit payments that are only granted if someone is not working should be abolished. This ensures an efficient market outcome. Secondly, a wage subsidy scheme should prevent impoverishment of large parts of the labour force by paying wage supplements up to a certain income.[15] Not to fight market forces and compensating low-skilled workers in that fashion is by far the better strategy.

Appendix

Proof of Result 4:

$\lambda(k) = f_L^H = \bar{w}^H \quad \text{with} \quad \lambda'(k) > 0$

$\mu(k) = f_K^H = r \quad \text{with} \quad \mu'(k) < 0$

after imposing the tax rate, $\mu(k) < \mu(k^{tax}) = r + \tau$

Assume $L^{tax} > 0$, then $\frac{K^{tax}}{L^{tax}} = \frac{K}{L}$ and hence, $\mu\left(\frac{K^{tax}}{L^{tax}}\right) = \mu\left(\frac{K}{L}\right) = r < r + \tau$

Thus, $L^{tax} = 0$ and $K^{tax} = 0$ in equilibrium.

[15] Among others, Jacques Drèze (2004) and Sinn (2004a) have recently favoured this idea. See also Sinn et al. (2002).

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Welfare Effects of Capital Mobility with Rigid Wages

Comment

By Carsten Eckel*

In his contribution "Welfare Effects of Capital Mobility with Rigid Wages", Tobias Seidel (2005) applies a MacDougall-Kemp framework to address the impact of capital exports when real wages are rigid. He shows that in autarky a capital abundant home country has a higher wage and a lower marginal return on capital than a capital scarce foreign country. Hence, if the home country opens up for trade and international investment, the capital will move from the capital abundant country to the capitals scarce country. The relocation of capital increases marginal productivity of labor abroad and lowers marginal productivity of labor at home. As a consequence, demand for labor rises abroad and falls at home. In a scenario with flexible wages, the relocation leads to an increase of the real wage rate abroad while real wages at home fall. Simultaneously, the marginal return on capital rises at home and falls in the foreign country, thereby raising the domestic real rental rate and lowering the foreign real rental rate.

Seidel (2005) points out that in a scenario with rigid wages this channel of adjustment is not available. The fall in demand for labor leads to unemployment instead of a falling in the wage rate. This has three consequences. First, the real rental rate at home cannot rise as long as the real wage rate does not fall. Hence, the adjustment pressure is larger and the volume of capital exports exceeds its volume in the case of flexible wages. Second, the volume of production at home falls by more compared to the flexible wage scenario. As a consequence to the arising unemployment, income also falls, so that the free trade / free capital movements scenario is clearly inferior to autarky for the home country. And third, in the foreign country, the additional capital imports (compared to the case with flexible wages) push up foreign workers' productivity even more, so that foreign workers are the real beneficiaries of the high domestic wage rate.

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The paper nicely illustrates the mechanisms through which wage rigidities can affect factor productivities when capital is mobile internationally. It emphasizes the fact that low real rental rates provide an incentive for capital exports, and that capital exports can create unemployment when wages are rigid. In this setup, the capital-labor ratio is fixed, so that the level of employment is determined solely by the volume of capital employed in the domestic production. This is highlighted in figure 1 which illustrates the mechanisms in a Lerner diagram.

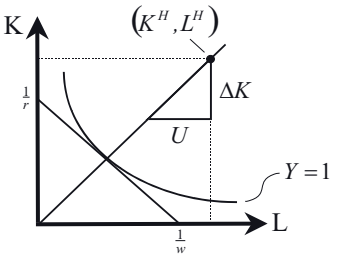

Figure 1: Capital Exports and Unemployment

In figure 1, $Y = 1$ denotes the unit value isoquant of the production of the consumption good *Y*. The unit value iso cost curve is given by the straight line between its *K* and *L* intercepts, $\frac{1}{r}$ and $\frac{1}{w}$ (r and w denote the real rental rate and the real wage rate in units of *Y*). The capital intensity in the production of *Y* is given by the ray from the origin through the point of tangency. The endowment of the home economy with capital and labor is illustrated by the point (K^H, L^H). Now assume that the real rental rate in this economy is lower than in the foreign country, so that capital has an incentive to move. In a flexible wage economy, the export of capital lowers the economy's capital-labor ratio (the ray from the origin falls) so that the production optimum moves along the unit value isoquant to the right. In the new economy, the slope of the unit value isoquant is lower, so that $\frac{1}{r}$ must fall and $\frac{1}{w}$ must rise. This corresponds to an increase in the real rental rate and a fall in the real wage rate.

When real wages are rigid, these rigidities prevent a fall in *w*. The new equilibrium must then be characterized by the same capital intensity, so that the ray from the origin does not change. In this case, the economy must move along this ray, so that any change in the endowment with capital also leads to a corresponding change in the employment of labor. In the case of capital exports, the adjustment process leads to unemployment. This is indicated in figure 1 by ΔK (capital exports) and U (unemployment). This diagram also shows that the unemployment is directly correlated with the extent of the capital exports. The more capital is relocated, the higher is unemployment.

The core problem for the home economy is its low rental rate. The low rental rate creates an incentive for capital to relocate. In Seidel (2005), this relocation actually takes place. The adjustment process is base on capital exports until the foreign rental rate is equally low. Then, a new equilibrium is reached and the relocation stops. This is the standard adjustment process in a MacDougall-Kemp framework. In a globalized world, however, this is not the only adjustment process. Here, I will present an alternative adjustment process that sheds some light on an issue of large public interest: outsourcing.

The term "outsourcing" is used in a variety of contexts. Here, outsourcing refers to imports of intermediate goods from low wage countries (Arndt 1997, Deardorff 2001, Jones 2000). In this context, outsourcing can raise the domestic rental rate and, thereby, lower the volume of capital exports. Through this channel, outsourcing can take away at least some of the adjustment pressure.

In order to illustrate how outsourcing works in this scenario, assume that in addition to liberalizing international capital markets, globalization also facilitates international trade in intermediate goods. In addition, assume that there exists a low-wage country that offers to trade a previously non-tradable intermediate good in exchange for the consumption good. This can be the same foreign country as in Seidel's original analysis, but it can also be a third country. If the intermediate good is offered at a lower price than what it costs to produce the input at home, this exchange takes place and outsourcing occurs.

The impact of outsourcing is illustrated in Figure 2. The original equilibrium as described in figure 1 is given by the point of tangency of the old unit value isoquant and the corresponding unit value iso cost curve. Again, the ray from the origin through the point of tangency denotes the economy's capital-labor endowment ratio. Now assume that outsourcing occurs. Since the intermediate good purchased on the world market is cheaper than the production costs at home, it becomes cheaper to produce one unit of the consumption good. Hence, the unit value isoquant shifts inwards. We assume that it is primarily labor intensive processes that can now be dropped from the production chain in the home country. Hence, the production at home becomes more capital intensive at given factor prices.

In addition to the increase in the capital intensity of production, outsouring also lowers production costs. Hence, the volume of production rises. Both effects lead to an increase in demand for capital. As a consequence, the rental rate will rise. In figure 2, this is indicated by the fall in $\frac{1}{r}$.

The increase in r takes away some of the adjustment pressure based on international rental rate differentials. If outsourcing raises the rental rate all the way to the foreign level, it can even prevent capital relocations at all. In this case, international rental rates are equalized at the higher foreign level (instead of at the lower domestic level as in Seidel's analysis) without creating unemployment. If the in-

crease in r is not sufficient to equalize international rental rates, we will still see some capital relocations, but the extent of these relocations is now significantly lower. Hence, unemployment is also lower.

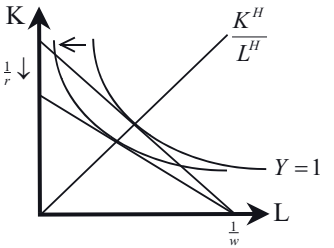

Figure 2: Outsourcing

The impact of outsourcing itself on the demand for labor is ambiguous (Eckel 2000, 2003). The increase in the capital intensity of production reduces demand for labor while the increase in production raises demand for labor. Figure 2 is drawn so that the two effects exactly cancel out and demand for labor remains unaffected. However, if the labor demand reducing effect dominates, it is possible that outsourcing itself creates unemployment. On the other hand, if the production cost effect dominates, demand for labor can even rise so that the wage rate rises, too. But in either case, independent of the size of these two effects, the rental rate clearly rises and capital relocation are lower than without outsourcing

The paper by Seidel emphasizes an important mechanism: International rental rate differences create an incentive for capital relocations from high-wage countries, and these relocations can create unemployment when real wages are rigid. This extension here has shown that international outsourcing can take away some of the pressures created by capital exports.

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Environmental Standards and the Location of Foreign Direct Investment: Evidence for Germany

By Peter Egger*, Tilmann Rave** and Ursula Triebswetter***

Abstract

This paper examines the role of measures of environmental sustainability for German net inward foreign direct investment (FDI). We set up an empirical specification based on the knowledge-capital model of the multinational enterprise and augment this specification by indicators of environmental sustainability. We find that environmental sustainability in the host (parent) countries of German outward (inward) FDI tends to foster German net inward FDI. A closer look at the driving forces behind this effect dismantles the relative importance of costly environmental protection and its adverse impact on a country's attractiveness for foreign production capital. Due to this effect, it turns out that a hypothetical harmonization of environmental standards in the major partner countries would lead to a net increase in German inward FDI.

JEL classifications: C23; F23; Q56

Keywords: Environmental sustainability; Foreign direct investment; Panel econometrics

1. Introduction

For years there has been a heated policy debate on the question of whether stringent environmental policy impairs international competitiveness to the extent that pollution-intensive industries relocate to countries with more lenient environmental standards. Also in the recent context of the discussion on globalisation the issue has received strong attention.

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Most of the numerous empirical studies testing this pollution haven hypothesis have examined the relationship between environmental regulation in U.S. jurisdictions (states or counties) and the location decisions of multinational or domestic firms across those frontiers. The results of these studies are quite disparate. According to a literature survey by Jeppesen et al. (2002) two research waves can be distinguished: Most of the studies of the first wave focus on the impact of environmental policy on new plant location decisions and show little evidence of the pollution haven hypothesis. Even when negative coefficients are found, they are typically quite small. Studies in the second wave of research have used both more recent data and more refined estimation techniques. They have found much stronger evidence that capital flows respond to heterogeneous environmental regulations. One strand of this literature again looks at the number of plant births as the dependent variable and comes to the result that there is a significant negative relationship between measures of environmental stringency and the number of new plant openings (among others see e.g. Gray, 1997; Henderson, 1996 and 1997; List et al. 1999). A newer strand of this second research wave examines the impact of environmental policy on foreign direct investment (FDI). Keller and Levinson (1999) as well as List and Co (2000) find a strong negative impact of pollution abatement costs on the total inward stock of U.S. foreign direct investment. Xing and Kolstad (2002) test the relationship between the capital outflow of several U.S. industries and the environmental policy of foreign host countries measured by SO_2 emissions. Their findings show for pollution-intensive industries a significant effect of the strictness of environmental regulation on FDI. Weaker regulations do tend to attract capital. For less-polluting industries these results are not confirmed. An exception within the second research wave are the findings suggested by Cole et al. (2002) and Fredriksson et al. (2003) which confirm a negative relationship, but a weaker one as in the other studies. A further specification in the newer literature is to examine whether domestic vs. foreign plant location decisions are dependent on variation in local environmental stringency. One study using a comprehensive data set that includes observations on both foreign and domestic plants has been carried out by List et al. (2004). They find the striking result that only new openings of domestic plants are influenced by environmental standards, confirming the results of List et al. (2003). Foreign owned firms are not deterred by stringent environmental regulations. This suggests a sort of double dividend: Foreign owned firms provide an economic stimulus for the host country (e.g. creating additional jobs, increasing local wages) and are not unduly influenced by stringent environmental regulation.

At the global level there are only a few papers that have analyzed the impact of environmental policy on FDI and these have found only weak evidence for the pollution havens hypothesis (e.g. Smarzynska and Wei, 2001; Eskeland and Harrison, 2003). Interestingly, in Smarzynska and Wei (2001) the pollution havens effect disappears when the potentially endogenous abatement cost is used as a proxy for environmental stringency. Globerman and Shapiro (2002) even provide some support for a claim that environmental policy measures encourage inward FDI.

Moreover, there is little empirical evidence for the European case. In a recent study on the relationship between a subjective assessment of regulatory stringency and German outward FDI, Wagner and Timmins (2004) have found strong support for the pollution havens hypothesis in the most pollution intensive industries. The authors have also accounted for agglomeration benefits which are a driving force of FDI.

We examine how German net inward FDI is affected by environmental standards. As a proxy of environmental sustainability (stringency) we use the Environmental Sustainability Index (ESI) published by the World Economic Forum. Specifically, we set up an empirical model based on what is now known as the knowledge-capital model of the multinational enterprise, i.e., a general equilibrium model of trade and multinational firms. The parameters are estimated in a random effects approach. We find that an increase in the stringency of environmental standards abroad leads to a significant increase in German net inward FDI. This supports an adverse effect of high environmental standards on firm location. Our findings suggest that a hypothetical harmonization of environmental standards and sustainability across EU member countries exhibits a positive impact on German net inward FDI.

The paper is organized as follows. The next section discusses in more detail how environmental variables have been specified so far and how environmental stringency may be measured. Section 3 rationalizes our empirical set-up and explains the construction and components of the environmental sustainability index that we use as a proxy. The database, the construction of the variables used in the econometric analysis, and the empirical results are presented and discussed in Section 4. The last section concludes with a summary of our main findings. In addition, we briefly discuss the consequences of "harmonizing" standards to a lower or higher level within host (parent) countries of German outward (inward) FDI.

2. Specification of Environmental Variables and Measurement of Regulatory Stringency

Studies vary widely in terms of specification of environmental variables and measurement of environmental regulation. To avoid specification and measurement error it seems important to be aware of differences in approximating the strictness of environmental regulation and related costs. A number of measures may be distinguished with each having advantages and disadvantages (Jeppesen et al., 2002):

1. *Private pollution abatement efforts:* Firm-level pollution abatement operating expenditures from industrial reports (PACE) are often used and differentiated according to environmental media. They allow to broadly pool industries according to their respective level of PACE. To classify industries (e.g. as polluting vs. non-polluting ones) actual emission data (e.g. on SO_2 or ozone) by in-

dustry or reference groups are also used. PACE data include average (i.e. not marginal) cost items like depreciation, labor, materials, supplies, services, but mostly exclude capital equipment (neglecting the timing of investment). Sometimes industry-specific pollution levy rates are also used as proxies (Dean et al., 2003). Major shortcomings of PACE data as proxies for regulatory stringency are that data do not control for the mix of old vs. new plants (old source bias) and that data are not very disaggregated. Abatement costs may also be endogenous to the process of relocation itself (Wagner and Timmins, 2004).

2. *Indexes of public regulatory stringency:* List and Co (2000) include actual state government expenditures to control environmental media (air, water, solid waste) as one possible measure of regulatory stringency, since higher expenditures may lead to a tighter constraint on production activity. As this is uncertain a priori and budgetary outlays may itself be a distorted proxy (e.g. due to regulatory economies of scale) other studies focus on public authority statutes and their ability to enforce these statutes. This is reflected by various indices (e.g. Conservation Index, FREE Index, Green Index) which include, for example, public monitoring expenditures or number of persons employed in implementation and monitoring activities (Jeppensen et al., 2002 citing Levinson, 1996). Finally, some studies rely more on qualitative indicators and rankings, for example from reports based on industry surveys on regulatory activities in particular sectors (e.g. the Executive Opinion Survey among investors by the World Economic Forum) (Cornelius and Schwab, 2003). The latter approach helps to overcome identification problems, but may easily be biased systematically or may be less helpful for comparisons over time.
3. *Relative attainment status:* As exogenous measures of environmental stringency are hard to obtain for a large data set, relative differences in treatment among firms (resulting in cost differentials) may be used as another proxy. Studies on potential pollution havens across U.S. states focus on the attainment status, defined as whether or not a county is in attainment of national environmental air quality standards or not. As a result, there are county-specific treatments of firms (resulting in differences in pollution abatement technology required and costs imposed on firms). Similarly, a smaller subset of countries may be studied for which data are available.
4. *Performance indicators:* Some studies rely quite heavily on performance indicators (such as the level of SO_2) and assume a direct relationship with environmental stringency (i.e., if SO_2 emissions are high then environmental regulation is lax). While these indicators may be obtained more easily, strong assumptions between regulation and enforcement as well as actual performance are required (Wagner and Timmins, 2004). In the wider sense, indicators may also reflect variables which are easily neglected in abatement cost estimates and relate to the wider regulatory environment and governance infrastructure (Globerman and Shapiro, 2004). Indicators may also reflect differences in endowment with natural resources between countries.

Overall, it seems that due to the multidimensional nature of the regulatory process the use of multiple measures of environmental stringency may be most appropriate (List and Co, 2000).

3. Theoretical Motivation of the Empirical Framework

Recent theoretical research on the determinants of multinational firms and trade in general equilibrium integrates the classical models of horizontally and vertically organized multinationals (see Carr, Markusen, and Maskus, 2001; Markusen, 2002). The approach is usually referred to as the knowledge-capital model of the multinational enterprise, since it aims at establishing the importance of human-capital endowments for the creation of firm-specific assets and multi-plant economies of scale.

Horizontal multinationals produce the same good at home and abroad without engaging in trade (Markusen, 1984; Markusen and Venables, 2000). They face a trade-off between proximity to the market to spare trade costs at the expense of higher fixed costs and the concentration of production at a single location to avoid higher plant-specific fixed costs associated with multi-plant production at the expense of trade costs due to serving consumer bases in foreign economies through trade (Brainard, 1997). Accordingly, horizontal multinationals prefer to locate in large countries that are characterized by high trade costs and low impediments to set-up foreign plants. In general, these firms tend to locate in developed economies.

Vertical multinationals are characterized by complete unbundling of headquarters services and production (Helpman, 1984; Helpman and Krugman, 1985). Whereas the former are undertaken in the parent country, where skilled labour is abundant, the latter take place in developing economies where unskilled labour is abundant and cheap. Therefore, these firms are often referred to as low-cost seeking. Since they concentrate production at a single plant and serve consumers all over the world from there (hence, foreign ones through trade), they locate in large, unskilled labour-abundant economies, where both investment impediments and trade costs are low.

