

Foreign Direct Investment: *What is the effect on the host country?*

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Abstract.

In this paper we examine the effect of foreign direct investment on real GDP per capita of host countries and economic areas while controlling for several variables that are deemed highly correlated with economic development. Using country and cross country data in our empirical analysis, we find evidence for an increased per capita income as a result of the inflow of FDI and that factors like human capital, economic freedom and the development of the banking sector play an important role in the influence of FDI, although these effects change slightly when we take account for country specific effects.

Keywords: foreign direct investment, GDP per capita, human capital, secondary schooling, openness, economic freedom, free trade, bank credit, Fraser index

Master Thesis

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1. Introduction

Foreign direct investment has become an increasingly important phenomenon in the last couple of decades. Where many have tried to derive a relationship between the amount of FDI a country receives and the effects of this inflow on the host country, findings vary. Some conclude that there is no relationship or a mildly negative influence of FDI on a country's growth, though many researchers agree that FDI has positive influences if the receiving country meets a couple requirements that cause FDI to become 'useful'. Most important factors are human capital (see Borensztein *et al.* 1998), a well developed financial market (see Alfaro *et al.* 2004) and a country's openness to trade (see Balasubramanyam *et al.* 1996). The stock of human capital, financial markets and openness thus effectively limits the absorption capabilities of a country.

The relationship is not always as clear as it would be expected, for example Chowdburry and Mavrotas (2003) show that in case of Chile it is in fact GDP that causes the inflow of FDI into the country and not vice versa. Though Chile is a special case, country growth can be most appropriately explained as a bidirectional causality, where FDI influences GDP and GDP influences FDI. It is intuitive that a country with a relative large amount of GDP would attract FDI because it is more likely that a multinational would be able to use the local market to sell their products. This being one of the explaining factors, a company can have many reasons as too why it would invest in a certain country, e.g. a small country with a relative low amount of GDP could be attractive for natural resources or cheap labor.

Many countries try to attract FDI by giving numerous versions of tax reductions, exemptions of tariffs or granting subsidies. Despite FDI being fairly sensitive for host country characteristics, some of the concessions made to attract multinationals are quite large. Harrison and Rodriguez (2009) discuss a situation where the state Alabama paid Mercedes-Benz \$150.000 per employee if Mercedes-Benz would decide to locate their plant to their state. Other examples are Germany offering AMD investment subsidies in 1995 and Turkey attracting Honda by lowering tax rates on new production plants for the automobile industry while at the same time lowering import tariffs on car parts in 1998 (see Hanson 2000). Although this might be partially explained by politicians, specifically the host country

politicians, who can claim to be responsible for creating new job opportunities for their own political agenda. It certainly suggests that attracting multinational companies is likely to be in favor of the receiving country.

Stating FDI is most likely favorable for a country is backed up by a large array of literature, Martins and Esteves (2007) show that foreign multinationals are willing to pay wages as much as 50 percent higher than their domestic counterparts. Although some critique has led to corrections of this number controlling for circumstances like firms size, still leaving a respectable 5 to 10 percent, according to Harrison and Scorse (2004). Though one could claim that controlling for, in this case, firm size is irrelevant. If domestic employees receive a higher wage because the multinational firm is larger than the domestic companies, then the workers are still better off in this case, following argumentation of Lipsey (2004).

Well over half of all private capital flows to developing countries is accounted for by foreign direct investment since 2007, while foreign capital remains in limited supply.¹ This alone makes FDI a very interesting subject in the field of growth and development economics. It is to be expected that these relatively major streams have a significant impact on the receiving country, may it be via technological progress gained by trading between the domestic market and the multinational company, the increased demand for human capital or simply the broadening of the existing market.

In this paper we will examine empirically whether there are signs of increased GDP per capita in countries that receive FDI. While specific countries can be very important for multinationals as an investment opportunity, it can be very interesting to see whether FDI has an impact on larger groups of countries and economic areas as well. Including the effect of human capita, financial markets and openness to trade as attractive factors for the inflow of FDI and to see whether these factors show positive effects for the absorption capabilities of FDI for the host country. In order to examine these effects we constructed the following hypotheses:

H1: Secondary schooling, bank credit and the EFW² variables are important factors that condition the environment for the effect of foreign capital on the host country.

¹UN conference on trade and development; World Investment Report 2009, Chapter 1, page 5 and Alfaro et al. (2004)

² The Economic Freedom of the World variables, which are more thoroughly explained in the data section and appendix B. In short the variables range from 0 to 10, with 10 being the best score.

H2: FDI causes an increase in GDP per capita in the host country.

H3: FDI causes an increase in GDP per capita in large economic areas like the EU or Asia.

Furthermore we will shortly elaborate on the thriving force behind foreign direct investment. Multinational firms base their investment decision on a variety of arguments like trade barriers or factor differences and e.g. attractive tax reductions or subsidies for locating in a specific area. FDI can be driven by market insecurities which can be reduced via vertical or horizontal expansionary investment. This may greatly diminish the risk a firm generally takes while being active in a certain market and very likely increase their profitability. Currently a significant amount of world trade takes place as intra-firm trade.³

The definition of FDI which will be used in this paper, as stated by the World Investment Report (2009, p. 243) is as followed: “An investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy in an enterprise resident in an economy other than that of the foreign direct investor. FDI implies that the investor exerts a significant degree of influence on the management of the enterprise resident in the other economy. Such investment involves both the initial transaction between the two entities and all subsequent transactions between them and among foreign affiliates, both incorporated and unincorporated. FDI may be undertaken by individuals as well as business entities.” Foreign direct investment consists of three aspects; equity capital, reinvested earnings and intra-company transactions.

In section 2 we will briefly mention important factors that play a role in the decision making process that precedes flows of foreign direct investment. Followed by section 3 where we give an extensive overview of the literature related to FDI and economic development. In section 4 we discuss the variables that are used in several specifications in order to explain the effect of FDI. This is followed by section 5 where we present our models and results considering the single country effects and the effects on economic areas. Section 6 presents possible causality issues and measures we took to control for these factors, followed by the conclusion.

³ See Roy and Viaene (1998), they state that around 30 to 35 percent of world trade exists of intra-firm trade.

2. What Thrives Foreign Direct Investment?

2.1 Exchange Rate and Tariffs

It is interesting to discuss which factors cause the streams of FDI into various countries. While there can be several reasons as to why a firm chooses to invest, only the most important factors will be mentioned, starting with exchange rates and tariffs.

Generally a firm will try to avoid as much risk as possible, to do so in relation with exchange rate risk there are basically three important options, namely; the usage of a forward market, trade in local currency or only trade with countries using the same currency. Though it must be noted that the latter is unlikely to occur when there are positive investment opportunities related to a certain country, a forward market seems the superior option when there are possible profits. The use of a forward market is common, while it is a useful tool for multinationals when trying to avoid small fluctuations in the exchange rate, thus eliminating some unwanted risks, it can be very expensive to hedge when your trading between e.g. the Netherlands and Israel.

A firm may conclude that it is more profitable to invest in a particular target area, where they could open a foreign plant, giving them a broader window to avoid exchange rates. Trading in local currency solves most of the unwanted exchange rate risk. If the multinational is able to subtract its liquidity from the local financial market while the domestic market is able to supply the input needs as well then there is no more need to continuously hedge your contracts. This suggests that FDI may be a valid way to increase profit or avoid unwanted risks.

Tariffs can be avoided in a similar way, namely investing in a foreign plant, effectively eliminating the effect of a barrier. Feenstra *et al.* (2009) show that for the US improvements in the terms-of-trade and tariff reductions account for 0.2 percent of a year's productivity growth between 1995 and 2006, which is roughly 20 percent of the growth in this period. This was especially apparent for information-technology products. There are considerable gains for multinationals to invest in countries with improving or better than average terms-of-trade and tariffs. Though the effect of these barriers have become less significant over the last years. Harrison and Rodriguez-Clare (2009) discuss the decline of barriers over the last decades. They find that these average trade barriers have been declining rapidly, especially

those in developing countries. Though this is easily explained by the fact that most developing countries used to imposed high tariffs on trade not too long ago while the developed countries had relative low barriers for decades. Data from the World Bank⁴ supports this finding, world tariffs have declined from 26,3% in 1986 to 8,6% in 2009, with currently Europe on 1,6% and OECD countries on 2,9%.

2.2 Factor Differences

Investment abroad can be caused by factor differences in factors like labor or capital. It can be very expensive to produce labor intensive goods in high income countries and producing capital intensive goods or services may be tricky in lower developed countries for reasons like lack of technological knowledge. Cheap labor, for example, is mostly found in underdeveloped countries, or countries where there is an abundance of labor. Examples, among many, are the clothing industry in China or the enormous amount of call centers in India. While multinationals tend to be located in developed countries, it is clear that many try to reallocate their most labor intensive production processes to developing countries. Though it is very common that companies keep their headquarter in the home country, this part of the production is very capital intensive and does not save enough money to relocate it abroad.

2.3 Mergers, Acquisitions and Competition Pressure

Mergers and acquisitions involve a large flow of capital and are expected to recover from the past financial crisis, amounting on an estimated 3 trillion dollars for 2011.⁵ Suggesting many internationally operating firms have come into contact with acquisitions or mergers during their existence. Often it is increased profitability or market power that lies behind these decisions. Generally we distinguish between Horizontal and Vertical mergers and acquisitions. Horizontal M&A's are typically a case of increasing market power via firm size or increasing profit via large scale productions. The combination of both cause the firm to become a stronger competitor in the specific market. The same goes for vertical M&A's considering profitability, though it's not so much a case of increasing the scale of production.

⁴ Data is provided by Francis K. T. Ng, Trade Researcher (2009)

⁵ See article on www.dailyfinance.com; M&A Activity Expected to jump 36% in 2011, by Dawn Kawamoto.

Vertical mergers eliminate a double margin on products, called double marginalization⁶, because two production steps are now controlled by the same company, rather than the previous single step. Besides the double marginalization it also reduces some of the firms risk considering input and output of products. When a firm merges with an upstream company it reduces or eliminates the risk of the loss of input suppliers.

These M&A's have a second important effect on the market, namely pressuring competing firms. The horizontal merge is quite straightforward, it increases similar output and most likely makes production more efficient due to the larger scale. Giving an edge over the competition and the possibility to compete with lower prices. A vertical merger is perhaps somewhat more complex. The concept is that a market consists of a limited amount of manufacturers (m) and retailers (r) and both try to obtain as much profit as possible. This quest for profit leads both firms to set their optimal prices, where the retailer is effectively forced to pay the manufacturer's profit margin. This leads to a sub-optimal situation and a situation where more profit can be earned by merging or acquiring the other firm, stimulating, in case of supply from a foreign plant, FDI.

When a manufacturer merges with a retailer the market remains with $(m-1)$ manufacturers and $(r-1)$ retailers and the merged firm. Since the manufacturers have less competition, prices of their output will rise slightly, making it harder for the retailers to buy their input products. Summarizing, the first effect is the increased competition with the merged firm via a possible lower final good price and increased output set by the merged firm and secondly the input price of the final good product has increased due to increased market power of the manufacturers. In this case firms that haven't merged may feel forced to do so, lowering its production costs as well. This explains partly why competing firms often invest in the same areas, trying to keep competition and market power strong and more importantly, not falling behind the competition.

What should not be forgotten is that improving efficiency through technological progress or innovation is closely connected with mergers as well. Though it's also, and perhaps more importantly, caused by research and development, creating a stronger market position for the multinational. Multinationals are generally more technologically advanced than national firms, allowing them to operate on a variety of markets where national firms lack.

⁶ Double marginalization is further explained in the appendix

3. Literary review

3.1 Foreign Direct Investment

Many countries promote FDI, though it is not entirely clear whether this is justified. The expectation is that foreign owned firms are more advanced than domestic firms and thus via several spillover possibilities increase domestic firm productivity. Hanson (2001) investigates which measures are used by countries to attract FDI and comments on whether it is justified to tip incentives in favor of foreign owned firms. He evaluates three cases, consisting of Ford, General Motors and Intel, where he finds that countries or local governments are prepared to pay large sums of money in order to attract or persuade these firms to open a plant in their area. GM, for example, was subsidized for 250 million dollars and received a tax break which is estimated on 1.5 billion dollars over a period of 15 years, if they decided to build their new production plant in Rio Grande do Sul, Brazil. Hanson finds that the most common policies to promote FDI are exemptions or reductions for taxes and import tariffs as well as 'case-by-case' based subsidies.

European examples of countries that actively attracting FDI are Portugal in relation to Ford and Volkswagen in 1991, providing subsidies and partial tax exemptions, Ireland with subsidies for Citibank and IBM in 1995 and Germany giving subsidies as well in 1995 to AMD, for building a plant in Saxony. Hanson finds that from 1990 to 1998 many countries lowered their corporate tax rates in order to allow more inflow of corporations.

In order to increase the benefit from FDI spillovers, Alfaro (2003) argues that it is better to attract investments for specific sectors. He shows that there is a large difference in the effect of FDI depending whether it is invested in the manufacturing, service or the primary sector. Although evidence for the service sector is unclear, he shows that foreign direct investment in the primary sector has a clear negative effect, while FDI in the manufacturing sectors is clearly positive for growth.

Chandra (2006) shows that countries that are technologically behind on developed countries have the possibility to leapfrog over a number of development stages. They have the ability to do so by attracting FDI into sectors from which one would expect the most technological spillover to domestic firms, arguing that firms only innovate or adapt technology in a competing environment, not because the government has granted them

access to research and development facilities. She studies ten cases and argues that higher skilled workers are an important factor in understanding the technological advancements. While attracting FDI is important for the adaptation of technology, timing, location and initial conditions are just as important.

Alfaro and Charlton (2008) follow with a paper on the quality of FDI, where they use the term quality to distinguish the effect of one unit of FDI on economic growth. They find that the specific growth effect, caused by FDI, is increased when they consider the quality measure of the respective investment. Similar to Chandra (2006), they state that industries with a higher skill prerequisite exhibit a stronger growth effect from FDI. Though they add that this is also the case for industries that rely more heavily on external capital, concluding that industry level FDI causes relatively higher growth in added value. FDI seems to cause increased growth and their evidence suggest, as they mention themselves as well, that financial development and human capital are important factors, factors from which a country should benefit when they are on the receiving end of foreign direct investment.

Human capital is an important factor considering the effectiveness of foreign direct investment. According to Barro and Lee (1994), human capital is the single most significant variable correlated with growth, and use for this their measure of male secondary schooling attainment. Borensztein *et al.* (1998) investigate FDI as a channel for technological transfer, his results suggest that the growth caused by technological spillover is even greater, relatively speaking, than the growth caused by domestic investment. Though importantly this only holds when there is a certain minimum level of human capital present, stating that the level of education effectively limits the 'absorptive capabilities' of the country. He finds that countries that possess a very low level of human capital may experience negative effects from the inflow of FDI, while countries with a sufficient amount of human capital will experience positive influences. While some countries can exhibit negative impacts from FDI, the overall effect on economic growth in general is positive.

