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SECTORAL FDI IMPACT ON EMERGING MARKETS

A SYSTEM GMM APPROACH

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ABSTRACT

Although it may seem natural to argue that Foreign Direct Investment (FDI) is positive for host economies and their economic growth, earlier research gives an ambiguous picture in this matter of interest. This paper uses a reconciliation of three important studies (Alfaro 2003, Bloningen and Wang 2005, and Carkovic and Levine 2005). By disaggregating the FDI into sectors and pooling against emerging markets while using a system GMM estimator, this paper avoids common mistakes in earlier studies, and therefore provides a new generalizing study of foreign direct investments' effect on growth. Our results indicate that FDI in each of the three sectors has an insignificant effect on host country growth. Plausible reasons behind our results and additional factors that might have altered the results are briefly discussed.

Keywords: FDI Inflows, system GMM, sectoral FDI, emerging market economies

CONTENTS

I. INTRODUCTION.....	4
II. THEORY AND BACKGROUND	6
THEORY	6
BACKGROUND	7
III. METHODOLOGY	10
SYSTEM GMM.....	10
DYNAMIC PANEL BIAS	12
THE FRAMWORK BEHIND SYSTEM GMM.....	12
VALIDITY OF THE CONDITIONS MADE.....	15
OVERCOMING A FALSE POSITIVE HANSEN TEST	15
IV. EMPIRICAL RESULTS	17
TABLE 1 – FDI PRIMARY	17
TABLE 2 – FDI MANUFACTURING	17
TABLE 3 – FDI SERVICES.....	18
SUMMARY	18
V. DISCUSSION.....	19
FDI PRIMARY	19
FDI MANUFACTURING	20
FDI SERVICES	21
VI. CONCLUSION	23
REFERENCES	24
APPENDIX A – TABLES AND FIGURES	28
TABLE 1 – ABBB ESTIMATION – FDI PRIMARY	28
TABLE 2 – ABBB ESTIMATION – FDI MANUFACTURING	28
TABLE 3 – ABBB ESTIMATION – FDI SERVICES	29
FIGURE 1 – FDI INFLOW TO EMERGING MARKETS 1990-2010	29
APPENDIX B - DATA	30
DATA FOR EACH COUNTRY	31
DATA SOURCES AND DESCRIPTIONS	31

I. INTRODUCTION

What is the impact of foreign direct investment on development? The answer is important for policymakers as well as billions workers and families in the developing world. It has, however, been shown hard to determine how FDI affects development and growth.

In the last three decades capital flows to emerging markets have steadily increased with a certain episodic nature (Ghosh et al. 2012). The transformation towards more liberalized economies with more open capital accounts was reflected in a heavy surge period towards emerging markets in the beginning of the 1990's. This surge period ended with the Asian Crisis of 1997-98. A second surge period began building up in 2002, after the collapse of the IT bubble. What characterized this heavy increase in capital flows was the predominance of Foreign Direct Investment (FDI) and a stronger current account position for many of the so called emerging markets (IMF, WEO 2007). The characteristics of the FDI flows in the years following the collapse of the IT bubble were somehow changing. Firstly, one could depict a stronger focus on the primary and service sector while the earlier so dominant manufacturing sector was declining. Secondly, developing and emerging markets emerged as influence players in terms of outward investment. This second surge period during the last two decades had its sudden stop after the financial crash of 2008 when outward FDI from developed countries fell with 50% (see figure 1). In contrast, the outward FDI flows from BRICs and developing economies actually remained stable which is the reason behind the large increase in total share of outward FDI from developing- and emerging economies that today amounts to 30% of total FDI, compared to 5% in 1990 (Krieger-Boden et al. 2012).

Even though there has been a steady increase in Foreign Direct Investment towards developing economies there is still no consensus regarding its effect. The general view from the 1990s, summarized by John Williamson (2003) and the so-called Washington Consensus, was that FDI was positive for development as long as the companies did not engage in work abuse or environmental pollution. This view was shared by prominent NGOs resulting in drastic policy changes, in many of the world's developing economies. During this period of time, a part of the academia had a more sceptical approach, an approach that was partly proven right. The evidence showed that FDI also could have a detrimental effect on growth under certain conditions. Thus, the earlier view that a given set of reforms could be used for all countries was changed. Another approach to this issue was that a country's development objectives could only be achieved with imposing performance requirements on the

multinational companies (MNCs) that seek to invest in the host economy. Even though there is a lack of consensus regarding host country effects, FDI has played a prominent role in the global market and increased since the 1990s, as depicted in figure 1.

As pointed out in the IMF World Economic Outlook (2011), emerging markets have historically experienced higher net capital inflows during periods when there has been low global interest rate, low global risk aversion and a higher growth performance in developing economies compared to advanced economies. These characteristics fit well into today's world and is the reason why we can suspect, and even start to see, another surge period of capital flows into emerging economies. With respect to this, it is especially interesting to view the effect of FDI on growth from the viewpoints of emerging markets.

In this paper we will try to answer the following question: Do FDI inflows towards emerging markets have a positive effect on the host economy growth? We then provide a brief discussion regarding plausible theories behind our empirical result.

This paper is organized as follows. The following section gives an overview of sectoral FDI and earlier research within this topic. Section III discusses data and methodology used. Section IV presents empirical results. In Section V we discuss our empirical results alongside with plausible ulterior theories. Section VI concludes the paper.