The theoretical knowledge-capital framework is not very explicit about the characteristics of fixed plant set-up costs – these could be related to institutional factors, bureaucratic or legal quality, or environmental standards. Our focus will be on the latter. For this, we set up an empirical model of German net inward FDI. We assume that environmental standards affect the location decision of international investors. Accordingly, environmental standards should be included in an empirical specification of the knowledge-capital model. We hypothesize the following. Higher environmental standards are positively related to costs. Therefore, we argue that multinationals leave countries with high environmental standards in order

to avoid higher costs of production and produce in other countries that offer a better deal (the pollution haven hypothesis).

Below, we formulate an empirical model of German net inward FDI that accounts for the most important determinants motivated by the knowledge-capital model of the multinational enterprise. These are the positive impact of both host and parent country size on outward and inward FDI, the positive one of capital-labour ratios for outward FDI (see Egger and Pfaffermayr, 2004, 2005) and the negative one for inward FDI, the positive (negative) relation between skilled labour endowments and outward (inward) FDI, and the negative one between host country investment costs (as captured by indicators of economic and political risk) and outward FDI. We augment this specification by variables of environmental sustainability abroad, for which we expect an adverse effect of the location of production there. Hence, we expect a positive effect on net German inward FDI, as far as these measures reflect the costs of environmental protection, reflecting higher fixed and / or variable production costs abroad.

4. Data, Empirical Specification, and Econometric Results

We use data from three different sources. First of all, stocks of inward and outward foreign direct investment (FDI) at the annual country-by-industry level are available from the German Bundesbank (Kapitalverflechtungen mit dem Ausland).[1] Second, four of the explanatory variables are published by the World Bank (World Development Indicators). Specifically, we use real GDP in U.S. dollars with 1995 as the base year, real GDP per capita, a country's tertiary school enrolment share, and the change in the share of urban population in total population. Third, indices of investment risk, political risk, and economic risk are taken from the International Country Risk Guide. Finally, the World Economic Forum publishes the environmental sustainability index and the sub-indices it consists of, reflecting the core indicators of our empirical analysis (see Box 1).

We use the log-difference in German inward and outward FDI in industry *i,* country *j,* and year *t.* as the dependent variable (f_{ijt}). Log real GDP (g_{jt}) is employed as a measure of country size, log real GDP per capita serves as a proxy for a country's capital endowment relative to labor (k_{jt}), log tertiary school enrollment (h_{jt}) indicates a country's endowment with skilled labor, and the change in the urban population share (u_{jt}) indicates the existence of linkage effects and agglomeration forces. Furthermore, we take the log of the investment risk (n_{it}), political risk (p_{it}), and economic (e_{it}) risk indices to avoid that any risk-related influences are erroneously attributed to the environmental sustainability indicators of interest. The following variables from the environmental sustainability index are used.

[1] Details on Industries

Box 1: The Environmental Sustainability Index

The Environmental Sustainability Index provides a composite profile of national environmental stewardship and benchmarks the ability of a total of 146 nations to protect the environment over the next several decades. It does so by integrating 76 data sets – tracking natural resource endowments, past and present pollution levels, environmental management efforts, and the capacity of a society to improve its environmental performance – generating 21 indicators of environmental sustainability. These indicators allow to make comparisons across a range of issues that fall into the following five broad sub-indices:

Environmental Systems: Indicators aim to represent air quality (e.g. weighted SO_2 concentration), biodiversity (e.g. percentage of threatened eco-regions or species), intensity of land use (percentage of land area with anthropogenic impact), water quality (e.g. concentration of pollutants) and water quantity (e.g. fresh water availability per capita).

Reducing Environmental Stresses: Indicators aim to measure the ability to reduce air pollution (e.g. coal consumption per populated land area), ecosystem stress (e.g. excess acidification from anthropogenic sulfur deposition), population pressure, waste and consumption pressure (e.g. ecological footprint per capita) and water stress (e.g. BOD emissions per available freshwater) and the ability to manage natural resources (e.g. percentage of certified forest area).

Reducing Human Vulnerability to Environmental Stresses: Indicators aim to measure the extent that people and social systems are vulnerable to environmental disturbances that affect environmental health (e.g. death rates from intestinal infectious diseases) and basic human sustenance (percentage of population with access to improved drinking water) or relate to natural disasters (e.g. death from floods, droughts).

Societal and Institutional Capacity to Respond to Environmental Challenges: A country is more likely to be environmentally sustainable to the extent that it has in place institutions and underlying social patterns of skills, attitudes, and networks that foster effective responses to environmental challenges. This is reflected by the indicators of environmental governance (e.g. measures for corruption or democracy), eco-efficiency (e.g. percentage of renewable energy production in total energy consumption), private sector responsiveness (e.g. Dow Jones Sustainability Group Index), science and technology (e.g. number of researchers per million inhabitants).

Global Stewardship: A country is more likely to be environmentally sustainable if it cooperates with other countries to manage common environmental problems, and if it reduces negative transboundary environmental impacts on other countries to levels that cause no serious harm. Indicators include participation in international collaborative efforts (e.g. participation in international environmental agreements), and efforts to reduce greenhouse gas emissions (e.g. carbon emissions per capita) and transboundary environmental pressure (e.g. SO_2 –exports).

The ESI score is an equally weighted average of the 21 indicators. However, it is possible to make comparisons only for selected indicators and variables or a sub-sample of countries (clustered peer groups). This is helpful given the multi-dimensional and normative nature of the concept of sustainability and the lack of (appropriate) data in certain areas. It also allows arriving at more specific conclusions in empirical work. Yet, in contrast to other environmental stringency measures the ESI and its sub-components are broader. While the level of detail may be higher by using other stringency measures, ESI covers a wider set of countries and additional variables related to endowment in natural resources, environmental performance and institutional capacity.

Source: YCELP and CIESIN (2005).

Environmental sustainability (esi_j; the overall index) and the major sub-indices it consists of, namely, environmental systems (sys_j; measuring air and water quality and quantity, etc.), reducing stresses (str_j; reducing air pollution, reducing waste and consumption pressures, etc.), reducing human vulnerability (vul_j, basic human sustenance, environmental health, etc.), social and institutional capacity (cap_j; environmental governance, eco-efficiency, etc.), and global stewardship (stw_j; participation in international cooperative efforts, reducing greenhouse gas emissions, etc.). A summary of the descriptive statistics of these variables is given in Table 1.

Table 1

Descriptive Statistics

Explanatory variables	Mean	Std. Dev.	Minimum	Maximum
Log outward FDI – Log inward FDI				
Log real GDP	27,014	0,955	25,789	29,192
Log real GDP per capita	10,291	0,261	9,869	10,754
Log tertiary school enrolment share	3,949	0,169	3,514	4,474
Log investment risk	-2,078	0,191	-2,485	-1,609
Log political risk	-4,438	0,059	-4,564	-4,277
Log economic risk	-3,716	0,056	-3,850	-3,541
Trade openness	77,957	33,908	18,541	167,793
Change in urban population share	0,421	0,276	0,063	1,339
Environmental sustainability	56,241	10,327	39,100	72,600
Environmental systems	49,187	17,476	25,900	90,400
Reducing stresses	30,766	12,672	9,400	51,200
Reducing human vulnerability	83,579	1,538	80,800	85,100
Social and institutional capacity	76,041	9,366	58,100	91,500
Global stewardship	54,299	10,187	38,000	67,100

431 observations.

With these variables at hand, we estimate the following specifications[2]

$$f_{ijt} = \beta_0 + \beta_1 g_{jt} + \beta_2 k_{jt} + \beta_3 h_{jt} + \beta_4 o_{jt} + \beta_5 u_{jt} + \beta_6 n_{jt} + \beta_7 p_{jt} + \beta_8 e_{jt} + \beta_8 esi_j + \varepsilon_{ijt}$$
$$f_{ijt} = \beta_0 + \beta_1 g_{jt} + \beta_2 k_{jt} + \beta_3 h_{jt} + \beta_4 o_{jt} + \beta_5 u_{jt} + \beta_6 n_{jt} + \beta_7 p_{jt} + \beta_8 e_{jt} + \beta_8 sys_j + \varepsilon_{ijt}$$
$$f_{ijt} = \beta_0 + \beta_1 g_{jt} + \beta_2 k_{jt} + \beta_3 h_{jt} + \beta_4 o_{jt} + \beta_5 u_{jt} + \beta_6 n_{jt} + \beta_7 p_{jt} + \beta_8 e_{jt} + \beta_8 str_j + \varepsilon_{ijt}$$
$$f_{ijt} = \beta_0 + \beta_1 g_{jt} + \beta_2 k_{jt} + \beta_3 h_{jt} + \beta_4 o_{jt} + \beta_5 u_{jt} + \beta_6 n_{jt} + \beta_7 p_{jt} + \beta_8 e_{jt} + \beta_8 vul_j + \varepsilon_{ijt}$$
$$f_{ijt} = \beta_0 + \beta_1 g_{jt} + \beta_2 k_{jt} + \beta_3 h_{jt} + \beta_4 o_{jt} + \beta_5 u_{jt} + \beta_6 n_{jt} + \beta_7 p_{jt} + \beta_8 e_{jt} + \beta_8 cap_j + \varepsilon_{ijt}$$
$$f_{ijt} = \beta_0 + \beta_1 g_{jt} + \beta_2 k_{jt} + \beta_3 h_{jt} + \beta_4 o_{jt} + \beta_5 u_{jt} + \beta_6 n_{jt} + \beta_7 p_{jt} + \beta_8 e_{jt} + \beta_8 stw_j + \varepsilon_{ijt}$$

[2] Note that the same regression coefficients have been used for convenience. Of course, we do not impose the assumption that they are identical across models.

$\varepsilon_{ijt} = \mu_{ij} + \nu_{ijt}$ is the error term with $\nu_{ij} \sim$ iid $N(0, \sigma_\mu^2)$ being a random country effect and $\nu_{ijt} \sim$ iid $N(0, \sigma_\nu^2)$ being a classical error term. Of course, the assumption of random cross-sectional effects is not necessarily appropriate. However, in our case it turns out that fixed effects estimation leads to insignificant but similar parameters and the random effects model is never rejected significantly.

Table 2

Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log real GDP (1)	1						
Log real GDP per capita (2)	-0,266	1					
Log tertiary school enrolment share (3)	-0,084	-0,495	1				
Log investment risk (4)	-0,001	0,385	-0,394	1			
Log political risk (5)	0,342	-0,117	-0,021	0,341	1		
Log economic risk (6)	0,363	-0,485	0,149	0,000	0,232	1	
Trade openness (7)	-0,703	0,015	0,255	-0,282	-0,151	-0,305	1
Change in urban population share (8)	0,136	-0,208	0,334	-0,218	-0,212	-0,012	0,097
Environmental sustainability (9)	-0,387	0,256	0,028	0,226	-0,377	-0,165	-0,102
Environmental systems (10)	-0,279	-0,050	0,332	0,040	-0,290	0,000	-0,048
Reducing stresses (11)	-0,126	0,109	0,025	0,326	-0,035	-0,112	-0,360
Reducing human vulnerability (12)	-0,188	-0,139	0,063	-0,178	-0,607	0,165	-0,019
Social and institutional capacity (13)	-0,388	0,560	-0,217	0,169	-0,632	-0,191	0,029
Global stewardship (14)	-0,775	0,450	-0,193	0,144	-0,213	-0,411	0,492
	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Change in urban population share (8)	1						
Environmental sustainability (9)	0,204	1					
Environmental systems (10)	0,413	0,909	1				
Reducing stresses (11)	0,112	0,854	0,790	1			
Reducing human vulnerability (12)	0,159	0,657	0,647	0,386	1		
Social and institutional capacity (13)	-0,032	0,626	0,401	0,216	0,575	1	
Global stewardship (14)	-0,347	0,446	0,219	0,261	0,216	0,399	1

Table 2 gives insights in the correlation structure of these variables. It is notable that the correlation coefficients between the environmental variables and the other determinants are of reasonable size on average. A similar conclusion applies for the correlations among the environmental factors. For the latter, only the correlation between str_j and sys_j comes close to 80%. Note that the high correlation between esi_j and other variables is not relevant, since the aggregate esi_j index should not be included together with its components, anyway. However, in the light of these results it seems justified to run an augmented model that includes all major components of esi_j as separate regressors.

Table 3: **Random Country Effects Analysis**

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Log real GDP	0,595***	0,431***	0,527***	0,379***	0,384***	0,643***	0,566***
	(0,151)	(0,146)	(0,152)	(0,120)	(0,117)	(0,138)	(0,165)
Log real GDP per capita	1,592***	1,628***	1,756***	1,891***	0,817**	1,302***	0,052
	(0,364)	(0,369)	(0,374)	(0,383)	(0,411)	(0,366)	(0,518)
Log tertiary school enrolment share	-0,854*	-0,910*	-0,825*	-0,520	-0,831*	-0,447	0,658
	(0,483)	(0,507)	(0,486)	(0,487)	(0,478)	(0,479)	(0,590)
Log investment risk	1,001*	1,362**	1,177**	1,122**	0,629	1,496***	-0,437
	(0,576)	(0,564)	(0,572)	(0,570)	(0,589)	(0,546)	(0,641)
Log political risk	-10,075***	-11,007***	-11,638***	-8,104***	-5,275**	-11,219***	-1,455
	(1,529)	(1,501)	(1,507)	(1,887)	(2,099)	(1,466)	(2,513)
Log economic risk	0,916	0,926	1,749	-0,345	-1,112	1,989	1,003
	(1,470)	(1,488)	(1,504)	(1,572)	(1,562)	(1,464)	(1,681)
Trade openness	0,012***	0,008**	0,012***	0,006*	0,005*	0,004	0,006
	(0,004)	(0,004)	(0,004)	(0,003)	(0,003)	(0,003)	(0,005)
Change in urban population share	-0,167	0,002	-0,023	0,182	0,283	0,597**	1,786
	(0,294)	(0,317)	(0,288)	(0,261)	(0,258)	(0,269)	(0,404)
Environmental sustainability	0,029***	-	-	-	-	-	-
	(0,010)						
Environmental systems	-	0,007	-	-	-	-	-0,064***
		(0,006)					(0,014)
Reducing stresses	-	-	0,017**	-	-	-	0,062***
			(0,008)				(0,017)
Reducing human vulnerability	-	-	-	0,155***	-	-	0,036
				(0,059)			(0,104)
Social and institutional capacity	-	-	-	-	0,050***	-	0,103***
					(0,013)		(0,018)
Global stewardship	-	-	-	-	-	0,048***	0,048***
						(0,011)	(0,014)
Observations	431	431	431	431	431	431	431
Number of countries	11	11	11	11	11	11	11
Country effects (p-value of Honda-test)	0,00	0,00	0,00	0,00	0,00	0,00	0,49
Time effects (p-value of F-test)	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

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Table 4: **Random Country-Industry-Pair Effects Analysis**

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Log real GDP	0,188	-0,020	-0,022	0,105	0,184	0,155	0,412
	(0,234)	(0,215)	(0,224)	(0,188)	(0,190)	(0,225)	(0,261)
Log real GDP per capita	1,865***	1,924***	1,895***	2,338***	0,898	1,552***	-0,134
	(0,518)	(0,534)	(0,528)	(0,541)	(0,573)	(0,547)	(0,888)
Log tertiary school enrolment share	-0,679	-0,772	-0,753	-0,565	-0,647	-0,743	-0,387
	(0,491)	(0,490)	(0,491)	(0,490)	(0,482)	(0,489)	(0,493)
Log investment risk	0,081	0,207	0,201	0,034	-0,079	0,268	-0,192
	(0,423)	(0,419)	(0,418)	(0,416)	(0,415)	(0,414)	(0,422)
Log political risk	-2,516*	-2,867**	-2,915**	-1,213	-0,514	-2,837**	0,089
	(1,445)	(1,436)	(1,434)	(1,531)	(1,540)	(1,429)	(1,564)
Log economic risk	1,321	1,363	1,421	0,800	0,402	1,452	0,420
	(1,012)	(1,016)	(1,019)	(1,023)	(1,028)	(1,014)	(1,027)
Trade openness	0,004	0,000	0,000	0,002	0,003	-0,002	0,009
	(0,006)	(0,005)	(0,006)	(0,005)	(0,005)	(0,005)	(0,007)
Change in urban population share	0,338	0,528	0,562	0,479	0,496	0,812**	0,996**
	(0,392)	(0,400)	(0,382)	(0,359)	(0,355)	(0,373)	(0,425)
Environmental sustainability	0,028*	-	-	-	-	-	-
	(0,015)	-	-	-	-	-	-
Environmental systems	-	0,004	-	-	-	-	-0,047***
	-	(0,008)	-	-	-	-	(0,018)
Reducing stresses	-	-	0,006	-	-	-	0,052**
	-	-	(0,012)	-	-	-	(0,025)
Reducing human vulnerability	-	-	-	0,248***	-	-	0,047
	-	-	-	(0,085)	-	-	(0,150)
Social and institutional capacity	-	-	-	-	0,064***	-	0,100***
	-	-	-	-	(0,017)	-	(0,029)
Global stewardship	-	-	-	-	-	0,033*	0,023
	-	-	-	-	-	(0,019)	(0,023)
Observations	431	431	431	431	431	431	431
Number of country-industry-pairs	93	93	93	93	93	93	93
Industry-country-pair effects (p-value of Honda-test)	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Time effects (p-value of F-test)	0,37	0,37	0,37	0,37	0,37	0,37	0,30

Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

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Further, we estimate a specification that employs the major sub-indices of the environmental sustainability altogether. This model reads

$$f_{ijt} = \beta_0 + \beta_1 g_{jt} + \beta_2 k_{jt} + \beta_3 h_{jt} + \beta_4 o_{jt} + \beta_5 u_{jt} + \beta_6 n_{jt} + \beta_7 p_{jt} + \beta_8 e_{jt} + \beta_9 sys_j + \beta_{10} str_j + \beta_{11} vul_j + \beta_{12} cap_j + \beta_{13} stw_j + \varepsilon_{ijt}$$

As an alternative to the above specifications, we account for the fact that random country effects are repeatedly observed across industries within each year. Then, the assumed data generating process of the error term becomes $\eta_{ijt} = \chi_{ij} + \xi_{ijt}$, with $\chi_{ij} \sim \text{iid N}(0, \sigma_\chi^2)$ denoting country-industry-pair effects and $\xi_{ijt} \sim \text{iid N}(0, \sigma_\xi^2)$ being the classical error term.