Considering financial markets Borensztein *et al.* (1998) found evidence for a crowding-in effect from the presence of multinationals, supportive for the findings of Alfaro *et al.* (2004). Alfaro investigates whether countries are better off with a well-developed financial system with respect to profiting from FDI and shows some robust evidence supporting his case. Very similar to the human capital concept, Alfaro finds that countries require a certain level of development in local financial markets in order to fully benefit from

FDI. He argues that a low developed financial sector is unable to cope with a large amount of short term cash flows and that long-term profits might not be realized as well. Their evidence shows that FDI positively affects a country's growth under the assumption that local financial markets are well enough developed in order to handle the large foreign investment inflows.

Bengoa and Sanchez-Robles (2003) stress the importance of an open economy in order to allow an improved inflow of FDI. They find a positive relation with foreign direct investment and the economic growth of the host country and show evidence that openness or economic freedom is a strong and positive determinant for FDI inflow. Although they found openness to be an important factor in respect to a country's growth they mention that it is also very important to have respectable levels of human capital, stability and financial markets in order to obtain benefits from FDI. Other than Hanson (2001), Bengoa and Sanchez-Robles (2003) are very positive about policymakers stimulating FDI, pointing out the importance of economic and political stability as well as the benefits of a market-oriented setting, concluding that improving openness to trade is a key factor in economic growth and should consequently be a priority of the particular country's politicians.

Although many researchers agree that under the right circumstances FDI is a positive factor for economic growth, evidence is not completely clear whether FDI is causing growth specifically or growth is causing, in other words attracting, FDI. Alfaro *et al.* (2004) present evidence that the relationship between FDI and growth is causal, where FDI is the factor causing growth. Chowdhury and Mavrotas (2006) beg to differ with their research on FDI and growth causality. They investigate three countries, namely Chile, Malaysia and Thailand, and find a bi-directional effect for Malaysia and Thailand. Though for the case of Chile it seems that GDP is causing the inflow of FDI. Furthermore, Carkovic and Levine (2002) conclude in their research on the relationship between FDI and economic growth that there is no robust evidence of foreign direct investment having a significant influence on the economic growth of a country on its own. Though this should be interpreted carefully, the fact that they do not find significant evidence of FDI independently causing an increased growth effect does not on itself mean FDI does not cause growth. They argue in their paper that FDI is likely to be a means of technological transfer, which on itself is a determinant of growth, and that FDI goes 'hand-in-hand' with economic growth, fitting nicely with the

importance of a necessary stock of growth determinants like human capital, a functioning financial market and an open economy.

3.2 Productivity and Spillover

Technological transfer is deemed to be one of the primary factors in relation to possible spillovers, potentially increasing domestic firm productivity. Aitken and Harrison (1999) wrote a paper about the transfer of technology and the increased productivity this created in the Venezuela manufacturing sector. They found a so called 'own-plant' effect, which stands for a typical joint venture where one part of the equity is held by foreign investors and the other part is held by the former plant owners. Interestingly, this own-plant effect only held for small firms up to 50 employees. Testing the effects of foreign participation in a large plant's production process showed no robust positive effects after controlling for plant specific characteristics. Although the overall effect on the economy is small, evidence showed this was in fact positive. Nevertheless domestic firms tend to show a negative impact of FDI as a result of the increasing foreign competition, suggesting joint ventures were capturing the complete positive effect of the investments. Though an explanation for these findings is that multinationals tend to invest in relatively more productive plants, also called 'picking winners'. This would explain the remaining firms becoming less productive on average, because the previously more productive firms were now changing into joint ventures. Aitken and Harrison (1999) conclude that the positive effects exceed the negative effects, stating that FDI is beneficial for the country as a whole, though they were unable to identify technological spillovers to domestic firms.

While Aitken and Harrison (1999) did not find evidence for technological spillover it should be considered that certain advantages in the production process are not supposed to be shared with domestic firms. Many advanced processes are kept secret in order to maintain a dominant market position. Javorcik (2004) explains the effects of horizontal, forward and backward spillovers and elaborates on the intuitive argument that knowledge, in other words spillovers, is not shared with competitors. She uses data from Lithuania and finds in her analysis that productivity spillovers, as a result from FDI, are positive. These spillovers are caused by connections between foreign affiliates and the local suppliers in upstream sectors, where data shows that joint ventures allow the foreign investor to easier participate in the domestic market. The ease of using the existing domestic market offers

large cost reductions compared to fully foreign owned enterprises. Data shows that joint ventures experience productivity increases, opposed to fully foreign owned firms, these do not show significant evidence for increased productivity. From this perspective it is understandable that policy makers tend to prefer joint ventures to fully owned foreign enterprises, which is quite evident in the Chinese firm policies. Lastly Javorcik (2004) mentions that she did not find any evidence for inter-sectoral spillovers, which is consistent with other firm-level studies, and that multinational presence does not seem to cause spillovers in sectors that supply intermediate input factors.

Considering Chinese joint ventures, Rodrik (2006) investigates the Chinese policy to only allow foreign investors into the domestic market if they form joint ventures with domestic enterprises. The key reasoning behind this policy is that the government wants to create technological transfer in important economic sectors, which are areas where they believe the country can gain many positive spillover effects, like electronics, which is quite noticeable since these products are associated with much higher productivity levels than one would expect from a country at the level of income that China is in right now. Rodrik finds that joint ventures, compared to the rarity of fully foreign owned firms or the more common domestic firm, are significantly more productive. Productivity growth of the Chinese joint ventures is not only higher, the growth level and the effect on state owned enterprises is higher as well⁷, suggesting that the combination of foreign investors and strong domestic companies is a very interesting growth opportunity for the Chinese economy. The Mckinsey Global Institute stated that, “the international companies’ interaction with domestic companies has created a genuine global success story”.⁸

Arnold and Javorcik (2006) investigate the effect these productive joint ventures have on the service side of the economy and attempt to find a robust spillover relationship with manufacturing firms that use these services as a production factor. They use data from the Czech Republic on the reform of the service sector and the downstream manufacturing sector, where evidence suggests that partly foreign ownership will cause additional spillovers to the manufacturing sector when compared to domestic firms. Stating that barriers to trade are more extensive on services, rather than goods, it may very well be economically attractive to relieve these barriers in order to benefit from potential

⁷ See Du, Harrison and Jefferson (2008)

⁸ McKinsey 2003, China consumer electronics summary, page 79.

productivity gains. Predicting what impact increased foreign activity in the service sector would mean for the manufacturing sector, Javorcik elaborates on three key points where the manufacturing sector would gain benefits. First, the reliability and quality of services will improve, second; new forms of services due to experienced 'service providers' entering the market and third; a more extensive availability of services due to a larger spread. Finally concluding that there is a strong and significant impact of service reforms on manufacturing plants that use these services as an input factor and that foreign investment is the most important factor for the increase in productivity in the downstream manufacturing sector.

The productivity increase in joint ventures makes a strong case for government policy to encourage foreign direct investment in specific sectors. Also considering technological spillovers, Chandra and Kolavalli (2006) find that these factors have played a significant role in the development of strategic policy to attract FDI. Alfaro and Charlton (2008) confirm this statement, investigating which sectors are most likely to be targeted by FDI policy and find that machinery, computers, telecommunications and transport equipment are the most important sectors for FDI policy inflow. These sectors show an increased inflow of foreign investments as well as increased growth rates caused by partly foreign ownerships, which was expected since governments target sectors that are believed to generate large amounts of positive externalities.

Besides the positive points mentioned in the above paragraphs, it should also be noted that promotion of FDI may cause more harm than benefit in some situations. Pack and Saggi (2006) state that in some cases spillovers are not nearly high enough to justify the amount of fiscal policy that some countries offer. In certain situations strong domestic firms may fall behind due to unfair policy, e.g. tax exemptions and investment incentives, in favor of their competing foreign multinational, while without these policies they would have the potential to become market leaders in the respective country. Policy to attract FDI should therefore be carefully evaluated before it is introduced with good intentions into specific sectors.

3.3 Foreign Firm Wages

A large amount of literature investigates the effect of FDI on the respective wage a worker receives and whether they benefit from the presence of multinational firms via wage increases, relative to domestic company wages. Earle and Telegdy (2007) use linked

employer-employee data from Hungary to investigate the relationship between the wage a worker receives and the type of ownership of a company. They find large wage differences between foreign owned firms and domestic corporations, which can be as large as 40%. Interestingly they found a wage difference of 24% between public and private sectors as well, in favor of the private sector. The results are quite similar to the findings of Martins and Esteves (2007), they investigated Brazil, finding higher wage rates for multinationals going as far as 49,8%. Although at first this seems exciting, it has to be taken into account that part of these higher wages are caused by firm specific factors. Controlling for these firm characteristics like specific industry, employment size and productivity, Early and Telegdy (2007) find that the increased wages are now 28% higher, which is still quite considerable for foreign firms. Although adding unobserved firm fixed effects, this increase drops to 7%. Concluding that most of the wage difference is caused by differences in firm specific factors and differences in workers, though that the results show statistically significant higher wages for foreign owned firms.

One could argue that it is not relevant for policy decision, when speaking of attracting FDI, to consider controlling for firm specific effects like employment size. Lipsey and Sjolholm (2004) argue that it does not make sense to control for firm specific factors like firm size, since whether increased wage is caused by this factor or not, workers still benefit from higher wages which they would not have received from the domestic companies. This would bring the results of Early and Telegdy (2007) up to a 34% wage increase for foreign firms compared to domestic wages, not considering unobserved effect. Although researchers generally agree that significant differences are found after controlling for all characteristics, which means that foreign owned firms generally pay a wage premium as high as 10%.

Interested why foreign firms tend to pay higher wages than their domestic counterparts, Harrison and Scorse (2008) find that foreign firms are more willing to increase wages under pressure from labor forces compared to domestic firms. Investigating the Indonesian anti-sweatshop campaign in the 90's they find that, apart from the minimum wage increase, production worker wages increased as much as 30%. Seemingly domestic firms are more prepared to fight domestic campaigns or government proposals for increased wages than the average multinational company.

3.4 Local Financial Market

Foreign firms increasingly use local financial markets in order to borrow their needed capital and to avoid fluctuating exchange rates. While this is good news for the financial markets, it raises concerns for domestic enterprises. Problems may arise when the respective domestic firms are 'crowded out' of the financial market due to increasing interest rates caused by increased demand. Harrison and McMillan (2001) and Harrison *et al.* (2002) investigate whether the presence of multinational demand on local financial markets causes a crowding out effect for domestic firms. Where Harrison and McMillan (2001) focus on a single country, namely Ivory Coast, and find a negative effect of multinational presence on the lending possibilities of domestic firms. This is explained by the difference in financial constraints between foreign owned firms and domestic companies, where foreign firms can borrow at a lower rate because of a general higher profitability. Though it has to be taken into account that Ivory Coast exhibits many market imperfections, which are effectively increased by FDI.

Harrison *et al.* (2002) show quite different results. They investigate numerous countries on their sensitivity of FDI inflows, specifically the effect this has on the financial constraints for multinationals and domestic firms. FDI seems to have a positive effect on countries considering the ease of lending, as well for foreign as domestic firms. The initial investment, which was also positively related to borrowing money in the previous paper, has a positive effect on financial constraints. This is followed by an actual crowding in effect of domestic firms in local financial markets because the credit availability for domestic firms actually increased due to the multinational presence and investments.

The most important factor whether FDI will cause a positive effect for domestic firms in relation to local financial markets, thus crowding in domestic firms, is a more developed financial system located in a less wealthy country. It is very important for countries to have a solid financial market in order to let domestic firms benefit from the FDI inflows. Interestingly, foreign owned firms do not benefit from FDI flows into the respective country, only pure domestically owned firms are the ones to benefit from financial market improvement after the inflow of FDI. Considering wealthier countries, Harrison *et al.* show that domestic firm benefits only hold until a certain level of 'quality' of financial market development and wealth is reached. Investigating this for G7 countries it does not show a significant difference in financial constraints as an effect of foreign direct investment.

Other papers confirm these findings, Alfaro *et al.* (2004) show robust results that countries with a well developed financial system gain significantly more than others, where some even exhibit negative influences as a result of imperfections in the financial market. Borensztein *et al.* (1998) find evidence for this as well, stating that a crowding in effect is apparent over his industrial country database, though not robust with the inclusion of his control variables.

4. Data

In this section we will discuss the data and specifications of the empirical model. Data for the model is gathered from various databases as an attempt to include the best explanatory variables as mentioned in the introduction and throughout the literary review.

GDP per capita

This is the dependent variable used in our empirical model. To remain in line with current literature on the subject we will use real GDP per capita.⁹ Data is gathered from the World Development Indicators database (WDI) and is available for the period 1960-2008.

Foreign Direct Investment

We consider two variables as a measurement of FDI, namely FDI_{icttw} and inward FDI_{stock} . '*FDI in comparison to the world*', referred to as ' FDI_{icttw} ' consist of net FDI inflow data, country GDP and world GDP, which is taken from the WDI database. The variable is constructed in the following manner:

$$FDI_{icttw} = \frac{\frac{FDI_i \text{ inflow}}{GDP_i}}{\frac{FDI_w \text{ inflow}}{GDP_w}} \quad (4.1)$$

where the subscripts i and w represent the specific country and the world as a whole consecutively. Data for this measurement is available for the period 1970-2009. Expectations are that FDI_{icttw} will have a positive effect on the dependent variable, which is likely to show large coefficients for countries that receive relatively more FDI than others. Meaning that when a country receives a more than average inflow of FDI, giving a FDI_{icttw} value of more than 1, a relatively large positive effect on real GDP per capita is expected.

'*Inward FDI_{stock}* ' is used as a more stable measure of FDI since it reacts less volatile to changes in FDI inflows compared to other measures of FDI. Inward FDI_{stock} is taken from the UNCTAD database and is available for 1980-2009. The expected effect of this variable is

⁹ There are many examples of articles using real GDP per capita, see Borensztein *et al.*(1998), Alfaro *et al.* (2004) and Earle and Telegdy (2007).

roughly similar to the FDI_{icttw} variable, namely the higher FDI_{stock} gets the larger the positive effect of FDI becomes. Since this variable is more stable we anticipate to see a larger amount of countries with a significant effect from FDI_{stock} , though the absolute effect might be more subtle.