II. THEORY AND BACKGROUND

THEORY

There is a widespread impression that FDI is somehow better for growth and development than other capital flows. This view has been held for several reasons. Firstly, there is strong empirical evidence that FDI flows are less volatile than other capital flows (see IMF, WEO 2007). Secondly, is the fact that foreign investors are unable to uproot plants or factories in the midst of crisis, which cannot be said for portfolio investment, or bank loans, which is capital that easily can be withdrawn from the host economy. Thirdly, FDI is expected to create potential growth benefits for developing countries, and especially for low-income countries, based upon the standard neoclassical argument, which proposes that FDI should flow from richer economies that experience diminishing capital returns, to poorer economies with higher rates of return (Walsh 2010). Even if FDI in this sense seems to be more attractive to developing economies than other types of capital flows, determining exactly how FDI affects development has proved to be remarkably elusive.

The theory behind FDI's positive effect on growth comes from the belief that multinational companies' foreign investments will produce externalities in the form of technology transfer and spillovers. Romer (1993) argues that foreign investments can ease the transfer of technological and business know-how to poorer countries. Spillovers from FDI occur when the entry or presence of a multinational enterprise increases the productivity in domestic firms in a certain country and the MNCs do not internalize all of these benefits. Thus, transfer of technology through FDI may have a substantial spillover effect for the entire economy.

Spillovers are divided into vertical- and horizontal spillovers. The theory behind the former is the so-called backward linkage phenomenon (Findlay 1978 and Wang 1990), i.e. a multinational presence will increase productivity within the potential suppliers in the host country. This happens because multinationals offer more lucrative contracts to its potential suppliers, contracts that can be obtained under certain conditions such as increased quality, on time delivery, and technological sophistication. Requirements that, if fulfilled, will make the supplier more efficient, which in turn will make the economy more efficient. Furthermore, a multinational company is more likely to import from another country if the host country suppliers do not live up to the requirements. Thus, there is also an increased competition in

the market, which also creates a necessity for the local firms to improve their operations if they wish to obtain the lucrative contract.

The horizontal spillover, on the other hand, derives from the theory that the multinational increases the competition on the local market that in turn forces the local firms to use their resources more efficiently. The presence of MNCs can enable domestic firms to increase their efficiency by observing the MNC's more sophisticated operations and copying them or by hiring people trained by MNCs. The above-mentioned spillover effects are commonly referred to as the crowding in effect of FDI.

Görg et al. (2001) questioned these positive effects from FDI spillovers and found that there is a crowding out effect that reduces the output of domestic firms and that dominates any potential productivity spillover. This is due to that foreign and domestic firms compete on product markets. In a competitive market workers are paid at their marginal product, the presence of MNCs will probably increase productivity and thereby wages. MNCs, therefore, attract skilled labour from the domestic exporting sector that will substitute towards unskilled labour. This in turn leads to a reduction in output produced by the exporting domestic firms, moving them up their average cost curve and reducing labour productivity. The decrease in productivity results in a lower output for each exporting domestic firm that leads to a diminishing growth and domestic welfare.

The theoretical reasoning regarding crowding in effects is why developing countries have chosen to promote FDI by creating exporting processing zones and tax incentives such as lower corporate income tax and exemption on import duties. There is also direct subsidies occurring for multinational cooperation; Brazil, Turkey, and Portugal are cases in point (UNCTAD 2006).

BACKGROUND

Aizenman and Sushko (2011) conducted a thorough study of capital flows in different manufacturing industries from 99 countries between 1991 and 2007. In this study FDI inflow, in contrast to portfolio- debt and equity, is found to have a positive association with growth during large parts of the sample period. A similar relationship between FDI and growth is found in the well cited paper of Borensztein et al. (1998) where the effect is found to be positive and related to technological progress, although with the important condition that the magnitude of the effect depends on the stock of human capital. For countries with well below

an average level of human capital the FDI inflow actually was found to have a negative effect on the economic performance of the country.

Aitken and Harrison (1999), Djankov and Hoekman (2000), and Konings (2001) all fail to find horizontal spillovers from FDI in the developing countries they studied. This in line with Truman (2002) who examines 12 emerging markets between 1980-2000 with the conclusion that the countries that was, to a larger extent, dependent on FDI demonstrated a weaker growth. If these countries had been growing faster with less FDI can be discussed, but even so it is not a favourable position to the theory that FDI will stimulate growth.

Earlier research has in different manner emphasized the reasons for this discrepancy. Firstly, as Blonigen and Wang (2004) point out many studies in this subject use only data from the most developed countries, since it is more readily available. Furthermore, the empirical FDI studies that do include data from less developed countries fail to distinguish between developed- and least developed countries. Naturally, these can lead to wrong estimates if the partial effect between FDI and growth differ between the two sets of countries.

Secondly, as Alfaro (2003) demonstrates one should take into account that the benefit of FDI to growth can vary greatly by sector. The study showed that FDI flows to the primary sector have a negative effect on growth whilst inflows to the manufacturing sector have a positive effect. As Hirschman (1958:110) pointed out “The grudge against what has become known as the “enclave” type of development is due to this ability of primary products from mines, wells and plantations to slip out of the country without leaving much of a trace in the rest of the economy.”

Thirdly, Carkovic and Levine (2005) point out that a majority of the macroeconomic studies on the FDI effect on growth do not fully control for country-specific effects, the reverse causality between growth and FDI, and the routine of lagged dependent variables to control for a delayed effect of foreign investments on growth, which one quite easily can argue for. By using a dynamic panel model¹ when examining the FDI-growth link. They failed to find a significant effect of FDI on growth when holding other factors constant.

