Good or bad? - The influence of FDI on output growth

An industry-level analysis*

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Abstract

In this paper we try to reconcile the often inconclusive evidence on the impact of FDI on output growth by taking explicitly two types of heterogeneity into account: heterogeneity among industries and among countries. Our empirical analysis is based on a specially compiled data set, including FDI inward stocks, output, employment, investment, as well as exports, imports and wages for eight industries and 35 countries (OECD, Asian and Eastern European catching-up countries) over the period 1987 to 2002. On this sample, we test the importance of both - stage of development and industrial pattern of FDI – for the impact of foreign capital on an economy. It turns out that the stage of development is highly crucial for the impact of FDI on growth. Further, FDI alone rarely translates into higher output or productivity growth, however in certain industries a significant and positive relationship emerges when FDI is interacted with investment or export orientation.

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Introduction

While in theory, the nexus between FDI and growth (in terms of output and productivity) is in general positive, the empirical literature is far less conclusive. Some studies find positive effects from outward FDI on the investing country (Van Pottelsberghe and Lichtenberg, 2001; Nachum et al., 2000), but suggest a potential negative impact from inward FDI on the host country. This results from a possible decrease in indigenous innovative capacity or crowding out of domestic firms. Thus, in their view, inward FDI, on average, is primarily intended to take advantage of host country characteristics instead of disseminating new technologies originating in the sending country. Other studies report more positive findings: Nadiri (1993) finds positive and significant effects from US sourced capital on productivity growth of manufacturing industries in France, Germany, Japan and the UK. Also Borensztein et al. (1998) find a positive influence of FDI flows from industrial countries on developing countries' growth. However, they report also a minimum threshold level of human capital for the productivity enhancing impact of FDI, emphasizing the role of absorptive capacity. Blonigen and Wang (2004) stress explicitly cross-country heterogeneity as the crucial factor which determines the effect of FDI on growth.

Moreover, it is equally likely that the impact of FDI on the host economy differs greatly according to the receiving industry. As a very intuitive example, heavy FDI in the extractive sector in Nigeria has not improved the country's growth performance (Akinlo, 2004). It is conceivable that the potential for positive spillovers does not solely depend on a country's overall absorptive capacity, but that the latter varies across sectors or industries inside an economy. Thus, the impact of FDI differs depending on the receiving sector or industry in connection with the country specific absorptive capacity or stage of development. The economy wide effect of FDI will then further depend on the extent of intra-industry versus inter-industry spillovers.

In this paper we investigate the magnitude of all these factors for the role of FDI in a receiving country by putting the focus on individual manufacturing industries. Since - due to measurement issues, interdependencies between various types of spillovers and their complexity - it is difficult to distinguish between different theoretically possible channels of technology transmission in empirical research. Therefore, we will focus on the overall effect of foreign sourced capital on an industry's output growth in addition to the effect of traditional factors (domestic capital and labour) and controlling for other factors. What is new in our analysis is the focus on the industry-level of the economy. To our knowledge, there is very little empirical research on FDI at this level of disaggregation. Disaggregated data on FDI for

a large and heterogeneous set of countries rarely exist in a comprehensive and comparable form. If these data exist, they are often plagued with two kinds of problems: On the one hand, the coverage of firms and flows which are recorded as FDI can differ between countries (problems are often caused by the exclusion of reinvested profits in some countries). On the other hand, the classification into industrial activities may differ between countries.

The paper proceeds as follows: Section 1 revises briefly the existing literature on the FDI growth nexus. Section 2 describes the data set. Section 3 introduces the estimating framework, the results are summarized in Section 4. We present results for both, the influence of FDI on output and on productivity growth. Section 5 deals with the particular experiences of CEECs and Section 6 concludes.

1. Theoretical Background

Economic theory has provided us with many reasons why foreign direct investment may result in enhanced growth performance of the receiving country. In the neo-classical growth literature, FDI is associated positively with output growth because it either increases the volume of investment and/or its efficiency and thus puts the economy on a higher long-term growth path. Thus, FDI can have a level effect and apart from the potential efficiency increase, there is no qualitative difference to domestic capital in these models. Turning towards endogenous growth model, the potential role for FDI is much greater. FDI may influence each argument in the production function and have additional indirect and thus permanent effects on the growth rate. Again, FDI can impact on the stock of capital available in the country. However, by raising for instance the number of varieties for intermediate goods or capital equipments, FDI can increase productivity (see Borensztein et al., 1998). In addition, FDI can permanently increase the growth rate through spillovers and the transfer and diffusion of technologies, ideas, management and production processes, etc. The literature mentions basically four channels which allow for technological spillovers from FDI on the host economy (Kinoshita, 2001, Halpern and Muraközy, 2005):

The classical indirect channel for the transmission of technology from FDI to the domestic economy functions via imitation. The absorptive capacity of the host country, especially in terms of legal and economic environment, as well as the complexity of the technology play a vital role in this respect. If the technological gap between two countries is too large, imitation may not be possible. On the other hand, if the legal environment is very advanced, imitation may become overly costly or risky due to a stricter protection of property rights.

Secondly, and often considered to be the most important channel, the training of local workers in foreign owned firms generates positive spillovers through the acquisition of human capital. The empirical evidence concerning the labour market implications of foreign owned firms is mixed. On the one hand, foreign firms spend on average more on training of workers than local firms. On the other hand, foreign owned firms may skim the market of well trained workers and – at least in the short run – free-ride on previous training by domestic firms. Thus, there are potentially negative spillovers through the labour market. The smaller the wage differential between foreign and domestic forms, the greater the scope for positive spillovers, since this would allow also domestic firms to attract well trained workers from foreign firms. Further, distance plays a role here: If foreign firms concentrate mostly in one region (for instance FDI in Hungary remains highly concentrated in the Western part of the country) spillovers are likely to occur in this region but not in other parts of the host country. Another important question relates to the specificity of the knowledge acquired by training in foreign owned firms. Based on meta-analysis, Görg and Strobl (2002) find evidence that the managerial skills of owners of domestic firms, who were previously employed by multinationals, were industry specific but not firm specific, which points towards a large potential for intra-industry spillovers.

Thirdly, foreign presence increases competition in a market. The ultimate effect on x-inefficiency, i.e. the difference between the efficient behaviour of firms as predicted by the theory and their empirically observed behaviour, is again unclear. Also in this context, the absorptive capacity of the host country is important: If the gap between foreign and domestic firms is too great, domestic firms will not be able to produce at their efficient level and go bankrupt, thus more productive foreign firms will crowd out domestic firms. If the gap is within limits, the increase in competition will induce higher productivity in the catching-up domestic firms.

Finally, there are vertical or backward spillovers. By purchasing intermediates from foreign suppliers or by selling output to foreign firms, local firms will be affected positively in terms of efficiency and quality of output. Thus, the increased variety of intermediate goods may induce a more effective international specialization in production and this together with increasing returns to scale in production will result in higher productivity growth.

The above mentioned importance of absorptive capacity of the host country also finds theoretical foundation. For example, Markusen and Rutherford (2004) develop a three-period model where they show the following: In low-capacity countries foreign experts substitute for domestic skilled workers and engage in productive activities in all periods, which implies

minimal spillovers through the labour market. With increasing absorptive capacity (i.e. higher initial human capital in the host country) foreign experts and skilled domestic workers become complements in the sense that domestic skilled workers are active in production while the foreign experts engage primarily in training activities. At very high domestic human capital levels, domestic skilled workers can immediately learn from foreign experts and thus substitute already in the second period for training activities by foreigners. In the latter case, the economy becomes independent from foreign workers after the first period. In an earlier paper, Rodriguez-Clare (1996) builds a new economic geography model which highlights the developmental impact of multinational firms through the linkages which they create. These linkage effects are stronger the more intensive the multinational is in the use of intermediate goods, the larger the costs of communication and trade between headquarters and local plants and the more similar home and host country are in terms of the variety of intermediate goods produced. This implies also stronger linkages, and thus greater positive effects, the smaller the developmental gap between donor and host country. These are just two examples of the large body of theoretical literature on the effects of FDI in receiving economies. Thus, for most of the channels outlined above, one can argue that positive spillovers will only occur in a suitable setting. If the host economy does not provide an adequate environment in terms of human capital, infrastructure, legal environment, and the like, many of the spillovers that may potentially be generated by FDI can not materialize.

The industrial structure is one related aspect which can be decisive for the effects of FDI on the host economy. According to the stage theory of development, every stage is characterised by a certain industrial pattern. In line with the previous arguments, a high structural match between the donor and the host country would imply an equal stage of development and thus also a good precondition for the absorptive capacity of the receiving country to be appropriately high. In other words, the match between the industrial allocation of FDI and the host country's stage of development as characterised by its industrial structure determines the effectiveness of FDI. We argue in this paper that the "optimal" industries to receive FDI vary with the stage of development. The effect of FDI in the same industry but in countries at different stages of development can be just as much different as the effect of FDI in one country but in different industries.

2. Developments in industrial FDI flows

Due to a lack of comparable data at the industry level, empirical research on the link between FDI and development has largely remained at the macro level, since comparable FDI data across countries are best available at this level. More recently, firm-level datasets have been

released and as a consequence the number of studies at the micro-level has grown rapidly. However, in contrast to the macro-level analysis, which often takes a global perspective and analyses large cross-country data sets (in the cross-section dimension as well as in the panel dimension), many firm-level studies are constrained to one country or a homogenous group of countries (like the EU) due to issues of data-availability and comparability.

In order to get a good picture of developments in FDI and growth of individual industries, we combined several sources in the collection of our data base.[3] Indicators like output, employment, gross fixed capital formation and wages are taken from the UNIDO Industrial Statistics Database 2003. The greatest challenge with this edition was to overcome the change in nomenclature from the second to the third revision of the ISIC classification. In 2003, about half the countries included in our sample still reported according to Revision 2, while the more advanced countries had already switched to reporting according to Revision 3 only. Thus, we extracted the data at the most detailed 4-digit level for both revisions and concorded them into eight industry groups, which we could match with the FDI data obtained from OECD. Data for CEECs were taken from the wiiw Industrial Database 2004. FDI data were collected from different sources: Data for OECD members dating back to 1980 are available from OECD for seven categories: food; textiles and wood; petroleum, plastics, rubber and chemicals; metal and mechanical products; office machinery; transport equipment; other manufacturing industries. The mineral and leather industries are not allocated in this scheme and is thus included in other manufacturing. In addition, a remainder category exists which we label “NA” (not allocated) and which picks up statistical discrepancies among other things. FDI data for nine Central and Eastern European countries (the new members states plus Croatia) are taken from the wiiw FDI Database (forthcoming), which reports the data at the NACE, Revisions 1, 2-digit level. Again industries were aggregated to match the OECD grouping. Finally, FDI data for Asian Countries are taken from UNCTAD’s World Investment Directory Volume VII (2000). More recent data for ASEAN members were available from the ASEAN Secretariat (see: http://www.aseansec.org/home.htm). The latter data refer to approved investment projects with foreign interest on total project cost basis. Where available, these data were compared to the figures reported by UNCTAD for FDI and they were found to match closely. In general, we used FDI stock data. In cases where only flow data was available, the PIM method was used to calculate stock data in form of cumulated dollar flows. Additional FDI data for Taiwan and South Korea was obtained from Timmer (2003) and Investment Commission (MOEA).