Human Capital

As a proxy for human capital we use the average years of secondary schooling that the population of a country attended, aged 25 years and older. Secondary schooling is used for its significance in research related to economic growth.¹⁰ Data is available on the World Development Indicators database. It is expected that this proxy for human capital shows highly significant and positive results for intuitive reasons as well as that a large array of literature containing the same or comparable variable consistently finds positive effects of schooling.

Population Growth

Population growth is added to correct for possible influences from an increase or even a decrease in population on per capita income. Influence of this variable is expected to be more important for developing countries, since these are more likely to exhibit larger growth rates and thus are more likely to show evidence of a large impact on GDP. In most cases we anticipate to see a clear negative effect of population growth on per capita income.

Financial Market

As a proxy for the development of the financial market in a country we will use the domestic credit provided by the banking sector as percentage of GDP.¹¹ The variable includes all credit provided by the banking sector to domestic recipients. This variable may be more relevant for countries that have a credible banking sector and is likely to show insignificance for countries with a lacking financial system. It is expected that countries with a positive amount of credit provided by the banking sector start showing a positive influence on GDP per

¹⁰ Evidence for this statement is found in Barro and Lee (1994), where they conclude that the secondary schooling variable is the one most significantly correlated with growth.

¹¹ Alfaro (2004) uses a similar variable to proxy for financial markets.

capita. Nearly all countries included in the dataset show a positive amount of banking credit provided to the domestic sector, thus overall this variable should have a positive effect.

Openness to Trade¹²

Data for the representation of economic freedom are taken from the Fraser Institute and are based on a variety of factors.¹³ The EFW (Economic Freedom of the World) index has several interesting variables which we will use in our model. The variables mentioned below are ranked between 0 and 10, with 0 as the worst possible rating and 10 as the best. First we have *'Size of the Government'*. The size of the government can be an important factor for the economy as a whole and may attract or repel FDI. A large government can have considerable influence via e.g. subsidies or taxes. The expected influence for this variable is unclear, while a large government might be able to influence economic factors in order to increase per capita income the same government must be funded as well. Generally we anticipate a positive effect from the size of the government on per capita income.

'Legal Structure and Security of Property Rights', legal institutions and property rights are at the basis of economic growth. Controlling for this we expect to see a considerable positive impact on GDP per capita. It is intuitive that FDI is attracted to areas where legal structures are well developed. Without property rights it is nearly impossible to establish a growing economy.

'Freedom to Trade Internationally', since regulatory trade barriers and taxes on international trade can have a significant impact on a country's economy it is important to include these factors in the analysis. Freedom to Trade internationally includes these factors as well as several others. Expectations are that, considering the openness to trade variables, this variable will show the most significance and is likely to show a positive effect for most countries in the database.

'Regulation of Credit, Labor and Business', an important variable for the ease of doing business. It includes many factors like minimum wage, contract regulations and bureaucracy costs. While an abundance or lack of regulations may work aversely we expect to see a

¹² Balasubramanyam *et al.* (1996) and Ponce, Aldo Fernando (2006) focus on the importance of openness to trade in relation to FDI.

¹³ An overview of all measurements the EFW indexes are based on is included in the appendix.

positive effect in general. Setting regulatory rules helps clear up what different parties can expect from each other, for instance in the business-employee relationship.

Finally we have the weighted average of the above variables, including a new variable called “Access to Sound Money”, which is explained in the appendix. This variable is referred to as ‘*SUM EFW*’ and is a good estimator of the economic freedom of a country as a whole. We expect to see a clear positive influence of this variable on real per capita income.

5. Models and results

The model containing FDI_{icttw} consists of 106 countries, constructed with 20 countries from America, 35 European countries, 28 African countries, 19 Asian countries and 4 countries from Oceania. The second model, concentrating on the effect of FDI_{stock} on GDP per capita consists of 105 countries, constructed with 20 countries from America, 34 European countries, 27 African countries, 20 Asian countries and 4 countries from Oceania.¹⁴ FDI_{icttw} covers the period 1970 till 2008 and FDI_{stock} covers 1980 till 2008, with some exceptions where countries lack various data points in the control variables.

In table 5.1 the descriptive statistics are presented for all used variables in the models.

Table 5.1
Descriptive statistics

	Mean	Standard deviation	Minimum	Maximum
Real GDP per capita	7081.141	9441.955	80.625	56624.728
FDI_{stock}	27.000	55.611	0.014	1007.671
FDI_{icttw}	2.224	8.854	-48.826	233.176
Secondary schooling	1.962	1.322	0.047	7.773
Bank credit	65.994	52.665	-72.994	333.987
Population growth	1.591	1.276	-3.820	11.181
Size government	5.489	1.576	1.660	9.750
Legal structure	5.873	2.223	1.080	9.890
Free trade	6.449	1.566	1.840	9.780
Regulations	5.744	1.224	1.420	8.900
Sum EFW	6.087	1.272	2.100	9.230

Notes: The descriptive statistics cover all 107 countries in the dataset. The variables Size of government till Sum EFW vary between 0 and 10, with 10 being the best score. Bank credit and are in percentages of GDP and Secondary schooling is the average years of secondary education of the population aged 25 and older.

As we can see there is quite a large amount of variation in the variable real GDP per capita across countries, ranging from 80.63 the democratic republic Cong in 2001 and 56,624.73 dollar for Luxembourg in 2007. FDI_{stock} shows a large variation as well, with a minimum of 0.014 percent for Nepal in 1983 and a maximum of 1,007.67 percent for Luxembourg in 2001. Furthermore we have the variable FDI in comparison to the world, showing a negative 48.83 percent for Sierra Leone in 1986 and 233.18 percent for Luxembourg in 2002. Though

¹⁴ A list of countries can be found in the Appendix

at first a negative amount for Sierra Leone might seem strange, this is due to the fact that Sierra Leone received a considerable negative amount of net FDI. The secondary schooling variable ranges from an average of 0.047 years of secondary schooling attended for the population of Niger in 1980 to the average of 7.773 years of secondary schooling attended for Germany in 2005. Bank credit shows a negative of 73 percent for Botswana in 1998 and 333.99 percent for Guyana in 1988. The banking sector of Botswana seems to cost more money than they are able to provide to the domestic sectors, while Guyana shows a very large amount of credit provided to domestic sectors by the banking sector. Furthermore population growth shows a negative growth for Croatia of minus 3.82 percent in 1996 and a 11.18 percent increase for Jordan in 1991. Size of the government ranges from 1.66 for Slovenia in 1991 to 9.75 for Jordan in 1991. Legal structure and security of property rights ranges from 1.08 for the democratic republic of Congo in 2003 and 9.89 for Finland in 1986. Freedom to trade internationally has a minimum of 1.84 for Bangladesh in 1986 and a maximum of 9.78 for Hong Kong in 1996. Regulation of credit, labor and business ranges from 1.42 for Niger in 2005 to 8.9 for Belize in 2006. Finally the average sum of EFW indicators, including the access to sound money variable, ranges between a minimum of 2.1 for Nicaragua in 1981 and a maximum of 9.23 for Hong Kong in 1976.

5.1 Single country effects

The purpose of the empirical analysis is to examine whether FDI is beneficial for the host country. For starters we look at the direct effect of FDI on per capita income while controlling for secondary schooling, bank credit and population growth by estimating the following equation:

$$GDP\ per\ capita_i = \beta_0 + \beta_1 FDI_i + \beta_2 Secschool_i + \beta_3 Bankcredit_i + \beta_4 Popgrowth_i + \varepsilon_i \quad (5.1)$$

where FDI_i is interchangeable for FDI_{icttw} and FDI_{stock} and i stands for the specific country. Results show that, while in many cases secondary schooling and bank credit are of significant influence, FDI remains a significant variable in explaining GDP per capita in a considerable amount of cases. Table 5.2 shows several countries considering FDI_{icttw} . While

the majority of the results suggest a positive impact, Germany for instance shows quite a large negative impact as a result of receiving FDI.

Equation 5.1 in table 5.2, covering all countries, shows a significant impact of FDI for 34 countries.¹⁵ From which 28 show a positive influence of FDI on the host country. At the same time secondary schooling and bank credit seems to be very important factors in the model, overall when we see a significant impact of FDI, these variables tend to be significant as well.¹⁶

Table 5.2
Dependent variable: Real GDP per capita.

Country	United States	Guatemala	Luxembourg	Germany	Cameroon	Israel	Hong Kong
Equation	5.1	5.1	5.1	5.1	5.1	5.1	5.1
Constant	-9711.989	-441.950	-20592.530	7479.992	-1099.658	-1192.656	11605.890
	0.007	0.385	0.000	0.000	0.001	0.476	0.185
<i>FDI_{icttw}</i>	2278.683	50.687	37.510	-801.595	23.194	437.302	813.654
	0.000	0.002	0.000	0.006	0.002	0.033	0.000
Sec Schooling	2697.395	1138.850	13603.730	1022.061	286.851	4736.035	4140.093
	0.001	0.000	0.000	0.000	0.000	0.000	0.004
Bank Credit	131.321	-6.567	59.438	72.835	-6.525	-14.695	-23.470
	0.000	0.052	0.001	0.000	0.092	0.006	0.620
Pop Growth	1033.736	618.381	5187.772	478.680	624.742	-471.381	233.859
	0.387	0.002	0.000	0.226	0.000	0.020	0.682
<i>R</i> ²	0.977	0.657	0.980	0.962	0.646	0.936	0.802

Notes: The numbers below the test statistics indicate the P-values.

Population growth seems to have a somewhat harder to explain impact. Generally population growth would have a negative impact on a country’s wage. One explanation for these results of Luxembourg and Hong Kong may be that the growth rate tends to be low, around 1 and 0.5 percent respectively, and at the same time these countries are very attractive for wealthy individuals and corporations, increasing the average income. Another reason for these results can be that these specific countries had an above normal value of GDP per capita compared to their neighboring countries, which stimulated population growth and attracted immigration at the same time.

¹⁵ Countries presented in tables considering single country effects are shown based on their goodness of fit and possible interesting results.

¹⁶ Significant effects are measured from a 10 percent significance level unless stated otherwise in the main text.

As for the equation related to FDI_{stock} , examples shown in table 5.3, we find that out of 106 countries 62 countries show significant influence of FDI from which the population of 47 countries seem to benefit from the inflow of investments. This equation shows far more importance considering the impact of FDI when compared to FDI_{icttw} . Though the resemblance considering secondary schooling is striking. Nearly all countries show positive influence of secondary schooling, although this is quite intuitive.¹⁷

Interestingly Europe displays the largest effect of FDI_{stock} , with over 47 percent of the receiving countries showing a significant positive effect and none having a negative impact of FDI. This may arguably be the most interesting area for further research considering why this continent seems to exhibit significantly more positive effects from FDI.

Table 5.3
Dependent variable: Real GDP per capita.

Country	Paraguay	Panama	Spain	Netherlands	Mauritius	Nepal	India
Equation	5.1	5.1	5.1	5.1	5.1	5.1	5.1
Constant	1810.332	4927.575	6842.112	-7514.674	-268.628	135.636	351.541
	0.000	0.029	0.000	0.019	0.210	0.000	0.006
FDI_{stock}	-19.880	36.413	131.168	33.841	110.248	9.097	28.007
	0.002	0.000	0.000	0.028	0.000	0.013	0.000
Sec Schooling	95.222	522.112	1036.664	5793.307	899.635	60.218	128.309
	0.032	0.044	0.000	0.000	0.000	0.000	0.015
Bank Credit	3.319	-20.088	8.314	25.861	10.774	1.409	0.831
	0.059	0.014	0.059	0.005	0.000	0.002	0.198
Pop Growth	-167.526	-1462.299	-696.611	893.953	-5.376	-13.166	-104.835
	0.033	0.072	0.007	0.312	0.962	0.174	0.028
R^2	0.499	0.889	0.983	0.978	0.983	0.976	0.991

Notes: The numbers below the test statistics indicate the P-values.

The next section concentrates on the role of free trade, adding this variable to the model we get the following equation:

$$GDP\ per\ capita_i = \beta_0 + \beta_1 FDI_i + \beta_2 Freetrade_i + \beta_3 Z_i + \varepsilon_i \tag{5.2}$$

where Z_i stands for the control variables secondary schooling, bank credit and population growth. Free trade seems to have some impact on the significance of FDI. Considering the

¹⁷ 80 percent of the included countries in equation 5.1 with FDI_{stock} show a positive effect from secondary schooling at a 10% significance level.

model of FDI_{icttw} , we see a slight decrease of countries that exhibit a noteworthy impact of FDI from 34 to 31. For FDI_{stock} this number decreases from 62 to 56, though the effect from investment remains the same, 79.3 percent of the significant FDI_{icttw} countries show a positive influence from the inflow of foreign direct investment. For FDI_{stock} this number is roughly similar at 75 percent of the host countries showing a positive effect.

The influence of the free trade variable is ambiguous though, showing large difference between countries. The model with FDI_{icttw} and FDI_{stock} show 56.1 and 57.6 percent significant positive impact from free trade, while the remaining countries show clear negative influence. In general it are the more developed countries that benefit from freedom of trade, like Spain and Switzerland in contrast to countries that seem to lose in this perspective, like Botswana and Ghana. This is most likely connected with the development of freedom to trade in these countries, where e.g. Spain and Switzerland score much higher in these perspectives than Botswana and Ghana.

The next equation adds three more economic freedom variables, namely the size of the government, legal structures and regulations:

$$GDP\ per\ capita_i = \beta_0 + \beta_1 FDI_i + \beta_2 Freetrade_i + \beta_3 Government_i + \beta_4 Legal_i + \beta_5 Regulation_i + \beta_6 Z_i + \varepsilon_i \quad (5.3)$$

Table 5.4 shows several examples of the model including FDI_{icttw} . When including these variables FDI seems to lose some of its significance, as well as secondary schooling and bank credit. A good example of this is India, which showed a significant positive impact from the inflow of FDI under a 5 percent significance level, while secondary schooling and banking credit were significant under a 1 percent level, though this importance seems to be taken away by the economic openness variables.

As displayed in table 5.4, we see that the economic freedom of the world variables is highly significant in some areas, especially in South Africa and India. In general legal structures and regulations seem to be the most important variables for the average country. In this model FDI loses the most significance, with only 20 countries remaining significant with the addition of the control variables. Switching FDI_{icttw} for FDI_{stock} we get a different picture. In this case, shown in table 5.5, we see only a slight change compared to equation 5.2. Secondary schooling and banking credit maintain most of their significance and FDI_{stock}

Table 5.4

Dependent variable: Real GDP per capita.