To summarize, there is an inconsistency in the empirical research regarding FDI and its effects on growth. And only one clear conclusion can be drawn from earlier research; the

¹ They used a system GMM approach developed by Arellano – Bover – Blundell – Bond

effect of FDI is ambiguous. However, a majority of these studies searched for an effect of aggregated FDI on host country growth. As Moran (2011:2) puts it “The use in these studies of aggregate data is like asking whether or not the FDI tree produces fruit punch (apples, oranges, bananas and pears)?” The task to find a clear relationship is thus a difficult one since different kinds of FDI flows have different kinds of effects in different countries.

Three studies from the “first generation of research”, Alfaro (2003), Carkovic and Levine (2005) and Blonigen and Wang (2004) all tried to narrow down the FDI notion in different ways in order to find significant partial effects. However, attempts to synthesize these three studies have been much needed (Moran et al. 2005) and a vast number of prominent case studies Wang (2010), Javorcik et al. (2012), Beugelswijk et al. (2008) just to mention a few, deals with many of the issues from the first generation of research. Nevertheless, the authors of this paper have not come across a generalising study that takes into account the issues with poor pooling, lagged effects, endogeneity bias, reverse causality, and disaggregated FDI, which a synthesize of these papers will do.

Because of the above mentioned we have chosen to collect panel data over a period of twenty year for three different sectors: Primary, Manufacturing, and Services. With a strong focus on emerging markets, with respect to this our belief is that this paper provides better and more reliable estimates of the true effect of FDI on the chosen set of countries.

III. METHODOLOGY

It has become apparent that Ordinary Least Squares estimation of cross-country growth regressions suffers from a number of statistical problems (Roodman 2006). Firstly, with the OLS methodology it is very hard, if not impossible, to control for the unobserved country-specific effects. Secondly, cross-country growth regressions due to the magnitude of factors related to growth include substantial omitted variable bias, a bias that is hard to sign. The third problem arising with OLS regression in growth studies is the plausible reverse causality with independent variables – in our model this causality problem occurs between the independent variable FDI, by sector, and the dependent variable Real GDP per capita growth. In a similar manner it is hard to determine if the effect of FDI causes a country to become more open or if a country's liberalizations process causes the FDI to increase.

SYSTEM GMM

Arellano and Bover (1995) came up with the Generalized Methods of Moments (GMM) an econometric model that was further developed by Blundell and Bond (1998). The GMM estimators are designed for panel analysis. To understand the models usefulness in our empirical problem one can compare the assumptions (in italic)² underlying the GMM with the issues encountered in the sample of our research analysis.

1. *There may be arbitrarily distributed fixed individual effects, which argues against cross-section regressions.* In our sample there is a great risk of country-specific effects, such as geography or demographics, captured in the error term to be correlated with the explanatory variables. In a simple OLS framework one can try to control for these types of effects by adding a control variable, as for example Initial GDP. Naturally, there is a risk of bias estimators with this approach since Initial GDP might be a bad proxy for these types of fixed effects. I.e. we cannot expect to capture all the countries' "ability" to grow just by adding Initial GDP.

2. *The process is dynamic with current realizations of the dependent variable influenced by past ones.* In our model one can easily argue that a country that had a high growth last year is more likely to continue on the same track the following year than a country that failed to find a similar growth rate. This type of dynamic model argues for an inclusion of *Growth* (lagged) as a regressor.

² Roodman (2006)

3. *Some regressors may be endogenous.* In our model the dependent variable is GDP per capita growth and the independent variable is FDI, two variables that are largely dependent on various factors and whose direction of causality is hard to determine, thus the risk of an endogenous regressors is overwhelming.

4. *The idiosyncratic disturbances may have individual-specific patterns of heteroskedasticity and serial correlation.* The error term, that for example could include corruption, is likely to vary over time and is also likely to depend on its past level.

5. *The Idiosyncratic disturbances are uncorrelated across individuals.* This implies that the time varying factors captured in the error term differ between the countries and is uncorrelated with ditto. This problem can be applied to our sample. Again, corruption serves as an example: we fail to take into account the country's level of corruption, a level that would most likely differ both between the countries and within the time period of twenty one years.

6. *Some independent variables may be predetermined but not strictly exogenous.* In a growth model there is a clear advantage of adding a lagged dependent variable (growth) into the model, since this variable might consist of factors that explain the growth of the year examined. This lagged dependent variable working as an independent variable is predetermined and not strictly exogenous since it will depend upon the factors in the residual.

7. *The number of period of available data, T , is small.* In our unbalanced panel, FDI by sector is missing for several years, which in turn results in a relatively low available time period for a majority of the countries examined. This is an important assumption since a large time-period would reduce the necessity of a GMM approach (see dynamic panel bias discussion below). Even with a long time period relative to the number of groups examined it is not wrong to use System GMM, although, a more straightforward fixed effects estimator would also work. (Roodman 2006). Since our data is limited (see appendix) we have chosen to use system GMM.

8. *The only available instruments are "internal".* With GDP per capita growth as a dependent variable the error term consists of a number of factors, which makes it a difficult task to find a suitable instrument variable to control for the more than likely omitted variable bias occurring from normal OLS regression. The system GMM approach, in contrast to Two Stage Least

Squares, is suitable for growth studies in the sense that one can use lagged independent variables as instrument variables.

The eight underlying assumptions about the data-generating process in the system GMM fit well into our empirical analysis and the issues that follow. System GMM is based upon more easily accepted assumptions and uses a more complex technique, that is why research today frequently use system GMM in growth modeling (Roodman 2006).