[3] We would like to acknowledge especially at this point the funding by Oesterreichische Nationalbank through Jubiläumsfondsprojekt No. 10214 which allowed us to spend the necessary time and resources on the collection of the data.

In total, our data set contains more than 3000 observations for 26 to 35 countries, eight industries and 14 years (1987-2000). The data set is highly unbalanced, the number of countries varies over time, with data for 26 countries in the years 1987 to 1994 and data for 35 countries in the years 1998 to 2000. The average FDI share in output varies along all dimensions, across industries, years and countries. For the sample in total, the FDI share in output ranges from less than 6% in the food industry to nearly 18% in the industry group comprising fuel, rubber, plastics and chemicals. Also the variance is highest in the latter industry (see Figure 1).

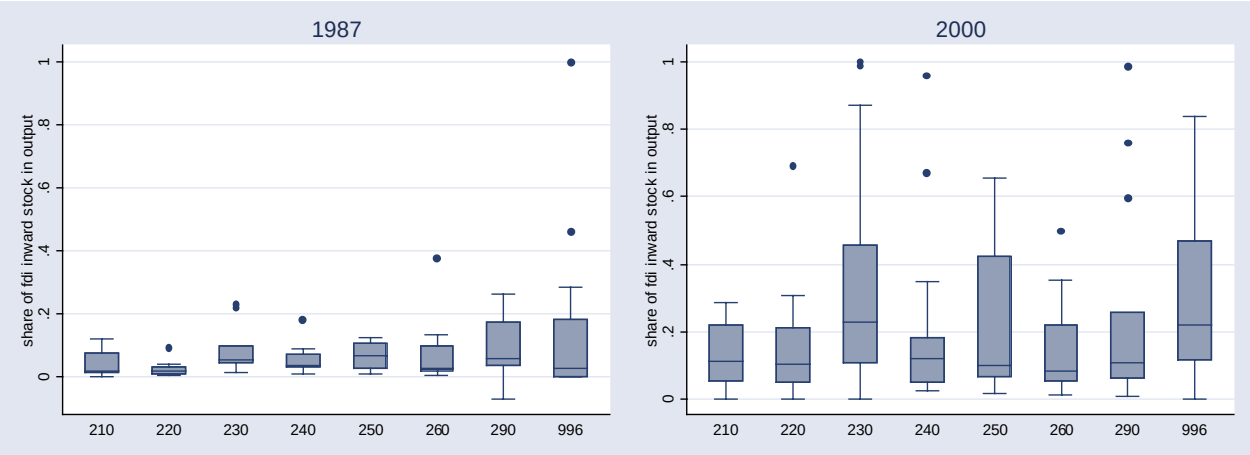

Figure 1: Share of FDI in output by industries; industry codes are: 210…food, 220…textile and wood, 230…petroleum, chemical, rubber, plastic, 240…metal and mechanical products, 250…office machinery, ICT equipment, 260…transport equipment, 290…other manufacturing, 996…not allocated.

It is further striking to see not only the rise in average FDI share over output, but also the rapid increase in variance over time. In some countries, the share of FDI over total industry output has increased to 100%. The general rise in FDI in relation to industry output clearly reflects the increasing internationalisation of production. The additional sharp increase in variance across countries tells us that this internationalization did not happen at equal rates for all countries. While Asian countries on average show higher shares of FDI in total industry output, they also exhibit much more variation across individual countries than OECD members. Entering the picture at a much later point in time, CEECs show again substantially higher FDI shares in output, yet with considerable less variation across countries. Thus, this region experienced a uniformly high inflow of foreign capital in manufacturing, which is due to its special history. The sharp disruption of the centrally planned system allowed market forces to act freely immediately. Many of the former communist countries allowed and also encouraged the inflow of foreign capital as a way to privatize the former state owned companies. Due to a general lack of domestic capital, the share of foreign capital was consequently high in the newly privatized firms.

The pattern of FDI across industries is similar between our three geographic regions (OECD; Asia, CEECs). Relatively little FDI is seen in the food industry, while the fuel and chemical industry receives the largest share compared to output levels. There are however differences across country groups. The machinery producing industry receives considerably more FDI in relative terms in Asia and Central and Eastern Europe than in core OECD countries. Finally, Central and Eastern Europe is characterised by high FDI shares in the production of transport equipment, which has a surprisingly low FDI share inside the group of OECD countries.

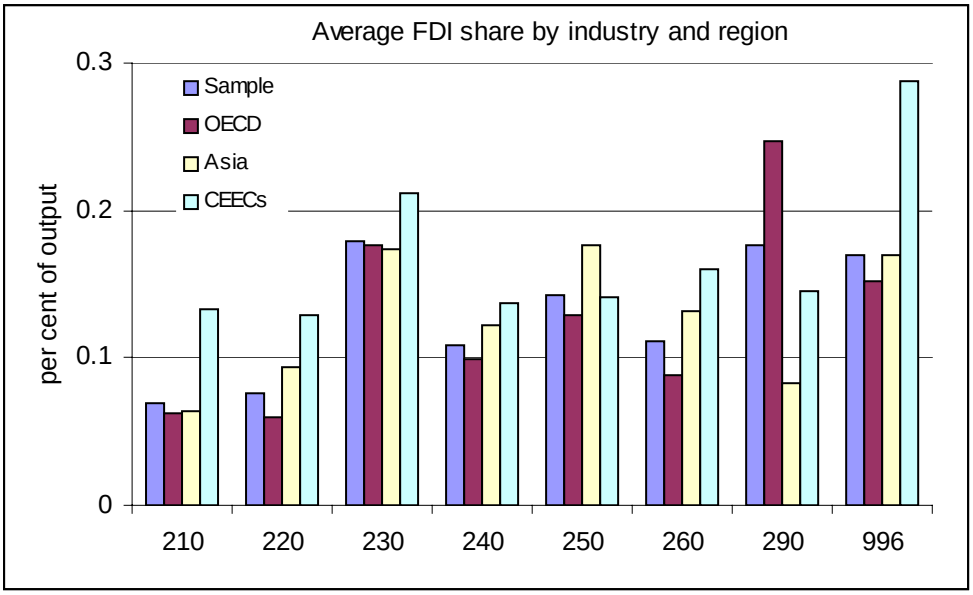

Figure 2: Average FDI share by regions and industries, industry codes: 210…food, 220…textile and wood, 230…petroleum, chemical, rubber, plastic, 240…metal and mechanical products, 250…office machinery, ICT equipment, 260…transport equipment, 290…other manufacturing, 996…not allocated.

One can see that already the data on FDI exhibit a substantial degree of heterogeneity across countries and industries. Given that further the impact of FDI on output and output growth is determined by a complex relationship that is likely to be influenced by these heterogeneities, it is worthwhile to explore this relationship in detail, given the data we have at hand. The remainder of this paper will analytically explore the impact of cross-country and cross-industry differences on the effect of FDI in industrial developments.

3. Analytical framework

In deriving our empirical specification we follow Nair-Reichert and Weinhold (NRW 2001) who explore the relationship between FDI and economic growth at the macro economic level,

putting a special emphasis on causality and on cross-country heterogeneity in the sample. We are taking up their second point and refine it in that we allow not only for heterogeneity arising from the inclusion of countries at different stages of development, but we also allow for heterogeneity stemming from the type of economic activity that receives FDI inside a country. Consequently we transfer the NRW (2001) model to the level of individual industries. Since we have a panel of country/industry-combinations over time, we are dealing in fact with three dimensions. In our estimation method we take account of this by allowing different error components along all these three dimensions. To emphasize this point, we do not simply treat every country/industry-combination as one individual "economy", but we explicitly allow for industry characteristics that are associated with certain economic activities and thus vary across industries, but remain constant across countries and over time. We additionally include country-specific effects that vary across countries only and are independent of the respective industry and time period. In its present form the model takes account of spillovers between industries and within countries as well as between countries only through the structure of the error terms. Thus, we cannot explicitly differentiate between different types of spillovers. However, we see it as a first step to allow for heterogeneity, since forcing all country and industry related effects into a common error term might potentially bias the results.

As in NRW (2001) our basic research question is whether an increase in FDI will lead to an increase in the growth rate of output, controlling for time-invariant country-specific characteristics and for other dynamic control variables. We are not interested in the correlation among levels, but in the dynamic impact of FDI. Thus, our basic model includes output growth of industry *i* in country *c* at time *t* as the dependent variable, the growth of the share of FDI in output for the same country/industry/time combination on the left hand side and the following controls: growth of the domestic investment share, proxied by gross fixed capital formation as a share of output, and export growth, measured again relative to output. We express all variables in shares of output because growth rates would otherwise be dominated mainly by level-effects. The heterogeneity arising from the detailed level of our analysis (country-industry pairs) is huge and often leads to exorbitantly high growth rates for economically negligible observations. Thus, the basic model looks like this:

$$GY_{ict} = \alpha_c + \sum_i \beta_{1i} GFDI_{ic(t-1)} + \sum_i \beta_{2i} GINV_{ic(t-1)} + \sum_i \beta_{3i} GEX_{ic(t-1)} + \gamma_c + \varepsilon_{ict}$$

where

Y…output
FDI…share of FDI in output

INV…share of investment in output
EX…share of exports in output
G…growth of resp. variable
i…industry
c…country
t…year

We also interact FDI with the other control variables in our model for the following reason: The effect of foreign capital may distinguish itself from the effect of capital as such only when a certain threshold of capitalization is reached in an industry. Also, FDI can act as a complement or a substitute for trade. These two possibilities arise primarily from differences in the motives for FDI. Resource- or labour seeking FDI is often associated with a complementary relationship to trade and can result in footloose production units, which move globally in order to extract the necessary resources. Thus, they are not intended to yield spillovers or a long-run positive development in a specific location. As a consequence, the effect of FDI on the development of this industry in the respective host country may be negative. On the other hand, market-seeking and strategic FDI, substituting for arm's length trade, pursues very different objectives and as a consequence it may yield opposite effects on the industry's development in the host country.