Country	Chile	Albania	Ukraine	South Africa	Benin	Hong Kong	India
Equation	5.3	5.3	5.3	5.3	5.3	5.3	5.3
<i>FDI_{icttw}</i>	61.829	44.053	36.095	30.272	-25.855	479.825	-40.109
	0.073	0.032	0.082	0.038	0.030	0.004	0.138
Sec Schooling	1526.047	1009.405	-160.004	154.922	78.227	1483.452	81.679
	0.000	0.006	0.124	0.175	0.048	0.109	0.104
Bank Credit	-6.605	-7.981	2.094	-2.777	-0.045	84.724	-0.034
	0.014	0.008	0.043	0.169	0.928	0.052	0.968
Pop Growth	-1007.264	383.993	281.276	-17.712	8.287	305.966	-242.888
	0.000	0.000	0.002	0.812	0.461	0.304	0.000
Size Government	-14.057	49.453	174.276	189.776	-10.302	-6696.627	-34.315
	0.891	0.097	0.005	0.049	0.086	0.097	0.001
Legal Structures	-304.130	-93.422	-206.119	69.656	-20.833	3702.746	-10.427
	0.001	0.140	0.011	0.015	0.019	0.006	0.007
Free Trade	158.434	373.118	-174.677	-371.570	-30.085	15546.570	82.376
	0.306	0.017	0.012	0.000	0.029	0.050	0.000
Regulations	224.858	-134.869	29.196	-519.198	13.099	-9501.262	40.324
	0.094	0.060	0.275	0.000	0.070	0.012	0.042
<i>R</i> ²	0.979	0.998	0.991	0.776	0.998	0.955	0.988

Notes: The numbers below the test statistics indicate the P-values. All regressions have a constant term.

Table 5.5

Dependent variable: Real GDP per capita.

Country	Canada	Paraguay	Denmark	Finland	Netherlands	Mauritius	Israel	Kuwait
Equation	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
<i>FDI_{stock}</i>	257.771	-17.857	131.957	228.332	53.523	100.065	41.627	-2805.028
	0.000	0.004	0.020	0.000	0.000	0.000	0.016	0.036
Sec Schooling	2700.862	204.124	4523.519	-264.414	1265.838	727.786	4030.762	2037.660
	0.003	0.045	0.009	0.659	0.074	0.005	0.000	0.034
Bank Credit	1.361	2.862	-7.675	67.069	47.292	8.318	-3.729	-20.645
	0.894	0.241	0.641	0.000	0.000	0.022	0.452	0.217
Pop Growth	-198.362	-305.309	2828.793	-4690.214	-303.834	-60.387	-340.714	-919.784
	0.731	0.040	0.161	0.004	0.574	0.678	0.007	0.013
Size Government	1410.766	-74.628	46.128	2113.784	2074.574	-260.794	-476.957	-2864.512
	0.064	0.241	0.936	0.019	0.000	0.432	0.086	0.032
Legal Structures	962.342	256.870	1431.622	1264.293	-438.343	-634.128	214.704	6817.285
	0.011	0.006	0.057	0.005	0.041	0.019	0.045	0.003
Free Trade	-881.919	166.668	2117.847	686.925	664.458	432.917	-502.396	4078.023
	0.112	0.069	0.100	0.040	0.176	0.046	0.230	0.020
Regulations	1621.729	-344.812	1342.627	1143.009	1544.888	279.610	1228.894	-997.760
	0.156	0.083	0.018	0.470	0.000	0.268	0.000	0.052
<i>R</i> ²	0.980	0.771	0.976	0.979	0.995	0.986	0.985	0.999

Notes: The numbers below the test statistics indicate the P-values. All regressions have a constant term.

slightly drops from 56 to 47 countries with a significant impact from FDI_{stock} , from which 70.21 percent shows a positive effect.

As a final tweak to the model we use the EFW index of the Fraser institute to describe a country’s openness to trade instead of the four openness variables used in model 5.3, this variable is based on five important factors described in the appendix. We get the following equation:

$$GDP\ per\ capita_i = \beta_0 + \beta_1 FDI_i + \beta_2 SUM\ EFW_i + \beta_3 Z_i + \varepsilon_i \tag{5.4}$$

Table 5.6 shows evidence for FDI_{icttw} and displays many similarities with model 5.1 and 5.2, with 32 countries showing significant impact of FDI and 75 percent gain from a significant positive influence. Again we see that the further a country is developed, the more it benefits from factors like secondary schooling and bank credit. We see that Hungary and Ireland exhibit positive effects from both secondary schooling and bank credit while these factors seem to reduce wealth in the other countries in the table, with the exception of Cameroon considering secondary schooling. With the addition of the Sum EFW variable for trade openness the significance of FDI remains roughly the same, showing that FDI is unlikely capturing welfare effects related to economic freedom.

Table 5.6
Dependent variable: Real GDP per capita.

Country	Hungary	Ireland	Cameroon	Central African Republic	Togo	Indonesia	Papua New Guinea
Equation	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Constant	-4682.150	-12243.900	-2960.738	631.102	384.611	2575.086	-2396.038
	0.023	0.004	0.000	0.000	0.000	0.000	0.001
FDI_{icttw}	-154.438	215.795	14.826	9.174	1.965	53.920	-15.518
	0.000	0.034	0.026	0.037	0.014	0.000	0.005
Sec Schooling	1381.852	3519.144	202.174	-122.870	-41.024	-53.895	-87.905
	0.000	0.031	0.019	0.000	0.001	0.428	0.268
Bank Credit	39.963	112.466	-2.551	-2.633	-1.278	-2.631	-5.122
	0.000	0.000	0.478	0.020	0.204	0.001	0.046
Pop Growth	-1373.293	1327.807	602.218	-34.182	32.179	-785.804	930.081
	0.133	0.028	0.000	0.019	0.002	0.000	0.000
Sum EFW	525.191	1321.570	344.251	-40.471	-30.750	-81.491	150.378
	0.045	0.088	0.000	0.028	0.050	0.000	0.003
R^2	0.882	0.970	0.763	0.881	0.772	0.989	0.670

Notes: The numbers below the test statistics indicate the P-values.

Table 5.7 shows model 5.4 with FDI_{stock} instead of FDI_{icttw} . Compared to the models with FDI_{icttw} , FDI_{stock} shows much more significance on a country's GDP per capita. While this might be caused by the more stable nature of FDI_{stock} , evidence shows that when using equation 5.4 we arguably get the best results for FDI. With the inclusion of a proxy for human capital, financial markets and openness to trade we still see a significant impact of FDI_{stock} in 58.5 percent of all cases. This translates to 62 out of 106 countries showing a significant impact, from which 74.2 percent actually shows a positive effect.

Table 5.7

Dependent variable: Real GDP per capita.

Country	Chile	Canada	Czech Republic	Denmark	Netherlands	Sri Lanka	Israel
Equation	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Constant	2224.324	-21192.690	-2781.695	-7596.998	-22006.910	-605.077	517.560
	0.004	0.006	0.082	0.079	0.002	0.000	0.857
FDI_{stock}	-19.032	194.610	33.865	124.545	57.611	30.268	40.085
	0.007	0.003	0.002	0.000	0.000	0.000	0.018
Sec Schooling	1075.037	2489.572	810.265	2971.989	3700.686	462.813	2513.308
	0.000	0.011	0.000	0.029	0.000	0.000	0.004
Bank Credit	1.926	16.239	38.875	-5.485	25.037	1.131	-6.565
	0.611	0.043	0.010	0.598	0.004	0.223	0.164
Pop Growth	-2163.353	289.058	269.973	1571.386	427.066	43.702	-297.855
	0.000	0.668	0.243	0.266	0.552	0.038	0.021
Sum EFW	407.778	3164.134	439.192	3139.544	2865.728	48.233	1115.557
	0.010	0.014	0.007	0.001	0.007	0.006	0.000
R^2	0.986	0.965	0.988	0.976	0.984	0.990	0.973

Notes: The numbers below the test statistics indicate the P-values.

The overall effect of sum EFW seems clear, namely 76.32 percent of the countries that show a significant impact from sum EFW exhibit positive influence from the economic freedom proxy. This supports the quite intuitive results that most countries are able to gain from economic freedom. Though Africa seems to somewhat struggle with this evidence, provided that half of the countries with a highly significant negative impact of economic freedom are situated there.

In general the model with FDI_{stock} seems to show the most significant evidence for foreign direct investment affecting the host country, ranging with results from an increase of GDP per capita of 990 dollar for the United Arab Emirates to a decrease of 2805 dollar for Kuwait. Combining results of all models we find that 84 countries show signs of significant

impact of FDI_{stock} under a 10 percent significance level and 75 countries under a 5 percent significance level. This model shows a positive effect for the host country, caused by foreign direct investment, in 74.1 percent of the cases at 5 percent significance, while the model for FDI_{icttw} shows significant evidence for a respectable 58 countries under a 10 percent significance level and 45 countries under a 5 percent significance level, ranging from an increase of GDP per capita with 2279 dollar for the US and a decrease of 1645 dollar for the Korean Republic. The FDI_{icttw} model shows significant positive influence of FDI in 78.3 percent of the cases at 5 percent significance. Together with FDI_{stock} this makes a strong case for the promotion of FDI for the development of a country's GDP per capita. Though it should be noted that one should still be careful considering active promotion of FDI since some countries, like Kuwait and the Korean Republic, have sustained a considerable decrease of income as a result of foreign direct investment.

5.2 Large economic areas

In order to perhaps better perceive the effects of FDI_{stock} and FDI_{icttw} we create several pooled datasets for groups of countries that can be considered 'economic areas'. In total we differentiate between 15 different regions and include one model considering the effect on the world, which is created with all 107 countries mentioned in the appendix.¹⁸ Since we have a large amount of data we will be using the following equation:

$$\begin{aligned}
 GDP\ per\ capita_j = & \beta_0 + \beta_1 FDI_j + \beta_2 Secschool_j + \beta_3 Bankcredit_j & (5.5) \\
 & + \beta_4 Popgrowth_j + \beta_5 Freetrade_j + \beta_6 Government_j \\
 & + \beta_7 Legal_j + \beta_8 Regulation_j + \varepsilon_j
 \end{aligned}$$

including the majority of the control variables and where FDI_j is again interchangeable with FDI_{stock} and FDI_{icttw} and j stands for the particular group of countries tested in the equation. We expect to see a clearer impact from all variables, especially the impact of the openness to trade variables which lacked significance in some cases. Table 5.8 and 5.9 show the results for both specifications and include the areas America, North America, Central

¹⁸ Section D of the appendix gives a list of countries that are included in the different areas mentioned as large economic areas followed with the mean FDI_{stock} and FDI_{icttw} . Section C shows the countries of the continents as well.

Table 5.8
Dependent variable: Real GDP per capita.

Area	America	North America	Central America	South America	Europe	EU-27	Euro Zone	OECD	Africa	Sub-Saharan Africa	Asia	Eastern Asia	Southern Asia	Western Asia	Oceania	World
Observations	590	110	161	319	942	728	497	1111	711	591	598	116	151	209	116	2957
Constant	-6407.243	-14131.880	387.019	3370.247	-20604.710	-17569.180	-6813.079	-11121.090	-755.083	-1198.506	-16729.340	-26455.950	721.664	-9524.667	-14717.400	-11359.560
FDI inflow	0.000	0.000	0.308	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FDI inflow	-291.710	715.760	9.559	-256.446	136.498	145.907	168.461	161.763	-21.415	-24.754	30.836	497.843	50.120	-510.161	7.614	158.261
Sec Schooling	0.000	0.000	0.514	0.000	0.000	0.000	0.000	0.000	0.034	0.028	0.695	0.000	0.000	0.011	0.915	0.000
Sec Schooling	3942.471	4320.293	1241.620	-1022.314	2047.546	1675.664	2143.092	1681.626	569.020	532.182	3879.495	3153.896	439.727	4652.860	3540.572	2223.771
Bank Credit	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Bank Credit	30.390	66.246	0.000	-9.589	-12.268	46.844	49.997	29.509	5.434	4.884	47.157	111.465	0.178	4.208	45.276	48.058
Pop Growth	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.798	0.516	0.000	0.000
Pop Growth	402.263	2092.706	128.262	-1205.528	2145.014	2684.691	2043.509	-43.000	-158.768	-160.636	481.188	604.022	-97.948	516.179	2538.559	244.806
Size Government	0.057	0.000	0.096	0.000	0.000	0.000	0.000	0.850	0.000	0.026	0.207	0.207	0.000	0.040	0.000	0.007
Size Government	457.912	735.099	-33.054	340.423	-526.480	-1395.515	-978.339	-564.684	-130.743	-117.935	346.865	3143.410	-36.208	94.099	-521.440	-311.362
Legal Structures	0.000	0.005	0.336	0.000	0.000	0.000	0.000	0.000	0.000	0.072	0.000	0.000	0.000	0.701	0.007	0.000
Legal Structures	1033.746	131.085	194.645	527.601	2349.536	1289.476	1052.606	1701.668	104.564	130.531	1106.958	1189.789	-12.274	-72.369	707.405	1666.361
Free Trade	0.000	0.461	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.030	0.782	0.001	0.000
Free Trade	-1065.399	-470.858	-181.276	-235.079	-858.661	443.546	195.897	-840.456	158.960	165.486	-1136.040	-2144.955	0.428	-351.993	881.880	-399.787
Regulations	0.000	0.036	0.000	0.017	0.000	0.056	0.464	0.000	0.000	0.000	0.000	0.000	0.573	0.253	0.051	0.000
Regulations	218.727	547.468	207.262	289.666	2564.420	2373.353	1057.865	1663.199	157.131	208.692	1899.210	611.341	-59.203	1551.194	-122.609	951.411
R ²	0.237	0.209	0.000	0.071	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.247	0.000	0.000	0.688	0.000
R ²	0.804	0.978	0.816	0.312	0.763	0.763	0.750	0.698	0.551	0.570	0.739	0.976	0.837	0.726	0.948	0.729

Notes: The numbers below the test statistics indicate the P-values. The period of the regression is from 1970 to 2006.

Table 5.9

Dependent variable: Real GDP per capita.