DYNAMIC PANEL BIAS

One of the most fundamental problems with applying OLS to our type of empirical problem is that $y_{i,t-1}$ is endogenous to the fixed effect in the error term, this gives rise to *dynamic panel bias*. An example of this, in our case, would be if one of the countries experienced a large negative growth shock that for some reason was not modeled. This growth shock would then go into the error term, which in turn would result in a deviation from the fixed effect for that country for the entire 1990-2010 period, i.e. the fixed effect will appear lower (or higher) and so will the lagged effect of growth the year following the growth shock. In particular, it will bias the coefficient estimators due to the positive correlation between the explanatory variable and the error term. With an even smaller time-period than the one we have, this type of problem with an incorrect fixed effect captured in the error term would be even larger and so would the endogeneity problem. Thus, depending on how one define our time-period of 20 years, with data for main variables missing for consecutive years, one can argue in both ways. Whereas a larger time period would reduce the necessity of a System GMM approach, since country fixed effect in larger T-panels would decline with time and the correlation between the error term and the lagged dependent variable would be insignificant (see Roodman, 2006). Ongoing research stills struggles with the definition of what can be define as a large T-panel, a time span below 25 years and above 15 is defined as a moderate T-panel by Han and Philips (2010), which is the case in our dataset.

THE FRAMEWORK BEHIND SYSTEM GMM

The basic idea behind the System GMM is to use two equations simultaneously. The first equation is in first difference, the second in level form. By using lagged explanatory in level form as instruments for the equation in first difference and lagged differences as instruments for the equation in levels, we can control for the fixed effects, omitted variable bias and reverse causality. Furthermore, we avoid the problem with only using a first difference

equation where information regarding the explanatory variables that are more or less persistent over time will be lost. In order for the system GMM to work the lagged explanatory variables in first-difference form (instruments used in level equation) need to be uncorrelated with the error term in the level equation, i.e. the country specific fixed effect -geography and demographics- captured in the level forms error term cannot depend upon the changes over the years in the explanatory variables. The same reasoning applies for the equation in difference form, where the lagged explanatory variables (instruments) cannot be correlated with the error term in differences.

To get a better grip of the System GMM or the so-called ABBB estimator, we start by considering the following equation:

$$y_{i,t} = \alpha y_{i,t-1} + \beta' X_{i,t} + u_i + \varepsilon_{i,t} \quad (1)$$

In our model:

$$GROWTH_{i,t} = \beta_1 GROWTH_{i,t-1} + \beta_2 FDI_{i,t}^S + \beta_3' X_{i,t} + u_i + \varepsilon_{i,t} \quad (2)$$

In equation (2), above, *Growth* is measured as Real GDP per capita growth and $Growth_{i,t-1}$ is its lagged value. $FDI_{i,t}^S$ is FDI from different sectors – Primary, Manufacturing, and Services – measured as FDI inflow percentage of GDP. $X_{i,t}$ is a vector of the following control variables: *Schooling*, *Inflation*, *Government Size*, *Openness*, and *Private Credit*. The time constant unobserved fixed effects is denoted by u_i , in this variable we find factors affecting growth but which do not change over time, such as a country's natural resources or geographic location. The $\varepsilon_{i,t}$ denotes the idiosyncratic error or time-varying error, this variable represents unobserved factors that change over time and affect $(y_{i,t})$ *Growth*.

As Anderson and Hsiao (1982) rightly proposed, we can eliminate the country specific effect by taking the first differences of equation (1).

$$y_{i,t} - y_{i,t-1} = \alpha(y_{i,t-1} - y_{i,t-2}) + \beta'(X_{i,t} - X_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \quad (3)$$

or

$$\Delta y_{i,t} = \alpha \Delta y_{i,t-1} + \Delta \beta' X_{i,t} + \Delta \varepsilon_{i,t} \quad (4)$$

In equation (3) we can get rid of the plausible endogeneity bias occurring from the time constant factor (u_i) and our explanatory variables. Still, however, the model suffer from the time-varying endogeneity bias, in other words the new error term ($\varepsilon_{i,t} - \varepsilon_{i,t-1}$) is correlated with the lagged dependent variable ($y_{i,t-1} - y_{i,t-2}$). We have included the latter as one of the explanatory variables. This inclusion is, however, worthwhile since we most probably can explain the GDP growth in one year with the same factors that explained the growth the previous year, e.g. a country's infrastructure or trade policy that is constant over two years will be captured in this lagged regressor and by this we hope to minimize the factors captured in the error term. We need to solve for the correlation between the error term and the lagged dependent variables in order to get good statistical properties in our sample, otherwise our estimates will not be reliable. By adding lagged level instruments in the difference equation we can solve for this correlation and the omitted variable bias occurring from the time-varying part of the error term.

The following two conditions (proposed by Arellano and Bond, 1991) are imposed on the lagged level instruments in equation (4);

$$E[y_{i,t-s}(\Delta \varepsilon_{i,t})] = 0 \quad \text{for } s \geq 2; t \geq 2 \quad (5)$$

$$E[x_{i,t-s}(\Delta \varepsilon_{i,t})] = 0 \quad \text{for } s \geq 2; t \geq 2 \quad (6)$$

(5) and (6) implies that $\Delta \varepsilon_{i,t}$ have a zero covariance with all $y_{i,t-s}$, and $x_{i,t-s}$, dated t-2 and earlier (allowing for reverse causality up to two years).

The level equation (1), in addition to the statistical problems occurring from the difference equation (4), also consists of a country specific fixed effect that might be correlated with our explanatory variables. We need to control for this omitted variable bias by adding instruments in form of lagged explanatory variables, from the first difference equation. In order for these instruments to be considered appropriate Blundell and Bond (1998) and Arellano and Bover (1995) set the following two conditions:

$$E[(y_{i,t-s} - y_{i,t-s-1}) * (u_i + \varepsilon_{i,t})] = 0 \quad \text{for } s = 1 \quad (7)$$

$$E[(x_{i,t-s} - x_{i,t-s-1}) * (u_i + \varepsilon_{i,t})] = 0 \quad \text{for } s = 1 \quad (8)$$

(7) and (8) implies that levels of the regressors and the regressand can be correlated with u_i

but not with the differences in the regressors.