The literature often mentions another threshold effect with respect to FDI. For example, Borensztein et al. (1998) report a significant impact of a certain level of human capital as a necessary condition for FDI to show a positive influence. At the industry level, these factors are much more likely to play an important role. Therefore, we also test if our coefficient on FDI depends in fact on this factor by interacting FDI with the respective country's level of per capita income, measured at purchasing power parities.

In order to avoid the unresolved causality question in this context, we include all right hand side variables with a lag of one period. Although we are aware of the possible feedback from growth on FDI, we want to isolate the effect of the latter on the former here, and chose this simple way of assuring a uni-directional relationship.

4. Empirical Results

We used a panel estimation methods to estimate the different effects between countries, industries and time in one equation. Because of data limitations – our panel is highly unbalanced with a varying number of observations for every industry per year and country – we were not able to estimate a system of seemingly unrelated equations. Therefore, we

chose to use a pooled sample of countries, industries and years. We assume that the impact of our variable of interest (FDI) on the dependent variable (growth of output or growth of productivity) is different in each industry. This is more general than assuming a common effect of FDI on growth in all industries. Due to the pooling of the data, the industry component of the residuals is correlated with the structural variables (like FDI, investments, and exports in the respective industry) and can be considered as fixed effects, which differ for each industry. The cross units in our panel are countries. The country component of residuals (γ_c) can be correlated or uncorrelated with the structural variables. In our data, we usually obtain the results that they need not be correlated with the structural variables, thus we model them as random effects. We end up having a country component, which is common to every industry, an industry component, common to every country, and in addition a time component. Pooling over industries and years, we are estimating a one-way error component, random effects model.

We want to make a few more econometric remarks here: First, we stress the impact of heterogeneity in the FDI-growth nexus and we further expect a great deal of heterogeneity in our specific sample. Since this is the case, we base our conclusions on heteroskedastic-consistent standard errors (HC-type 1). Second, for every specification, we decided on fixed versus random effects based on the results of the Hausman test between the two models. Since the test was mostly in favour of random effects, we always report these results. We also think that the incompleteness of our data (with individual countries and industries missing in some years but not in others) calls for a treatment of the country specific effects as being drawn randomly from a common population. However, in the few cases, where the Hausmann test rejected the use of a random effects model, we report both, the fixed and the random effects output. Third, we ran the estimations also including lagged output growth on the right hand side and we got similar results. We interpret this as an indication that growth rates are stationary over time.

4.1. The impact of FDI on output growth

Table 1 reports the summary of results from estimating our empirical model from above, including various interaction terms. The detailed results are given in Table A2 in the appendix.

The results for the basic model in column 1 show that a significant effect from FDI is seen very surprisingly in the food industry, further in the group containing the petroleum, chemicals, plastics and rubber industry (henceforth called PETCHEM) and in the

manufacture of transport equipment. These three industry clusters differ a lot with respect to their use of skills, human capital, and resources. In the transport industry, also investment and exports exercise are a statistically significant, positive influence on output growth. Thus, this first model confirms that the effect of FDI on output growth is not unique across industries. However, no clear picture emerges with respect to which types of industries profit most from FDI. Next, we interact FDI with both, openness and investment, since it is often stressed that a threshold level in the available capital stock has to be reached before FDI can exert a positive influence. We choose to interact FDI also with openness on the export side because the two are often seen as complements and again, FDI may have a qualitatively different impact in export-oriented industries as compared to domestic-market oriented industries. The sign on this interaction term should reflect to some extent the motive for FDI. Market seeking FDI is clearly associated with a positive coefficient, while the effect of labour- or resource-seeking FDI on the host industry is in principle ambiguous and may well be negative in the long-run for the respective country. This would reflect the finding by Akinlo (2004) for Nigeria.

Table 1: Summary of results for output growth, GLS estimation

	(1)	(2)	(3)	(4)
GFDI	Food, PETCHEM, Transport	Transport	PETCHEM, (Metals)	-
GINV	Textiles/Wood, Transport	Textiles/Wood, Transport	Textiles/Wood	Textiles/Wood, Transport
GEX	Food, Transport	Food, Transport	Transport, Other	Food, PETCHEM, Transport
GFDI*INV	-	Food, Textiles/Wood, PETCHEM, electr. Machinery, Transport	-	-
GFDI*OPEN	-	-	Food, Textiles/Wood, Metals, Transport	-
GFDI*Income	-	-	-	PETCHEM, Transport
adj. R-squared	65.78	68.37	75.58	62.57
Std. Error of Reg.	0.2539	0.2441	0.2145	0.2646

Notes: Dependent variable is output growth; Industries in brackets indicate a significant and negative coefficient, 0 indicates no significant coefficient in any industry; number of observations in all specifications = 1,243.

The interactions with investment and openness increase the fit of the model notably. Interacting FDI with investment shares causes the adjusted R-squared of the regression to increase by 6 percentage points. The interaction between both types of capital – foreign and domestic – is important for an industry's output growth. Thus, our results are supportive of threshold levels in the existing capital stock before FDI can have a positive effect. There is a great deal of complementarity between the two forms of capital. Foreign capital growth on its own does not result in increased output growth, if not accompanied by certain level of domestic capital in the same industry. Further, the interaction term shows a significant coefficient in nearly all industries, except for metals and mechanical products. The only industry with an additional significant impact from FDI alone is now the PETCHEM industry which is a special industry group. It would be highly desirable to have detailed information on every individual industry contained in this group, since petroleum extraction is not only very capital intensive, but also very closely tied to endowments and thus not relevant for every country in the sample. Chemicals on the other hand cover themselves a very wide spectrum of economic activities ranging from low-skill, resource intensive production to high-skill,

technology intensive activities (such as pharmaceuticals). However, for the present sample, covering a wide range of countries, this was not possible.

The coefficients on investment and export shares are robust to the introduction of the interaction terms, both variables are crucial in spurring output growth in the transport industry, further, investment is important in the textile and wood sector. The significance of exports in the food industry drops in this specification.

Turning now to a different channel of interaction, namely the openness of an industry, column 3 shows that this interaction improves again the explanatory value of the model (the adjusted R-square raises to 75%). The interaction between FDI and export share is significant in the following industries: food, textiles and wood, metals and transport equipment. As before, only in the PETCHEM industry conglomerate, FDI on its own adds to higher output growth. A negative coefficient is recorded for FDI that is not accompanied by high investment growth as such in the metal industry. This may hint towards resource-extracting FDI in the long run in this industry, where instead of promoting domestic investment host countries “sell” the whole industry to foreign investors. The significant effect from investment in the transport industry has vanished in this specification, while it is still seen for exports. In total, the picture is again very unclear and no common characteristic can be found among the industries where FDI significantly boosts output growth.

Also exports in the electrical machinery industry, comprising activities such as the manufacture of computers and information and communication equipment, show a significant and positive effect on output growth in this specification. Actually, it is surprising that for none of the three variables - FDI, investment and exports – a significantly positive coefficient was observed in the other specifications. This hints to the fact that international knowledge and technology spillovers (through FDI and/or trade) are either too small or too difficult to absorb in this high-tech and high-skill industry. In contrast, the medium skill intensive transport industry seems to be especially suited for such spillovers to play a significant and positive role. For all three variables, the coefficients are often significant for the transport industry.

As mentioned earlier, the impact of FDI depends on among other things the level of human capital in the economy (Borensztein et al., 1995). We can only proxy for this very crudely by some indication of the development stage of each country. Thus, in the last column we interact FDI growth with per capita income of each economy in the respective year. The adjusted R-squared for the specification in column 4 drops slightly, which is surprising and not to encouraging given previous results in the literature. However qualitatively the results

change. A clearer picture emerges in the last specification. For higher levels of per capita income, FDI plays a strong role in PETCHEM and in the transport industry only. Thus, with a rising stage of development, the skill and technology intensity of those industries that benefit significantly from FDI rises. Like before, also investment and openness are significant determinants of output growth in the transport industry.

The specifications including the interaction terms very clearly point towards the fact that FDI needs to be accompanied by something else in order to realize statistically significant effects in most industries apart from PETCHEM and transport equipment. The question now arises what this “something else” is. In other words, it is not clear from our analysis whether the impact from FDI is tied to the level of investment in the industry, to the openness of the industry or how much the stage of development as measured by per capita income adds to this link. Our results do not enable us to distinguish unambiguously between the three interaction models on purely statistical grounds.

Given the more precise picture we get, when controlling for per capita GDP, we will now focus more on the role of absorptive capacity. In Table 2 we look at the interdependencies between this variable and the two others, investment and openness. Since a three-way interaction would not lead to any meaningful interpretation of the coefficients, we divided our sample into two broad groups which can roughly be associated with differing stages of development. The first group contains OECD member countries as of 2002, while all other countries are subsumed in the second group (see Appendix Table 1A for a listing of countries and their grouping). This second group displays in itself a great deal of heterogeneity, since it represents a wide range of catching-up countries which differ with respect to the initial levels of development as well as with respect to their speed of catching-up. Still, we see those countries as relatively homogenous compared to the group of industrialized countries, despite a greater amount of heterogeneity inside the group than inside the group of advanced OECD members. The summary of results in Table 2 strongly supports our decision to treat these two broad groups of industrialized and catching-up economies separately. (Again, detailed results are reported in Table A3 in the appendix).

Table 2: Summary of results for output growth by stage of development

	(1)	(2)	(3 RE)	(3 FE)
GFDI-OECD	PETCHEM, Transport	(Transport)	PETCHEM	PETCHEM, NA
GFDI-nonOECD	Food, (Metals), (Transport), (NA)	(Food), (Textiles/Wood), (Metals), (electr. Machinery), (Transport), (NA)	(Food), (Textiles/Wood), (PETCHEM), Metals), (Transport), (NA)	(Food), (Textiles/Wood)
GINV-OECD	Transport	Transport	0	Food, Transport, NA
GINV-nonOECD	Food, Textiles/Wood, Metals, NA	Food, Textiles/Wood, (electr. Machinery), NA	Textiles/Wood, Metals, NA	Textiles/wood, Metals
GEX-OECD	Transport, Other	Transport, Other	Other	Food, electr. Machinery, Other
GEX-nonOECD	Food, Textiles/Wood, Transport	Transport, NA	Transport	Transport
FDI*INV-OECD	-	PETCHEM, Transport	-	-
FDI*INV-nonOECD	-	Food, Textiles/Wood, PETCHEM, electr. Machinery, NA	-	-
FDI*OPEN-OECD	-	-	Metals, Transport	Metals, Transport
FDI*OPEN-nonOECD	-	-	Food, Textiles/Wood, PETCHEM, Metals	Food
adj. R-squared	69.54	77.55	78.23	79.26
Std. Error of Reg.	0.2395	0.2056	0.2025	0.1977

Notes: Dependent variable is output growth; Industries in brackets indicate a significant and negative coefficient, 0 indicates no significant coefficient in any industry; number of observations in all specifications = 1,243.