If the contribution of the country-industry-pair dimension to the overall variance is significant, then a model that only accounts for random country effects is inferior and leads to potentially upward biased *t*-statistics (i.e., downward biased standard errors, see Moulton, 1990). We summarize estimation results for all models and assumptions about the data generating process of the error term in Tables 3 and 4.

Whereas the positive impact of country size (*g*) vanishes, if we stick to a preferred specification that accounts for country-industry-pair effects, the positive impact of capital-labour ratios (*k*) seems fairly robust. The latter implies that higher parent-country capital-labour ratios are associated with higher net inward stocks of FDI in Germany. The latter is in line with both the horizontal and the vertical models of FDI (see Egger and Pfaffermayr, 2005, for a theoretical reasoning in a three-factor model of trade and multinationals). However, in the augmented specification (Model 7), we face a loss in the degrees of freedom which does not allow us to estimate these parameters at the 10% significance level. Trade openness as a measure of trade costs and a country's remoteness seems not important, which points to a mix of horizontal (trade-cost jumping) and vertical multinationals. The positive relationship between agglomeration forces in parent countries (reflected in urban population growth, u) and the country's net outward FDI to Germany seems robust across the preferable specifications (Model 7). We cannot identify a robust negative impact of risk on Germany's net inward FDI. However, the reason for this might lie in the composition of the sample of developed economies for which data are available.

There is a significant positive impact of the overall environmental sustainability in the parent countries on Germany's net inward FDI position (see Model 1 in Tables 3 and 4). This could be rationalized in the following way. If the (fixed) cost effects of environmental standards are a dominant ingredient in the index, then it would reflect the incentive of multinationals to (re-) locate their production facilities to other economies such as Germany. In this case, higher fixed costs of environmental standards could lead to a crowding out of domestic firms by foreign multinationals. Such costs are partly also due to the protection of and limited access to natural resources. In contrast, if environmental sustainability are mainly

reflected in environmental conditions that improve the productivity of workers, a location might be attractive due to higher demand and the supply of more productive factors of production. The latter could eventually lead to higher net inward FDI in such countries, at least as long as they are not too capital abundant to be a net exporter of FDI themselves.

To shed further light on these issues, we use the major sub-indices in Models 2 – 6 rather than the overall index. It turns out that the overall positive effect is mainly borne by a reduction in human vulnerability (*vul*), social and institutional capacity (*cap*), and global stewardship (*stw*). However, if we include these variables simultaneously in Model 7, it turns out that reducing stresses (*str*) and social and institutional capacity (*cap*) contribute positively, whereas environmental systems (*sys*) is negatively associated with German net inward FDI (see Table 4). As mentioned above, it is noteworthy that *sys* captures the availability and quality of a country's natural resources rather than cost-related factors. By way of contrast, the latter are more likely to be reflected in *str* (reducing air pollution, reducing waste and consumption pressures, etc.) and cap (environmental governance, eco-efficiency, etc.). Hence, our findings are in accordance with the hypothesis of a negative cost-related effect of environmental standards on net inward FDI and a positive one of the availability and quality of natural resources.

However, we still must admit that several of these sub-indices are composed of variables that represent a huge variety of determinants. For instance, *vul* is an aggregate of indicators related to basic human sustenance (e.g., the proportion of undernourished in total population or the percentage of population with access to improved drinking-water supply) and ones associated more closely with environmental health (e.g., the child death rate from respiratory diseases or the death rate from intestinal infectious diseases). Also *cap* consists of indicators that are less (e.g., the overall level of science and technology standards in a country or a country's capacity for a debate reflected in the level of civil and political liberties or the development of democratic institutions) and others that are more directly associated with environmental sustainability (e.g., environmental governance as indicated by the percentage of land area under protected status, private sector responsiveness such as reflected in the average Innovest EcoValue rating of firms, or eco-efficiency as expressed in the renewable energy production as a percentage of total energy consumption). Therefore, we run alternative regressions that replace *vul* and *cap* by their sub-indices that are more closely related to environmental sustainability. Instead of *vul,* we use environmental health (enh_j), and instead of *cap,* we use environmental governance (gov_j), private sector responsiveness (psr_j), and eco-efficiency (ece_j).

Table 5 summarizes the descriptive statistics and the correlation matrix for these sub-indices, and Table 6 reports our findings from the two different random effects model specifications that are associated with the assumption of random country versus random country-industry-pair effects. The results from estimation of this

Table 5

Descriptive Statistics and Correlation Matrix for Environmental Sustainability Subindices

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Statistics				Descriptive statistics			
Mean	49,187	30,766	0,982	1,055	1,004	-0,018	54,299
Standard Deviation	17,476	12,672	0,067	0,268	0,881	0,329	10,187
Minimum	25,900	9,400	0,770	0,560	-0,330	-0,430	38,000
Maximum	90,400	51,200	1,030	1,470	2,640	0,590	67,100
Variables				Correlation matrix			
Log real GDP	-0,279	-0,126	0,134	-0,140	-0,339	-0,314	-0,775
Log real GDP per capita	-0,050	0,109	-0,521	0,240	0,576	0,453	0,450
Log tertiary school enrolment share	0,332	0,025	0,205	-0,161	-0,333	-0,424	-0,193
Log investment risk	0,040	0,326	-0,237	-0,080	0,222	0,399	0,144
Log political risk	-0,290	-0,035	0,155	-0,570	-0,591	-0,060	-0,213
Log economic risk	0,000	-0,112	0,204	0,107	-0,273	-0,145	-0,411
Trade openness	-0,048	-0,360	0,219	-0,115	0,069	-0,280	0,492
Change in urban population share	0,413	0,112	0,067	-0,052	-0,039	-0,383	-0,347
Environmental systems (1)	1	0,790	0,229	0,324	0,205	0,424	0,219
Reducing stresses (2)		1	0,099	0,016	0,099	0,652	0,261
Environmental health (3)			1	-0,040	-0,321	-0,043	0,104
Environmental governance (4)				1	0,681	0,364	0,221
Private sector responsiveness (5)					1	0,306	0,371
Eco-efficiency (6)						1	0,503
Global stewardship (7)							1

Model 8 indicate that, on net, German FDI tends to flow to countries where the environment is characterized by a high level of quality (sys; however, this does not necessarily mean that there are huge efforts to reduce pollution) where energy is efficiently used and the share of renewable energy production in percent of total energy consumption is high (ece), and where countries comply with international environmental agreements and CO_2 emissions both per capita and in percent of GDP are low (stw). On the other hand, German FDI tends to flow in on net from countries where an effort is undertaken to reduce air and water pollution (str) and environmental disease (enh), and where there is high-quality environmental governance (gov). The latter index consists of components such as World Economic Forum survey questions on environmental governance, percentage of land area under protected status, and number of sectoral EIA guidelines.

Table 6

Extended Random Country-Industry-Pair Effect Regressions

Explanatory variables	Model 8	
Log real GDP	-1,700**	-1,795**
	(0,860)	*(0,817)*
Log real GDP per capita	4,452***	4,495***
	(1,295)	*(1,566)*
Log tertiary school enrolment share	-0,728	-0,805
	(0,688)	*(0,509)*
Log investment risk	-0,124	-0,059
	(0,649)	*(0,426)*
Log political risk	-0,327	-0,878
	(2,233)	*(1,528)*
Log economic risk	0,501	0,906
	(1,626)	*(1,012)*
Trade openness	-0,011	-0,009
	(0,023)	*(0,015)*
Change in urban population share	0,957**	0,656
	(0,461)	*(0,427)*
Environmental systems	-0,130***	-0,136***
	(0,042)	*(0,039)*
Reducing stresses	0,217***	0,231***
	(0,076)	*(0,065)*
Environmental health	14,205**	14,268**
	(6,522)	*(6,493)*
Environmental governance	5,885***	6,240***
	(2,194)	*(1,907)*
Private sector responsiveness	-0,154	-0,237
	(0,325)	*(0,365)*
Eco-efficiency	-5,371***	-5,677***
	(1,379)	*(1,551)*
Global stewardship	-0,091**	-0,100**
	(0,046)	*(0,050)*
Observations	431	431
Number of countries / country-industry-pairs	11	93
Country / Industry-country-pair effects (p-value of Honda-test)	0,02	0,00
Time effects (p-value of F-test)	0,00	0,18

Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7

Sensitivity Analysis: Simultaneous Quantiles Pooled OLS Regressions

Explanatory variables	Model 1	Model 7	Model 8
Log real GDP	0,276*	0,227	-2,387**
	(0,161)	*(0,217)*	*(1,007)*
Log real GDP per capita	1,423***	-0,641	4,007**
	(0,437)	*(0,702)*	*(1,707)*
Log tertiary school enrolment share	-0,888	-0,087	-1,192
	(0,594)	*(0,603)*	*(0,770)*
Log investment risk	0,978*	-0,594	-0,391
	(0,568)	*(0,638)*	*(0,659)*
Log political risk	-9,954***	-0,437	1,515
	(1,985)	*(3,545)*	*(2,295)*
Log economic risk	-0,268	-0,095	-0,420
	(1,462)	*(1,841)*	*(1,541)*
Trade openness	0,007*	0,001	-0,036*
	(0,004)	*(0,007)*	*(0,019)*
Change in urban population share	0,178	1,571***	1,115**
	(0,311)	*(0,425)*	*(0,565)*
Environmental sustainability	0,021**	-	-
	(0,009)	-	-
Environmental systems	-	-0,053***	-0,104***
	-	*(0,013)*	*(0,035)*
Reducing stresses	-	0,050***	0,154***
	-	*(0,019)*	*(0,054)*
Reducing human vulnerability	-	0,020	-
	-	*(0,128)*	-
Environmental health	-	-	17,827**
	-	-	*(7,913)*
Social and institutional capacity	-	0,094***	-
	-	*(0,022)*	-
Environmental governance	-	-	4,31082**
	-	-	*(1,711)*
Private sector responsiveness	-	-	0,082
	-	-	*(0,325)*
Eco-efficiency	-	-	-5,076***
	-	-	*(1,582)*
Global stewardship	-	0,047**	-0,080
	-	*(0,021)*	*(0,054)*

Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

In a final step, we assess the robustness of our findings with respect to influential observations. For this, we perform median regressions based on pooled OLS versions of Models 1, 7, and 8.[3] These regressions aim at inferring the relative importance of leverage points and outliers of the left-hand-side variable (i.e., German net inward FDI at the industry level). We find that the previous results are quite robust. In neither case, the point estimate of one of the environmental sustainability variables of interest changes its sign. Beyond this qualitative robustness, we find that the results also tend to be quantitatively stable compared to the original regressions in Tables 4 and 6.

5. Conclusions

This paper analyzes the importance of environmental sustainability for German net inward FDI. In general, we find that a higher level of environmental sustainability in the host (parent) countries of German outward (inward) FDI is associated with more inward FDI on net. This suggests that the overall effect of environmental sustainability seems mainly determined by cost-related issues, at least for German FDI. Hence, whereas the endowment with a healthy environment per se is positively associated with a country's attractiveness as a location for foreign production capital, efforts to protect this environment and means of protection that increase fixed or variable production costs seem to generate adverse effects on the plant location of firms.

With our empirical findings at hand, we could quantify the relative importance of environmental sustainability by means of an experiment of thought. In this regard, one could infer the impact of a "harmonization" of environmental sustainability in the considered sample of host (parent) countries of German outward (inward) FDI. For the year 2000, such a hypothetical harmonization would have led to an increase in German net inward FDI of approximately six percent. Hence, on net Germany would gain as a location for foreign capital as environmental standards are harmonized in the major target and source countries of FDI.

Of course, future research is warranted to provide further insights in the impact of environmental standards on net inflows of foreign direct investment. For instance, at the level of single economies the use of a more narrow and detailed index of environmental sustainability would be interesting. However, the necessary data are not available yet, but could be collected by means of survey techniques. Additionally, in the medium term it would be interesting to rely on time-variant data on environmental sustainability in a larger panel of economies. However, given the available data this will only be possible in several years.

[3] We are well aware of the fact that pooled OLS is rejected against random effects estimation in Tables 3, 4, and 6. However, the issue there is one of efficiency rather than one of consistency. Accordingly, the median regression results in Table 7 are informative.

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Environmental Standards and the Location of Foreign Direct Investment: Evidence for Germany
Comment

By Michael Pfaffermayr*

The paper concentrates on German net inward foreign direct investment (i.e. stock of inward minus the stock of outward FDI) at the industry level and investigates the impact of various indicators of environmental sustainability on net inward FDI into Germany. The main issue of this paper is to test in an empirically coherent fashion whether stringent environmental standards of host countries tend to reduce FDI into them. Specifically, the hypothesis has been put forward that pollution-intensive industries may locate in countries with more lenient standards. From an economic policy perspective this pollution haven hypothesis is obviously an important issue.

The paper bases the empirical specification to test the pollution haven hypothesis on the knowledge capital model of multinational enterprises (Markusen 2002), where stringent economic standards are thought of as reducing fixed setup costs of plants. Due to the proximity concentration trade-off of this reduces production in the foreign host and, especially decreases the number of foreign plants at the expense of exporting activity. However, one would argue that in addition stringent environmental policy increases also variable production costs. To analyse this additional channel of pollution, the knowledge capital model would have to be reformulated in a more general way to allow differences in technology between parent and host country, and possibly a variable degree of substitution between capital and abatement intensity (see, Waldkirch and Gopinath, 2004, for a simple single firm model of this issue). However, it is intuitive that this channel acts in a similar way- although differences still have to be worked out for the knowledge capital model.

The paper uses a panel of net inward and outward stocks of German FDI by industry to identify the impact of environmental regulations on FDI. Thereby, several sub-indices of regulatory stringency and environmental sustainability with respect to pollution from the Environmental Sustainability Index as published by the

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World Economic Forum are introduced as explanatory variables. The other controls are motivated by the knowledge capital model of multinational enterprises and are taken from the World Development database. Careful econometric testing shows that a random effects model is the suitable panel model here.

The main finding of the paper is that "a higher level of environmental sustainability in the host (parent) of German outward (inward) FDI is associated with more inward FDI on net". Hence, there is support of the pollution haven hypothesis. Furthermore, a hypothetical harmonization of environmental standards in 2000 would have increased the German net inward FDI by approximately 6%. The reason is that Germany maintained higher environmental standards on average in 2000. A harmonization would imply that the other countries in the sample would have to increase their standards vis-à-vis Germany.

With respect to the empirical exercise some comments are in order. First, the scaling of the indicators is not clear. So it seems safest to use disaggregated sub indices. Cleary, any quantification of the impact in environmental sustainability as measured by these indices suffers from this drawback. On the other hand, these indicators cover several dimensions of environmental sustainability which could not be taken into account in previous research.

Second, it has to be emphasized that the stock of net inward FDI into Germany has been used as explanatory variable. Therefore, the analysis on the one hand relates to the environmental stringency in Germany vis-à-vis the countries whose firms directly invest in Germany, but at the same time a comparison of environmental standards of host countries of German FDI with German standards is made. Hence, the interpretation of the explanatory variables deviates from traditional approaches (e.g. Carr; Markusen and Maskus, 2002). In this regard, future research should look at a larger set of home and / or host countries. This would also allow considering third country effects and to test whether there is a race to bottom in environmental standards when countries compete for inward FDI.

Thirdly, some industries may be more sensitive to changes in environmental standards. To analyse this issue in more detail, one could test for differential effects of environmental stringency across industries – however at the danger of over-parameterisation.

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International Investment and Domestic Employment

By Henning Klodt*

Abstract

Theoretical predictions about the labor market impact of FDI crucially depend on the analytical framework. In traditional trade theory, where FDI is motivated by exploiting international factor price differentials, domestic employment and employment in foreign subsidiaries are substitutes. In the theory of the multinational firm, where FDI is a means for exploiting firm-specific scale economies, domestic and foreign employment are rather complements. The empirical patterns of FDI presented in the paper suggest that the latter is much more on the mark. The paper concludes that public concerns about a massive export of German jobs via FDI are strongly exaggerated.

JEL classifications: F21, F23.

Keywords: Foreign Direct Investment, Multinational Firms, Labor Market Adjustment.

1. Introduction

Many observers are concerned that the relocation of production to low-wage countries may erode the industrial base of highly developed countries. In Germany, this debate is fostered by Eastern enlargement of the European Union, because the large wage differential between old and new EU countries opens up rich potentials for cost-saving international investment.

It is the central hypothesis of this paper that the reasons behind foreign direct investment (FDI) are much more complex than suggested in the public debate. It is argued here that predictions on the employment effects of FDI crucially depend on the analytical framework. In traditional trade theory, FDI is driven by international factor price differentials, whereas new trade theory stresses the exploitation of firm-specific scale economies by exporting so-called headquarter services. The impact on domestic employment substantially differs between these two frameworks. Section 2 briefly illustrates the treatment of FDI in different settings of trade theory, and it discusses their predictions about its regional and sectoral pat-

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terns. Section 3 confronts these predictions with actual investment patterns. Section 4 concludes.

2. Theories of International Investment

In traditional trade theory, FDI basically reflects imperfections in factor price equalization via international trade. These may result from natural and artificial trade barriers or from extreme differences in relative factor endowment of countries which prevent factor price equalization even in the case of perfect specialization in production and trade. In comparative statics, FDI changes the relative endowment of countries with capital and labor until an equilibrium of factor price equalization is reached. It thereby reduces wages and increases profit rates in capital-rich countries and increases wages and reduces profit rates in labor-rich countries. In this context, the following patterns of foreign direct investment should be expected:

– FDI will be a one-way flow from capital-rich to capital-poor countries.

– At the sectoral level, FDI will be dominated by labor intensive industries, where the potentials for cost-saving relocation of production to low-wage countries are most pronounced.

– In highly developed countries, real wages will decline or - with rigid labor markets - employment will be reduced especially in those industries which are strongly engaged in FDI.