THE VALIDITY OF THE CONDITIONS

To control for the validity of the system GMM estimator there are two conditions that have to be fulfilled. First, there should be no serial correlation in the random error term. This is examined by taking the first and second order serial correlation of the first-differenced residuals, that is the residuals from equation (4). The first-differenced is assumed to have a negative and significant first-order serial correlation since $\Delta \varepsilon_{i,t} = \varepsilon_{i,t} - \varepsilon_{i,t-1}$ $\Delta \varepsilon_{i,t-1} = \varepsilon_{i,t-1} - \varepsilon_{i,t-2}$, both contains $\varepsilon_{i,t-1}$. The second-order serial correlation in this autoregressive model should be insignificant. This is vital since it will detect if the level model consists of serial correlation. Second, the instruments should be uncorrelated with the error term. In our empirical model we used lagged differences and lagged levels as instruments. Hansen's (1982) test for overidentification determines if the instruments are correlated with the error or not. The null hypothesis of the test is that there is no correlation between the overidentified instruments³ and the error term. A non-rejection of the null in a Hansen test confirms that the instruments as a group are exogenous.

Furthermore, the system GMM can be severely biased in finite samples. Windmeijer (2005) came up with a correction for this bias that is included when adding "robust" in the "xtabond2" syntax and is therefore taken into account in our results, since we use robust standard errors to control for heteroskedasticity.

OVERCOMING A FALSE POSITIVE HANSEN TEST

Roodman (2006) concludes that too many instruments can severely weaken and bias the Hansen test. As a rule of thumb, he suggests that the number of instruments should stay below the number of countries. This is especially a large problem when there are many endogenous variables and a small sample size. To increase the validity of the over-identification test one can use the collapse command that will transform the data in a manner that will decrease the number of instruments used with the System GMM approach, this in turn will make the

³ Coefficients on endogenous regressors are said to be overidentified when number of instruments exceeds number of endogenous variables

Hansen test more valid. Roodman (2006) suggests using the “collapse” command in a small sample to overcome the possibility of a false positive Hansen test. The idea behind “collapsing” is to create one instrument for each variable and lag distance. Whereas an “uncollapsed” matrix would consist of one instrument for each time period, lag distance and variable. This requires that the conditions (4) and (5) are replaced by the following two conditions:

$$E[y_{i,t-s}(\Delta \varepsilon_{i,t})] = 0 \quad \text{for } s \geq 2 \quad (9)$$

$$E[x_{i,t-s}(\Delta \varepsilon_{i,t})] = 0 \quad \text{for } s \geq 2 \quad (10)$$

With the *collapse* command, the instrument set is compressed such that there is a separate column for each lag and variable only.

IV. EMPIRICAL RESULTS

We ran a total of 18 regressions, six for each sector. All our chosen controls are based upon the conditioning set used in Carkovic and Levine (2005) in order to create a comparable model. To ease the comparison between our results we have run the regressions in the same order with the same control variables. It is also our belief that the model though simple, captures the most important control variables. However, Initial GDP has been replaced by the GDP per capita growth lagged one year. Reasons are discussed in the methodology section. Also, the control variable “Black market premium” has been excluded due to unavailability of reasonable proxies and the insignificance found in Carkovic and Levine (2005). The results are presented in Appendix B.

TABLE 1 – FDI PRIMARY

The table presents the results over six regressions estimated with system GMM and robust standard errors. What can be drawn from this regression is that *FDI Primary* is insignificant throughout all six regressions. The addition of any control variable to the “basic” set of controls does not affect *FDI Primary* insignificance. However, focus for this table lies in regression 6, which contains the full model regression. All regressions reject the null-hypothesis of serial correlation in the second order (P-value Serial Correlation AR (2)) and reject the null-hypothesis of exogenous instruments with correction for heteroskedasticity (P-value Hansen Test). The findings is line with Carkovic and Levine (2005) for aggregated FDI and thus contradictive to the findings in Alfaro (2003) which found a significant effect on FDI inflows to the primary sector.

TABLE 2 – FDI MANUFACTURING

The six regressions clearly demonstrate the insignificant effect *FDI Manufacturing* has on growth. The sign of the coefficient shifts along with different control variables. We experienced a pattern similar to table 1, although *Openness* is significant in the last regression with all control variables. All regressions reject the null-hypothesis for Hansen- and the serial correlation test. Once again with the approach of system GMM, our results contradict Alfaro’s (2003) findings; FDI inflows to the manufacturing sector do not have a significant partial effect in our sample. They do, however, confirm Carkovic and Levine (2005) findings on aggregated FDI.

TABLE 3 – FDI SERVICES

Table 3 presents six regressions with *FDI Services* plus different control variables. The significance of *FDI Services* varies with the choice of control variables. In column 3 when we control for government size, but exclude important variables such as *Openness* and *Inflation* we obtain a negative result at the 10% significance level. However, this regression probably suffers from an omitted variable bias, due to excluded variables partial effect on *Growth*. Though the sixth regression, which controls for more variables, show that *FDI Services* has an insignificant negative effect on *Growth*. All regressions cannot reject the null-hypothesis of the serial correlation and the Hansen test. The result coincides with the finding in Alfaro (2003) where the FDI inflow to services have an insignificant negative impact on growth.