The distinction between OECD and non-OECD further increases the fit of the model by about 3 percentage points. But more interestingly, the industries where FDI exerts a statistically significant and positive effect differ substantially between the two subsamples. The positive association between FDI and output growth, which was found predominantly in PETCHEM, can be confirmed for the subsample of advanced OECD countries only. In sharp contrast, the relationship between high FDI growth and output growth is mostly negative for the subsample of catching-up countries. However, this finding is modified when the interaction terms are taken into account. While the marginal impact of FDI remains negative in all industries, the interaction with either investment or openness yields a positive coefficient in

the same industries plus PETCHEM. Thus, for this subsample we see very clearly the role of an existing stock of capital as a precondition to enable positive effects from FDI on output growth. Also, export orientation plays an important role. The results suggest that FDI flowing to catching-up countries generates a positive influence on growth mainly in outward oriented industries.

The importance of all three variables – FDI, investment, and exports – for output growth in the transport equipment industry in advanced OECD countries is striking. Still today, this medium skill and medium technology intensive industry emerges as a key industry for industrialized economies. The high degree of internationalization in this industry which is manifested through a substantial degree of outsourcing and highly internationally fragmentized production chains is reflected in this finding. A similar role is being played by low-skill, labour intensive industries like food and textiles/wood in the subsample of catching-up countries. Our results thus confirm previous findings in the literature stressing the importance of the stage of development (Borensztein et al. 1998, NRW 2001, Blonigen and Wang, 2004) in connection with the effects of FDI. Our focus on individual industries further allows us to explicitly name the differences and identify those industries where inward FDI and outward oriented production (or exports) offer the greatest potential for output growth given a certain stage of development.

4.2. The impact of FDI on productivity growth

So far we have looked at output growth as our dependent variable. This has given us an indication of the effects of FDI in various industries controlling for the host country's stage of development. However, the correlation between FDI growth and output growth reflects more or less the direct effect on output through an increase in the capital stock. Indirect effects and thus spillovers are better captured when looking at the relationship between FDI and productivity growth. Using productivity growth as our independent variable will allow us to assess the improvement in efficiency resulting from increases in FDI in a certain industry/country pair. Table 3 shows the summary of results obtained from using our basic model without interactions, when we replace output growth with productivity growth as the dependent variable. Table 4 reports the results for productivity growth using the additional interaction between stage of development (OECD versus catching-up) and FDI. (The interested reader is again referred to Tables A4 and A5 in the appendix for the results in detail.)

The most striking observation is the sharp fall in adjusted R-squares from roughly 70-75% to 20-25%. The explanatory value of this model is much inferior to the one before. What does this tell us? Clearly, we have missed one important factor in explaining the efficiency of production processes across countries, industries, and time. The prime candidate is technological progress or a measure for R&D. However, for the present paper we did not have this information available. Keeping in mind the lower explanatory value of this model, we still want to interpret the changes that occurred compared to the previous model which explained output growth.

Table 3: Summary of results for productivity growth

	(1)	(2)	(3)	(4)
GFDI	Transport	0	(Textiles/Wood), (Metals)	
GINV	Textile/Wood, Transport	Textiles/Wood, Transport	Textiles/Wood	Textiles/Wood, Transport
GEX	Food, Transport, NA	Food, Transport, NA	Food, Transport, NA	Food, Textiles/Wood, PETCHEM, Transport, NA
FDI*INV	-	Textiles/Wood, Transport	-	-
FDI*OPEN	-	-	Textiles/Wood, Metals, Transport	-
FDI*Income	-	-	-	Transport
adj. R-squared	19.47	20.71	25.66	18.34
Std. Error of Reg.	0.2201	0.2184	0.2115	0.2217

Notes: Dependent variable is output growth; Industries in brackets indicate a significant and negative coefficient, 0 indicates no significant coefficient in any industry; number of observations in all specifications = 1,243.

The only industry where a significant influence from FDI on productivity growth is found is the transport industry. Its significance also disappears when interaction terms are introduced. The significance of investment in two industries with greatly differing skill and labour intensities, namely textiles/wood and transport equipment, can be explained by Table 4, which shows the results for the additional interaction between stage of development and FDI. Not surprisingly, FDI is important in augmenting productivity in the transport equipment industry in the group of advanced OECD countries only, while a positive impact from FDI in textiles and wood arises from the subsample of catching-up countries. Somewhat more surprisingly, the positive productivity impact from exports in the food and transport equipment industries prevails in both subsamples alike.

Interacting FDI, stage of development and investment simultaneously indicates a positive influence from FDI in the PETCHEM industries for the group of advanced OECD members.

This corresponds to the result that was obtained for output growth above. Transport equipment is the only industry again, where FDI can robustly be associated with increased productivity in the subsample of advanced countries. Also in accordance with our earlier findings, the direct effect of FDI on productivity growth in catching-up countries is often found to be negative in certain labour intensive, low skill industries, while the interaction between FDI and investment has a significant and positive effect on productivity growth in the same industries. The interaction with openness gives again similar results, however only for the subsample of catching-up countries. In the OECD-sample, very few statistically significant effects were found. This hints towards a greater importance of openness at lower levels of development.

Thus, even if the results for productivity growth are less satisfactory in statistical terms, they are qualitatively similar, which shows some robustness of our findings.

Table 4: Summary for productivity growth by stage of development

	(1)	(2)	(3)
GFDI-OECD	Transport	(PETCHEM), Transport	0
GFDI-nonOECD	Transport, NA	(Textiles/Wood), (Metals), (electr. Machinery), (Transport), (Other), (NA)	(Food), (Textile/Wood), (PETCHEM), (Metals), (Transport), (NA)
GINV-OECD	Transport	Transport	0
GINV-nonOECD	Food, Textiles/Wood	Food, Textiles/Wood	Textile/Wood
GEX-OECD	Food, Transport, NA	Transport, Other	NA
GEX-nonOECD	Food, Textiles/Wood, Transport	Transport	Metals, Transport
FDI*INV-OECD	-	PETCHEM, Transport	-
FDI*INV-nonOECD	-	Textiles/Wood, Other, NA	-
FDI*OPEN-OECD	-	-	Food, Metals, Transport
FDI*OPEN-nonOECD	-	-	Food, Textiles/Wood, PETCHEM, Metals, (Other)
adj. R-squared	21.04	25.96	27.37
Std. Error of Reg.	0.2179	0.2110	0.2090

Notes: Dependent variable is output growth; Industries in brackets indicate a significant and negative coefficient, 0 indicates no significant coefficient in any industry; number of observations in all specifications = 1,243.

5. Are CEECs different?

Like few other countries, Central and Eastern European countries (CEECs) have experienced a rapid transformation of their output and trade patterns over the past decade and FDI has played a decisive role in this transformation process. Compared to the sample in total, the group of CEECs represents a very homogenous group despite some fundamental differences with respect to how they treated FDI during the transformation process. FDI inflows in these countries were closely connected to the process of privatization. Privatization policies in turn have been very distinct in individual CEECs. While Hungary pursued a policy of early privatization via the capital market, thus attracting large

FDI inflows into all sectors, the voucher privatization in e.g. the Czech Republic implied that foreign capital was kept out of the country for a relatively long time period. Poland started to privatize state-owned firms at a later point in time; thus FDI inflows occurred at a later stage. Consequently, the timing and industrial spread of foreign capital inflows into individual CEECs differed because of different privatization policies. Still, FDI inflow into these countries were highly dynamic, so that eventually they share a few common characteristics. For instance, due to the coincidence of privatization, a certain lack of domestic capital and the closing down of inefficient firms, FDI stocks in relation to output are very high (see Figure 2).

Also their distribution across industries is distinct from the distribution found for other country groups, like OECD and Asia. CEECs show a higher proportion of FDI in the food industry, but also in the PETCHEM industries. Using our estimating framework, we will investigate, whether CEECs fit into the picture we have drawn in the previous section. Table 5 summarizes the results from estimating the same equation as above for the subset of CEECs only, the details are given in tables A6 and A7 in the appendix. Given the much greater homogeneity in this group in general, the fit of the regression has greatly improved. However, FDI exhibits a significant growth promoting effect in only a few industries. In the first specification, without interaction terms, no significant influence from FDI growth is found in any industry. When interacting FDI with investment or openness, the electrical machinery industry emerges as the only industry, where FDI has spurred growth in interaction with either high investment levels or a high degree of export orientation. The results for output and productivity growth are very similar, again, only developments in the electrical machinery industry were influenced positively by FDI. The export-led growth experience of CEECs in the most recent past can also be read from the table.

Table 5: Results for CEECs

dep. var:	output growth			productivity growth		
	(1)	(2)	(3)	(1)	(2)	(3)
GFDI	0	PETCHEM	PETCHEM, (electr. Machinery)	0	(electr. Machinery)	0
GINV	electr. Machinery	(electr. Machinery)	(Metals), electr. Machinery	electr. Machinery, (NA)	(NA)	(NA)
GEX	PETCHEM, Metals, electr. Machinery, Transport	PETCHEM, Metals	PETCHEM, Transport	PETCHEM, electr. Machinery, (NA)	PETCHEM, (NA)	PETCHEM, (NA)
GFDI*INV	-	electr. Machinery	-	-	electr. Machinery	-
GFDI*OPEN	-	-	electr. Machinery	-	-	electr. Machinery
adj. R-squared	96.08	98.32	97.73	75.32	77.6	77.27
Std. Error of Reg.	0.1812	0.1182	0.1380	0.2251	0.2137	0.2168

Notes: Industries in brackets indicate a significant and negative coefficient, 0 indicates no significant coefficient in any industry; number of observations in all specifications = 55

The results are remarkable in two ways. First, the observation period for this group of countries is much shorter than for the sample as a whole. In general, one would expect to see effects from FDI on the growth rate only after a certain time lag. These countries already show a significant correlation after a very short time period. Second, in Central and Eastern Europe, FDI has a significant influence in neither of the two industries that were identified previously as key industries, the transport industry for OECD members and textiles and wood for the catching-up countries. In contrast, significant growth effects are observed in one of the more high tech and skill intensive industries, in the electrical machinery industry. Again, the existence of a sufficient stock of capital as well as export orientation are important. In any case, the result confirms the rapid and successful transformation of these countries.