New trade theory, by contrast, explicitly considers the business strategies of multinational firms. In this view, foreign direct investment is driven by the exploitation of firm-specific scale economies (see, e.g., Krugman 1983, Helpman 1984, Markusen 1984, Brainard 1997, Kleinert 2004). These models are based upon three central assumptions:

(1) There exist two different types of scale economies. Plant-specific economies of scale, which may result from fixed capital requirements of production or other indivisibilities, can only be exploited at individual production sites. Firm-specific economies of scale, by contrast, can be transferred between different plants within firms and can also be utilized in foreign affiliates. This type of economies of scale results from so-called headquarter services such as research and development, public relations activities, the establishment of brand names, or the development of managerial know-how which can be applied to all plants of the respective firm.

(2) Selling on export markets is associated with higher costs than selling in the domestic market. These additional costs may result from transport costs or from artificial trade barriers.

(3) Managing and monitoring of foreign affiliates give rise to additional costs which are related to geographical distance, to language and cultural barriers, or to unfamiliarity with foreign bureaucracies and institutions.

The relative importance of these three factors is crucial for the decision whether a domestic firm prefers to serve foreign markets by exports or by foreign production and for the competitive advantages and disadvantages of independent producers in the foreign country.

In this framework, investing abroad is strongly related to an export of services - notably headquarter services. By contrast to traditional trade theory, foreign production is not expanded at the expense of domestic production. The latter may even increase, because a better exploitation of scale economies from headquarter services will raise the profitability of this domestic activity and thus gives incentives to expand the domestic base for multinational activities. However, this adjustment in the production structure will require corresponding adjustments in the structure of labor input: Qualification requirements in the provision of headquarter services tend to be higher than in production. Hence, multinational activities based on the exploitation of headquarter services may even increase the total number of jobs at home, but will be associated with a substantial shift in the relative demand for qualified and less qualified workers.

For the purpose of this paper, the following implications of new trade theory for the basic patterns of FDI are relevant:

– FDI will be dominated by tow-way flows between highly developed countries, because each of these countries will dispose of their own multinational headquarters which serve domestic and foreign markets with goods produced either at home or by their affiliates in other developed countries.

– The sectoral composition of FDI will be dominated by those industries which heavily rely upon headquarter services. By and large, the technology intensity of those industries will be above average, because the provision of technological knowledge constitutes one of the most important headquarter services.

– Finally, it should be expected that multinational activities and domestic employment are positively correlated, because the expansion of foreign production creates additional job opportunities in domestic headquarters.

It can be concluded, therefore, that traditional and new trade theory substantially differ with respect to their predictions on the stylized facts of FDI. The following section confronts these predictions with the empirical patterns of FDI.

3. Stylized Facts of International Investment

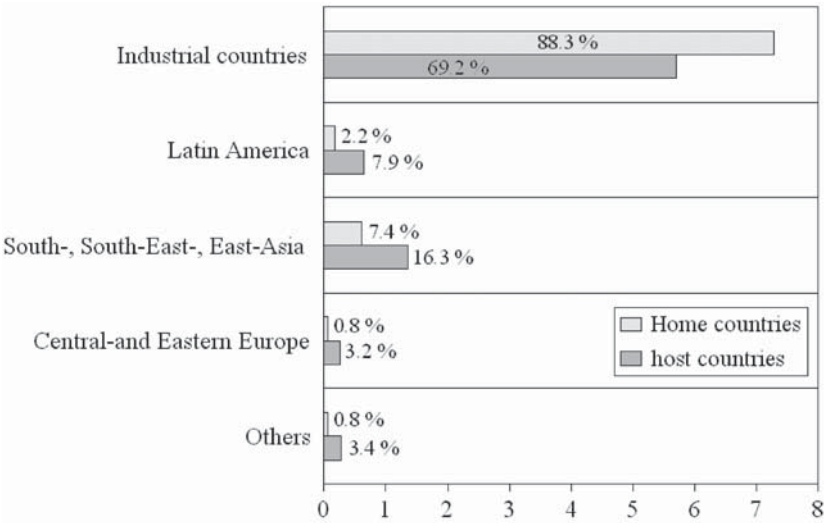
Individual investment projects do not carry a tag which allows to identify them as driven by factor price arbitrage or by firm-specific scale economies. Also ques-

tionnaires addressed to international investors can be misleading, because they typically only differentiate between cost-saving and market-oriented motives of multinational activities. To our knowledge, no questionnaire study has ever tried to identify the relative importance of firm-specific scale economies for explaining international investment activities.

Also statistics on FDI should be handled with care. Basically, there are two sources of information: statistics on investment flows and statistics on cumulated stocks of investment. Statistics on investment flows are typically generated from balance of payments statistics, which in turn rely on international transactions denoted to the central banks. These statistics are affected by severe deficiencies. For instance, if the establishment or acquisition of a foreign affiliate is financed by funds raised from banks in the host country, the balance of payments of the home country is not affected at all. Hence, corresponding statistics on foreign direct investment flows do not indicate any multinational activity at all. In economic terms, however, such a transaction undoubtedly constitutes an international investment activity. Furthermore, investment flow statistics are highly sensitive to stock market fluctuations, because the majority of FDI consists of cross-border mergers and acquisitions and many of them are financed by an exchange of shares. Finally, flow statistics may be distorted by the repatriation of profits from foreign affiliates to parent companies: For the year 2003, the German balance of payments displays a financial flow from foreign affiliates to German parent companies of 23.7 billion 80, whereas gross German investment abroad reached a level of 26.0 billion 80. In the statistics on foreign direct investment, these gross flows are consolidated to a net outflow of 2.3 billion 80 from Germany. This figure is obviously heavily misleading (Deutsche Bundesbank 2004a: 51).

For these reasons, this paper makes no use of FDI flow statistics, but relies upon statistics on investment stocks. These statistics are collected from the Deutsche Bundesbank and other central banks from the balance sheets of companies. They may suffer from an insufficient discrimination between book values and market values, but nevertheless appear to be highly preferable to flow statistics.

As discussed above, traditional trade theory would predict that FDI is dominated by developed countries as home countries and less developed countries as host countries. As a matter of fact, however, not only 90 per cent of FDI outflows, but also about 70 per cent of FDI inflows are concentrated on industrial countries (Figure 1). Among less developed countries, only South and East Asia have gained a significant importance. The largest host countries of this region are Hong Kong (326 billion US-$), Singapore (91 billion US-$), Taiwan (65 billion US-$), Taiwan (65 billion US-$), China (37 billion US-$), and South Korea (35 billion US-$). Hong Kong, Singapore, Taiwan and South Korea are classified as less developed countries by the UNCTAD, although their per-capita income well exceeds the ones in several industrial countries. If these “four tigers” are classified as industrial countries, too, the dominance of North-North FDI would be even more visible.



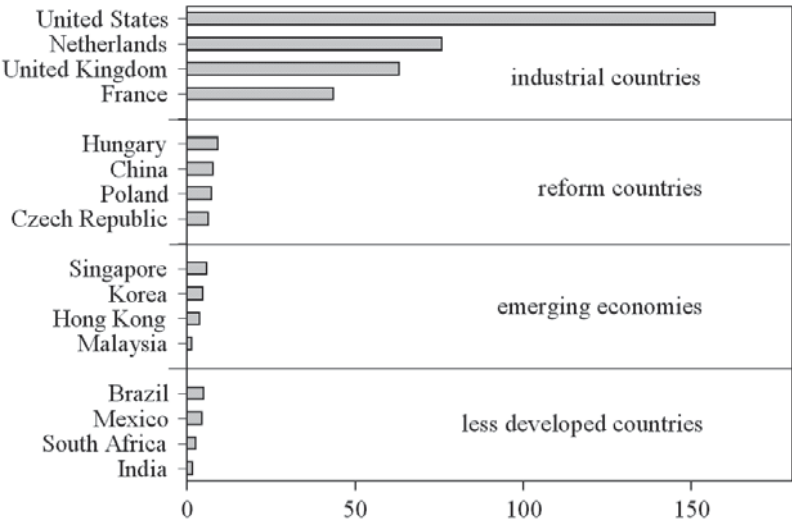
Source: UNCTAD (2004).

Figure 1: FDI by Region 2003 (trillion US-$)

Similar regional patterns can be observed for German FDI. Figure 2 presents German outward FDI for the four most important countries in different country groups (detailed information for more countries is provided in Table A1 in the appendix). Again, industrial countries strongly dominate as host countries. It can be calculated from Table A1 that outward investment in industrial countries represent 86.2 per cent of total German outward investment.[1] For certain, the relative importance of the new EU members and China is expected to rise in the future. But even a twofold or threefold increase in their shares in German outward FDI would not reverse the general trend that their importance is rather minor as compared to the importance of industrial countries.

In order to evaluate the relative importance of factor price differentials and scale economies from headquarter services at the sectoral level, detailed information on the production structure of different industries would be required. Unfortunately, such information is not explicitly available. As discussed above, however, the sectoral technology intensity can be regarded as an appropriate proxy for the importance of firm-specific scale economies. Following the conventional approach of respective studies, industries are classified as technology intensive if the share of R&D expenditures in total sales exceeds a level of three per cent. In industrial countries, this criterion is met by chemicals, non-electrical machinery, transport

[1] In addition, it should be noted that at least part of FDI in reform countries is motivated by firm-specific scale economies and not by factor price arbitrage (Jost, Nunnenkamp 2002; Marin 2004).



Source: Deutsche Bundesbank (2004b).

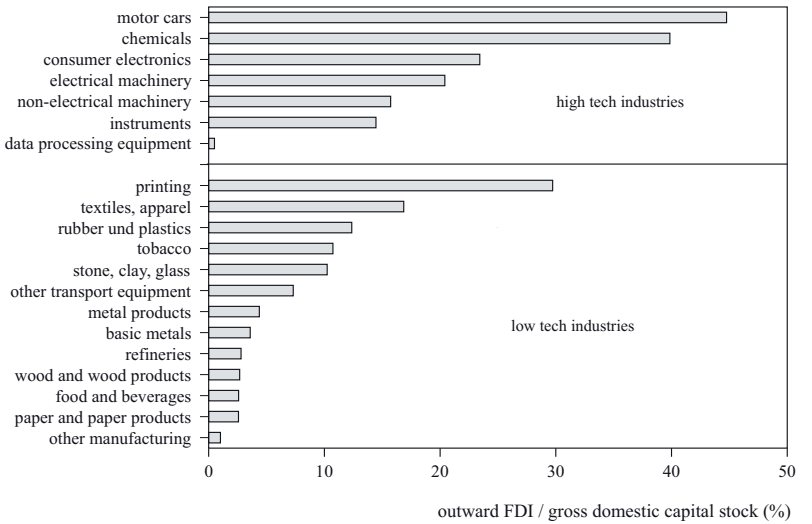
Figure 2: German Outward FDI by Major Host Countries 2002 (billion 80)

equipment, electrical machinery, consumer electronics and communication technology, and instruments, whereas the remaining industries are classified as less technology intensive.[2]

In Figure 3, the relative importance of international investment is captured by the ratio of outward FDI stocks to domestic capital stocks. Although there are substantial differences across industries, the overall pattern clearly suggests that multinational activities are largely a domain of technology intensive industries On average, the ratio of FDI to domestic capital stock reaches a level of 22.7 per cent for these industries, whereas the corresponding value for less technology intensive industries is 8.2 per cent. Hence, it can be concluded that the exploitation of scale economies from headquarter services play a decisive role for multinational business strategies.

As described in the previous section, traditional and new trade theory also differ with respect to the impact of FDI on domestic employment at the firm level. According to traditional trade theory, FDI is interpreted as a relocation of production to foreign countries at the expense of domestic production and employment. Hence, domestic employment should shrink especially in those industries where the home country is facing a comparative disadvantage, whereas industries enjoying a comparative advantage would have no incentives to invest abroad and would even be able to expand domestic employment.

2 See, e.g., BMBF (2004).



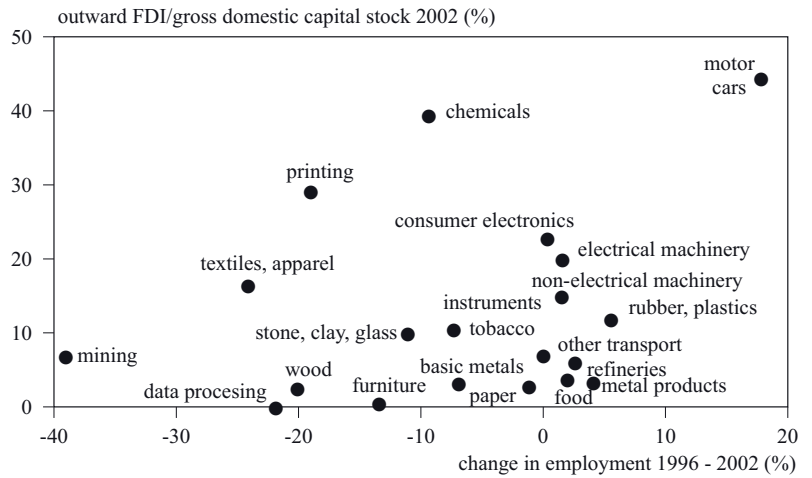
Source: Deutsche Bundesbank (2004b); Statistisches Bundesamt (2004); own calculations.

Figure 3: Ratio of German Outward FDI to Gross Domestic Capital Stock by Industry 2002 (per cent)

In new trade theory, the impact of FDI on domestic employment in developed countries is more complex. On the one hand, a better utilization of headquarter services via FDI gives multinational firms an incentive to specialize on such activities and to expand domestic employment in this area. On the other hand, the decisions about where to locate production facilities will be influenced (among others) by international cost differentials. As a result, domestic employment in headquarters will rise, whereas domestic employment in production may even decline. The latter effect may be compensated, however, by market-oriented inward FDI from other industrial countries.

The empirical picture about the relationship between FDI and domestic employment seems quite scattered, but nevertheless more favorable to new than to traditional trade theory (Figure 4). If cost-oriented relocations of production dominate, it should have been expected that industries with above-average FDI would have to face the strongest decline in domestic employment. In fact, the North-West quadrant of Figure 4 is almost empty. Instead, the sectoral pattern is dominated by a large number of industries where the importance of FDI is very limited and the employment performance is mixed. The outliers are the four major German manufacturing industries – motor cars, chemicals, electrical and non-electrical machinery – which all are strongly engaged in international investment and simultaneously enjoy a relatively favorable development of domestic employment.[3]

[3] A similar sectoral pattern of FDI and domestic employment is reported by Becker, Jäckle and Mündler (2004):26). See also Klodt (1999).



Source: Deutsche Bundesbank (2004b); Statistisches Bundesamt (2004); own calculations.

Figure 4: FDI and Domestic Employment in Germany by Industry

The results of this analysis should not be misinterpreted in the sense that international competition would not affect the German labor market at all. A more appropriate conclusion would be that the relocation of industrial jobs to low-wage countries is not accomplished by FDI, but by other channels. As a rule, standardized and labor intensive industries suffering from import competition do not shift production and jobs to low-wage countries, but simply shrink (and sometimes even disappear), whereas foreign competitors expand. Hence, international investment seems not a suitable strategy for ailing industries to escape declining profitability at home.[4] Instead, FDI activities are dominated by the strategy of expanding business success achieved at domestic locations to foreign locations.

4. Summary and Conclusions

Theoretical predictions about the labor market impact of FDI crucially depend on the analytical framework. In traditional trade theory, FDI reduces the capital stock of the home country and thereby reduces domestic employment (at given wages). In new trade theory, FDI improves the exploitation of firm-specific scale economies and increases the number of domestic jobs in the provision of headquarter services.

[4] This view is supported by Kinkel et al. (2002), who are reporting a concentration of failed FDI projects on those cases where labor cost considerations dominated.

The empirical evidence suggests that models derived from new trade theory are much more on the mark. About 86 per cent of German outward investment are directed towards other industrial countries (above all the United States), whereas the share of low-wage countries (including the new EU members and China) still is very limited. Moreover, FDI is dominated by high-tech industries and not by low-tech industries which particularly suffer from high German labor costs. Finally, the development of domestic employment tends to be much more favorable in industries with strong multinational activities than in other industries.

As a result, public concerns about a massive export of jobs via FDI appear to be strongly exaggerated. Nevertheless, it would be ill-conceived that offshoring activities would not affect Germany's industrial structure at all. Multinational strategies of German firms may well increase the number of jobs both in the host country and in the home country, but the qualification requirements of newly created jobs in Germany will differ from those of relocated jobs. If the number of jobs in the provision of headquarter services in Germany is expanded at the expense of jobs in production activities, the human capital intensity of German industry will rise. As a result, increased offshoring to low-wage countries may significantly add to structural unemployment in Germany, which is and will continue to be concentrated on low-qualified workers.

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Appendix

Table A 1

German Outward FDI by Region and Selected Countries (billion €)

Industrial countries	509,2	Reform countries	38,6
EU–15	315,6	China	6,3
Austria	21,5	Latvia	0,2
Finland	0,9	Lithuania	0,2
France	43,6	Poland	7,7
Greece	1,4	Rumania	0,6
Ireland	7,2	Slovakian Republic	2,4
Italy	19,0	Slovenia	0,4
Luxemburg	28,4	Czech Republic	7,2
Netherlands	75,7	Hungary	9,0
Portugal	3,1	Developing Countries	43,4
Spain	14,7	South Africa	2,4
Denmark	3,1	Argentina	1,2
Sweden	9,6	Brazil	4,8
United Kingdom	63,1	Hong Kong	3,6
Other industrial countries	193,6	India	1,5
Japan	7,7	South Korea	4,6
Switzerland	16,4	Singapore	5,8
United States	157,1	World total	591,2

Source: Deutsche Bundesbank (2004).

International Investment and Domestic Employment

Comment

By Sascha O. Becker

1. Introduction

The expansion of domestic firms' operations abroad and the outsourcing of production stages to low-income countries in particular raise concerns about labor market consequences in high-income countries.

Klodt (2005) points out that the reasons behind FDI are much more complex than suggested in the public debate. He presents stylized effects on international investment patterns that are inconsistent with traditional trade theory, which regards FDI as driven by international factor price differentials. First, 90% of worldwide FDI outflows and 70% of worldwide FDI inflows are concentrated on industrialized economies. In Germany in particular, 86% of outward FDI goes to industrialized countries. This suggests market-access motives as an additional factor driving FDI. Second, multinational activities are more dominant in technology-intensive industries, where cost-saving motives may be less important. Third, employment growth is higher in sectors with a comparatively high outward FDI intensity.