SUMMARY

To summarize our results in table 1-3 we can draw the conclusion that FDI, disregarding sector, have no significant effect on host country growth. The inconsistency in earlier empirical research regarding aggregated FDI depicts a picture of aggregated FDI's effect on growth as ambiguous, as Moran (2011) points out; each country can experience both positive and negative effects in the three sectors but there is absolutely no certainty in either way. This ambiguity is depicted clearly in our three tables since the effect of the different sectoral FDI flows all have insignificant both positive and negative coefficients. Or FDI by sector could simply have no affect on growth.

V. DISCUSSION

Apart from the obvious conclusion drawn from the results that sectoral FDI has no *ceteris paribus* effect on growth it should also be noted that the first differencing method incorporated in the GMM method can reduce the variation in the explanatory variables with the implication of high standard errors and insignificant results. We will below, however, give a brief discussion for plausible reasons to why there still can be a significant effect.

FDI PRIMARY

As the results from Table 1 imply we fail to find a significant effect of FDI in primary sector on economic growth. A plausible reason would be that FDI into the Primary sector consists of both a negative and a positive effect on growth.

Even though many countries have succeeded in translating an abundant natural resource into a great accelerator for prosperity and growth by transferring the money to infrastructure and projects in human resources, the direct opposite has also occurred. The Natural Resource Curse described by several prominent researchers (Shaxson 2007, Le Billion 2005, and Frankel 2010) is a well-known pitfall for developing countries with a resource-based export.

Within the natural resource curse we find factors, such as corruption, that can be directly related to FDI investments. Foreign investors into the oil, gas, and mining industries are the most widely accused of bribery and corruption⁴. In this way foreign investors and their investments are driving factors behind a country's decay instead of being a factor that improves institutional quality, business climate and thus, economic growth.

Another explanation for resource rich country experiencing negative growth is the Dutch Disease, which also is considered a factor within the Natural Resource Curse. In short, the undesired effect derives from a heavy increase in capital inflow -FDI- due to a newly found natural resource (or a commodity boom) leading to a real appreciation of the exchange rate, either through inflation under a fixed rate regime or through exchange rate appreciation under a floating regime. This in turn implies a change in the relative prices between non-traded and traded goods, which leads to a reduction of the competitiveness from other domestic industries and prevents diversification from the extractive industry (Sachs et al. 2007 p. 182.).

⁴ http://bpi.transparency.org/in_detail/#myAnchor1

Chile is one of few developing countries that have succeeded in transforming its natural endowment into something positive. In the case of Chile transparency and authorities emphasizing and conducting contra-cyclical measurements with a strengthening of fiscal Institutions and introduction of a Fiscal Balanced Based rule has been the way to success (Frankel 2011). All countries are, however, not suitable for this approach see Ter-Minassian (2010) for a more thorough discussion regarding this issue.

As the above discussion implies, our econometric model might fail to take into account certain factors within the country that turns the primary FDI flowing into different emerging markets to become both negative and positive. A similar study, with the same aim, should try to control for more factors – corruption and exchange rate misalignment – that unfortunately was out of the scope for this paper due to data unavailability and time-constraints.

FDI MANUFACTURING

As table 2 clearly depicts no clear generalizing conclusions can be drawn from manufacturing FDI effect on host country growth. One explanation may lie in our dataset that do not control for factors that have been found significant in case studies presented below. These studies often take into account the intent of MNCs and host economy policy towards FDI.

Dunning (1993) made a distinction between “market-seeking” MNCs and “efficiency-seeking” MNCs. The former wanted to set up operations in highly trade restricted countries in order to reach a market that they otherwise could not reach, and thereby work as a cash cow for the parent company. The latter sought to integrate the satellite plant in the international supplier chain in order to reduce costs and gain competitive advantages. Moran (2011) points out that the distinction between these two kinds of manufacturing FDI is crucial when examining the host country growth effects.

From a host country point of view their motivations for FDI into the manufacturing sector are also two-sided. Host economies with a stricter mercantilist approach put restrictions on the MNCs and their FDI with domestic content requirements and joint ventures to ease for the domestic industrialization. On the other hand there are countries with “export-seeking” approaches. They want to attract MNC’s to facilitate for domestic firms to be a part of the exporting chain (i.e. gain vertical spillovers) or create a competitive environment for domestic exporting firms in order to enhance their competitiveness (horizontal spillover).

It is very important to be distinct between these different intents from both MNC's and host countries, since the different combinations have provided drastically different results. The combination of a market seeking MNCs and import-substitution seeking host countries has been further examined in interesting case studies Wasow (2010), and Krueger (1986) and depicts a lucid negative relationship with growth and FDI. Another clear example is provided by Cline (1987) who found that Mexico's high trade barriers and domestic content requirements on computer-industry MNCs led to a production of older and more expensive computers.

However, a different combination of an efficiency-seeking MNC and an export-seeking host economy are most likely to lead to host country growth (Reuber 1973 and Encarnation and Wells 1986). A symptomatic example by Moran (2011) is that when Mexico in 1995 loosened their trade restrictions IBM built a factory that was directly integrated in the company's network and nine times larger than any other computer plant.

Another possible reason for the insignificance is that FDI in some cases can have both a crowd in and crowd out effect, as discussed in the background section, which has to be taken into account. The establishment of an MNC in the host country can lead to spillovers in form of increasing competitiveness and backward linkages but it can also result in a brain drain and decreasing market shares for domestic companies. These effects can differ among countries but also within countries.