6. Conclusions

We can conclude from our empirical analysis that the impact of FDI on economic development (in terms of output growth as well as in terms of efficiency and thus productivity gains) differs between countries at different stages of development. This observation is very strongly related to a differential impact of FDI in individual industries. For a country's long term prospects it is thus crucial, which types of industries receive foreign capital and not so much the aggregate amount of FDI flowing into a country. This has important implications for

the design of industrial and trade policies as well as for policies restricting or allowing capital mobility across borders. The decisions, when, how, and which industries to open to the international capital market are important and should be guided by the long-run implications of FDI in different industries.

Secondly, not only the industrial allocation in connection with the timing of FDI over the development process matters, but we could also identify important interactions between FDI and investment as well as exports. Again, the patterns differ across industries and so a common characterisation is not possible.

However, if one broadly controls for the stage of development, a rather unified pattern emerges with qualitative differences between industrialized countries and catching-up economies. Among the group of advanced OECD members, FDI is robustly associated with higher growth (in terms of output and productivity) in the transport industry. Likewise, FDI plays a positive and significant role in the conglomerate of industries including petroleum, chemicals, rubber, and plastics (PETCHEM) for these countries. It should be mentioned that also export orientation and investment have a positive influence on output and productivity growth in these two industries. Thus, FDI yields the greatest benefits in medium high tech and medium skill intensive industries. In all other industries, no significant effect from FDI on output and productivity was observed for this subsample. Unfortunately the level of industrial disaggregation does not allow us to explicitly look at the most high tech industries in isolation (for example manufacture of drugs, medicine and aircraft). The most homogenously high tech industry in our sample is the manufacture of electrical machinery. However, this industry only shows a significant impact when being interacted with either investment or openness.

The picture is different for the group of catching-up economies. Although they are spanning a wide spectrum of countries - ranging from the first Asian-Tiger countries Hong Kong, South Korea, Singapore, and Taiwan to the new EU member countries of Eastern Europe – and thus exhibit quite some heterogeneity among themselves, they still display some common features with respect to the relationship between FDI and output (respectively productivity) growth. In general, low skill and resource intensive industries are the ones where a positive link between FDI and growth is observed. The food and textiles and wood industries are often characterised by a significant coefficient on FDI or on one of the interactions of FDI with either investment and export orientation. Again, FDI in the transport industry plays an important role, too. Thus, the only industry with a robustly positive correlation between FDI and growth is the transport industry.

Finally, CEECs show a very distinct pattern of development, whereby FDI plays an important role in the production of electrical machinery. This implies that since the disruption of the centrally planned economies in the early 1990s, CEECs have rapidly caught up with the most advanced countries in terms of absorptive capacity.

As a third conclusion, the impact from FDI as such is often weak, however FDI often turns out to be an important contributor to growth in combination with investment or exports. This is especially true for the group of catching-up countries, where the interaction of investment with FDI is significant for most industries. Therefore, we conclude that FDI can be an important contribution to the host country's economic development, provided that the conditions and/or the economic environment is conducive to bringing out its positive impact.

Finally, we should mention that in principle, the causality between FDI and growth remains unclear. Using a sophisticated econometric technique, which allows for country specific heterogeneity in a panel across countries and time, NRW (2001) find a causal relationship between FDI and aggregate economic growth and some evidence that the efficacy of FDI is higher in more open economies. However, they also emphasize that the relationship is highly heterogeneous across countries. We tried to avoid the issue of causality by using lagged values of FDI and all other explanatory variables in the regressions. Given certain limitations in the data (most importantly, the short time series dimension and the highly unbalanced sample) we were not able to do a rigorous causality test in this case. This remains on the agenda for future research.

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Appendix

Table A1: Listing of countries and grouping

Group	*UNIDO code*	*Abbreviation*	*Country*
OECD	36	aus	Australia
	40	aut	Austria
	203	cze	Czech Rep.
	208	dnk	Denmark
	246	fin	Finland
	250	fra	France
	276	deu	Germany
	300	grc	Greece
	348	hun	Hungary
	352	isl	Iceland
	372	irl	Ireland
	380	ita	Italy
	392	jpn	Japan
	410	kor	Korea
	484	mex	Mexico
	528	nld	The Netherlands
	578	nor	Norway
	616	pol	Poland
	620	prt	Portugal
	703	svk	Slovak Rep.
	724	esp	Spain
	752	swe	Sweden
	792	tur	Turkey
	826	gbr	Great Britain
	840	usa	USA
catching-up	344	hkg	Hong Kong
	702	sgp	Singapore
	158	twa	Taiwan
	360	idn	Indonesia
	458	mys	Malaysia
	608	phl	Philippines
	764	tha	Thailand
	191	hrv	Croatia
	428	ltv	Latvia
	705	svn	Slovenia

Table A2: Results for the output growth equation.

Variable	Industry	(1) Estimated Coefficient	*t-stat*	(2) Estimated Coefficient	*t-stat*	(3) Estimated Coefficient	*t-stat*
GFDI	Food	0.1439	*4.87*	-0.0560	*-1.03*	-0.0450	*-1.22*
GFDI	Textiles/Wood	0.0202	*0.86*	-0.0320	*-0.84*	-0.0444	*-1.46*
GFDI	PETCHEM	0.0935	*4.05*	0.0345	*1.04*	0.0723	*2.08*
GFDI	Metals/Mechanicals	0.0225	*0.51*	0.0111	*0.21*	-0.1616	*-2.61*
GFDI	Electr. Machinery	0.0289	*0.93*	-0.0264	*-0.61*	0.0167	*0.46*
GFDI	Transport	0.2308	*11.25*	0.0677	*2.47*	-0.0244	*-1.13*
GFDI	Other	0.0012	*1.09*	-0.0019	*-0.05*	0.0214	*1.17*
GFDI	N.A.	0.0000	*0.18*	-0.0018	*-0.59*	0.0000	*0.06*
GINV	Food	0.0046	*1.26*	-0.0042	*-1.05*	0.0035	*1.14*
GINV	Textiles/Wood	0.2495	*4.57*	0.2262	*4.08*	0.1674	*3.02*
GINV	PETCHEM	0.0062	*0.27*	-0.0102	*-0.43*	0.0052	*0.26*
GINV	Metals/Mechanicals	0.0098	*0.52*	0.0039	*0.09*	0.0107	*0.67*
GINV	Electr. Machinery	0.0283	*0.81*	-0.0098	*-0.24*	0.0249	*0.83*
GINV	Transport	0.0425	*4.06*	0.0748	*6.94*	0.0125	*1.38*
GINV	Other	-0.0045	*-0.25*	-0.0043	*-0.24*	-0.0032	*-0.20*
GINV	N.A.	0.0002	*0.67*	0.0003	*0.85*	0.0002	*0.70*
GEX	Food	0.1833	*5.77*	0.0806	*2.08*	0.0313	*0.89*
GEX	Textiles/Wood	0.0474	*1.10*	0.0225	*0.51*	0.0154	*0.40*
GEX	PETCHEM	0.0390	*1.15*	0.0111	*0.32*	0.0204	*0.51*
GEX	Metals/Mechanicals	0.0471	*1.05*	0.0462	*1.07*	-0.0175	*-0.41*
GEX	Electr. Machinery	0.0607	*1.29*	0.0470	*1.02*	0.0530	*1.31*
GEX	Transport	0.0756	*3.65*	0.0469	*2.31*	0.0314	*1.75*
GEX	Other	0.0916	*1.56*	0.0880	*1.55*	0.0862	*1.70*
GEX	N.A.	0.0100	*0.63*	0.0086	*0.56*	0.0075	*0.56*
GFDI*INV	Food			1.8671	*4.34*		
GFDI*INV	Textiles/Wood			0.4078	*1.71*		
GFDI*INV	PETCHEM			0.7503	*2.36*		
GFDI*INV	Metals/Mechanicals			0.1038	*0.21*		
GFDI*INV	Electr. Machinery			0.7314	*1.67*		
GFDI*INV	Transport			2.1908	*8.60*		
GFDI*INV	Other			0.0510	*0.08*		
GFDI*INV	N.A.			0.0340	*0.59*		
GFDI*EX	Food					0.0548	*6.93*
GFDI*EX	Textiles/Wood					0.0501	*2.68*
GFDI*EX	PETCHEM					0.0363	*0.57*
GFDI*EX	Metals/Mechanicals					0.3424	*3.44*
GFDI*EX	Electr. Machinery					-0.0004	*-0.03*
GFDI*EX	Transport					0.0979	*20.61*
GFDI*EX	Other					-0.0399	*-1.11*
GFDI*EX	N.A.					0.0000	*-0.02*
GFDI*GDPpc	Food						
GFDI*GDPpc	Textiles/Wood						
GFDI*GDPpc	PETCHEM						
GFDI*GDPpc	Metals/Mechanicals						
GFDI*GDPpc	Electr. Machinery						
GFDI*GDPpc	Transport						
GFDI*GDPpc	Other						
GFDI*GDPpc	N.A.						
CONST		0.0137	*0.85*	0.0168	*1.11*	0.0249	*2.11*
adjusted R-squared		65.78		68.37		75.59	
Std. Error of Reg.		0.2538		0.2441		0.2145	
Hausmann (p-value)		1.3539	*(0.9686)*	2.3297	*(0.8870)*	0.3723	*(0.9847)*

Table A3: Results for output growth, OECD versus catching-up.