All these stylized facts are, however, consistent with the exploitation of firm-specific scale economies and market-access motives which are at the heart of new trade theory.

The hypothesis that outward FDI is driven by several motives is very well taken (see also Markusen, 2002) and raises the question what are the *net effects* of outward FDI on home labor markets. The co-existence of both market-seeking and cost-reducing forces makes theoretical predictions about the effect of outward FDI on real wages and employment ambiguous. Moreover, even when considering exclusively cost-reducing FDI, the theoretical prediction about the effect on parent employment is ambiguous. The effect depends on whether the cost reduction allows the multinational enterprise (MNE) to expand its market share, and whether the parent retains activities at home that are complementary to foreign operations.

It is therefore inherently an empirical issue to what extent FDI may lead to an *overall* reduced labor demand at home and downward pressure on home country wages.

2. Econometric Studies on Home Labor Market Effects of Outward FDI

A number of studies have tried to assess the home labor market effects of outward foreign direct investment. Feenstra and Hanson (1999) find that foreign outsourcing of *United States* firms to affiliates or unrelated firms abroad contributed substantially to the observed increase in the wage premium for skilled labor in the U.S. Slaughter (2000) studies the same issue focusing exclusively on FDI. He does not find a significant wage impact of U.S. parents' shift in production activities to foreign affiliates. This finding has been interpreted as evidence that the effects found by Feenstra and Hanson (1999) are mainly related to trade at arm's length, sub-contracting or licensing.

For *Japan,* Head and Ries (2002) estimate the impact of a foreign expansion of MNEs on the skill-intensity of the work force at Japanese parents and find that foreign expansions lead to an increased skill intensity and higher wages at the parent firm, and that this effect is stronger when firms expand into low-wage countries.

For *Sweden,* some studies report evidence that MNEs tend to locate relatively high-skill intensive rather than low-skill intensive activities abroad. Evidence of skill seeking among Swedish MNEs is presented by Blomström, Fors and Lipsey (1997). However, Hansson (2001) disputes their result and finds – in a study similar to Slaughter (2000) – that shifts of production activities within Swedish MNEs to non-OECD countries have a negative effect on the relative wage of unskilled Swedish workers.

Marin (2004) presents evidence of skill seeking among German MNEs. She uses detailed data on *German* (and *Austrian*) MNEs and their activities in Central and Eastern Europe (CEE) and finds that the foreign affiliates tend to employ workers with higher educational attainment and offer more R&D related occupations than the German (and Austrian) parents.

Another strand of the micro-econometric literature addresses directly the question whether parent and affiliate employment substitute or complement each other. Slaughter (1995) proposes the estimation of multi-location translog cost functions in order to test whether employment at foreign affiliates tends to substitute or complement employment at domestic parent firms. Brainard and Riker (2001) and Konings and Murphy (2001) apply the translog framework to U.S. and European corporations, respectively. Brainard and Riker (2001) find that foreign affiliate employment substitutes modestly for U.S. parent employment. However, substitut-

ability is stronger between workers employed in different low-wage locations than between parents and affiliates. Konings and Murphy (2001) find weaker substitutability between parent employment and affiliate employment in CEE than between parent employment and affiliate employment in the EU-15.

Using data on *German* and *Swedish* multinational enterprises (MNEs) in the manufacturing industry, Becker, Ekholm, Jäckle and Muendler (2005) analyze the degree of substitutability of labor across locations. In MNEs from either country, affiliate employment tends to substitute for employment at the parent firm. At the margin, substitutability is the strongest with respect to affiliate employment in Western Europe. This substitutability between parent and affiliate employment suggests an adverse effect of German outward FDI on home employment (even) at the *intensive margin,*[1] i.e. in existing parent-affiliate pairs, at least in the manufacturing sector.

3. Should We Worry about Outward FDI?

Should we worry about outward FDI, in particular from a German perspective?

While it is true that the vast majority of German outward FDI is (still) located in industrialized countries, there are clear signs of an increasing importance of FDI to CEE countries (and other reform countries, e.g. China).

Klodt (2005) measures German outward FDI by the nominal FDI stocks. The eight CEE countries that joined the EU in May 2004 make up for only 4% of German FDI stocks worldwide in the early 2000's. Klodt concludes that even a twofold or threefold increase in the share of German outward FDI to new EU members and China would not reverse the general trend that their importance is rather minor as compared to the importance of industrial countries.

Alternatively, regional patterns of German outward FDI can be measured by employment in foreign affiliates.

When measured by number of employees, German outward FDI to the 8 EU accession countries in CEE, has increased dramatically, and in 2001 made up a share of 14,9% of worldwide employment in German foreign affiliates.

A recent study by the German Chamber of Commerce and Industry (DIHK, March 2005) identifies the EU accession countries and China as the main target countries for (recent) German outward FDI. EU accession countries are more and more considered to be attractive locations by German firms because they increasingly trust those countries' legal environment, the latter therefore complementing the favorable economic conditions in terms of labor costs and company taxation.

[1] At the time of *opening up* a foreign affiliate, e.g. when moving a labor-intensive stage of production abroad, foreign labor will be clearly a substitute for home employment. This is being referred to as the *extensive margin* of labor demand.

Table 1

Foreign Employment of German Multinationals

Employment by country (in %)	1989	1995	2001
USA	21.68	19.13	18.25
Great Britain	4.85	7.91	7.17
Belgium / Netherlands / Luxemburg	3.28	3.50	2.68
France	9.78	8.95	7.83
Italy	3.79	3.66	3.39
Switzerland	2.21	2.26	2.28
Greece / Spain / Portugal / Ireland	8.54	7.63	6.61
Year 2004 CEE accession countries	0.17	8.60	14.90
Other	45.71	38.36	36.88

Note: The foreign employment is weighted by the ownership shares of the German parent.
Source: Becker, Jäckle and Muendler (2005), based on the Deutsche Bundesbank International Capital Links database.

Different from FDI before the 1990s, recent trends in FDI might therefore entail more negative effects, especially in the face of (still) relatively rigid labor markets as the German one, with little downward wage flexibility.

Another recent trend in outward FDI is the growing importance of the trade and services sectors. In Germany, foreign affiliate employment in trade and services went up by factor 5 to 7 between the years 1991 and 2001, whereas in the machine construction industry, for instance, it "only" increased by factor 3 (see Becker, Jäckle and Muendler 2005 for further details).

There is, however, little econometric evidence (for Germany) so far as to the home labor market effects following the increase in outward FDI in the trade and services sectors.

Outward FDI is a natural and growing phenomenon in a globalized world. Profit-maximizing firms choose domestic and foreign locations so as to maximize their profits. While outward FDI – and foreign outsourcing more generally – helps German firms to stay competitive and access foreign markets, German workers' competitiveness, in particular that of low-qualified workers, may be questioned.

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Does FDI in Central and Eastern Europe Weaken Germany's Position as a Business Location?

By Christine Borrmann*, Rolf Jungnickel** and Dietmar Keller***

Abstract

Due to the expansion of German FDI in CEE countries, fears were raised that investment and jobs would be driven out of high-wage Germany leading to an increase in unemployment. This paper analyses the effects of German FDI in CEEC on German trade and employment in the context of structural change and growth of the entire economy. We find significantly positive relationships between German foreign production and exports resp. imports indicating intensified division of labour rather than relocation of jobs. Deficiencies of the German economy mainly lie in structural weaknesses. The competitive position of Germany towards the CEECs should be improved by structural measures.

JEL classifications: F15, F21

Keywords: foreign direct investment, employment effects, trade effects

1. Introduction

The expansion of German FDI in CEE countries is often considered an indicator of lacking quality of Germany as a business location and as an element of a trend towards a "bazar economy". Such views are mostly based on the assumption that cost-motivated investments are dominating the market-oriented ones. Investment and jobs are driven out of high-wage Germany so that labor at German locations suffers from unemployment while the investing firms profit from lower labour costs in the East. Many observers fear that even the German "Mittelstand" (SME, mostly family-run) has started to re-locate jobs to the East which would further erode the basis of the German economy.

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The authors would like to thank the Deutsche Bundesbank for granting access to the FDI micro database on the Bundesbank premises in Frankfurt.

Critical views like these on FDI in CEE are raised not only by trade unions acting on behalf of employees losing their jobs. The discussion last year culminated in Bundeskanzler Schröder's accusation of the DIHK president Braun for being unpatriotic.[1] Also the general public as well as a number of German economists often argue along this line, and even representatives of the business sector use the growth of FDI in CEE countries as evidence of the weakness of Germany as a business location and as an argument in favor of the demand for improvements in regulation and taxation.

In this contribution, we take a more differentiating view of FDI in CEE countries. Our analysis rather shows that

– FDI in CEE countries is an inadequate indicator of (lack of) location quality.
– FDI in CEE countries not necessarily leads to income and employment losses with the investing firms
– Relocation has to be evaluated in a wider perspective spanning firms, both foreign investors and non-investors, and sectors. It can thus only be evaluated meaningfully in the context of structural change and growth of the entire economy.
– It is hard to quantify "job losses" or foregone income resulting from relocation since there are other important determinants, both domestic and foreign, of employment changes, for example technical progress or non-FDI related foreign trade.

As a yardstick of location quality we take the employment situation in Germany since this is the most urgent problem for economic policy. We therefore discuss whether FDI in CEE exerts an influence on the domestic employment situation. If such FDI leads to employment losses in Germany we consider this a weakening of German locations.[2] As such effects would largely work via trade relations – relocated production could effect both imports and exports of investing and non-investing firms – we focus on the relationship of FDI[3] and foreign trade.[4]

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1 See e.g. Die Welt of March 23rd, 2004.

2 Besides the level of (un)employment one could also consider effects on the skill structure of the labor force concerned. This would, however, go beyond the scope of this paper.

3 Throughout this paper what we label FDI is mostly not measured as capital stock or flows, but by foreign affiliates' production and employment. We do this for two reasons. First, FDI data, especially the annual flows, are characterized by strong volatility. Second, FDI capital cannot really be considered an indicator of economic activity since there is no corresponding domestic variable: FDI does not necessarily go along with real investment, and real investment at a foreign affiliate can well take place without any FDI transfer (Jungnickel 2000, Borrmann 2002). Foreign production of German firms is defined as sales of affiliates excluding the trade sector. Data on foreign affiliates' production were kindly supplied by the Deutsche Bundesbank

4 Of course, employment effects of FDI can arise without any changes in trade, e.g. when company growth is re-located to foreign countries. However, in most cases trade will be involved.

Our aim is to give some estimates of the direction and order of magnitude of employment effects. The time span covered ends in 2001 respectively 2003[5] which means that changes that have taken place since then cannot be considered. To what extent the situation has actually changed must remain an open question. From reports of individual firms it seems that the relevance of relocations has increased substantially. On the other hand, FDI outflows from Germany to core CEE countries has decreased and partly turned into backflows in 2003.

Starting point of our analysis is a brief stocktaking of German FDI in CEE countries. This should demonstrate the relevance of our topic which is often overstated in the public (section 2). It follows a discussion of the – ambiguous – link between FDI and location quality as well as a presentation of results of prior studies on this issue (3). In section (4) we present our data base and methodological procedure employed in the main part 5. There we deal empirically with the relation of "German" production in CEE countries on the one hand and bilateral trade and domestic employment in Germany on the other. In part 6 we draw some conclusions for economic policy.

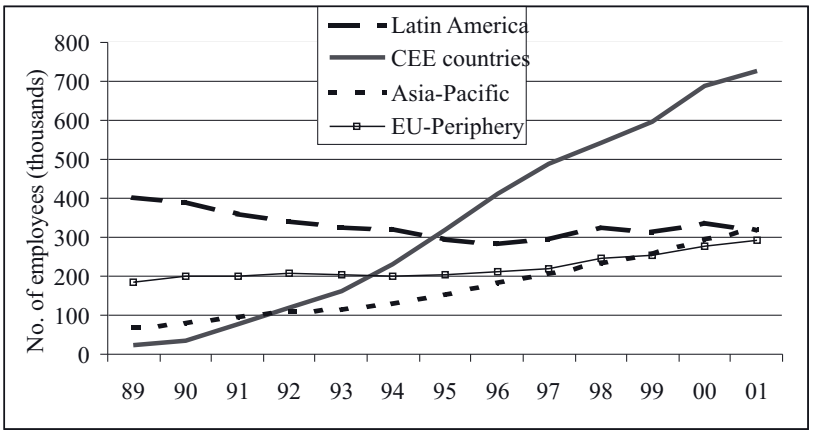
2. Pattern of German FDI in CEE Countries

The opening-up of CEE had substantial influence on the regional pattern of German FDI in the 1990s. Employment growth in these affiliates outpaced that of most other regions between 1996 and 2001 (fig. 1). The same holds, although to a lesser degree, for foreign affiliates' production (fig. 2; Borrmann / Jungnickel / Keller 2004). Most traditional host regions, especially the Western European periphery and the Mediterranean as well as developing regions other than China and India fell far behind.

High growth rates in CEE do not only result from the low basis of the mid 1990s. Bundesbank figures show that as much as 25% of all employment growth in German-owned affiliates between 1996 and 2001 took place in CEE. Due to backwardness in productivity of the often labour-intensive production, the share in production growth is clearly lower. It is behind the North American and the Core EU share (fig. 2). However, with 6% of all German production abroad and almost 16% of total foreign employment, the CEE countries are no longer marginal production locations for German investors.[6] They dramatically caught up during the

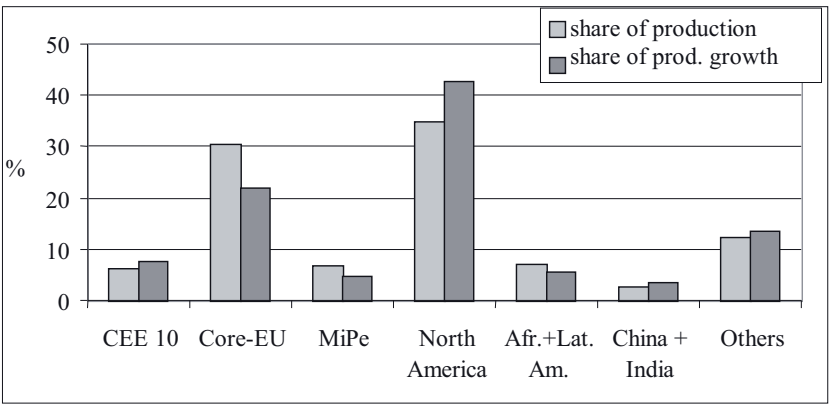
[5] From 2002 on, the threshold for inclusion of foreign affiliates in the Bundesbank statistics was increased. A number of smaller ventures have, therefore, fallen out of the statistics. This means that FDI development is understated, in particular in the case of CEE since the share of small-size foreign investors is particularly high in that region. For regressions in the empirical part (5) we have scaled up FDI figures of the years 2002 and 2003 by applying the ratio of FDI according to the old and the new concept in 2001.

[6] Other forms of engagement, such as processing with co-operation partners or imports from unrelated third parties in CEE are not considered here.



Source: Own calculations , based on Bundesbank data

Fig. 1: Growth of Employment in CEE Countries Compared with other Regions, 1989 – 2001



CEEC10: Baltic States, Poland, Czechia, Slowakia, Hungary, Slovenia, Bulgaria, Roumania.
Source: Own calculations based on Bundesbank data.

Fig 2: Share of CEE Affiliates in Foreign Production in 2001 and Production Growth,[a] 1996 – 2001 (All Industries, excl. Trade)

[a] Production growth in the various regions as percentage of total foreign production growth.
Core EU: France; Belgium, Netherlands, Luxemburg, Italy, UK, Ireland, Denmark.
MiPe: Greece, Portugal, Spain, Tunisia, Algeria, Morokko.

late 1990s, starting from 3% respectively 12% of foreign production and employment in 1996.[7] Manufacturing production of German affiliates in core CEE has reached the magnitude of bilateral trade relations.

[7] China and India, in comparison, are further behind in their catching-up process with only 3% of German overseas production.

The individual CEE countries profited to a very different degree from their opening up for foreign investors; the firms from the various German sectors took advantage of the new opportunities to a different degree:

– With respect to host countries, German investors have heavily concentrated their activities on the four core CEE countries Poland, Czech Republic, Slovakia, Hungary with almost 90% of the employment and even 94% of the sales of all CEE affiliates. Even when the size of the host economies is taken into account, both employment and production are disproportionately located there. This also holds in a comparison with Western host countries, while most other accession countries are still far behind. The dominance of core CEE has only slightly decreased in recent years.

– In a sector perspective, there are more pronounced changes. The traditional dominance of manufacturing is fading, in particular in terms of sales (production). As counterpiece, services and utilities have clearly gained weight, and so did the trade affiliates (both wholesale and retail) in terms of employment (Table 1).[8]

Table 1

Operations of German Affiliates in CEE(10) 1995 and 2001, by Sector

		Affiliates in CEE(10)			
		production		employment	
		1995	2001	1995	2001
all sectors	Mill. € resp. 1000	15531	95600	278	784
	in %	100	100	100	100
manufacturing (%)		54.9	43.3	70.1	55.4
trade (%)		29.9	29.7	11.5	16.5
services (%)		9.4	14.0	12.1	17.1
other (%)		5.8	13.0	6.3	10.9

Source: Own calculations from Bundesbank data

– In virtually all industries, growth of production and employment in CEE was clearly higher than in Germany. The relation of affiliates' employment to employment in Germany increased. In some traditional consumer goods industries (TCG) like clothing, leather goods, textiles and glass / ceramics it figures at around 15% or even higher, up to over 35% in the case of leather goods, although the relation of foreign and German *production* is much lower than the respective relation for *employment.* Increasing importance of CEE locations was not restricted to labour intensive TCG production where pressure for relocation

[8] Gains in services were, however, smaller than in Western host countries. Services were about the only sector where EU locations gained compared with CEE countries.

of production should be especially high. Growth took place across the board with public utilities in a prominent position which is neglected in most studies. Annex figure A1 gives some examples of industries engaged above average in the East. Since in most other industries the respective numbers are much lower, the figure gives reason to substantial qualification of fears of emigration of the German industry to the East that are often raised in the public.