To draw generalizing conclusion result is therefore quite hard when the host country policy and MNCs intent is not controlled for. In fact, plausible results would be just as the insignificant ones we found. A generalising study that separated FDI Manufacturing; market seeking and efficiency seeking along with a dummy variable if a host economy uses import-substitutions or not might reinforce the relationship found in case studies. However, it is a far greater task and thus out of scope for this paper.

FDI SERVICES

Table 3 presents similar results as table 1 and 2; FDI inflow to the service sector has an insignificant effect on growth. A similar reasoning regarding our data (that it does not control for host country policies) is a likely explanation, since several case studies have found both a positive and a negative relationship between FDI inflows to services and host economy

growth (Javorcik et al. 2012, Mattoo et al. 2006). However, research aimed at strictly the service sector is scarce and in its infancy.

Most of the studies focus on the strong relationship between manufacturing FDI and FDI to services, since most of the services are important inputs to the manufacturing sector. Javorcik (2012) examined India's policy reforms post 1991 and found that restrictions on MNCs in the service sector are likely to decrease productivity in the manufacturing sector. It is of great significance when determining host country growth if the host imposes restrictions on MNCs in the service sector or not, since restrictions imposed on MNCs is not only likely to decrease productivity in the manufacturing sector but also reduce the likelihood of spillover effects to domestic service companies. Another study (Javorcik et al 2007) found a positive relationship between liberalization of services sectors and total factor productivity growth in Czech Republic.

In our dataset we do not control for host country restrictions policy. This is a plausible explanation to the insignificant results we obtained. Again, a too great task within the time frame of this paper since it requires very deep knowledge of each country.

VI. CONCLUSION

The objective of this paper has been to synthesize the three studies of Alfaro (2003), Blonigen and Wang (2004) and Carkovic and Levine (2005). When combining the three studies we avoid the inappropriate pooling of countries, aggregated FDI or an estimation technique that does not exploit the time variation in the data. Each study suffers from at least two of these flaws. Thus, the aim of this paper has been to provide a general study of how sectoral FDI towards emerging markets with the system GMM estimation technique affects host country growth.

Our results confirmed those found in Carkovic and Levine (2005); FDI divided into sectors have an insignificant effect on growth, but stand in contrast to the findings in Alfaro (2003) and Blonigen and Wang (2004). In other words can FDI in each sector, create a crowding in effect that will generate horizontal and vertical spillovers on the host economy. Meanwhile, FDI can also create a crowding out effect that will result in a brain drain and decreasing market share for domestic firms. The discrepancy of our results compared to other studies could depend on that sectoral FDI does not simply have any effect on host country or that the model does not control for intents of MNCs or host country policy towards FDI, which was out of scope for this paper.

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APPENDIX A – TABLES AND FIGURES

TABLE 1 – ARELLANO – BOVER – BLUNDELL – BOND ESTIMATION
FDI PRIMARY
 DEPENDENT VARIABLE: GDP PER CAPITA GROWTH

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Growth (lagged)	0.291* (0.162)	0.204 (0.184)	0.238 (0.155)	0.0792 (0.167)	0.186 (0.152)	0.0607 (0.174)
FDI Primary	3.720 (59.81)	3.566 (49.04)	62.13 (96.24)	82.16 (72.85)	33.67 (57.52)	72.03 (74.07)
Schooling	0.0251*** (0.00767)	0.0337*** (0.00920)	-0.0617 (0.0615)	0.0201** (0.00874)	0.00818 (0.0112)	0.00743 (0.0736)
Inflation		-0.0441* (0.0231)				-0.0421 (0.0358)
Government Size			0.499 (0.372)			0.147 (0.306)
Openness				0.00684*** (0.00229)		0.00457 (0.00279)
Private Credit					0.0396* (0.0214)	-0.00416 (0.0534)
Observations	167	167	167	155	167	155
Number of countrys	16	16	16	16	16	16
P-value Serial Corr. AR(2)	0.234	0.223	0.302	0.416	0.321	0.383
P-value Hansen test	0.133	0.197	0.421	0.575	0.143	0.801

Autocorrelation is assumed in the first order

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 2 – ARELLANO – BOVER – BLUNDELL – BOND ESTIMATION
FDI MANUFACTURING
 DEPENDENT VARIABLE: GDP PER CAPITA GROWTH

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Growth (lagged)	0.267 (0.157)	0.186 (0.183)	0.167 (0.149)	0.0632 (0.157)	0.184 (0.154)	0.0298 (0.178)
FDI Manufacturing	30.58 (71.19)	-15.96 (73.64)	171.6 (245.4)	-129.6 (118.7)	186.9 (187.0)	-81.15 (72.06)
Schooling	0.0219* (0.0108)	0.0375** (0.0156)	-0.0568 (0.0861)	0.0326** (0.0117)	-0.00124 (0.0209)	0.0193 (0.0648)
Inflation		-0.0508* (0.0240)				-0.0433 (0.0326)
Government Size			0.375 (0.480)			0.116 (0.249)
Openness				0.0104** (0.00456)		0.00657* (0.00313)
Private Credit					0.0153 (0.0254)	0.00275 (0.0408)
Observations	167	167	167	155	167	155
Number of countrys	16	16	16	16	16	16
P-value Serial Corr. AR(2)	0.215	0.247	0.128	0.409	0.102	0.450
P-value Hansen test	0.166	0.318	0.291	0.421	0.258	0.854

Autocorrelation is assumed in the first order

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 3 – ARELLANO – BOVER – BLUNDELL – BOND ESTIMATION
FDI SERVICES
 DEPENDENT VARIABLE: GDP PER CAPITA GROWTH