	Variable	Industry	(1) Estimated Coefficient	*t-stat*	(2) Estimated Coefficient	*t-stat*	(3 RE) Estimated Coefficient	*t-stat*	(3 FE) Estimated Coefficient	*t-stat*
OECD	GFDI	Food	0.0108	*0.24*	0.1390	*1.27*	0.0025	*0.05*	-0.0015	*-0.03*
	GFDI	Textiles/Wood	-0.0084	*-0.28*	-0.0780	*-0.92*	-0.0457	*-0.96*	-0.0312	*-1.23*
	GFDI	PETCHEM	0.0742	*3.11*	-0.0539	*-0.73*	0.0827	*2.42*	0.0809	*2.62*
	GFDI	Metals/Mechanicals	0.0624	*1.29*	0.0013	*0.01*	-0.0915	*-1.38*	-0.0806	*-1.48*
	GFDI	Electr. Machinery	0.0322	*0.83*	-0.0716	*-0.94*	0.0212	*0.57*	0.0179	*0.80*
	GFDI	Transport	0.2610	*12.89*	-0.1659	*-5.81*	-0.0079	*-0.36*	-0.0078	*-0.55*
	GFDI	Other	0.0011	*1.09*	-0.0366	*-0.42*	-0.0069	*-0.15*	-0.0139	*-0.78*
	GFDI	N.A.	0.0000	*0.22*	-0.0008	*-0.32*	0.0000	*0.08*	0.0000	*1.70*
non-OECD	GFDI	Food	0.1548	*3.13*	-0.1713	*-1.91*	-0.2161	*-3.02*	-0.1828	*-2.66*
	GFDI	Textiles/Wood	-0.0824	*-1.19*	-0.1813	*-2.17*	-0.2400	*-2.72*	-0.2094	*-1.63*
	GFDI	PETCHEM	0.1016	*1.29*	-0.0671	*-0.56*	-0.3356	*-1.88*	-0.2672	*-0.87*
	GFDI	Metals/Mechanicals	-0.1470	*-1.75*	-0.3126	*-2.77*	-0.4265	*-2.60*	-0.3799	*-1.43*
	GFDI	Electr. Machinery	0.0049	*0.08*	-0.2309	*-2.18*	0.0391	*0.28*	0.1596	*1.05*
	GFDI	Transport	-0.1621	*-2.35*	-0.1761	*-2.14*	-0.1879	*-2.70*	-0.1772	*-1.57*
	GFDI	Other	-0.0755	*-1.49*	-0.1611	*-1.57*	-0.1459	*-1.24*	-0.0783	*-0.79*
	GFDI	N.A.	-0.1551	*-3.24*	-0.9579	*-5.54*	-0.3759	*-2.24*	-0.3031	*-0.70*
OECD	GINV	Food	0.0038	*1.11*	0.0158	*1.50*	0.0033	*1.12*	0.0040	*5.70*
	GINV	Textiles/Wood	0.1005	*1.07*	0.0894	*1.09*	0.0920	*1.14*	0.1029	*1.46*
	GINV	PETCHEM	-0.0086	*-0.36*	-0.0259	*-1.16*	-0.0092	*-0.45*	-0.0063	*-0.52*
	GINV	Metals/Mechanicals	0.0147	*0.32*	0.0152	*0.37*	0.0241	*0.60*	0.0192	*0.72*
	GINV	Electr. Machinery	0.0085	*0.20*	-0.0041	*-0.11*	0.0031	*0.09*	0.0095	*0.27*
	GINV	Transport	0.0488	*4.53*	0.1619	*14.58*	0.0133	*1.41*	0.0152	*2.56*
	GINV	Other	-0.0026	*-0.11*	0.0059	*0.21*	-0.0042	*-0.20*	-0.0039	*-0.70*
	GINV	N.A.	0.0002	*0.69*	0.0002	*0.66*	0.0002	*0.67*	0.0002	*3.84*
non-OECD	GINV	Food	0.0868	*1.64*	0.1011	*2.19*	0.0452	*0.98*	0.0351	*0.83*
	GINV	Textiles/Wood	0.3067	*4.15*	0.3293	*5.06*	0.2278	*3.06*	0.2413	*3.56*
	GINV	PETCHEM	0.0720	*0.86*	0.0482	*0.63*	0.0232	*0.31*	0.0071	*0.07*
	GINV	Metals/Mechanicals	0.0432	*1.73*	-0.1658	*-1.20*	0.0517	*2.40*	0.0420	*2.51*
	GINV	Electr. Machinery	0.0635	*1.09*	-0.2359	*-1.70*	0.0565	*0.97*	0.0351	*0.72*
	GINV	Transport	-0.0002	*-0.01*	0.0009	*0.04*	0.0023	*0.11*	0.0036	*0.26*
	GINV	Other	0.0106	*0.40*	-0.0094	*-0.26*	0.0120	*0.53*	0.0134	*1.15*
	GINV	N.A.	0.7040	*8.77*	0.3365	*3.23*	0.6316	*7.16*	0.6846	*1.42*
OECD	GEX	Food	0.0630	*1.26*	0.0657	*1.50*	0.0597	*1.37*	0.0600	*2.13*
	GEX	Textiles/Wood	0.0201	*0.45*	0.0221	*0.57*	0.0210	*0.54*	0.0172	*0.59*
	GEX	PETCHEM	0.0135	*0.38*	0.0044	*0.14*	0.0228	*0.56*	0.0211	*0.78*
	GEX	Metals/Mechanicals	0.0534	*1.16*	0.0585	*1.45*	0.0059	*0.14*	0.0101	*0.35*
	GEX	Electr. Machinery	0.0603	*1.28*	0.0562	*1.37*	0.0543	*1.34*	0.0507	*1.74*
	GEX	Transport	0.0764	*3.68*	0.0584	*3.21*	0.0197	*1.09*	0.0195	*0.75*
	GEX	Other	0.1137	*1.88*	0.1114	*2.11*	0.1095	*2.10*	0.1110	*1.75*
	GEX	N.A.	0.0069	*0.46*	0.0054	*0.41*	0.0053	*0.41*	0.0110	*1.48*
non-OECD	GEX	Food	0.1550	*2.90*	0.0606	*1.16*	-0.0118	*-0.22*	-0.0019	*-0.07*
	GEX	Textiles/Wood	0.2652	*1.80*	0.1452	*0.97*	0.1262	*0.88*	0.1520	*0.83*
	GEX	PETCHEM	0.0414	*0.38*	0.0177	*0.18*	-0.0514	*-0.51*	-0.0331	*-0.24*
	GEX	Metals/Mechanicals	-0.0299	*-0.27*	-0.0483	*-0.50*	-0.2384	*-1.59*	-0.2423	*-1.36*
	GEX	Electr. Machinery	0.0234	*0.14*	0.0828	*0.55*	0.0652	*0.43*	0.0177	*0.18*
	GEX	Transport	0.1766	*2.89*	0.1783	*2.85*	0.1634	*2.65*	0.1659	*2.38*
	GEX	Other	-0.0507	*-0.34*	-0.0578	*-0.44*	-0.0954	*-0.72*	-0.0457	*-0.35*
	GEX	N.A.	0.0036	*0.03*	-0.2132	*-1.94*	-0.0266	*-0.27*	-0.0161	*-0.08*
EC	GFDI*INV	Food			-2.9027	*-1.25*				

	GFDI*INV	Textiles/Wood			1.2167	*0.89*				
	GFDI*INV	PETCHEM			2.4851	*1.82*				
	GFDI*INV	Metals/Mechanicals			1.3889	*0.74*				
	GFDI*INV	Electr. Machinery			2.2326	*1.51*				
	GFDI*INV	Transport			6.0153	*19.19*				
	GFDI*INV	Other			0.6286	*0.43*				
	GFDI*INV	N.A.			0.0162	*0.33*				
non-OECD	GFDI*INV	Food			2.5581	*4.09*				
	GFDI*INV	Textiles/Wood			0.6750	*1.62*				
	GFDI*INV	PETCHEM			0.9559	*1.61*				
	GFDI*INV	Metals/Mechanicals			2.3110	*1.59*				
	GFDI*INV	Electr. Machinery			2.3350	*2.35*				
	GFDI*INV	Transport			0.0082	*0.02*				
	GFDI*INV	Other			0.9000	*0.81*				
	GFDI*INV	N.A.			8.8113	*4.74*				
	GFDI*EX	Food					0.0175	*0.08*	0.0314	*0.25*
	GFDI*EX	Textiles/Wood					0.0984	*0.92*	0.0542	*0.82*
	GFDI*EX	PETCHEM					-0.0210	*-0.33*	-0.0192	*-0.39*
OECD	GFDI*EX	Metals/Mechanicals					0.2970	*2.99*	0.2643	*2.59*
	GFDI*EX	Electr. Machinery					0.0063	*0.38*	0.0041	*0.57*
	GFDI*EX	Transport					0.0964	*20.44*	0.0939	*23.30*
	GFDI*EX	Other					0.0157	*0.18*	0.0294	*0.84*
	GFDI*EX	N.A.					0.0000	*-0.03*	0.0000	*-0.69*
	GFDI*EX	Food					0.0881	*6.39*	0.0815	*6.73*
	GFDI*EX	Textiles/Wood					0.1004	*2.28*	0.0818	*1.30*
	GFDI*EX	PETCHEM					0.6511	*2.56*	0.5678	*1.26*
	GFDI*EX	Metals/Mechanicals					0.6497	*1.65*	0.6745	*1.25*
non-OECD	GFDI*EX	Electr. Machinery					-0.0273	*-0.48*	-0.0599	*-1.11*
	GFDI*EX	Transport					0.0915	*0.39*	0.0856	*0.36*
	GFDI*EX	Other					0.0414	*0.54*	0.0004	*0.01*
	GFDI*EX	N.A.					0.3505	*1.35*	0.2314	*0.34*
	CONST		0.0268	*1.78*	0.0259	*2.36*	0.0316	*2.96*		
	adjusted R-squared		69.54		77.55		78.23		79.26	
	Std. Error of Reg.		0.2395		0.2056		0.2025		0.1977	
	Hausmann (p-value)		10.2010	*(0.677)*	2.8579	*(1.000)*	73.2970	*(0.000)*		

Table A4: Results for productivity growth.

Variable	Industry	(1) Estimated Coefficient	*t-stat*	(2) Estimated Coefficient	*t-stat*	(3) Estimated Coefficient	*t-stat*	(4) Estimated Coefficient	*t-stat*
GFDI	Food	0.0001	*0.00*	0.0134	*0.27*	-0.0365	*-1.00*		
GFDI	Textiles/Wood	0.0322	*1.55*	-0.0419	*-1.23*	-0.0510	*-1.69*		
GFDI	PETCHEM	0.0147	*0.73*	0.0115	*0.38*	0.0121	*0.35*		
GFDI	Metals/Mechanicals	0.0292	*0.75*	0.0327	*0.70*	-0.1081	*-1.77*		
GFDI	Electr. Machinery	0.0055	*0.20*	-0.0235	*-0.61*	0.0018	*0.05*		
GFDI	Transport	0.0995	*5.54*	0.0257	*1.04*	-0.0112	*-0.53*		
GFDI	Other	0.0007	*0.76*	-0.0275	*-0.80*	0.0074	*0.41*		
GFDI	N.A.	0.0000	*0.25*	-0.0004	*-0.16*	0.0000	*-0.07*		
GINV	Food	0.0027	*0.85*	0.0031	*0.87*	0.0024	*0.79*	0.0027	*0.86*
GINV	Textiles/Wood	0.2435	*5.09*	0.2033	*4.07*	0.1324	*2.41*	0.2714	*6.14*
GINV	PETCHEM	-0.0093	*-0.45*	-0.0104	*-0.49*	-0.0096	*-0.48*	-0.0081	*-0.39*
GINV	Metals/Mechanicals	0.0115	*0.70*	0.0175	*0.43*	0.0115	*0.72*	0.0151	*0.92*
GINV	Electr. Machinery	0.0081	*0.26*	-0.0135	*-0.37*	0.0062	*0.21*	0.0078	*0.25*
GINV	Transport	0.0168	*1.83*	0.0314	*3.23*	0.0039	*0.43*	0.0213	*2.32*