Area	America	North America	Central America	South America	Europe	EU-27	Euro Zone	OECD	Africa	Sub-Saharan Africa	Asia	Eastern Asia	Southern Asia	Western Asia	Oceania	World
Observations	493	80	148	265	713	541	352	813	634	532	479	97	124	161	96	2415
Constant	-3757.484	-5910.400	517.054	4693.332	-21699.980	-21070.560	-12454.020	-13146.780	-829.611	-1288.075	-19789.290	-19874.300	513.201	-18528.290	-14202.520	-12762.710
FDI stock	0.001	0.074	0.135	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FDI stock	-85.107	3.594	9.935	-22.028	19.700	20.778	23.161	25.593	-6.876	-7.316	20.148	25.232	26.351	-186.584	22.973	24.391
Sec Schooling	0.000	0.889	0.008	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.277	0.000	0.000
Sec Schooling	4232.610	6015.640	1081.331	-520.986	2402.686	1983.272	2514.713	1765.057	552.351	502.711	4082.993	3528.425	326.999	4304.829	3174.078	2369.595
Bank Credit	0.000	0.000	0.000	0.061	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Bank Credit	37.432	51.350	-8.653	-14.415	34.020	37.494	8.705	78.118	5.567	4.781	43.453	108.014	0.551	28.289	51.396	45.752
Pop Growth	0.000	0.000	0.000	0.001	0.000	0.000	0.315	0.000	0.000	0.000	0.000	0.000	0.389	0.000	0.000	0.000
Pop Growth	-406.879	3561.528	87.235	-1479.088	2710.264	3683.886	5174.833	458.548	-164.031	-161.238	340.403	125.458	-54.569	663.152	2445.126	475.860
Size Government	0.051	0.000	0.204	0.000	0.000	0.000	0.000	0.139	0.000	0.140	0.804	0.000	0.002	0.005	0.000	0.000
Size Government	115.606	-181.159	60.158	78.988	-453.179	-1483.506	-1215.866	-580.904	-128.705	-114.156	515.794	2043.173	-36.629	465.449	-337.270	-185.685
Legal Structures	0.307	0.617	0.078	0.428	0.008	0.000	0.001	0.000	0.000	0.000	0.024	0.001	0.000	0.070	0.075	0.017
Legal Structures	639.514	-99.194	329.931	663.015	3166.144	2081.867	1934.383	2487.750	122.695	143.143	1503.501	1163.919	4.949	-19.296	1439.308	1982.646
Free Trade	0.000	0.651	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.421	0.949	0.000	0.000
Free Trade	-727.673	-305.167	-262.596	-251.874	-1104.447	401.716	912.125	-1039.132	166.119	178.487	-1551.393	-2136.972	4.643	482.935	640.330	-452.294
Regulations	0.000	0.521	0.000	0.030	0.000	0.245	0.030	0.001	0.000	0.000	0.000	0.000	0.561	0.162	0.217	0.000
Regulations	372.258	-442.998	609.938	225.221	1914.419	2007.665	3.232	1104.529	162.861	214.523	2112.001	549.461	-48.136	1847.097	-933.464	626.419
R ²	0.039	0.499	0.288	0.155	0.000	0.000	0.000	0.692	0.577	0.596	0.765	0.978	0.008	0.000	0.013	0.000
R ²	0.859	0.984	0.864	0.488	0.793	0.779	0.718	0.692	0.577	0.596	0.765	0.978	0.898	0.819	0.962	0.734

Notes: The numbers below the test statistics indicate the P-values. The period of the regression is from 1980 to 2006.

America, South America, Europe, EU-27, Euro Zone, OECD, Africa, Sub-Saharan Africa, Asia, Eastern Asia, Southern Asia, Western Asia, Oceania and World.

We see that the overall effect on the world is positive for FDI_{icttw} as well as for FDI_{stock} .¹⁹ While most variables act as expected, we see that the size of the government has a strong negative impact in Europe and Oceania. We considered the effect unclear in the data section discussion, though we did not expect such a clear negative influence for these areas. There can be several explanations for these results like the height of the marginal tax rate, which will likely have the largest impact on the results. Though Europe and Oceania are known for their bureaucracy as well, which is costly and gets translated into the size of the government variable via tax rates and government consumption and spending.

Besides size of the government we see an unexpected results for free trade as well. Table 5.8 and 5.9 show a negative impact for most regions, under a 5 percent significance level only Africa and to a lesser extent the Euro zone seem to benefit from free trade.

Lastly we see a strange and quite large effect from population growth. For example when we take a look at North America, Europe and Oceania we see a large positive impact of population growth on real GDP per capita while one would expect a clear negative influence. We tried to explain this before in section 5.1, arguing that the above average GDP per capita in these areas attracts immigrants and as a result shows a positive influence from population growth. Though since population growth is generally low and has a small variation as well, especially in the areas that show strange effects, we will remove the variable from the model.

Table 5.10 and 5.11 present the new model without the population growth variable and leaves us with the following equation:

$$\begin{aligned}
 GDP\ per\ capita_j = & \beta_0 + \beta_1 FDI_j + \beta_2 Secschool_j + \beta_3 Bankcredit_j & (5.6) \\
 & + \beta_4 Freetrade_j + \beta_5 Government_j + \beta_6 Legal_j \\
 & + \beta_7 Regulation_j + \varepsilon_i
 \end{aligned}$$

¹⁹ We see similar results for research on the overall wage paid by foreign multinational, which tends to be significantly higher than domestic wages, see e.g. Martins and Esteves (2007) or Harrison and Scorse (2004).

Table 5.10
Dependent variable: Real GDP per capita.

Equation	America	North America	Central America	South America	Europe	EU-27	Euro Zone	OECD	Africa	Sub-Saharan Africa	Asia	Eastern Asia	Southern Asia	Western Asia	Oceania	World
Observations	590	110	161	319	942	728	497	1111	711	591	599	116	151	210	116	2958
Constant	-5264.049	-9570.771	780.395	-288.084	-20133.560	-18667.870	-6706.510	-11256.970	-1302.706	-1751.063	-15086.880	-25805.920	261.913	-7996.795	-6147.301	-10658.720
FDI:ctw	-284.806	0.001	0.010	0.756	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.089	0.000
Sec Schooling	0.000	0.000	0.419	-243.790	150.116	161.882	179.572	161.462	-22.928	-25.869	26.359	436.864	60.111	-611.145	85.038	159.675
Bank Credit	3852.938	3213.981	122.839	-397.050	1569.744	1331.341	1877.225	1676.875	640.854	600.100	3853.447	2933.429	489.245	4657.968	3128.764	2141.496
Size Government	0.000	0.000	0.000	0.131	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Legal Structures	0.000	0.011	0.057	0.048	0.009	0.000	0.000	0.000	0.000	0.000	0.375	0.000	0.001	0.797	0.184	0.000
Free Trade	1032.181	42.269	202.974	596.299	2462.227	1454.744	1101.749	1701.000	109.399	134.027	1059.349	1173.838	0.376	-144.510	542.186	1640.435
Regulations	-1102.384	-767.290	-190.475	-178.684	-1222.206	196.317	-138.962	-824.990	141.572	143.266	-1126.528	-2187.064	8.097	-382.803	397.020	-434.698
	0.000	0.000	0.000	0.089	0.000	0.420	0.610	0.000	0.000	0.000	0.000	0.000	0.373	0.216	0.506	0.000
	213.738	1134.475	225.531	408.116	2795.295	2509.377	1317.325	1668.037	163.902	220.851	2082.605	604.680	-33.731	1805.590	-228.771	967.020
	0.249	0.008	0.000	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.253	0.029	0.576	0.000	0.000
R ²	0.802	0.978	0.813	0.204	0.744	0.735	0.729	0.698	0.538	0.558	0.737	0.975	0.802	0.723	0.906	0.729

Notes: The numbers below the test statistics indicate the P-values. The period of the regression is from 1970 to 2006.

Table 5.11

Dependent variable: Real GDP per capita.

Equation	America	North America	Central America	South America	Europe	EU-27	Euro Zone	OECD	Africa	Sub-Saharan Africa	Asia	Eastern Asia	Southern Asia	Western Asia	Oceania	World
Observations	493	80	148	265	713	541	352	813	634	532	480	97	124	162	96	2416
Constant	-4971.900	-1065.322	793.272	173.868	-21829.220	-22460.990	-12137.710	-11976.300	-1389.616	-1830.082	-18289.410	-19929.990	215.932	-16690.250	-7214.441	-11424.280
FDI stock	0.000	0.738	0.004	0.846	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.000	0.056	0.000
Sec Schooling	-83.677	-49.854	10.446	-17.442	23.624	26.600	30.093	26.283	-6.700	-7.333	19.734	24.635	29.716	-192.760	86.167	24.957
Bank Credit	0.000	0.040	0.005	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.001	0.000
Size Government	4300.731	4138.525	1061.325	-157.672	1895.702	1772.953	2094.599	1826.323	629.892	571.940	4067.410	3485.096	332.979	4253.071	2431.183	2185.478
Legal Structures	0.000	0.000	0.000	0.608	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Free Trade	0.000	0.000	0.000	-14.099	50.707	65.888	52.668	77.672	6.218	5.278	40.530	107.717	0.340	27.616	36.740	46.368
Regulations	118.405	73.488	44.282	-107.664	-191.555	-1380.819	-1113.810	-539.527	-110.038	-96.599	368.170	2086.508	-32.576	244.382	-126.442	-153.830
	0.297	0.846	0.162	0.324	0.275	0.000	0.000	0.002	0.000	0.000	0.072	0.000	0.323	0.584	0.049	0.000
	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.606	0.000	0.023	0.000
	679.301	-736.581	340.991	830.434	3469.488	2402.343	1795.959	2454.380	129.306	145.736	1487.991	1167.298	14.647	-132.954	2407.109	1949.768
	0.000	0.924	0.000	-37.082	-1509.307	-50.945	-13.949	-1197.856	147.102	0.000	0.000	0.000	0.000	0.665	0.000	0.000
	0.000	0.142	0.000	0.769	0.000	0.889	0.976	0.000	0.000	0.000	0.000	0.000	0.786	0.205	0.846	0.000
	369.628	431.354	67.100	309.000	1970.647	2116.744	1028.231	1141.865	167.815	227.225	2277.197	559.800	-25.442	2256.207	-1732.361	661.501
	0.041	0.532	0.241	0.083	0.000	0.000	0.043	0.000	0.000	0.000	0.000	0.388	0.139	0.000	0.000	0.000
R ²	0.858	0.981	0.863	0.350	0.770	0.749	0.649	0.691	0.561	0.582	0.764	0.978	0.889	0.811	0.940	0.732

Notes: The numbers below the test statistics indicate the P-values. The period of the regression is from 1980 to 2006.

When comparing results with equation 5.5 we see some minor differences, for example South America seems to have lost its significance considering the effect of secondary schooling in both specifications and Free trade has lost some of its significance as well in multiple areas. Though the overall effect of the variables has remained the same. However one important change is that, considering North America, FDI_{stock} is now significant under a 5 percent significance level and shows a negative influence and that for Oceania FDI_{stock} now shows a significant positive impact on GDP per capita. FDI_{icttw} shows increased or the same significance in 14 out of 16 areas, excluding South America and Asia. Considering FDI_{stock} we see similar results for 15 out of 16 areas, with again South America losing some significance.

FDI seems to be most effective in areas that are relatively more developed, showing most beneficial impacts in Europe, Eastern Asia and Oceania. North America shows a similar result for FDI_{icttw} , though when we examine table 5.11 with FDI_{stock} we see that North America actually exhibits a negative impact from FDI. This may be due to the fact that the size of the economy is so vast that FDI_{stock} remains relatively small when it is expressed in percentages of GDP. The average FDI_{stock} for this area which consists of Canada, the United States and Mexico amounts to 17.69 percent. Comparing this to the rest of the world, which amounts to an average of 29.66 percent, we see that North America receives a little over half this amount. For Europe the average FDI_{stock} is 40.49 percent, which is actually above average and adds to the explanation why North America shows an unexpected impact from FDI_{stock} . Furthermore Canada shows a significant positive effect while the US and Mexico show little to no significance from FDI_{stock} , possibly contributing to the negative impact of the area as a whole.

5.3 Country Specific Effects

To eliminate possible country specific effects we perform regressions for a fixed effects model and a random effects model based on equation 5.6, giving us the following model:

$$\begin{aligned}
 GDP\ per\ capita_j = & \beta_0 + \beta_1 FDI_j + \beta_2 Secschool_j + \beta_3 Bankcredit_j & (5.7) \\
 & + \beta_4 Freetrade_j + \beta_5 Government_j + \beta_6 Legal_j \\
 & + \beta_7 Regulation_j + \sum_{i=1} \alpha_j \delta_i + \varepsilon_j
 \end{aligned}$$

where $\sum_{i=1} \alpha_j \delta_i$ stands for the country specific effects we control for in the fixed and random effects model. Performing a Hausman test we verify which model gives the best results for our specification. Since the random effects model is only viable when we have more cross sections than coefficients we are able to test which model is more efficient for 11 areas.²⁰ Table 5.12 presents the results from the Hausman test.

The Hausman test shows highly significant evidence for the alternative hypothesis of misspecification. For every area except South America in the specification of FDI_{icttw} we find that the fixed effects model is more efficient than the random effects model. Based on these results we will use the fixed effects model for further interpretation of the effect of FDI. Also one minor benefit of these results is that the fixed effects model is able to control for year specific effects, while the random effects model can only do this when we impose no country specific effects.

Table 5.12 – Hausman test
Dependent Variable: real GDP per capita

	Cross sections	FDI_{icttw} Chi square*	FDI_{icttw} Probability	FDI_{stock} Chi square*	FDI_{stock} Probability
America	20	68.406	0.000	63.460	0.000
South America	11	11.468	0.120	54.557	0.000
Europe	35	130.667	0.000	168.679	0.000
EU-27	26	83.172	0.000	124.533	0.000
Euro Zone	16	46.433	0.000	94.755	0.000
OECD	34	50.559	0.000	62.977	0.000
Africa	28	34.468	0.000	27.604	0.000
Sub-Saharan Africa	24	37.646	0.000	27.948	0.000
Asia	20	37.531	0.000	28.995	0.000
Western Asia**	9	2638.491	0.000	2168.585	0.000
World	107	139.049	0.000	173.792	0.000

Notes: Equation 5.6 from section 5.2 is used for the comparison of the fixed and random effects model. Cross sections are similar for both specifications of the model.

*The required value of the Chi square at a 1 percent significance level is 18.48 with 7 degrees of freedom.

**The high Chi square is caused by the estimated cross-section random effects variance, which is zero.

We estimate equation 5.7 for FDI_{icttw} and FDI_{stock} . Results for both these tests are shown in table 5.13 and 5.14.

²⁰ Areas that did not contain enough cross sections are North America, Central America, Eastern Asia, Southern Asia and Oceania.

Comparing results for the model based on FDI_{icttw} we see that 9 areas show a significant effect for FDI_{icttw} under a 1 percent significance level and 11 areas under 5 percent. Again we see the specifications for Europe, EU-27, Euro Zone and OECD showing highly significant and positive effects from FDI. The effect of FDI for Asia has become significant, though the overall effect is negative, with South Asia now showing a clear negative impact, Western Asia showing a large decrease in negativity and Eastern Asia presenting a large positive effect. With Asia negative as a whole and Eastern Asia strongly positive, this presents quite strong evidence for the theory that relatively richer and more trade driven countries benefit more from FDI, also since we have seen strong positive effects for European countries and the OECD as well. North America shows a somewhat more unexpected result, losing its significance with the inclusion of country specific effects. Though this may be partially explained by the inclusion of Mexico in the North America area, separately the US and Canada show significant positive effects in line with evidence from other further developed countries.