In our context, it seems to be noteworthy that CEE obviously displayed special attraction to smaller foreign investors who often started their foreign operations in this region. They particularly profited from lowered transaction costs by proximity and stability of investment conditions in the course of EU accession. By grouping the Bundesbank's micro data by the extent of foreign operations of individual investors, it can be seen that firms with less than 250 employees abroad have allocated over 30% of their employees in CEE(10), compared with only 10% in the case of firms with over 25000 employees abroad (Annex figure A 3). It seems, therefore, that the opening-up of CEE led to the emergence of new investors that had hardly invested abroad before. Their high share could indicate that this group of firms is indeed particularly affected (be it in a positive or negative way).

By and large, both level and pattern of German FDI in CEE do not support dramatizing views that German firms have been emigrating to the East. However, in view of the strong increase[9] and the high level already achieved in some sectors, it seems meaningful to analyze possible links between expansion in the East and development at home.

3. The (Ambiguous) Link between FDI and Location Quality

The various theoretical approaches to explain FDI mostly base their reasoning on distinguishing between cost- or market- oriented FDI. Cost-oriented "vertical" FDI (Helpman 1985) is considered to go along with substitution of home country employment and promotion of home country imports. The effects of market-oriented projects (horizontal FDI; Markusen 1998) is, however, less clear. In most cases, they are assumed to have no or only limited effects on trade and domestic employment. Such seemingly generalizing lines of argumentation do not live up with complex reality. First, there will often be a problem to classify projects as cost- or market-oriented. Many affiliates at the same time serve the host country as well as the home or third country markets – how could one classify, for example, VW's affiliate Skoda or the voluminous operations of Schieder, a manufacturer of furniture that developed Eastern European markets from initially largely cost-moti-

[9] Probably, growth has continued in most recent years not yet covered by official statistics. Even in 2002, when the Bundesbank raised the threshold for foreign affiliates to be included in the statistics, operations in CEE countries remained rather stable, compared with other regions.

vated engagements in Poland?[10] Second, and more important, in both cases there will be room for a wide range of links between foreign and domestic operations of the investing firms and the economies affected. These links mostly are effective via changes in foreign trade relations.[11]

Even if we only consider cost-motivated FDI, the link to location quality and employment in the home country is far from clear. While it is obvious that cost-motivated relocations often go along with cutbacks of employment and production in Germany in the first round, further adjustment processes can take a great variety of directions. They reach from effects on suppliers and competitors both at home and abroad to economy-wide adjustment to changing income levels resulting from FDI:

– The use of re-imported components or final products can strengthen the competitiveness of the investing firms and lead to employment growth, not least by way of increased exports.
– Re-imports from relocated production leads to growth in real income in Germany and hence to improved employment chances in sectors profiting from increased demand.
– Even cost-motivated investment projects can open up the host country market for export products of the investing firm.
– Cost-motivated investments could substitute production by host country or third country investors that would otherwise have taken place.
– On the other hand, cost-motivated relocation of part of the German production may also result in further relocations because of better knowledge of investment and production conditions in the host country and when scale economies can be realized.

If we take into account that FDI in CEE countries can as well be market-seeking in the first place, this may be without any effect on home country employment when new markets are developed. However, it is more likely that adjustment processes take place which lead to further qualifications of the relocation argument:

10 Manager Magazin of Juli 26th, 2004

11 Another approach to study these links could be to consider the effects of capital flows involved with FDI. If the national stock of financial capital is assumed as given, FDI-determined capital outflows could be taken as a loss of resources in Germany which would put wages under pressure or – in case of wage rigidity – lead to unemployment. However, this would be a too narrow perception of FDI. First, in a world of global financial markets, establishment and operation of foreign affiliates do not necessarily go along with FDI transfer from the home country. Second, the main characteristic of FDI is the border-crossing flow of knowledge (e.g. headquarter services) and competencies. Contrary to the transfer of a given capital stock from one country to another, the transfer from knowledge to host countries does not entail a loss to the home country. It can have positive as well as negative consequences for the locations involved.

– To the extent that FDI opens up the host country market for other products of the investing firm, exports and employment in Germany can, on balance, be promoted rather than substituted. If FDI is directed towards new markets that had not been served before by exports, this could at least promote headquarter services supplied to the affiliates

– On the other hand, even market-seeking FDI can be at the cost of employment in Germany, namely when former exports (by the investing or by other German companies) to the host country are substituted by local production or when third country markets are served from the CEE affiliate. One could even think of market-driven relocation of expansion if more modern plants are put up in CEE countries and not in stagnating Germany. This aspect seems to be quite relevant not only in CEE context, although it is seldom addressed in studies at hand.

– In the case that production and employment of the German investor are not directly affected, there may occur indirect effects by income changes FDI brings about in the host country. Increased income would lead to increased demand for German exports in general. This effect should be relevant across the board and especially in export-intensive sectors supplying investment goods, such as machinery, equipment and instruments.

Furthermore, a general qualification holds: What is defined, by one way or the other, as relocation of manufacturing jobs to CEE could be compensated by job increases in other sectors of the German economy, for example in services. If additional jobs elsewhere balance the number of jobs transferred to the East, and if this is not achieved by cutting down wage levels, one cannot meaningfully speak of FDI as an indicator of location weakness. It is rather one out of several elements of structural change.

Finally, there remains the general argument that it can be misleading, from an economic policy perspective, to draw *general* conclusions regarding location quality from *bilateral* investment or trade relations. FDI in (or trade with) other regions could have compensating or reinforcing effects. No country can have only competitive strengths vs. all other countries. A balance of strengths and weaknesses can be considered the basis of productivity-increasing international division of labour.

The ultimate effects of FDI in CEE will, therefore, come about by the interplay of a number of actors in the home as well as in the host country and in the rest of the world. A schematic, although not comprehensive, overview of these actors and of the most important links between FDI and the home country economy is given in figure 3.1 for the case of vertical FDI.

From the theoretical reasoning presented above and condensed for vertical investment in Figure 3, it is obvious that considering direct employment effects with the investing firms only would be too narrow in scope when the aim is to evaluate

effects on location quality in general. However, most studies at hand deal with just one or a few of these links.

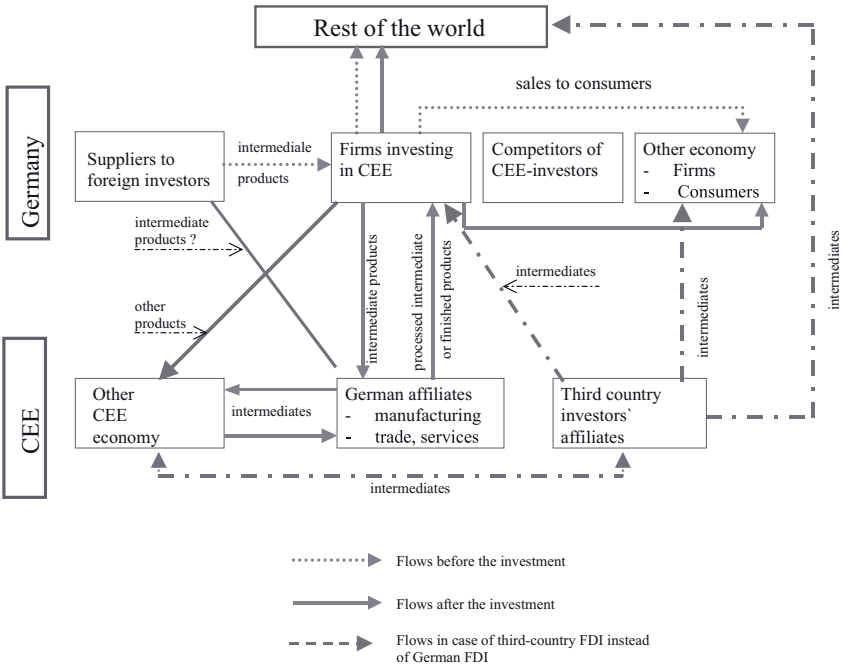


Figure 3: Implications of German Investment in CEE: Actors Involved and Main Transactions Resulting in the Context of Vertical Investment

4. Results of Former Studies

A first and large group of studies focuses on the level of relocated production to CEECs. The results often provoke the interpretation that an increase in employment abroad will go along with a corresponding decrease of employment at home – even when such a conclusion is neither implicitly nor explicitly suggested by the authors. A good example for this interpretation neglecting links and repercussions is the annual DIHT / DIHK survey which is regularly discussed in the media in this way.

A second strand of literature estimates the share of vertical and / or horizontal FDI in total FDI. The theoretical background of this approach is the above-mentioned (and ill-founded) thesis that (only) vertical fragmentation of production will

have a negative effect on employment while horizontal FDI means the capture of a new market with no effect on production plants at home. The results are rather inconsistent:

– Jost / Nunnenkamp (2002) for instance estimate the weight of market-oriented vs. cost-oriented FDI in the light of the growing importance of CEECs as host countries. Contrary to their hypothesis they find that market-seeking still is the dominant motivation of investment abroad.

– A similar result is reported by Chakribarti (2001): In his Extreme Bounds Analysis he finds market size to be the only robust predictor of FDI in CEE.

– In an inquiry of their customers, two banks (IKB and KfW, 2004) find out that for 80% of the firms investing abroad primarily opening up new or safeguarding existing markets plays an important role, while 61 percent mention lower wages as prominent investment motivation.

– Marin / Lorentowicz / Raubold (2003), however, identify vertical FDI as the main component of FDI in CEECs and, consequently, as one reason for unemployment in Germany.

– Likewise, according to a recent survey carried out by the DIHK (2003), 42 percent of all German investors go abroad primarily because of cost-related reasons, 26% try to open up new markets, and 32 percent name technical reasons like distribution and marketing.

Some authors focus on distribution effects of offshoring to CEE countries. Geishecker / Görg (2004), for example, find evidence that the real wage for workers in the lowest skill categories is relatively reduced by outsourcing, while the real wage of high skilled workers increases. The overall effect on the wage level is undetermined.

Empirical analyses and comparisons of their results are significantly hampered by scarcity of the data needed. Few countries offer official data that allow a combination of investment and employment analysis on firm level (for example Ireland (Görg / Hanley 2004) and Belgium (Sleuwaegen / Pennings 2001)). In most countries – and this applies to Germany in particular – information has to be drawn from

– either commercial balance sheet data (for Italy see e.g., Navaretti / Castellani (2004))

– or a combination of official statistics with such balance sheet data, as e.g. done by Becker et al (2004), who match the Bundesbank FDI micro data set with balance sheet data, both from Bundesbank amd commercial sources

– or from company surveys (Marin (2004), DIHK (2004), Kinkel et al. (2004), IKB / KfW).

Geishecker / Görg (2004) chose a different way by using the German Socio-Economic Household Panel (SOEP) and combining it with industry level information on industries' outsourcing activities from input-output tables.

The differing availability of data is a major reason for a wide variety of *methodological approaches* applied in the various studies:

– Studies based on surveys using information about the home country employment of investing firms can estimate the direct effects of FDI on the investing firms (see for example Kinkel at al 2003). This procedure neglects further determinants of employment and the implications of FDI for other firms via trade effects.

– Other authors use a subtraction approach. They start from the number of employees abroad and adjust these figures by factors like productivity differences and intra-firm trade in order to calculate the net employment effects at the parent firms (Marin 2004). This approach, too, provides no information on sector or economy-wide effects, and it remains a bit vague regarding causality.

– Some authors applying more econometric approaches often go beyond the investing firms' perspective by estimating wage or labour demand equations in order to explain the development of home country labour demand resp. wages (see Geishecker / Görg 2004, Becker et al 2004, Marin 2004). In order to identify the role of outsourcing, such estimations can control for further variables affecting employment and – depending on the aggregation level – imply effects of the adjustment rounds taking place after FDI was realized.

As to the *effects of FDI* on home country employment, the studies arrive at different conclusions.

– Geishecker / Görg (2004) state that low-skill workers are negatively affected by FDI while high-skilled workers will benefit from offshoring. They do not quantify the overall effect of outsourcing on labour demand in their results.

– For Marin / Lorentowicz / Raubold (2003) only vertical FDI will affect home country employment. FDI is assumed to be vertical if a high fraction of total sales of CEE affiliates is exported to German parent firms or a high share of intermediate goods from the German parent company is used by an affiliate. The authors find strong evidence of such FDI, although the results are different in the various host countries and sectors. They conclude that FDI in Eastern Europe could increase unemployment in Germany, but this potential is not specified.

– The converse is found to prevail by Kinkel / Jung Erceg / Lay (2003). Their survey shows that firms producing at home and abroad raised employment in Germany while only locally operating firms reduced employment. Again, there is no quantitative result.

– Similarly, the survey of IKB[12] and KfW[13] (2004) inquiring the investment and employment performance of 215 firms find that 21% of the firms investing abroad reduce employment at home while 60% add new jobs and 19% record no change at all. Here too, the net effect has not been quantified.
– Very few studies calculate concrete figures of the overall employment effect of FDI. Using survey data of 660 German and Austrian firms[14] Marin (2004) runs a regression explaining the parent firms' labour demand by labour costs and demand conditions across destinations. The results differ by the country group referred to: For the eight first round accession countries, a 10 percent decline in affiliate wages surprisingly leads to a 1,6 percent increase in the parent companies' employment demand.[15] For CIS[16] affiliates similar effects are found to prevail. On the other hand, wages with affiliates in South Eastern European[17] countries do not play any role for the parents' labour demand in Germany or Austria. Rising FDI – caused by declining affiliate wages – may thus have an ambiguous effect on employment at home, although these effects seem to be minor. In additional calculations based on the number of jobs in CEE affiliates, corrected for productivity differentials and intra-firm trade induced jobs, Marin arrives at a net job destruction in Germany of 89106 workers resulting from FDI. This is less than one percent of parent employment and 0.26% of total employment in Germany.
– Becker / Ekholm / Jäckle / Muendler (2004), too, find a marginally substitutive relation between FDI and employment in the home country: A one percent wage reduction at existing affiliates in CEE reduces employment with German parents by about 0.02 percent. This would mean that German MNEs are rather insensitive to slight wage changes, given the host location's low income level. However, these results are not very significant.

Summing up, while studies on the employment effect of FDI do not agree on the direction of the job impact, most of them find that the effects are negligible in relation to total employment in Germany and even in relation to the parent firms' employment. In contrast to the public opinion, there is no evidence that FDI in CEE has to a noteworthy degree been responsible for the rise in unemployment in the last decade. These results are mostly based on effects on the investing firms, i.e. largely on "first round effects". They do not take into account indirect effects taking place in further rounds of adjustment.

12 Deutsche Industriebank.

13 Kreditanstalt für Wiederaufbau.

14 The firms included are maintained to be highly representative.

15 The immanent causality of this process remains unexplained. It could run via improved competitiveness resulting from re-imported inputs.

16 Covering Russia, Ukraine and several Republics of the former Soviet Union (see Marin, 2004, p. 4, Table 1).

17 Comprising Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Macedonia, Romania, and Serbia.

Some conclusions can be drawn from the foregoing analysis:

– Distinguishing cost- from market-oriented FDI does not lead further in our aim to assess employment effects. It is neither possible in a clear-cut manner nor is it meaningful with regard to evaluation of Germany as a business location.

– German FDI in CEE countries can have detrimental employment effects on the side of the investing firm, but this is not the only consequence of FDI that should be taken into account.

– Relocation of jobs to the East should be discussed in the context of the macroeconomic development and structural change (or lack of structural change) in Germany which is influenced by manifold factors, such as international competition, technical progress, and changes on the demand side. One and the same amount of "relocation" can be evaluated quite differently in terms of location quality, depending on the economic situation.

– Furthermore, competition by other foreign investors and by domestic host country firms should be taken into account: What would have happened, for example, to Skoda and Skoda exports to Western countries including Germany, had not VW but a French or Japanese manufacturer taken over?

– Finally, the demand situation in the host country in question and the competitive position of the investing firm before and after FDI is of importance.

This does, however, not mean that an analysis of direct employment effects of first-round relocations is unimportant. These effects define the extent of employment gains needed for compensation of employment losses that could have resulted from relocations in the first round i.e. it defines the extent of structural change needed. Since the most important effects are brought about via foreign trade relations, we particularly discuss the relation of German production in and trade with CEE countries. In doing so, we go beyond the investing firm and focus on the industry level. This gives us the possibility to include adjustments taking place with investing firms, their domestic competitors and other firms in home and host countries.

5. Empirical Evidence

5.1 Data Base and Methodological Approach

In our analysis we use Bundesbank data for outward-FDI (K3-statistics), aggregated from micro data. Although the database goes back to 1989 (Lipponer 2002), we start our analysis only after the mid 1990s, i.e. after a substantial stock of FDI in CEE countries was built up and when the sector breakdown of FDI and foreign trade statistics became fully comparable. The database contains balance sheet information and employment figures for the foreign affiliates, but it provides vir-

tually no information about the reporting firms in Germany besides the level of foreign operations. As a measure of these operations we use production and employment of foreign affiliates instead of commonly used FDI-stocks. Foreign production is quantified by turnover of foreign affiliates. Turnover and employment figures represent a better measure of the level of foreign production activities since they are not distorted by financial strategies and can better be compared with the economic activity in a country.[18] Furthermore, they can better be compared with domestic statistics. When differentiating between sectors, we use the branch of the investment object instead of the investor's branch. The reason for this is that holdings account for a big share of all investors.

In our analysis we proceed as follows:

– First we deal with the question whether affiliate production in CEE is a significant factor influencing bilateral trade with the region. This is done on the assumption that the main effect of FDI on domestic employment goes via trade effects. We correlate – as a first step – German production in CEE with trade with CEE. Correlations are performed over five years (1997 – 2003) and over the four core-CEEC (Poland, Czech Republic, Slovakia, Hungary – CEE(4)) as well as over six other CEE accession countries (Baltic states, Slovenia, Romania, Bulgaria – CEE(5 – 10)) respectively. Our special focus is on traditional consumer goods which we assume to play an important role in relocation of production.

– In a second step, we analyse the determinants of German imports from and exports to CEEC via gravity-type regressions. Regressions are performed over CEE (10), 22 industrial sectors, and seven years (1997 to 2003). Our special interest is in the role of affiliate production in the region. Other potential trade determinants of trade included are GDP of host country as a proxy for market size, wages in host countries, distance (between capitals), the size of the investing sector in Germany (value added) and the R&D intensity of the investing sector in Germany (R&D outlays in % of turnover). Regressions were run for all years pooled as well as separately for 1997 and 2003.