GINV	Other	0.0128	*0.81*	0.0097	*0.59*	0.0126	*0.80*	0.0123	*0.77*
GINV	N.A.	0.0001	*0.44*	0.0001	*0.40*	0.0001	*0.42*	0.0001	*0.44*
GEX	Food	0.0835	*3.00*	0.0906	*2.60*	0.0563	*1.61*	0.0814	*8.77*
GEX	Textiles/Wood	0.0348	*0.92*	-0.0003	*-0.01*	-0.0060	*-0.16*	0.0601	*1.73*
GEX	PETCHEM	0.0456	*1.53*	0.0444	*1.41*	0.0442	*1.12*	0.0495	*1.72*
GEX	Metals/Mechanicals	0.0546	*1.39*	0.0546	*1.40*	0.0047	*0.11*	0.0435	*1.10*
GEX	Electr. Machinery	0.0490	*1.18*	0.0421	*1.02*	0.0457	*1.14*	0.0472	*1.16*
GEX	Transport	0.0503	*2.77*	0.0374	*2.05*	0.0311	*1.75*	0.0731	*4.14*
GEX	Other	0.0532	*1.03*	0.0505	*0.99*	0.0506	*1.01*	0.0525	*1.01*
GEX	N.A.	0.0522	*3.77*	0.0521	*3.78*	0.0511	*3.81*	0.0521	*3.73*
GFDI*INV	Food			-0.1232	*-0.32*				
GFDI*INV	Textiles/Wood			0.5926	*2.75*				
GFDI*INV	PETCHEM			0.0440	*0.15*				
GFDI*INV	Metals/Mechanicals			-0.0600	*-0.13*				
GFDI*INV	Electr. Machinery			0.4160	*1.05*				
GFDI*INV	Transport			0.9926	*4.33*				
GFDI*INV	Other			0.4692	*0.83*				
GFDI*INV	N.A.			0.0086	*0.17*				
GFDI*EX	Food					0.0102	*1.30*		
GFDI*EX	Textiles/Wood					0.0673	*3.65*		
GFDI*EX	PETCHEM					0.0001	*0.00*		
GFDI*EX	Metals/Mechanicals					0.2649	*2.69*		
GFDI*EX	Electr. Machinery					-0.0009	*-0.06*		
GFDI*EX	Transport					0.0423	*9.00*		
GFDI*EX	Other					-0.0131	*-0.37*		
GFDI*EX	N.A.					0.0001	*0.11*		
GFDI*GDPpc	Food							5.59E-07	*0.27*
GFDI*GDPpc	Textiles/Wood							-4.87E-08	*-0.04*
GFDI*GDPpc	PETCHEM							4.46E-07	*0.51*
GFDI*GDPpc	Metals/Mechanicals							3.47E-06	*1.49*
GFDI*GDPpc	Electr. Machinery							7.79E-07	*0.46*
GFDI*GDPpc	Transport							3.90E-06	*3.49*
GFDI*GDPpc	Other							6.07E-08	*0.75*
GFDI*GDPpc	N.A.							5.79E-10	*0.25*
CONST		0.0298	*2.34*	0.0293	*2.31*	0.0347	*3.12*	0.0323	*2.53*
adjusted R-squared		19.47		20.71		25.66		18.34	
Std. Error of Reg.		0.2201		0.2184		0.2115		0.2217	
Hausmann (p-value)		0.0319	*(0.999)*	1.7356	*(0.973)*	2.2693	*(0.810)*	0.3457	*(0.999)*

Table A5: Results for productivity growth, OECD versus catching-up.

	Variable	Industry	(1) Estimated Coefficient	*t-stat*	(2) Estimated Coefficient	*t-stat*	(3) Estimated Coefficient	*t-stat*
OECD	GFDI	Food	0.0118	*0.28*	0.0991	*0.88*	-0.0773	*-1.48*
	GFDI	Textiles/Wood	-0.0088	*-0.32*	-0.0330	*-0.38*	-0.0282	*-0.57*
	GFDI	PETCHEM	0.0164	*0.75*	-0.1804	*-2.37*	0.0263	*0.74*
	GFDI	Metals/Mechanicals	0.0559	*1.25*	-0.0263	*-0.26*	-0.0461	*-0.67*
	GFDI	Electr. Machinery	0.0126	*0.35*	-0.0129	*-0.17*	0.0111	*0.29*
	GFDI	Transport	0.1175	*6.29*	-0.0676	*-2.30*	0.0012	*0.05*
	GFDI	Other	0.0007	*0.75*	0.0032	*0.04*	0.0094	*0.20*
	GFDI	N.A.	0.0000	*0.25*	-0.0006	*-0.23*	0.0000	*-0.07*
non-OECD	GFDI	Food	-0.0267	*-0.59*	-0.1065	*-1.15*	-0.1847	*-2.50*
	GFDI	Textiles/Wood	-0.0619	*-0.97*	-0.1610	*-1.87*	-0.2436	*-2.66*
	GFDI	PETCHEM	-0.0262	*-0.36*	-0.0209	*-0.17*	-0.3288	*-1.77*

	GFDI	Metals/Mechanicals	-0.0790	*-1.02*	-0.1937	*-1.67*	-0.5921	*-3.49*
	GFDI	Electr. Machinery	-0.0418	*-0.74*	-0.1916	*-1.76*	-0.1246	*-0.87*
	GFDI	Transport	-0.1369	*-2.16*	-0.1520	*-1.79*	-0.1504	*-2.09*
	GFDI	Other	-0.0140	*-0.30*	-0.2129	*-2.02*	0.0165	*0.14*
	GFDI	N.A.	-0.1096	*-2.49*	-0.5099	*-2.80*	-0.4835	*-2.76*
OECD	GINV	Food	0.0024	*0.75*	0.0107	*0.98*	0.0021	*0.70*
	GINV	Textiles/Wood	0.0656	*0.76*	0.0611	*0.72*	0.0621	*0.74*
	GINV	PETCHEM	-0.0114	*-0.52*	-0.0356	*-1.55*	-0.0115	*-0.55*
	GINV	Metals/Mechanicals	0.0340	*0.80*	0.0304	*0.72*	0.0390	*0.94*
	GINV	Electr. Machinery	-0.0061	*-0.16*	-0.0099	*-0.26*	-0.0079	*-0.21*
	GINV	Transport	0.0205	*2.06*	0.0694	*6.07*	0.0053	*0.54*
	GINV	Other	0.0165	*0.73*	0.0165	*0.56*	0.0159	*0.73*
	GINV	N.A.	0.0001	*0.43*	0.0002	*0.43*	0.0001	*0.40*
non-OECD	GINV	Food	0.0871	*1.79*	0.0894	*1.88*	0.0653	*1.37*
	GINV	Textiles/Wood	0.2782	*4.08*	0.2941	*4.39*	0.1707	*2.21*
	GINV	PETCHEM	0.0244	*0.32*	0.0309	*0.39*	-0.0168	*-0.21*
	GINV	Metals/Mechanicals	0.0222	*0.96*	-0.1423	*-1.00*	0.0247	*1.11*
	GINV	Electr. Machinery	0.0191	*0.36*	-0.1820	*-1.28*	0.0365	*0.61*
	GINV	Transport	-0.0119	*-0.51*	-0.0112	*-0.49*	-0.0093	*-0.42*
	GINV	Other	0.0078	*0.32*	-0.0502	*-1.35*	0.0093	*0.39*
	GINV	N.A.	0.0226	*0.23*	-0.1287	*-1.09*	-0.1182	*-1.02*
OECD	GEX	Food	0.0845	*1.83*	0.0862	*1.91*	0.0653	*1.45*
	GEX	Textiles/Wood	-0.0034	*-0.08*	-0.0028	*-0.07*	-0.0037	*-0.09*
	GEX	PETCHEM	0.0474	*1.44*	0.0320	*0.98*	0.0584	*1.37*
	GEX	Metals/Mechanicals	0.0546	*1.29*	0.0590	*1.42*	0.0231	*0.52*
	GEX	Electr. Machinery	0.0433	*1.00*	0.0420	*0.99*	0.0405	*0.96*
	GEX	Transport	0.0434	*2.26*	0.0356	*1.90*	0.0192	*1.02*
	GEX	Other	0.0544	*0.97*	0.0530	*0.97*	0.0519	*0.96*
	GEX	N.A.	0.0532	*3.81*	0.0524	*3.86*	0.0522	*3.88*
non-OECD	GEX	Food	0.0924	*1.88*	0.0711	*1.32*	0.0237	*0.43*
	GEX	Textiles/Wood	0.2713	*2.00*	0.1356	*0.88*	0.0979	*0.66*
	GEX	PETCHEM	0.0516	*0.51*	0.0508	*0.51*	-0.0143	*-0.14*
	GEX	Metals/Mechanicals	0.0470	*0.46*	0.0369	*0.37*	-0.3508	*-2.25*
	GEX	Electr. Machinery	0.1304	*0.82*	0.1618	*1.04*	0.1301	*0.83*
	GEX	Transport	0.1625	*2.88*	0.1569	*2.44*	0.1557	*2.43*
	GEX	Other	0.0385	*0.28*	0.0761	*0.56*	0.0433	*0.32*
	GEX	N.A.	0.0856	*0.80*	-0.0260	*-0.23*	0.0598	*0.58*
OECD	GFDI*INV	Food			-1.9754	*-0.82*		
	GFDI*INV	Textiles/Wood			0.4255	*0.30*		
	GFDI*INV	PETCHEM			3.7921	*2.70*		
	GFDI*INV	Metals/Mechanicals			1.7544	*0.91*		
	GFDI*INV	Electr. Machinery			0.5610	*0.37*		
	GFDI*INV	Transport			2.6011	*8.06*		
	GFDI*INV	Other			-0.0403	*-0.03*		
	GFDI*INV	N.A.			0.0119	*0.23*		
non-OECD	GFDI*INV	Food			0.6164	*0.96*		
	GFDI*INV	Textiles/Wood			0.7209	*1.68*		
	GFDI*INV	PETCHEM			-0.0521	*-0.09*		
	GFDI*INV	Metals/Mechanicals			1.7832	*1.19*		
	GFDI*INV	Electr. Machinery			1.5536	*1.52*		
	GFDI*INV	Transport			0.0841	*0.17*		
	GFDI*INV	Other			2.3358	*2.04*		
	GFDI*INV	N.A.			4.3883	*2.24*		
OECD	GFDI*EX	Food			0.035945	3.338	0.5302	*2.61*
	GFDI*EX	Textiles/Wood					0.0477	*0.43*
	GFDI*EX	PETCHEM					-0.0254	*-0.38*
	GFDI*EX	Metals/Mechanicals					0.1928	*1.87*

	GFDI*EX	Electr. Machinery					-0.0002	*-0.01*
	GFDI*EX	Transport					0.0414	*8.47*
	GFDI*EX	Other					-0.0170	*-0.19*
	GFDI*EX	N.A.					0.0001	*0.12*
non-OECD	GFDI*EX	Food					0.0373	*2.62*
	GFDI*EX	Textiles/Wood					0.1203	*2.63*
	GFDI*EX	PETCHEM					0.4566	*1.73*
	GFDI*EX	Metals/Mechanicals					1.3155	*3.23*
	GFDI*EX	Electr. Machinery					0.0301	*0.51*
	GFDI*EX	Transport					0.0338	*0.14*
	GFDI*EX	Other					-0.0272	*-0.35*
	GFDI*EX	N.A.					0.5878	*2.18*
	CONST		0.0371	*3.10*	0.0359	*3.34*	0.0412	*4.04*
	adjusted R-squared		21.04		25.96		27.37	
	Std. Error of Reg.		0.2179		0.2110		0.2090	
	Hausmann (p-value)		8.6063	*(0.736)*	6.1356	*(0.977)*	1.6470	*(0.990)*

Table A6: Results for CEECs, output growth.