Considering our secondary schooling variable we see a significant effect on GDP per capita in all 16 specifications under a 1 percent significance level. South America now shows a significant positive effect from the variable as well as the other 15 areas.

The effect of bank credit remained roughly similar, though the absolute effect has diminished somewhat. The overall influence of bank credit is positive for all areas that show a significant relation with real GDP per capita.

The first real differences appear when we look at the effect of the size of the government. We see that for the European areas and the OECD area the overall effect of the government size has become positive, while this showed considerable negative influence in model 5.6 which did not control for country specific effects. An explanation for this can be that the European government fills its political roll for the benefit as Europe as a whole quite well, though forms a more or less double layer of governance with the country specific governments. In turn this 'double layer' may have caused the considerable negative effects of this variable in model 5.6. Furthermore Eastern Asia has lost its significance in the fixed effects model, while in the previous equation it showed considerable impact from government size.

Table 5.13 - Fixed Effects Model
 Dependent variable: Real GDP per capita.

Area	America	North America	Central America	South America	Europe	EU-27	Euro Zone	OECD	Africa	Sub-Saharan Africa	Asia	Eastern Asia	Southern Asia	Western Asia	Oceania	World
Observations	590	110	161	319	942	728	497	1111	711	591	598	116	151	210	116	2958
Constant	2617.693	-1067.548	1690.607	2535.713	2504.885	3354.060	4017.407	2178.980	869.190	921.066	1647.010	4360.497	215.439	-4811.580	1264.992	2781.015
FDI inflw	0.000	0.739	0.000	0.000	0.032	0.022	0.070	0.054	0.000	0.000	0.237	0.335	0.001	0.000	0.603	0.000
FDI outw	-47.453	279.071	16.653	-26.605	133.748	135.518	136.120	129.200	-11.304	-12.006	-171.866	574.339	-10.451	-139.502	95.165	115.566
Sec Schooling	0.124	0.110	0.020	0.208	0.000	0.000	0.000	0.000	0.002	0.004	0.002	0.000	0.435	0.044	0.083	0.000
Bank Credit	1466.804	1422.258	931.798	664.578	2876.666	2529.880	2358.001	2908.310	425.696	393.859	2919.664	2812.203	370.681	1002.445	2665.344	2721.408
Size Government	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Legal Structures	29.643	63.230	0.302	0.696	42.432	45.885	47.981	53.353	1.539	0.849	19.766	104.603	-1.009	13.966	62.347	34.992
Free Trade	0.000	0.000	0.000	0.645	-0.779	0.000	0.000	0.000	0.019	0.849	19.766	104.603	0.142	0.000	0.000	0.000
Regulations	435.938	1823.047	-111.838	65.252	776.942	757.220	596.195	488.763	-42.144	-36.588	154.323	421.730	-19.561	121.994	-264.400	74.414
R ²	0.000	0.000	0.003	0.144	0.000	0.000	0.001	0.000	0.001	0.016	0.311	0.359	0.006	0.347	0.062	0.135
Legal Structures	-209.370	-117.069	95.427	19.447	257.811	76.936	-76.175	199.407	46.123	33.767	-270.703	597.579	2.129	-196.047	-121.786	-47.604
Free Trade	0.001	0.486	0.004	0.570	0.003	0.431	0.536	0.009	0.000	0.023	0.063	0.006	0.714	0.008	0.406	0.238
Regulations	-373.313	-852.579	-38.762	20.557	132.629	643.376	971.435	-125.798	-7.240	-0.786	-250.801	-1891.309	23.096	-23.568	457.086	-213.546
R ²	0.000	0.000	0.074	0.647	0.322	0.000	0.000	0.291	0.598	0.961	0.018	0.000	0.003	0.836	0.180	0.000
Regulations	-119.639	371.159	13.631	-130.836	-976.151	-1432.624	-1581.323	-367.292	-54.654	-68.797	-308.161	-942.078	-21.034	1867.414	-574.650	-271.201
R ²	0.309	0.384	0.691	0.083	0.000	0.000	0.000	0.057	0.013	0.006	0.044	0.066	0.077	0.000	0.044	0.001
R ²	0.966	0.982	0.959	0.940	0.952	0.935	0.902	0.942	0.948	0.949	0.946	0.989	0.904	0.981	0.976	0.960

Notes: The numbers below the test statistics indicate the P-values. Country specific effects are added for all included countries. The period of the regression is from 1970 to 2006.

Table 5.14 - Fixed Effects Model

Area	America	North America	Central America	South America	Europe	EU-27	Euro Zone	OECD	Africa	Sub-Saharan Africa	Asia	Eastern Asia	Southern Asia	Western Asia	Oceania	World
Observations	493	80	148	265	713	541	352	813	634	532	479	97	124	162	96	2416
Constant	3256.345	10036.750	1680.350	2538.899	10457.130	10544.710	12872.070	4879.261	650.843	692.624	-431.374	2295.581	559.381	3012.621	9046.342	3735.776
FDI inflw	0.000	0.010	0.000	0.000	0.000	0.002	0.012	0.020	0.000	0.000	0.757	0.695	0.000	0.028	0.047	0.000
FDI outw	-0.627	137.016	10.833	-7.791	6.636	6.720	6.350	5.791	-8.110	-9.218	44.207	25.752	10.987	19.411	-19.818	8.494
Sec Schooling	0.916	0.002	0.000	0.027	0.000	0.001	0.008	0.002	0.000	0.000	0.000	0.000	0.000	0.019	0.261	0.000
Bank Credit	1914.119	1351.654	1002.421	1176.674	2438.776	2182.068	1755.089	2807.287	440.456	418.967	2370.778	2764.937	309.948	137.930	1187.854	2413.894
Size Government	0.000	0.124	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.575	0.050	0.000
Legal Structures	20.337	64.372	0.246	-2.648	47.331	53.012	75.189	48.164	2.616	2.030	10.671	93.500	-1.956	-15.569	79.651	28.270
Free Trade	0.000	0.000	0.717	0.092	0.000	0.000	0.000	0.000	0.000	0.013	0.008	0.000	0.003	0.001	0.000	0.000
Regulations	-288.646	-118.346	-61.941	-92.048	108.857	606.222	870.280	146.481	12.397	30.705	-81.960	-1644.790	37.608	-141.731	-441.534	-258.770
R ²	0.000	0.802	0.006	0.058	0.616	0.029	0.017	0.459	0.384	0.068	0.435	0.000	0.000	0.350	0.345	0.000
Regulations	-184.187	-75.882	-48.413	-43.685	-1006.872	-1418.094	-1775.800	-199.171	-18.396	-30.299	-545.670	-691.936	-85.722	980.385	-605.614	-171.887
R ²	0.074	0.898	0.129	0.533	0.000	0.000	0.001	0.418	0.420	0.240	0.000	0.264	0.000	0.000	0.043	0.040
R ²	0.980	0.987	0.971	0.958	0.952	0.926	0.876	0.941	0.948	0.948	0.973	0.987	0.949	0.988	0.981	0.969

Notes: The numbers below the test statistics indicate the P-values. Country specific effects are added for all included countries. The period of the regression is from 1980 to 2006.

While our proxy for legal structures proved to be important in our previous model its effect now diminished considerably. Aside from the drop in significance, America and Western Asia exhibit a negative influence from the variable. Though Western Asia was not significant in model 5.6, America showed a positive coefficient of 1032.18 as opposed to the negative 209.37 it presents now.

Considering the effect of free trade we see an interesting development for the Euro Zone and EU-27. Both areas showed insignificant effects in our previous estimation, yet they now clearly distinguish themselves as the two areas that exhibit a large positive influence from free trade. Other areas remained roughly similar with the exception of Africa and Sub-Saharan Africa losing their significant impact.

Finally we compare the influence of regulations, where we see Western Asia as the only area that presents identical results. Again we see a considerable loss of significance, although this can be expected with the control for country specific effects. European and African areas maintain their significance as well as Oceania showing significant results in the estimation. An explanation for the negative effect after the control for these country effects is that in many cases the regulations are enforced by individual countries instead of the area as a whole, which may be especially important for Europe.

As for model 5.7 based on FDI_{stock} we see that most areas present a positive effect from FDI with North America showing the largest impact of 137 dollar per capita, creating an absolute effect of 2423.81 dollar per capita with the mean of 17.69% FDI_{stock} that North America receives. This is quite a considerable effect bearing in mind Europe, EU-27, Euro Zone and the OECD border at around 6 dollar, though with their FDI_{stock} ranging between 40 to 60 percent they still reach a respectable 240 to 360 dollar per capita. Asian areas show a positive influence as well, though considering Africa we see that they lose on average 8 to 9 dollar per capita from every percent of FDI_{stock} their receive, which amounts to a negative 176.72 dollar per capita for Africa and 191.55 dollar for Sub-Saharan Africa.²¹

Although North America shows the largest impact from FDI_{stock} they lose their significant effect from secondary schooling as well as Western Asia which presented significant influence in the previous model which it now seems to have lost. South America has gained significant evidence for the positive effect of secondary schooling and overall the

²¹ Mean FDI_{stock} percentages are applicable for all the area regression models and can be found in Appendix D, together with FDI_{icttw} means.

effect of secondary schooling has remained comparable with model 5.6. Secondary schooling generally has a positive influence in every specification of our model.

Bank credit shows very stable results with comparable values for the model with FDI_{icttw} and FDI_{stock} . Again we see the areas Eastern and Western Asia struggling, displaying a negative influence from bank credit, while every other area shows a positive effect from the variable.

Considering the size of the government variable we see a similar change as we saw in table 5.13, although results are less significant. We see a positive effect for the European areas which experienced a negative influence before. North America remained insignificant in this area, although America as a whole shows signs of a positive influence from the government. While Asia did not show any evidence of effect from government size we see Western and Eastern Asia switching significance. These two areas seem quite problematic to estimate since some of the control variables change signs or significance, although the effect of FDI remains very similar in the specifications.

As for legal structures we see a general negative effect while we expected to see a positive influence from this variable. One explanation may be that most legal structures are regulated by individual countries and therefore any overlapping legalities form confusion or barriers to economic development, where for example the European court can overrule any national court. Another perspective can be that individual country legal structures do not connect to each other very well, leaving several inefficient or contradicting situations in the legal system.

The effect of free trade has lost a lot of his power in the last model and gives contradicting evidence with America, Central America and Eastern Asia showing a clear negative influence while Southern Asia, EU-27 and the Euro Zone show a clear positive influence. While the effects for America and Asia might be harder to explain it is quite intuitive that the EU-27 and the Euro Zone exhibit positive effects for this variable since these areas have many trade related connections and the majority of the countries included pay with the same currency, which makes it much simpler to do business with others.

With regulations as the last variable we see a similar change in importance as we saw for legal structures. Where regulations were important e.g. in European areas we see that when controlling for country specific effects that the overall influence that remains is

negative. The only area that seems to benefit in both specifications from regulations is Western Asia, showing a positive coefficient of 980 dollar.

Furthermore we briefly touched upon a model controlling for year specific effects. Controlling for this we saw no clear change in our previous model, though the coefficients of the year specific effects showed a clear linear growth movement that was trendwise very similar for every area around the world.

5.4 Overview Variables Effects

To get a clear overview of the results we have seen from section 5.1 to section 5.3 we constructed several tables that show the percentages and amounts of countries or areas that exhibited a significant or positive effect from the respective variable under different significance levels. Table 5.15 shows the results for all four equations covered in section 5.1 considering the effect of FDI_{stock} under a 10 and 5 percent significance level.

FDI_{stock} shows quite some variation in the amount of significant countries varying between 47 to 72 and 38 to 61 countries in model 5.3 and 5.1, though the overall effect shown by the host countries is very stable with 70.21 to 77.78 percent showing a positive impact.

Overall secondary schooling shows the most importance, ranging from 44 to 76 countries with a significant effect, with by far the highest percentage of positive influence on host country per capita income. Model 5.4 shows the lowest effect in this case with 81.54 percent of the countries exhibiting a positive effect up till 93.18 percent for model 5.3.

Furthermore we see bank credit ranging between 31 to 52 countries with a dominant positive effect as well, although weaker than what FDI_{stock} and secondary schooling showed, 61.7 till 75 percent of the sample countries presented a positive influence from the development of bank credit.²²

Considering the contribution of population growth we see an unclear though slightly negatively dominated effect. We previously discussed the unexpected effect from population growth and followed with removing the variable from the area regressions.

²² For research on the effect of FDI on financial market factors see Harrison and McMilland (2001), which presents a negative effect for Ivory Coast and Harrison *et al.* (2002) for a broader consideration and a general positive influence from FDI on the financial system.

Table 5.15 - Single country percentages
Dependent variable: Real GDP per capita.

equation	5.1*	5.2*	5.3*	5.4*	5.1**	5.2**	5.3**	5.4**
total countries included	107	105	105	106	107	105	105	106
FDI stock	67.29 (72)	54.29 (57)	44.76 (47)	58.49 (62)	57.01 (61)	49.52 (52)	36.19 (38)	50.94 (54)
	77.78 (56)	73.68 (42)	70.21 (33)	74.19 (46)	75.41 (46)	71.15 (37)	71.05 (27)	74.07 (40)
Sec Schooling	71.03 (76)	60.95 (64)	52.38 (55)	61.32 (65)	65.42 (70)	54.29 (57)	41.90 (44)	59.43 (63)
	81.58 (62)	89.06 (57)	92.73 (51)	81.54 (53)	82.86 (58)	89.47 (51)	93.18 (41)	82.54 (52)
Bank Credit	48.60 (52)	44.76 (47)	34.29 (36)	44.34 (47)	37.38 (40)	33.33 (35)	29.52 (31)	38.68 (41)
	63.46 (33)	61.70 (29)	75.00 (27)	72.34 (34)	62.50 (25)	68.57 (25)	74.19 (23)	73.17 (30)
Pop Growth	55.14 (59)	48.57 (51)	41.90 (44)	45.28 (48)	43.93 (47)	40.95 (43)	34.29 (36)	41.51 (44)
	52.54 (31)	47.06 (24)	40.91 (18)	39.58 (19)	53.19 (25)	44.19 (19)	38.89 (14)	40.91 (18)
Size Government			20.95 (22)				13.33 (14)	
			77.27 (17)				78.57 (11)	
Legal Structures			32.38 (34)				26.67 (28)	
			50.00 (17)				53.57 (15)	
Free Trade		30.48 (32)	34.29 (36)			25.71 (27)	22.86 (24)	
		56.25 (18)	50.00 (18)			48.15 (13)	41.67 (10)	
Regulations			32.38 (34)				24.76 (26)	
			61.76 (21)				61.54 (16)	
Sum EFW				35.85 (38)				26.42 (28)
				76.32 (29)				75.00 (21)

Notes: First the percentage of countries that show a significant effect are shown, below these the percentage of significant countries that show a positive effect, the percentage of significant negative countries can be found by subtracting the positive percentage from 100 percent. The numbers in the parenthesis are the total amount of countries that showed the respective result. *Shows results at a 10% significance level, **shows results at a 5% significance level.