– Finally, direct relations between foreign affiliate production and employment in Germany are explored. For this purpose, determinants of employment in Germany are analyzed. A fixed effects regression (pooled and panel) was performed over all industrial sectors and the years 1997 – 2003.

[18] FDI does not necessarily go along with real investment, and real investment at a foreign affiliate can well take place without any FDI transfer (Jungnickel 2000). Foreign production of German firms is defined as sales of affiliates excluding the trade sector. Data on foreign affiliates' employment and production were kindly supplied by the Bundesbank.

5.2 Affiliate Production and Trade

A first indication of a possible link between German production in CEE and German – CEE trade relations can be obtained from correlations between the two. We do this first for traditional consumer goods (TCG) industries[19] which can be considered most affected by low wage competition of CEE countries. The respective trade-production relationship would reflect not only "first-round effects" of foreign production in the investing firms but also in competing and supplying firms in the same industry. By broadening the perspective to total manufacturing or all sectors we then aim at including more inter-sectoral adjustment effects, for example to the extent that exporting sectors, such as machinery, are profiting from the demand effects of other sectors' foreign production.

The results clearly show that only looking at (re-)imports resulting from relocations would be too narrow a perspective. Furthermore, there are significant differences between the core CEE countries (CEE(4)) and CEE (5 – 10).

– The regional structure of German TCG production in CEE(4) is clearly stronger correlated with German imports from (.70) than with exports (.37) to this region (table 2 a). This is a clear consequence of cost-motivated relocations with resulting re-imports. However, affiliate production increasingly involves supplies from Germany as the export coefficient clearly catches up. Changes of German production since 1997 are already almost as strongly correlated with export changes as with import changes.
– In the broader perspective of all manufacturing sectors (table 2 b), the coefficients for both exports and imports have increased strongly in CEE (4). The relationship is still stronger with imports than with exports. Correlation coefficients are lower in CEE (5 – 10). This reflects the fact that German affiliates' production is more focused on just a few sectors in manufacturing.

Bilateral correlation coefficients do not necessarily reflect the real role of affiliate production for foreign trade with the respective host country when other relevant determinants are not taken into account which are theoretically considered relevant (such as demand-, endowment- and distance-related variables). Therefore, we run multiple regressions taking into account those factors of influence (table 3). Regressions are pooled over manufacturing sectors and years (1997 – 2003).

The regressions confirm our correlation results in that foreign production generally displays significantly positive (beta) coefficients. This holds for both exports and imports in the various sectors. However, interesting details emerge that go beyond the correlations.

[19] TCG are made up mainly of textiles, clothing, leather and wooden goods, fine ceramics and toys / jewelry / musical instruments / sporting goods.

Table 2

German Production in and Trade with the CEE Countries, Correlation Coefficients[a] 1997 – 2001

a) Traditional Consumer Goods (TCG products)

	Correlation coefficients affiliate production vs. trade					
Affiliate production in …	Imports 1997	Imports 2001	Exports 1997	Exports 2003	Imports '97 – 2003	Exports '97 – 2003
… CEE (4)	.69	.70	.52	.37		
change 1997 – 2003					.53	.37
… in CEE (5 – 10)	.72	.76	.20	.09		
change 1997 – 2003					.61	.09

b) All Manufacturing Sectors

	Correlation coefficients affiliate production vs. trade					
Affiliate production in …	Imports 1997	Imports 2003	Exports 1997	Exports 2003	Imports '97 – 2003	Exports '97 – 2003
… CEE (4)	.54	.77	.45	.63		
change 1997 – 2003					.81	.75
… in CEE (5 – 10)	.25	.35	.37	.37		
change 1997 – 2003					.21	.24

[a] All coefficients are significant at the 0.01 level.
Source: Own calculations, based on Bundesbank data and Statistisches Bundesamt, series 7.7.

– In the pooled regressions (I and II, years included: 1997 to 2003) foreign production is stronger related to imports than to exports. Also, in relation to the other regressors included, the influence of foreign production on imports is particularly strong.

– From the coefficients of the pooled regressions we can conclude that 1% increase of German affiliates' production in CEE on average goes along with 0.36% increase of imports and 0.09% increase of exports.

– The Beta coefficients of affiliate production have increased from 1997 to 2003 for imports (specifications III-VI). This indicates that the division of labour with CEE countries increasingly is intra-industry in nature. The fact that the increase is only for imports confirms the results of other studies that low (wage) costs as attracting factor for production in CEE has grown in importance compared with market factors.

In additional regressions (not shown here) we controlled for the size of the host country and the sector in Germany by dividing trade and production values by the host country's GDP and by sector production in Germany. Regressions using these

Table 3

Determinants[a] of German Imports from, and Exports to CEE Countries in Manufacturing Industries: The Role of Foreign Affiliates' Production, 1997 – 2003[b]

	ln imports pooled I	ln exports pooled II	ln imports 1997 III	ln imports 2003 IV	ln exports 1997 V	ln exports 2003 VI
ln GDP	0.49***	0.72***	0.57***	0.40***	0.72***	0.67***
	[0.26]	[0.48]	[0.32]	[0.21]	[0.47]	[0.45]
	(11.2)	(36.4)	(4.6)	(0.21)	(12.4)	(13.1)
ln affiliate prod.	0.36***	0.09***	0.27***	0.44***	0.10***	0.09***
	[0.39]	[0.12]	[0.30]	[0.46]	[0.13]	[0.12]
	(14.9)	(7.9)	(3.7)	(6.6)	(3.0)	(3.2)
ln sector size	.	0.64***	.	.	-0.17	0.53***
		[0.43]			[-0.10]	[0.35]
		(3.6)			(-1.2)	(3.9)
ln wage host country	0.21***	0.07***	0.38**	0.26	0.17**	0.02
	[0.07]	[0.03]	[0.14]	[0.08]	[0.07]	[0.01]
	(4.0)	(2.8)	(2.4)	(1.4)	(2.4)	(0.2)
ln distance	-0.82***	-0.78***	-0.62**	-0.75***	-0.63***	-0.82***
	[-0.22]	[-0.26]	[-0.18]	[-0.19]	[-0.21]	[-0.27]
	(-10.6)	(-21.9)	(-2.6)	(-3.2)	(-5.9)	(-8.2)
ln r&d intens.	0.36***	0.38***	0.37***	0.34**	0.20***	0.40***
	[0.39]	[0.50]	[0.42]	[0.35]	[0.27]	[0.52]
	(7.2)	(11.8)	(2.9)	(2.3)	(3.4)	(9.9)
constant	0.82	-6.03***	-1.31	0.15	0.63	-3.63*
	(1.0)	(-3.4)	(-0.5)	(0.1)	(0.4)	(-3.6)
sector dummies	yes	yes	yes	yes	yes	yes
r^2	0.77	0.93	0.76	0.76	0.93	0.76
N	914	916	116	138	116	138

[a] regression–coefficients, [] beta-coefficients, () t-values,
significant at the * 10%-, ** 5%-, *** 1%-level.
[b] figures for foreign affiliates production have been extrapolated for the years 2002 and 2003.
Source: Deutsche Bundesbank; Federal Statistical Office; World Bank; own calculations.

normalized values thus show to what extent the influence of the regressors "size of host country" and "sector size in Germany" deviate from proportional relations. It turns out that both GDP and sector size have less than proportionate influence on trade flows while the results for affiliates' production largely remain clearly positive.

In sum, we can conclude from these statistical relationships that German affiliates' production in CEE leads to import growth in the same sector. However, the

relation to exports is positive as well, although clearly smaller.[20] German production in that region thus does not lead to one-sided surge in imports, it rather promotes a productivity-increasing intra-sector division of labour.

Our intra-sector analysis goes beyond the investing firms' perspective in that it considers effects on competing German firms in the same sector. However, this is only part of the story, as outlined in section 3. There can be second and third round effects of affiliate production in one sector on trade and hence employment in other sectors. In this context, it is of particular interest to know, whether the German core exporting sectors (machinery in a wide classification)[21] profit from German manufacturing FDI in CEE countries.

Table 4

German Affiliates' Manufacturing Production in CEE Countries and Machinery Trade,[a] Correlation Coefficients[b] 1997 – 2001

	Correlation coefficients affiliate production vs. trade					
Affiliate production in ...	Imports 1997	Imports 2001	Exports 1997	Exports 2001	Imports '97 – 2001	Exports '97 – 2001
...CEE (10)	.93	.94	.97	.97		
change 1997 – 2001					.92	.95

[a] Trade: Mechanical and electrical engineering, office machinery and instruments.
[b] All coefficients are significant at the .001 level.
Source: Deutsche Bundesbank; Federal Statistical Office; own calculations.

In table 4 we relate exports to and imports from CEE in the dominant German export sectors to total manufacturing production of German affiliates in that region. From the figures it seems rather obvious that the export of investment goods is stimulated by German affiliates' production. However, coefficients for imports are almost of the same size indicating that an intra-industry division of labour has developed even in this sector.

In addition, regressions were run regressing German exports of machinery on the German affiliates' manufacturing production as well as on market size of host countries and wage level prevailing there and other determinants (table 5).

By pooling ten CEE-countries and seven years (1997 – 2003) we found a highly significant positive relationship between affiliate production and exports of machinery. Market size (GDP) was also significantly positive, while distance dis-

20 These results do not change significantly when the sectors are weighted according to their domestic production. This would take into account that the value added of the three largest sectors is about 30 times the value added of the three smallest.

21 We define this sector as mechanical and electrical engineering, office and data processing machines and optical and precision instruments.

played a negative sign (specification I in table 5). The very high R^2 value (0,93) could indicate that the positive relationship mainly results from size effects. Thus, we normalized exports by dividing exports by the GDP of the host country (not reported here). Then the coefficient of GDP is significantly negative indicating a less than proportionate increase of exports with GDP. The coefficient for affiliate production does not change at all. It seems, therefore, that size effects do not play a decisive role.

Table 5

Determinants[a] of German Exports of Machinery[b] to CEEC

	ln exports pooled 1997 – 2003 I	ln exports pooled 1997 – 1999 II	ln exports pooled 2001 – 2003 III
ln GDP	0.52***	0.62***	0.44**
	[0.44]	[0.48]	[0.42]
	(6.6)	(8.4)	(2.8)
ln wage	-0.03	0.07	0.01
	[-0.02]	[0.03]	[0.01]
	(-0.5)	(1.0)	(0.1)
ln affil. product.	0.28***	0.26***	0.29**
	[0.48]	[0.43]	[0.51]
	(6.2)	(6.4)	(2.7)
ln distance	-0.33***	-0.39***	-0.15
	[-0.12]	[-0.13]	[-0.06]
	(-2.7)	(-3.1)	(-0.5)
constant	-0.25	-1.06	-1.04
	(-0.2)	(-0.9)	(-0.4)
r^2 adj.	0.93	0.98	0.88
N	70	30	30

[a] regression-coefficients, () t-values, [] beta-coefficients.
significant at the * 10%-, ** 5%-, *** 1%-level.
[b] machinery: mechanical engineering, automatic data processing machines, bureau machines, electrical engineering, medicine-, precision- and optical instruments
Source: Deutsche Bundesbank; Federal Statistical Office; World Bank; own calculations.

In order to take into account changes in time, regressions were computed for two subperiods (1997 – 1999 and 2001 – 2003, specifications II and III). Foreign affiliate production is the only variable which exhibits a significant increase of its beta coefficient. This shows that foreign production is increasingly correlated with machinery exports.

The foregoing calculations (tables 3 – 5) show that relocation of production to the East not only leads to lopsided import growth. Via promoting exports, it rather intensifies the East-West division of labour. The results do not support the view that German affiliates' production in CEE countries leads to a hollowing out of German industry and thus to a weakening of Germany as a business location. They do rather suggest that the main trade effect is a structural one with limited effects on the level of employment.

5.3 Affiliate Production and Employment in Germany – The Direct Link

In addition to FDI effects via trade, we now analyse the direct relationship between affiliate production and domestic employment. There, we can take implicitely into account other factors of influence and, depending on the level of aggregation, also inter-industry effects as well as second and third round adjustments via income effects in the host countries.

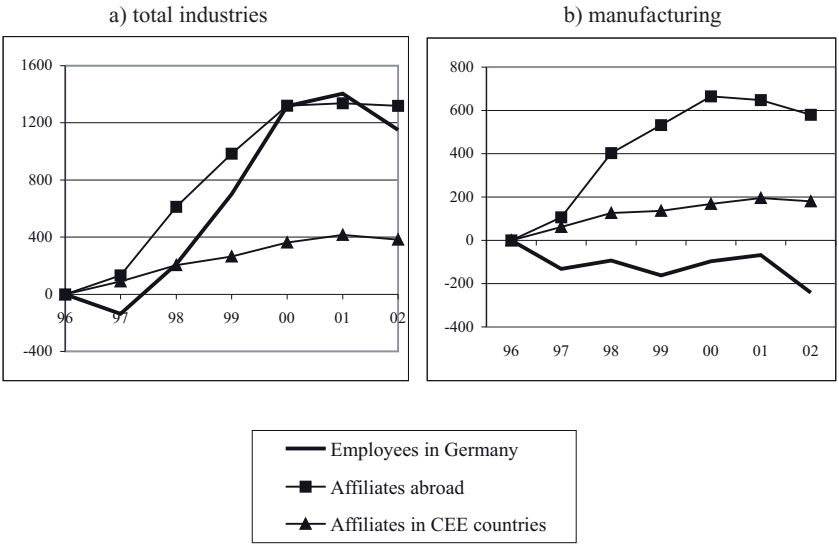
First impressions can be obtained from figure 4 by comparing changes of employment in Germany and at foreign locations, particularly in the CEE countries:

– Manufacturing employment[22] in Germany and with CEE affiliates seem to be in a substitutive relationship, particularly in most recent years, although increases in CEE, and in general abroad, by far exceed the losses in Germany (fig. 4 b).
– On an aggregate level (fig. 4 a), the relationship is different, since the build-up abroad goes along with expansion of employment23 in Germany until very recently. This would indicate a complementary relationship of employment abroad (in CEE countries) and in Germany.

Both these provisional conclusions can be right: Substitution in manufacturing is consistent with our preceding regressions, and the economy wide complementary relationship can come about if positive employment effects of foreign production in non-manufacturing over-compensate substitution in manufacturing.

However, there are strong arguments against such reasoning. On the aggregate level of all sectors, complementarity is brought about by high growth of services employment in Germany, i.e. by a sector that is clearly less internationalized. It seems highly doubtful to assume sufficient effects from the expansion of foreign

[22] The number of employees is given in persons employed and not as full-time equivalents.



Sources: Deutsche Bundesbank; Federal Statistical Office; own calculations

Figure 4: Cumulated[a] annual Change in Employment in Germany and abroad, in 1000

[a] Changes are cumulated over the years.

production on domestic employment in services that could compensate for employment losses in manufacturing.

By the same token, the conclusion of a substitutional relationship of foreign production and domestic employment in manufacturing is not fully supported when the data are disaggregated by industry. This is done by estimating labor demand for 20 manufacturing sectors in Germany, with CEE affiliates' production as independent variable and controlling for sector size, wages and input of technology in Germany. The results are displayed in table 6 both for absolute values and for first differences. The input of technology as operationalized by R&D intensity was dropped since it was insignificant throughout.

Contrary to the impression from Fig. 4 and the expectations from the trade regressions in Table 3, our results of the first model (I) indicate a complementary relationship, since affiliate production carries a positive sign, although significance is not very high. This relationship largely may come about by sector-specific features not included in the equation. We therefore estimated a fixed-effects model (II), and there affiliate production comes out significantly negative which means that production in CEE is at the cost of German employment in the same sector. This result is based on differences between sectors regarding their domestic performance and production in CEE. Additionally, calculations can be based on changes over time in order to get closer to the issue of causality. Therefore, we run regressions with first differences (model III) resulting in a slightly complementary rela-

tionship of CEE production and domestic employment. According to this model, a one per cent change in German manufacturing production in CEE would result in a 0.02 percent increase in domestic employment.

Table 6

German affiliates' production in CEE countries and labour demand in Germany,[a] 1997 – 2003

Depend.: ln Employment in Germany	(I) values OLS	(II) values fixed effects	(III) first differences OLS
ln value added Germany	0.87***(37.9)	-0.11 (-1.45)	0.01 (0.3)
ln wage of German sector	-0.45***(-5.4)	0.69***(9.47)	0.59***(11.2)
ln affiliate production	0.03*(1.7)	-0.05***(-7.49)	0.02**(2.6)
CONSTANT	-6.59***(-14.6)	13.49***(8.63)	-0.02***(-9.3)
r^2	0.96	0.64	0.60
N	130	130	111

[a] Fixed effects regressions, 1996 – 2003, 20 industrial sectors regression coefficients, () t-values, significant at the * 10%-, ** 5%-, *** 1%-level.

Source: Deutsche Bundesbank; Federal Statistical Office; own calculations.

Moreover, our calculations have shown that the resulting elasticities highly depend on the specification of the models. There is obviously a lot of uncertainty involved which is supported when the changes of production in CEE are contrasted with the changes of domestic employment over the five year period 1996 – 2001 (annex fig. A2). From the scattergram there can hardly be detected a distinctive relationship of the two variables. We therefore conclude that until now, production in CEE had a negligible influence on the German labor market which is much in line with former studies.

6. Summary and Conclusions

1. German firms have heavily built up operations in CEE with traditional focus on manufacturing, but increasing weight of service companies. Over 90% of the engagements have been in the four core CEE countries. When discussing implications of German CEE investments for the quality of Germany as a business location, we take implications for domestic employment and income as a yardstick. A rough comparison of affiliate and domestic operations reveals that production in CEE is no longer of marginal significance. However, with on average less than 4% of the German production, it should not be overrated.