Variable	**Industry**	**(1)**		**(2)**		**(3)**	
		Estimated Coefficient	***t-stat***	**Estimated Coefficient**	***t-stat***	**Estimated Coefficient**	***t-stat***
GFDI	Food	-0.1106	*-0.38*	-0.0928	*-0.48*	0.0963	*0.14*
GFDI	Textiles/Wood	0.2422	*0.85*	0.4370	*0.94*	0.1550	*0.33*
GFDI	PETCHEM	0.3134	*1.08*	0.4317	*1.81*	0.5576	*1.61*
GFDI	Metals/Mechanicals	0.0194	*0.09*	0.0775	*0.55*	0.2067	*0.86*
GFDI	Electr. Machinery	0.2079	*0.66*	0.1631	*0.76*	-1.9682	*-5.19*
GFDI	Transport	-0.1436	*-0.52*	0.4255	*0.50*	0.1183	*0.14*
GFDI	Other	-0.1025	*-0.59*	0.0479	*0.30*	0.2477	*0.75*
GFDI	N.A.	0.1740	*0.26*	0.3064	*0.62*	-3.3324	*-1.04*
GINV	Food	-0.1522	*-0.32*	-0.5219	*-1.36*	-0.4904	*-1.49*
GINV	Textiles/Wood	0.3869	*0.96*	0.4100	*1.04*	0.3007	*0.94*
GINV	PETCHEM	-0.0929	*-0.39*	-0.1783	*-0.56*	-0.0688	*-0.31*
GINV	Metals/Mechanicals	-0.1836	*-1.24*	-0.0132	*-0.06*	-0.1590	*-1.64*
GINV	Electr. Machinery	1.1298	*3.07*	-1.8919	*-3.64*	-0.7896	*-2.14*
GINV	Transport	0.1628	*0.74*	0.1997	*0.68*	0.1580	*0.61*
GINV	Other	-0.0642	*-0.24*	-0.1302	*-0.70*	-0.2409	*-1.02*
GINV	N.A.	-0.0957	*-0.27*	-0.4252	*-0.82*	-0.5031	*-1.42*
GEX	Food	0.3683	*0.37*	-0.3553	*-0.43*	0.0081	*0.01*
GEX	Textiles/Wood	-0.1759	*-0.19*	-0.4175	*-0.63*	-0.4591	*-0.65*
GEX	PETCHEM	1.6543	*4.10*	1.7357	*5.62*	2.1326	*5.85*
GEX	Metals/Mechanicals	0.9693	*2.33*	0.8867	*3.01*	2.3903	*1.59*
GEX	Electr. Machinery	2.4285	*4.99*	-0.3953	*-0.73*	-0.2461	*-0.48*
GEX	Transport	1.1928	*4.63*	0.7279	*0.95*	1.0722	*1.86*
GEX	Other	0.2385	*0.26*	-0.0907	*-0.15*	-0.2643	*-0.43*
GEX	N.A.	-0.8756	*-0.58*	-1.0341	*-0.96*	-1.1854	*-1.19*
GFDI*INV	Food	-0.0519	*-1.23*	3.4453	*1.16*	-1.45954	-0.3624
GFDI*INV	Textiles/Wood			0.3939	*0.27*	0.175519	0.377
GFDI*INV	PETCHEM			-0.0220	*-0.04*	-0.610741	-0.8334
GFDI*INV	Metals/Mechanicals			-0.5210	*-0.78*	-0.744502	-0.9023
GFDI*INV	Electr. Machinery			31.5396	*6.52*	5.44853	6.8538
GFDI*INV	Transport			-0.0509	*-0.55*	-0.026035	-0.2912
GFDI*INV	Other			-0.5401	*-1.28*	-0.502574	-1.2966
GFDI*INV	N.A.			2.0652	*0.62*	6.95777	1.1916
GFDI*EX	Food					-1.4595	*-0.36*
GFDI*EX	Textiles/Wood					0.1755	*0.38*
GFDI*EX	PETCHEM					-0.6107	*-0.83*

GFDI*EX	Metals/Mechanicals					-0.7445	*-0.90*
GFDI*EX	Electr. Machinery					5.4485	*6.85*
GFDI*EX	Transport					-0.0260	*-0.29*
GFDI*EX	Other					-0.5026	*-1.30*
GFDI*EX	N.A.					6.9578	*1.19*
CONST		-0.0519	*-1.23*	-0.0917	*-2.95*	-0.0995	*-2.39*
adjusted R-squared		96.08		98.32		97.73	
Std. Error of Reg.		0.1812		0.1182		0.1379	
Hausmann (p-value)		0.4818	*(0.786)*	3.0843	*(0.379)*	4.7035	*(0.319)*

Tabelle A7: Results for CEECs, productivity growth.

Variable	**Industry**	**(1)** **Estimated Coefficient**	***t-stat***	**(2)** **Estimated Coefficient**	***t-stat***	**(3)** **Estimated Coefficient**	***t-stat***
GFDI	Food	-0.1924	*-0.94*	-0.0409	*-0.05*	-0.1859	*-0.86*
GFDI	Textiles/Wood	-0.0250	*-0.12*	-0.1949	*-0.36*	-0.0919	*-0.18*
GFDI	PETCHEM	0.2150	*1.02*	0.2081	*0.53*	0.2814	*0.98*
GFDI	Metals/Mechanicals	-0.0257	*-0.17*	-0.0712	*-0.26*	0.0488	*0.29*
GFDI	Electr. Machinery	0.0274	*0.12*	-0.8196	*-1.93*	0.1154	*0.45*
GFDI	Transport	0.0155	*0.08*	0.2133	*0.23*	0.3609	*0.35*
GFDI	Other	-0.1583	*-1.28*	-0.0159	*-0.04*	-0.0017	*-0.01*
GFDI	N.A.	0.6219	*1.33*	-4.6172	*-1.28*	0.6881	*1.29*
GINV	Food	-0.2200	*-0.65*	-0.4547	*-1.22*	-0.5524	*-1.39*
GINV	Textiles/Wood	0.2052	*0.73*	0.0841	*0.24*	0.0430	*0.10*
GINV	PETCHEM	0.0831	*0.49*	-0.0337	*-0.13*	-0.1942	*-0.56*
GINV	Metals/Mechanicals	-0.0890	*-0.85*	-0.0903	*-0.83*	-0.0472	*-0.22*
GINV	Electr. Machinery	0.6359	*2.35*	-0.2323	*-0.56*	-0.5876	*-1.06*
GINV	Transport	0.2297	*1.46*	0.1869	*0.64*	0.1820	*0.55*
GINV	Other	0.0983	*0.51*	-0.0486	*-0.18*	0.0165	*0.08*
GINV	N.A.	-0.5190	*-2.00*	-0.9550	*-2.43*	-0.9767	*-1.81*
GEX	Food	0.1703	*0.24*	-0.0665	*-0.09*	-0.6158	*-0.63*
GEX	Textiles/Wood	-0.0734	*-0.11*	-0.5096	*-0.64*	-0.2419	*-0.32*
GEX	PETCHEM	1.0602	*3.73*	1.1006	*2.75*	0.9970	*3.04*
GEX	Metals/Mechanicals	0.4517	*1.50*	-0.0156	*-0.01*	0.3919	*1.11*
GEX	Electr. Machinery	0.6559	*1.86*	-0.2993	*-0.52*	-0.4435	*-0.75*
GEX	Transport	0.2093	*1.16*	0.0921	*0.14*	-0.0595	*-0.07*
GEX	Other	0.1131	*0.17*	-0.2497	*-0.37*	-0.1581	*-0.24*
GEX	N.A.	-2.1336	*-2.09*	-2.5123	*-2.31*	-2.4141	*-2.16*
GFDI*INV	Food			-0.9666	*-0.22*		
GFDI*INV	Textiles/Wood			0.3004	*0.57*		
GFDI*INV	PETCHEM			0.2388	*0.29*		
GFDI*INV	Metals/Mechanicals			0.3100	*0.34*		
GFDI*INV	Electr. Machinery			2.2364	*2.54*		
GFDI*INV	Transport			-0.0130	*-0.13*		
GFDI*INV	Other			-0.2238	*-0.52*		
GFDI*INV	N.A.			9.8716	*1.49*		
GFDI*EX	Food					3.5140	*1.09*
GFDI*EX	Textiles/Wood					-0.5540	*-0.35*
GFDI*EX	PETCHEM					0.3667	*0.57*
GFDI*EX	Metals/Mechanicals					-0.0757	*-0.11*
GFDI*EX	Electr. Machinery					12.6335	*2.47*
GFDI*EX	Transport					-0.0242	*-0.22*
GFDI*EX	Other					-0.5354	*-1.09*
GFDI*EX	N.A.					2.9893	*0.84*

CONST	0.0754	*1.19*	0.0401	*0.70*	0.0351	*0.57*
adjusted R-squared	75.33		77.6		77.27	
Std. Error of Reg.	0.2251		0.2137		0.2168	
Hausmann (p-value)	0.5334	*(0.912)*	1.6140	*(0.899)*	7.8629	*(0.164)*