The effect of the EFW variables is somewhat more confined. The size of the government shows a limited significance of 22 countries under a 10 percent significance level and only 14 at 5 percent. Though when showing significance we saw a positive effect in roughly 78 percent of the countries.

The size of the government is followed by one of the more important EFW variables, namely legal structures. Together with regulations and free trade this variable shows the most importance considering the effect of economic freedom. Depending on the significance we see 28 to 34 countries showing a significant influence, though the effect seems uncertain. Positive influence ranges from 50 to 53.57 percent of the cases, indicating one should be careful with the implementation of legal structures.

Free trade shows roughly similar results as legal structures, though we expected a clear positive effect from free trade. It shows a range of 41.67 to 56.25 percent of countries with a positive influence and 24 to 36 countries showing a significant impact. Clearly a considerable number of countries are not yet ready to benefit from the effects of free trade, which is often the case when countries are in the first stages of opening up to the world

market. Considering more developed countries we see a change in effect towards a more positive influence.

Furthermore we see that the effect of regulations is significant for 26 to 34 countries with a stable positive effect ranging from 61.54 to 61.76 percent of the countries. Overall the EFW variables seem to be quite country dependent, with perhaps the exception of size of the government which showed a clear positive impact. Considering the combined effect of these variables in sum EFW we see a more promising result with 28 to 38 countries presenting a significant impact, but with a fairly high 75 to 76.32 percent positive influence.²³

When we consider the results based on FDI_{icttw} in table 5.16 we see a large change in significance for FDI. The amount of countries that showed a significant impact when we use FDI_{stock} roughly halved when the measurement of FDI_{icttw} is used. Country significance ranges from 14 to 35 countries as compared to the 38 to 72 countries with a

Table 5.16 - Single country percentages
Dependent variable: Real GDP per capita.

equation	5.1*	5.2*	5.3*	5.4*	5.1**	5.2**	5.3**	5.4**
total countries included	106	106	106	106	106	106	106	106
FDI icttw	33.02 (35)	27.36 (29)	18.87 (20)	30.19 (32)	22.64 (24)	16.98 (18)	13.21 (14)	21.70 (23)
	80.00 (28)	79.31 (23)	75.00 (15)	75.00 (24)	91.67 (22)	83.33 (15)	71.43 (10)	78.26 (18)
Sec Schooling	78.30 (83)	71.70 (76)	50.94 (54)	71.70 (76)	77.36 (82)	68.87 (73)	46.23 (49)	64.15 (68)
	87.95 (73)	86.84 (66)	88.89 (48)	85.53 (65)	87.80 (72)	89.04 (65)	91.84 (45)	85.29 (58)
Bank Credit	62.26 (66)	58.49 (62)	45.28 (48)	57.55 (61)	50.94 (54)	50.00 (53)	40.57 (43)	50.00 (53)
	63.64 (42)	62.90 (39)	75.00 (36)	68.85 (42)	70.37 (38)	69.81 (37)	74.42 (32)	66.04 (35)
Pop Growth	54.72 (58)	48.11 (51)	42.45 (45)	46.23 (49)	48.11 (51)	36.79 (39)	34.91 (37)	39.62 (42)
	55.17 (32)	54.90 (28)	55.56 (25)	51.02 (25)	58.82 (30)	53.85 (21)	51.35 (19)	50.00 (21)
Size Government			36.79 (39)				25.47 (27)	
			64.10 (25)				66.67 (18)	
Legal Structures			33.96 (36)				25.47 (27)	
			38.89 (14)				37.04 (10)	
Free Trade	42.45 (45)	27.36 (29)				33.02 (35)	21.70 (23)	
	48.89 (22)	44.83 (13)				48.57 (17)	43.48 (10)	
Regulations			35.85 (38)				28.30 (30)	
			65.79 (25)				66.67 (20)	
Sum EFW				42.45 (45)			34.91 (37)	
				75.00 (21)			70.27 (26)	

Notes: First the percentage of countries that show a significant effect are shown, below these the percentage of significant countries that show a positive effect, the percentage of significant negative countries can be found by subtracting the positive percentage from 100 percent. The numbers in the parenthesis are the total amount of countries that showed the respective result. *Shows results at a 10% significance level, **shows results at a 5% significance level.

²³ Bengoa and Sanchez-Robles (2003) stress the importance of an open economy in order to allow for an improved inflow of FDI, which seems to be supported by our general positive effect of Sum EFW.

significant impact with FDI_{stock} . Although the number of countries that shows a significant impact from FDI has diminished greatly, the percentage of host countries that exhibit a positive effect from FDI has remained very similar as 71.43 to 91.67 percent of the cases showed a positive influence.

Considering the effect of the control variables we see a very similar effect as was presented in table 5.15, with most variables having a slight increase in their amount of significant impact. Though there are two variables that presented a noteworthy change in effect, namely the size of the government and legal structures.

The size of the government variable presents a significant impact on 27 to 39 countries with a positive effect on 64.10 to 66.67 percent of the cases. Where we previously have seen a positive influence on 77.27 to 78.57 percent of the countries. Although it should be noted that the higher positive effect may be caused by the lack of significance in the previous model, which presented a considerable lower impact of 14 to 22 countries.

Finally we see a change in the effect of legal structures, dropping roughly 10 to 15 percent of their positive effect. The amount of significant countries remained very similar, at 27 to 36 countries compared to 28 to 34 countries in table 5.15. While the positive influence of the variable previously ranged from 50 to 53.57 percent it has dropped to the range of 37.04 to 38.89 percent, tipping the general effect of legal structures towards the negative. We discuss the general effects we have seen in the area regression models, combining the pooled models and the fixed effects models in table 5.17 and 5.18.

Considering the difference in significance for FDI_{stock} and FDI_{icctw} , which we have seen in table 5.15 and 5.16, we see a perpetuation of these results for the general effect in model 5.17 and 5.18. Although less severe, we see a decline in the significant impact when the model is based on FDI_{icctw} . FDI_{stock} presents a significant impact on 40 to 44 countries on a total of 48, where the model based on FDI_{icctw} presents 30 to 37 countries with a significant influence from FDI. The positive impact as a result of the inflow of FDI remains, though at a lower ratio, with FDI_{stock} showing a positive influence in 68.18 to 72.50 percent of the cases and FDI_{icctw} in 62.16 to 73.33 percent of the cases.

Table 5.17 - Area percentages
Dependent variable: Real GDP per capita.

Significance level	5%	1%
Observations	48	48
FDI stock	91.67 (44) 68.18 (30)	83.33 (40) 72.50 (29)
Sec Schooling	91.67 (44) 100.00 (44)	89.58 (43) 100.00 (43)
Bank Credit	89.58 (43) 86.05 (37)	85.42 (41) 85.37 (35)
Pop Growth*	68.75 (11) 63.64 (7)	68.75 (11) 63.64 (7)
Size Government	56.25 (27) 37.04 (10)	41.67 (20) 30.00 (6)
Legal Structures	70.83 (34) 82.35 (28)	68.75 (33) 84.85 (28)
Free Trade	56.25 (27) 29.63 (8)	47.92 (23) 21.74 (5)
Regulations	62.50 (30) 66.67 (20)	50.00 (24) 70.83 (17)

Table 5.18 - Area percentages
Dependent variable: Real GDP per capita.

Significance level	5%	1%
Observations	48	48
FDI icttw	77.08 (37) 62.16 (23)	62.50 (30) 73.33 (22)
Sec Schooling	97.92 (47) 97.87 (46)	97.92 (47) 97.87 (46)
Bank Credit	81.25 (39) 92.31 (36)	79.17 (38) 92.11 (35)
Pop Growth*	75.00 (12) 66.67 (8)	62.50 (10) 60.00 (6)
Size Government	72.92 (35) 40.00 (14)	66.67 (32) 37.50 (12)
Legal Structures	72.92 (35) 91.43 (32)	66.67 (32) 93.75 (30)
Free Trade	60.42 (29) 24.14 (7)	54.17 (26) 26.92 (7)
Regulations	66.67 (32) 71.88 (23)	56.25 (27) 81.48 (22)

Notes: First the percentage of countries that show a significant effect are shown, below these the percentage of significant countries that show a positive effect, the percentage of significant negative countries can be found by subtracting the positive percentage from 100 percent. The numbers in the parenthesis are the total amount of countries that showed the respective result. *Pop Growth contains 16 observations since it was only included in one specification.

As for secondary schooling we see a significant impact on 43 to 44 countries in the model of FDI_{stock} and showing a positive influence on every country included. Secondary schooling for the model with FDI_{icttw} presents an even higher amount of significance with 47 out of 48 countries showing a significant impact and 97.87 percent of the cases exhibit a positive influence.

The effect of Bank credit has become much clearer compared to our previous tables, showing a positive influence varying from 85.37 to 86.05 percent in table 5.17 and ranging from 92.11 and 92.31 percent in table 5.18 with 41 to 43 and 38 to 39 areas showing a significant impact consecutively.

While the size of the government had a general positive influence in the single country regressions, we see that in the majority of the cases for the area regressions we have a negative effect from the government size. Where FDI_{icttw} shows more significance than FDI_{stock} , the overall positive effect ranges between 30 and 40 percent. Although it should be noted that this effect changes for e.g. Europe when controlling for country specific effects, results for larger areas considering government size seems to be partly ambiguous.

Furthermore we have a remarkable improvement for legal structures, showing very similar results for FDI_{stock} and FDI_{icttw} , ranging between 33 and 34 countries for FDI_{stock} and 32 and 35 countries for FDI_{icttw} with a significant impact. Where a positive effect is apparent in 82.35 to 84.85 percent and 91.43 to 93.75 percent of the cases consecutively. Clearly legal structures are more important and beneficial when implemented in large areas when compared to individual countries.

In the previous tables 5.15 and 5.16 we have seen an ambiguous effect of free trade, though when taken into consideration in table 5.17 and 5.18 we see the positive effect diminishing even further. While the percentage of areas with a significant impact is higher than that of the country significant effects, we remain with a very low 21.74 to 29.63 percent of cases with a positive influence in the model with FDI_{stock} and 24.14 to 26.92 percent of the cases with a positive effect in the model with FDI_{icttw} . Depending on the specification with or without country specific effects we see a positive influence for example in Europe in the latter and Africa in the former.

Finally we have regulations as the last variable in this model. Regulations show very similar results compared to table 5.15 and 5.16 considering the effect on the host country. Though the significant impact has increase to 50 to 62.50 percent for table 5.17 and 56.25 to 66.67 percent for table 5.18 with a positive range of 66.67 to 70.83 percent for the former and 71.88 to 81.48 percent for the latter. Overall regulations shows a stable impact throughout various specifications used in section 5.

6. Causality issues

It is well known that research on the effect of foreign direct investment is influenced by the course of causality between FDI and a country's GDP. So far we briefly mentioned this in the introduction and literary overview. Chowdburry and Mavrotas (2003) conclude that for some cases it is more appropriate to speak of a bidirectional causality, with a relative high GDP growth attracting FDI and the inflow of FDI increasing the respective country's GDP. The idea behind this result is that countries with a large domestic income provide multinationals with a local market which has the potential to create and sustain demand for their products.

In order to control and correct for potential causality issues with FDI in relation to the dependant variable, GDP per capita, we first performed a simple OLS with lagged FDI_{stock} and FDI_{icttw} for up to 2 years. Therefore we get the following equation:

$$GDP\ per\ capita_i = \beta_0 + \beta_1 FDI_i + \beta_2 FDI_{i,t-1} + \beta_3 FDI_{i,t-2} + \beta_4 Controls_i + \varepsilon_i \quad (6.1)$$

where Controls stands for the control variables secondary schooling, bank credit and free trade.

When we look at the results of the Granger Causality test we see that several countries show signs of causality problems. When we take a look at FDI_{icttw} , we see a total of 6 countries with reverse causality issues under a 5 percent significance level, consisting of Bangladesh, Belgium, India, Lithuania, Malaysia and Niger. In these cases it is more likely that the height of GDP per capita is causing FDI inflow then the other way around, making a case for the existence of several papers with mixed results.²⁴ Though there are no direct signs of bidirectional causality in this dataset. Considering the results for FDI_{stock} we see a total of 11 countries showing evidence for reverse causality issues, namely Armenia, Canada, El Salvador, India, Mauritius, Namibia, Norway, Papua New Guinea, Spain, Uganda and the United Kingdom, showing some similarities with the crude lagged variable test. Considering bidirectional causality, we find that there is evidence for Slovak, Thailand and Uruguay under a 5 percent significance level.²⁵ Baring in mind that for FDI_{stock} 75 countries showed a

²⁴ For example see Borenzstein *et al.* (1998) and Carkovic and Levine (2002).

²⁵ For similar and more extensive results see Chowdburry and Mavrotas (2003), they investigate Chile, Malaysia and Thailand and find evidence that Malaysia and Thailand are under the effect of bidirectional causality and that Chile shows signs of reverse causality.

significant effect from FDI under a 5 percent significance level, 18.4 percent of the countries exhibiting causality problems is a considerable yet manageable amount. For FDI_{icttw} this amounts to 13.3 percent out of 45 countries with a significant causality issue at the 5 percent significance mark.

While a considerable amount of countries are under the effect of reverse- and bidirectional causality, the total amount seems manageable and should not have a large impact on the results. Results suggest that 81.6 and 86.7 percent of the countries from FDI_{stock} and FDI_{icttw} consecutively have no causality issues and thus should create no problems for the interpretation of the data.

7. Discussion

In this section we will attempt to construct an appropriate answer to the hypotheses that we formulated in the introduction. Starting with the first hypothesis:

H1: Secondary schooling, bank credit and the EFW²⁶ variables are important factors that condition the environment for the effect of foreign capital on the host country.

When we argue that the variables mentioned above have a positive influence on the effect that FDI brings to a specific host country we are generally speaking of an indirect effect in the majority of the cases. This indirect effect is situated in the creation of an environment for the respective country that is attractive for foreign investors. A country with a reasonable level of these factors will in general display a stronger capability to benefit from these streams of investment. Considering the results we have seen in the several equations that we have modeled in section 5 we can carefully conclude that it are the more economically and legally developed countries that present the most stable and beneficial result from FDI and likewise it are those countries that have to furthest developed factors of secondary schooling, bank credit and any of the economic freedom variables. The average marginal effect of FDI_{stock} on the host country averages just below 25 US dollar per percent of FDI_{stock} , with the elimination of country specific effects this averages around 8.5 US dollar, for FDI_{icttw} this is 159 and 115 US dollar respectively for each point increase in the variable.