2. Former studies arrive at ambiguous results but agree in that employment effects (be they positive or negative) are not very significant. Effects are assumed to take place largely via foreign trade. Our results display a significantly positive relationship with imports. However, the relation with exports is only a little lower. Affiliate operations thus predominantly produce structural effects. They contribute to an intensified international division of labour with resulting income gains.
3. Confronting CEE affiliates' manufacturing operations with domestic manufacturing employment performance since the mid-1990s leads to inconclusive results. Much depends on the specification of the underlying model. It would be premature to conclude from a negative relationship that FDI in CEE impairs the quality of Germany as a business location and to demand economic policy action. Moreover, there are important general qualifications:
   - Even if the import promotion effect, on balance, led to a weakening of Germany as business location (which is by no means certain), simultaneous export effects would be strengthening German locations.
   - More imports could lead to less employment in the respective sectors, but at the same time real income could increase via lower import prices and to the extent the workers displaced by relocations find jobs elsewhere.
   - Manufacturing is only part of the economy and manufacturing affiliates in CEE countries are only part of all foreign operations. There could be countervailing effects by activities in other regions and by other sectors. When comprising all sectors and regions, a positive relation seems to prevail. This would mean that employment losses in manufacturing import sectors are over-compensated by gains elsewhere. Gains could have come about by FDI in other regions and functions (e.g. distribution outlets), by other actors, or any other factors, such as demand shifts towards services.
4. On the other hand, job losses following relocation of manufacturing jobs to the East are felt much more directly than positive countervailing effects which are spread wider in the economy. Although these job losses rather indicate than cause location weakness and although these losses are only minor factors for unemployment in Germany, they exert pressure for structural change in Germany. In view of high unemployment, this pressure seems to exceed the capacity to adjust. Economic policy then faces two alternatives
   - take away pressure for structural change exerted by FDI in CEE, or
   - improve the capacity to adjust to this pressure.

The option to reduce pressure for structural change is limited as long as the advantages of an intensified division of labour are not to be jeopardized. To reduce negative effects without impairing the positive ones will hardly be possible. At best, there seem to be some possibilities to generally limiting (or not increasing further) the competitive pressure from the East on the German labour market inde-

pendently from FDI. One option in this respect could be to further restrict access to social benefits for immigrants for a certain period of time. This would reduce incentives for immigration particularly of low-skilled workers.

On the whole, however, there seems to be no alternative to improving the capacity to adjust. Possible measures should not be designed to adjust to pressure resulting especially from FDI, but to improve chances on the labour market for the unemployed in general and to reduce institutional arrangements hindering the creation of jobs. The main option in this respect seems to be to subsidize wages of low-skilled workers in order to reduce wage costs for employers without reducing income of these workers too much. However, the recent discussion in Germany showed that there is no nostrum to fundamentally improve the employment situation in the short run.

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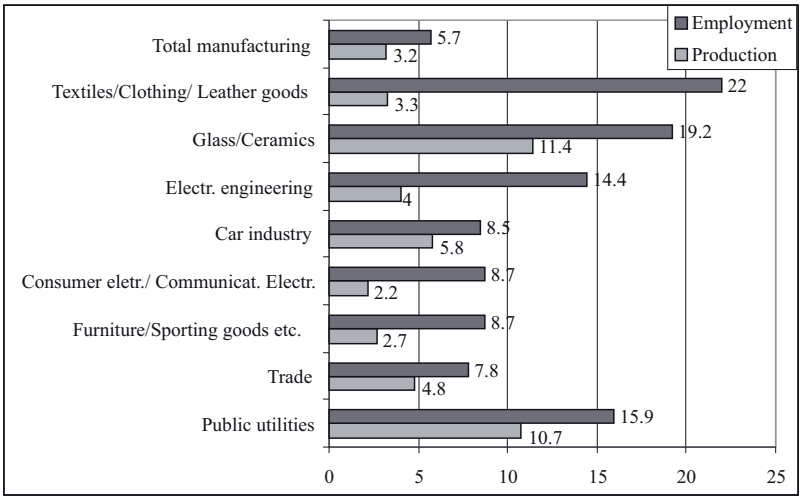
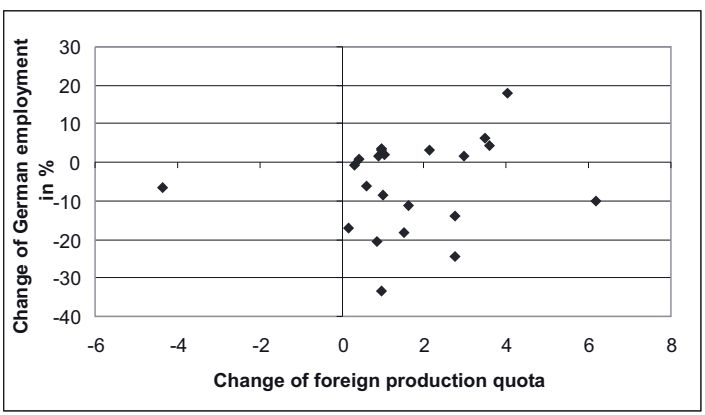
Annex



Source: Deutsche Bundesbank; Federal Statistical Office; own calculations,

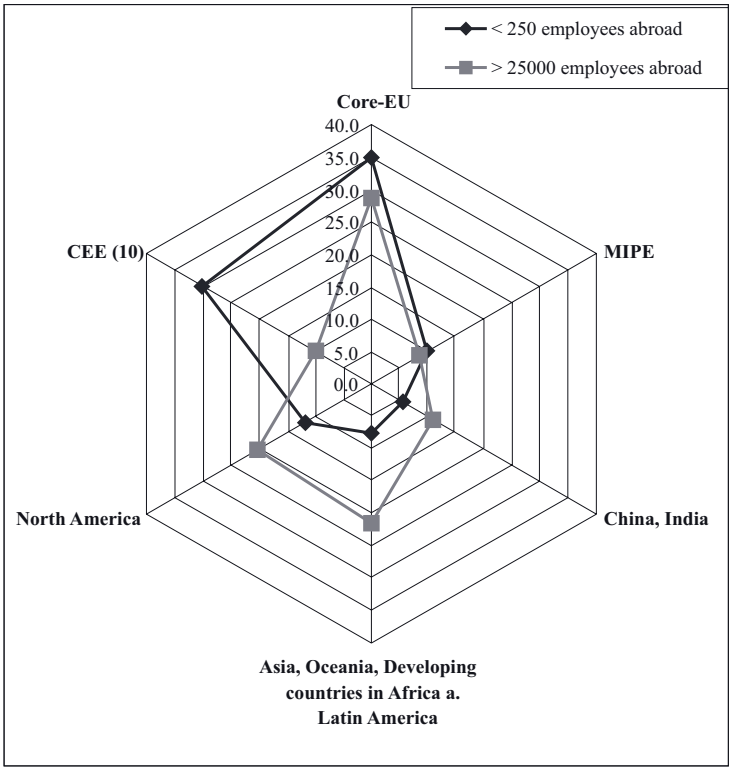
Figure A 1: Ratio of Operations of German Investors in CEE to Domestic Operations, 2001



Source: Federal Statistical Office; Deutsche Bundesbank; own calculations.

Fig. A 2: Relation between Changes in German Employment and Foreign Production Quota[a] for Manufacturing Industries

[a] 1996 – 2001, employment in manufacturing industries,
foreign production quota = foreign affiliate turnover / turnover of German sector * 100



Source: Deutsche Bundesbank; own calculations

Fig A 3: Regional Structure of Small and Big German Foreign Investors

Does FDI in Central and Eastern Europe Weaken Germany's Position as a Business Location?

Comment

By Wilfried Altzinger

1. Introduction

The paper of Borrmann, Jungnickel, and Keller (BJK) discusses in a very comprehensive way one of the most controversial issues of today's economic policy, namely the impact of foreign direct investment (FDI) on the host economy. As BJK describe in their paper the implications of FDI on the home economy are quite manifold and indeed it is rather difficult to calculate precise net employment effects of FDI. In particular the linkages between FDI and trade are rather complex (see Fontagné 1999; this issue). Also the implications on domestic capital accumulation are hard to capture. Both, the effects on trade as well as on capital formation implicitly cause severe structural changes with serious implications on domestic employment. These structural changes do also raise important questions on distributional issues. Hence the subject of FDI is not only an analytical challenge but also a political one.

Since the discussion of this economic as well as political issue takes place in nearly all developed countries we want to compare the experiences of Germany with one of the most affected countries of the transformation process, namely Austria. Hence, the paper is divided into two sub-sections. Firstly we discuss the methodology and results of the BJK-paper. In the second chapter we present the development of Austria's FDI in Central and Eastern Europe (CEE) and compare this development with the German experiences. Finally we discuss some policy implications and conclude.

2. Some Remarks on the BJK-Paper

As BJK explain in Section 3 the linkages between FDI and trade are quite complex and manifold. Fontagné (1999; this issue) has shown that these effects depend very much on the level of aggregation. Is it the aggregate level, the industry level or the firm level (macro, meso or micro) where the analysis is conducted? The most compelling results are mainly provided by micro data. However, access to

these data is usually hard to get. Hence, also BJK use aggregated data. The manifold linkages between FDI and trade can be summarized by three effects:

- Market-extension effect

If FDI takes place in emerging and strong growing markets FDI and exports (from the domestic economy) can grow simultaneously. Both exports of intermediate as well as capital goods may grow.

- Competition-enforcing effect

The more matured the host economy becomes the more imports to the domestic economy will be provided. This results in tougher competition for domestic production but also in cheaper inputs.

- Competition-enhancing effect

In particular due to cheaper inputs and therefore intensified specialisation the production of the parent company in the domestic economy may become more competitive on world markets. I.e., Austria exports close to 80% of all its exports to highly developed (EU-) countries with strong purchasing power. The overall exports depend mainly on Austria's market shares within these markets. Some minor change of these market shares (probably due to improved specialisation) can cause severe export improvements. However, since such effects are difficult to measure they are often neglected. Also in the BJK-paper no such empirical evidence is provided.

BJK measure the determinants of German imports and exports to CEE by the affiliates' production and some other variables (see Table 5.2.). Both are positively determined by affiliates' production (however, imports grow stronger than exports). This strongly supports the proposition of complementarities between FDI and exports as well as between FDI and imports (for similar results see Fontagné 1999) and substantiates the view of an enforced division of labour. However, one issue in the analysis of BJK remains questionable. They explain the increase of the Beta coefficient of foreign production as determinant for imports (column III and IV in Table 5.2.) as follows: *"However, the increase is only for imports which confirm the results of other studies that low (wage) costs as attracting factor for production in CEE has grown in importance compared with market factors."* Unfortunately, BJK do not mention that they have included wages (of the host country) in their regression as an explanatory variable! Surprisingly, this variable is positive and significant for German exports (as expected, W.A.) but also for German imports (which is not expected at all, W.A.)! This result contradicts to the above cited explanation. Due to this regression (low) wages cannot explain growing imports from CEE. On the contrary, the higher the wages in CEE the stronger the imports from these countries are. Finally, also the result that the R&D intensity of the investing sector in Germany is a significant and positive explanatory variable for exports to and imports from CEE is an interesting (and surprising) result which should have been discussed. Usually, it is expected that in particular low-

tech industries relocate their production to low wage countries. To conclude, both explanatory variables (wages of the host countries; R&D intensity of the investing sector in Germany) seems to indicate that the division of labour between Germany and CEE can no longer be explained by traditional explanations like low wages and low-tech industries. Some recent studies seem to confirm that FDI relations between old and new member countries become more and more relations of an equal footing. For example, Rojec and Damijan (2005) mention "efficiency-seeking FDI in the new member states is increasingly in medium tech and in lower end segments of high tech industries, while the attractiveness of these countries for low tech industries is gradually vanishing."

One final remark should be added concerning the employment data presented in the BKJ paper. Firstly, the development of employment in CEE countries compared with domestic employment is to some extent misleading. Since the productivity of the affiliates in CEE is nearly always (far) below the productivity of the parent companies it makes sense to calculate some productivity-adjusted numbers of foreign employment. For Austria we found that such productivity-adjusted employment figures are only 40% to 50% of the official numbers (Altzinger 2001). Hence, the *implicit* threat of the recorded employment numbers of the affiliates in CEE declines considerably. Secondly, as stated in the BJK-paper, the results of affiliate's production on domestic employment are inconclusive. This means no evidence can be provided that some kind of substitution takes place.

To conclude with, the paper offers plentiful new evidence on trade and employment effects of Germans FDI in CEE. In particular, imports as well as exports are positively determined by the amount of affiliate's production. Hence, some complementary relation seems to prevail. However, since there are many (first, second or third round) effects net trade and employment figures are hard to calculate. Finally, BJK state that *"the discussion of jobs to the East should be discussed in the context of the macroeconomic development and of structural change."* In particular this statement should be emphasized strongly.

3. The Experiences of Austria's FDI in CEE

Since Austria's economy is mainly dominated by small and medium enterprises (SME) its outward FDI stock (measured as a percentage of GDP) has been traditionally very low. In 1989, at the beginning of the transition period this share has been 2.1% only whilst the share of inward FDI stock has been 7.0%. Only 15 years later these shares have increased up to 19.5% and 21% respectively. In 2003 these shares have been rather balanced for the first time in Austrian history. The exceptional increase of Austria's outward FDI since 1989 was mainly due to the opening up of the CEE economies where Austrian firms invested intensively. Austria's share in total outward FDI stock was 0.7% in 2004. Its comparable share in the eight new member states Hungary, Poland, Czech Republic, Slovakia, Slove-

nia, and the three Baltic states reached 8.8% (see Table 1). The largest investors in the region are the Netherlands, followed by Germany. Austria is ranked third. In the adjacent countries to Austria these shares are considerably higher, i.e. 23.2% in Slovenia and 14.2% in Slovakia. These data show impressively the strong activities of Austrian firms in this region. Most of these economic activities can be explained by geography but also by cultural and historical ties.

Table 1

Inward FDI stock in NMS-8 by major home countries

December 2004, share in per cent

	SI	SK	CZ	HU	PL	NMS-8
Netherlands	5.4	25	30.9	19.5	23.3	21.9
Germany	7.8	18.5	20.6	29.2	17.2	19.6
Austria	23.2	14.2	11.8	11.2	4	8.8
France	7.5	3.1	7.9	4.3	14.5	8
US	1.6	4.2	5.2	5.2	9.5	6.3
Other	54.5	35	23.6	30.6	31.5	35.4

Source: WIIW 2005

What is the impact of these activities on trade? The aggregate figures present a very straightforward explanation. Austria's aggregated trade balance with the eight new member countries was positive throughout the period 1992 to 2004. After 1997 the trade surplus remained at a high level of approximately 0.9% of GDP. However, during the last years the surplus declined to some extent. Beside these aggregated figures several studies confirm that Austria's FDI in and exports with CEE shows a complementary relationship (Pfaffermayr 1996, 1998). Additionally Austria has increased its intra-firm trade with the affiliates in CEE considerably (Altzinger 2000). Also this is an indicator for a stronger specialisation which should improve the competitiveness of parent firms.

Finally it is of interest to have a look at third-country effects. If Austria has improved its competitiveness, among others by improving its efficiency through intensified specialisation, then its export market share should increase.[1]

[1] The overall competitiveness of an economy is certainly the result of many features. However, since Austria has been affected (positively as well as negatively) by the opening-up of the transition countries more intensively than any other old EU-member country it seems plausible that this development has the most severe impact on the overall development of the Austrian economy.

Table 2

Austrian and German market shares of total OECD-exports

	Austria I	Germany II	III = II / I	Austria IV	Germany V
	market shares, 2002			1994 = 100	
CEEC-5	8,2	42,1	5,1	83,7	101,3
Czech Republic	7,4	50,6	*6,8*	73,3	99,2
Slovakia	12,0	44,3	*3,7*	83,1	95,5
Hungary	12,5	40,6	*3,2*	75,0	107,9
Slovenia	15,7	25,8	*1,6*	121,9	80,9
Poland	3,3	39,8	*12,1*	101,8	99,9
Baltic Countries	2,0	27,0	*13,5*	243,0	94,1
World	1,9	15,2	8,0	119,7	102,2

Source: Wolfmayr (2004).

Table 2 provides evidence of Austrian and German trade development through the period 1994 to 2002. Since Germans GDP is approximately ten times larger than Austria's GDP also market shares should be ten times larger. As we can see in Table 2, the market shares are worldwide 15.2% and 1.9% respectively. However, these differences are much less pronounced in the new member countries. At the aggregate CEEC-5 level this relation is only less 5.1 whilst in the adjacent countries to Austria this relation is much lower. These particularly favourable market shares of Austria in the adjacent countries contrast strongly to the data for Poland and the Baltic countries. There Germany performs much better. These figures can be explained to a large extent by gravity considerations. However, what is of additional interest is the development of trade shares for both countries over the transition period 1994 to 2002 (column IV and V). The most striking fact is the strong improvement of Austria's worldwide market share. Within this period Austria's market share improved by 19.7% whilst the German market share remained nearly constant. In particular this data emphasize strongly the improvement of Austria's international position.

We should note that Austria has not only improved its market position worldwide. Moreover, also the profitability of Austrian affiliates in CEE has improved. In the period 1994 – 2002, most Austrian FDI in the accession countries had become very profitable. This applies to nearly all accession countries. In 2002 the annual profits translate into an average return on equity of 10.4%. Consequently the profitability of direct investments in the accession countries was far above average. The return on equity outside the accession countries was only at 5.7% (Altzinger 2004).

4. Conclusion

BJK claim that until now the overall effects of FDI on trade and employment are rather small for Germany. However, these are *net* effects only. In contrast, *gross* effects of job growth and decline are not small. FDI predominantly produce structural effects. We would like to add that FDI and the opening up of the transition economies produced an *enforced structural change* with many winners and losers by sectors, regions and qualifications. Only the aggregated net effect seems to be favourable for the Austrian economy. Hence there is an intense political pressure to cushion this process for people who are seriously affected by wage or job losses.

In Germany and Austria both economies are undergoing a severe structural transformation. However, in particular due to the tremendous increase of outward FDI Austrian parent firms as well as the affiliates became more profitable. Parent firms also increased their worldwide export market shares. Therefore it seems to be the case that this kind of internationalisation did help to improve the competitiveness of Austrian firms considerably. However, the costs of this internationalisation are mostly concentrated in a few regions, sectors, and among a few specific groups of employees. The opening up of CEE and the EU enlargement not only cause an enormous structural challenge but also an immense distributional one. Hence, appropriate policy measures are the main challenge for survival of the contemporary EU-25.

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