Following this reasoning we should see larger effects of FDI on countries that are the highest developed, which is almost always but not exclusively the case. For example we see a consistent positive coefficient of roughly 60 US dollar for Iran, while the Netherlands has a coefficient around 55 US dollar. While the difference is quite small, it leaves some room for debate on the existence of other important factors that may have given a less developed country a possibility to benefit from FDI_{stock} quite well. Though it should be clear that these differences are likely caused by the absolute amounts these countries receive, with Iran having an FDI_{stock} of only 3.72 percent and the Netherlands with 40.4 percent, it may just be the effects of diminishing return on FDI. Furthermore while areas like North America,

²⁶ The Economic Freedom of the World variables, which are more thoroughly explained in the data section and appendix B. In short the variables range from 0 to 10, with 10 as the best score.

Europe and Eastern Asia are expected to show larger results from FDI, this is not exclusively the case, though on average they present roughly similar or better results than the world's average and clearly better results compared to Africa, South America and Western Asia.

In general we can quite safely conclude that secondary schooling, a variety of factors in the EFW variables and bank credit contribute strongly to a country's capability to benefit from the inflow of FDI. Leading us to the second hypothesis:

H2: FDI causes an increase in GDP per capita in the host country.

Clearly FDI does not cause an increase in GDP per capita in every host country, though we have seen that FDI is beneficial in the majority of our controlled countries. In section 5.1 we investigated the effect of FDI on individual countries and found that for the worst fitting model we still see a positive effect from FDI in 70.21 percent of the cases, which goes up to a positive influence of 91.67 percent of the host countries for model 5.1.

While these results strongly support the theory that FDI is beneficial for the receiving country, one should still be careful with the active promotion and attraction of foreign investors. Most countries have shown beneficial results from the inflow of FDI, though there are examples like Kuwait that show a serious negative impact. This can be explained by exogenous influences like the turbulent area in which Kuwait is located, considering several invasions of the Iraqi army. Furthermore Kuwait is largely dependent on the oil industry, which impairs economic stability.

FDI certainly is an interesting instrument when your goal is to raise your country's income, though countries might find themselves competing against each other, which brings us to our third hypothesis:

H3: FDI causes an increase in GDP per capita in large economic areas like the EU or Asia.

In section 5.2 and 5.3 we investigated the effect of FDI on larger areas and found similar results as in the individual country regressions. While the positive percentage of areas is more mildly spread between 62.16 and 73.33 percent, this is under considerable influence since a fluctuation of one or two areas will have a large impact on these percentages.

In general we can conclude very similar to hypothesis 2, that FDI is beneficial in the majority of the cases, with the emphasis on the more economically and legally developed areas. We see the most stable results for Europe, Eastern Asia and Africa, where Europe and Eastern Asia are always clearly positive with a coefficient of 20 to 30 US dollar per percent of FDI_{stock} for European areas and 6.5 US dollar when controlling for country specific effects. For Eastern Asia this results in an average of 25 US dollar per percent of FDI_{stock} for both specifications, while Africa presents a negative impact of 7 to 9 US dollar per percent of FDI_{stock} on average.

Interesting to see is that the more extreme form of the area regression, namely the combination of all 107 included countries mentioned as the World regression, shows a strong positive result in all specifications with FDI, averaging around 25 US dollar per capita for each percent increase in FDI_{stock} or 8.5 US dollar when controlling for country specific effects and around 159 US dollar per capita for each point of FDI_{icttw} or 115 US dollar when we control for country specific effects here as well, which is strong support that FDI is beneficial on a net basis.

8. Conclusion

The main focus of this paper is to investigate on a large scale if FDI is beneficial or detrimental for the respective receiving host country or group of countries in a pooled area regression model. We investigate the remaining effect of FDI while controlling for variables as secondary schooling, various economic freedom indicators and bank credit, which are deemed some of the most highly correlated variables with economic growth.

Our results, primarily shown in section 5, present a generally positive effect from foreign direct investment on per capita income. Where the importance of FDI seems to increase for countries that can be considered as further or highly developed compared to the rest of the world. The results show a positive effect ranging from 70.21 to 91.67 percent for our individual country regressions that presented a significant impact from FDI, which included 105 to 107 countries depending on the specification. While these results are promising, FDI still causes a negative impact ranging from 29.79 percent in the worst case to only 8.33 percent as our best case. Leaving quite some room for countries to be careful with the inflow or stimulation of the inflow of FDI.

When considering the significant impact of FDI on a respective country we see that FDI_{stock} presents a fairly high significance with slightly over half of the countries included in our database showing a significant impact. Our own constructed measure of FDI in comparison to the world is less successful however, with on average a significant impact slightly below a quarter of the cases.

Furthermore the results from the economic areas are highly significant, showing a clear positive influence for further developed areas like Europe and Eastern Asia. Where North America seems to gain a lot from our own measure of FDI, though has trouble to present a clear effect from FDI_{stock} . Considering the effect on less developed areas we see e.g. in Africa that the influence from FDI is negative in all specifications of the model. Similar results arise for Western Asia, with the exception of FDI_{stock} when we control for country fixed effects. In general the area regressions give a good view of the effect of economic development on the usefulness of FDI for the respective area.

While the results for the inflow of FDI are promising for countries that may attempt to attract FDI in order to increase welfare, one should still remain careful when the effect is not completely clear. There are several examples of countries that actually lost significantly

from the inflow of FDI. Though this are in most cases the lesser developed countries like Togo, Niger or Zimbabwe, we have seen a perhaps surprising negative impact on Kuwait and Germany as well, which are both considered highly developed economies.

In general we can state that FDI is most likely beneficial and having a further developed economy increases the chance of a positive impact from FDI, though carefulness with these large streams of money is warranted since there are some cases where FDI can be destructive in situation where this was not expected.

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Appendix

A. Theory of Double Marginalization²⁷

Let's assume we have a market of some sort that has manufacturers and retailers. The demand for the product, let's say they produce shoes, is equal to $p = w - \frac{1}{100}q$. Where w is the maximum willingness to pay.

To keep this fairly simple we will assume that the marginal costs of producing shoes for retailers is equal to c_R and for manufacturers c_M . Solving this via backward induction we have to take a look at the retailer first. The retailer will try to maximize his profit, therefore marginal costs equals marginal revenue. We get;

$$w - \frac{1}{50}q = r + c_R \quad \text{with } r_R = w - c_R - \frac{1}{50}q$$

Where r stands for the wholesale price, which is the product price of the upstream firm or in other words, the prices the retailer has to pay too the manufacturer. The r_R and r_M are revenue retailer and revenue manufacturer respectively. The inverse demand function is now given by $r = w - c_R - \frac{1}{50}q$. Considering the manufacturer, which will also try to maximize profit, will have the following function;

$$w - c_R - \frac{1}{25}q = r + c_M \quad \text{with } r_M = w - c_R - c_M - \frac{1}{25}q \quad \text{where } q = 25(w - c_R - c_M)$$

This $q = 25(w - c_R - c_M)$ is the function which the manufacturer will base his production decision on, maximizing profit.

Now if these firms where to vertically integrate we would have the following function, where c_{vi} stands for the marginal costs of the vertically integrated firm;

$$r_{VI} = w - c_{VI} - \frac{1}{50}q \quad \text{where } q = 50(w - c_{VI})$$

As one might already see that r_{VI} is most likely bigger than $r_R + r_M$. We will take some numbers to visualize the outcome somewhat more;

²⁷ Adapted from industrial organisation classes from Prof.Dr. H.P.G. Pennings

Assume that the costs of production for retailers and manufacturers is constant and is equal to 20 and 30 respectively and that the maximum willingness to pay equals 750. Using backward induction gives us the following outcome;

$$r_R = 750 - 20 - \frac{1}{50}q \quad \text{for the retailer where for the manufacturer we get;}$$

$$r_M = 750 - 50 - \frac{1}{25}q \quad \text{Maximizing this function gives us } q = 17.500$$

$$\text{Where we can see that } p = 750 - \frac{1}{100}17.500 = 575 \text{ and } r_R = 730 - \frac{1}{50}17.500 = 380$$

$$\text{Profit for the retailer is } (P - r_R - 20)q = (575 - 380 - 20)17500 = 3.062.500$$

$$\text{Profit manufacturer is } (r - 30)q = (380 - 30)17500 = 6.125.000$$

If these firms were to merge we would get the following profit maximization;

$$750 - \frac{1}{50}q = 50 \quad \text{where we get } q = 35.000$$

Substituting this into the demand function $p = w - \frac{1}{100}q$ will give $p = 750 - 350 = 400$, therefore the profit of the merged firm will be $(400 - 50)35.000 = 12.250.000$

Now we can show that the combined profit of the firms pre-merger is $3.062.500 + 6.125.000 = 9.187.500$ whereas the profit of the merge firm equals $12.250.000$. As we can see, the profit of the merged firm is greater than the profit of the separated firms combined, even though the price of the good has been lowered, implying an increase in consumer as well as producer surplus. The vertical merge has lowered costs of producing in such a way that competition has greatly improved for the merged firm.

B. Components of the EFW Index

Elaboration on the EFW variables is directly taken from the EFW index.

Size of Government: Expenditures, Taxes, and Enterprises

- General government consumption spending as a percentage of total consumption
- Transfers and subsidies as a percentage of GDP
- Government enterprises and investment
- Top marginal tax rate
 - Top marginal income tax rate
 - Top marginal income and payroll tax rates

Legal Structure and Security of Property Rights

- Judicial independence (GCR)
- Impartial courts (GCR)
- Protection of property rights (GCR)
- Military interference in rule of law and the political process (CRG)
- Integrity of the legal system (CRG)
- Legal enforcement of contracts (DB)
- Regulatory restrictions on the sale of real property (DB)

Access to Sound Money

- Money Growth
- Standard deviation of inflation
- Inflation: Most recent year
- Freedom to own foreign currency bank accounts

Freedom to Trade Internationally

- Taxes on international trade
 - Revenues from trade taxes (% of trade sector)
 - Mean tariff rate
 - Standard deviation of tariff rates
- Regulatory Trade Barriers
 - Non-tariff trade barriers (GCR)
 - Compliance cost of importing and exporting (DB)
- Size of the trade sector relative to expected
- Black-market exchange rates
- International capital market controls
 - Foreign ownership/investment restrictions (GCR)
 - Capital controls

Regulation of Credit, Labor, and Business

- Credit market regulations
 - Ownership of banks
 - Foreign bank competition
 - Private sector credit

- Interest rate controls/negative real interest rates
- Labor market regulations
 - Minimum wage (DB)
 - Hiring and firing regulations (GCR)
 - Centralized collective bargaining (GCR)
 - Mandated cost of hiring (DB)
 - Mandated cost of worker dismissal (DB)
 - Conscription
- Business Regulations
 - Price controls
 - Administrative requirements (GCR)
 - Bureaucracy costs (GCR)
 - Starting a business (DB)
 - Extra payments/bribes (GCR)
 - Licensing restrictions (DB)
 - Cost of tax compliance (DB)

SUM EFW as referred to in the text and tables is the weighted average value of the five EFW index variables.

C. List of Countries

Countries included in the dataset				
America	Europe	Africa	Asia	Oceania
Argentina	Albania	Algeria	Bangladesh	Australia
Belize	Armenia	Benin	China	Fiji
Bolivia	Austria	Botswana	Hong Kong	New Zealand
Brazil	Belgium*	Burundi	India	Pap. New Guinea
Canada	Bulgaria	Cameroon	Indonesia	
Chile	Croatia	Cen. African Rep	Iran	
Colombia	Cyprus	Cote d'Ivoire	Israel	
Costa Rica	Czech Republic	Dem Rep Congo	Japan	
Ecuador	Denmark	Egypt	Jordan	
El Salvador	Estonia	Gabon*	Korea Rep	
Guatemala	Finland	Ghana	Kuwait	
Guyana	France	Kenya	Malaysia	
Mexico	Germany	Malawi	Nepal	
Nicaragua	Greece	Mali	Pakistan	
Panama	Hungary	Mauritius	Philippines	
Paraguay	Iceland	Morocco	Singapore	
Peru	Ireland	Namibia	Sri Lanka	
United States	Italy	Niger	Syrian Arab Rep	
Uruguay	Latvia	Rep Congo	Thailand	
Venezuela	Lithuania	Senegal	UAE**	
	Luxembourg	Sierra Leone		
	Netherlands	South Africa		
	Norway	Tanzania		
	Poland	Togo		
	Portugal	Tunisia		
	Romania	Uganda		
	Russian Fed	Zambia		
	Slovak Republic	Zimbabwe		
	Slovenia			
	Spain			
	Sweden			
	Switzerland			
	Turkey			
	Ukraine			
	United Kingdom			

*Countries are not included in FDI_{stock} dataset

**Country is not included in FDI_{icttw} dataset

D. Countries included in the area regressions

Area: Countries. (mean FDI_{stock} as percentage of GDP, mean FDI_{icttw})

America: See C. (23.36%, 1.64)

North America: Canada, United States and Mexico. (17.69%, 1.55)

Central America: Belize, Costa Rica, El Salvador, Guatemala, Nicaragua and Panama. (25.90%, 1.80)

South America: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Uruguay and Venezuela. (23.50%, 1.58)

Europe: See C. (40.49%, 4.25)

EU-27: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Romania, Slovak, Slovenia, Spain, Sweden and the United Kingdom. (48.11%, 5.24)

Euro Zone: Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Slovak, Slovenia and Spain. (58.83%, 7.10)

OECD: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea Republic, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom and the United States. (38.36%, 3.98)

Africa: See C. (21.79%, 1.23)

Sub-Saharan Africa: Benin, Botswana, Burundi, Cameroon, Central African Republic, Cote d'Ivoire, Congo Democratic Republic, Congo Republic, Gabon, Ghana, Kenya, Malawi, Mali, Mauritius, Namibia, Niger, Senegal, Sierra Leone, South Africa, Togo, Tanzania, Uganda, Zambia and Zimbabwe. (20.78%, 1.18)

Asia: See C. (31.10%, 1.44)

Eastern Asia: Hong Kong, China, Japan, Korea Republic. (87.53%, 0.85)

Southern Asia: Bangladesh, India, Nepal, Pakistan and Sri Lanka. (4.52%, 0.35)

Western Asia: Cyprus, Iran, Israel, Jordan, Kuwait, Syrian, Turkey, United Arab Emirates. (14.08%, 0.92)

Oceania: See C. (32.39%, 3.63)

World: All countries, see C. (29.65%, 2.32)²⁸

²⁸ FDI_{icttw} for the World area differs from 1 because the variable is based on more than 200 countries that had available data for the construction of the variable.

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