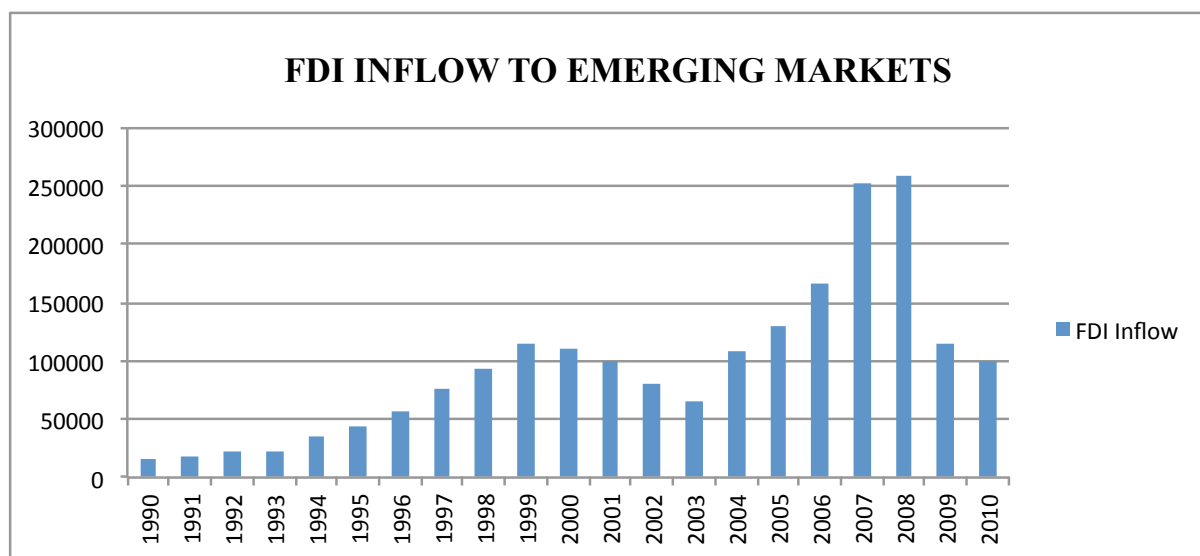
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Growth (lagged)	0.416*	0.405**	0.377*	0.0938	0.402*	0.206
	(0.198)	(0.188)	(0.189)	(0.160)	(0.223)	(0.163)
FDI Services	-18.65	-27.84	-41.51*	-15.27	-41.87	-2.171
	(19.63)	(20.67)	(23.67)	(9.338)	(41.80)	(15.23)
Schooling	0.0285***	0.0398**	-0.174	0.0229**	-0.00174	-0.115
	(0.00848)	(0.0141)	(0.135)	(0.00896)	(0.0288)	(0.127)
Inflation		-0.0845				0.000853
		(0.0531)				(0.0386)
Government Size			1.262			0.804
			(0.832)			(0.656)
Openness				0.00963***		0.00322
				(0.00303)		(0.00429)
Private Credit					0.0731	0.0159
					(0.0772)	(0.0716)
Observations	131	131	131	120	131	120
Number of countrys	16	16	16	16	16	16
P-value Serial corr. AR(2)	0.292	0.245	0.243	0.786	0.361	0.358
P-value Hansen test	0.292	0.456	0.275	0.101	0.383	0.706

Autocorrelation is assumed in the first order

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

FIGURE 1 – NET FDI INFLOW TO EMERGING MARKETS



Source: Authors' calculations based on World Bank's World Developing Indicators

APPENDIX B - DATA

FDI is by itself a quite new appearance and finding accurate data for each sector of FDI over two decades is hard to find for developed countries in general and for developing countries in particular. This has been the major constraint for this paper since we have not been able to find any more publicly available data for developing countries with a FDI record by each sector.

Our sample therefore consists of somewhat different span of time-series for each of the 16 countries that we have pooled as emerging⁵, all sorted in panel data between 1990 and 2010. The particularities of our data set, which is discussed in the next section, calls upon a system GMM estimation approach. This approach enables us to distinct between our independent variables into three groups: endogenous-, exogenous- and instrumental variables. The reasons to do so are discussed in the methodology section. For a full specification of all variables see appendix a.

Firstly, we have chosen as a proxy for the dependent variable *Growth* the real GDP per capita growth in per cent, which was collected from the World Bank's World Developing Indicators (WDI). Secondly, FDI inflows are divided into three sectors; *FDI Primary*, which consists of inflows to business in the agriculture, mining and quarrying industry, *FDI Secondary*, which is inflows to manufacturing business and *FDI Tertiary*, which is inflows to the service sector.

The main source of sectoral FDI has been the OECD International Direct Investment Database, where data on inflows by sector was available for all OECD countries but as mentioned earlier seldom for the whole timespan. To fill out those gaps, we have used data from the UNCTAD World Investment Directory where it has been possible.

The data from non-OECD countries have been fetched from the UNCTAD World Investment Directory (WID) and for Thailand from its central bank. The WID contains data over many developing countries, but many have poor records of sectoral FDI or been presented in the local currency and has therefore been excluded in this paper.

Apart from the variables that appear in the Carkovic and Levine (2005) we use four variables as instrumental variables. All these variables have been collected from the World Bank's (WDI) except for *Political Stability*, which has been collected from the Quality of

⁵ We used the BBVA's definition of an emerging market.

Governance Institute's dataset. All in all we have a total of fifteen variables or instruments that play a part in our model. These are: *Growth*, *FDI Primary*, *FDI Manufacturing*, *FDI Services*, *Schooling*, *Technology*, *Political Stability*, *Inflation*, *Infrastructure*, *Openness*, *Natural Resources*, *Private Credit*, *Market size*, *Government Spending* and finally *Growth (lagged)*.

DATA FOR EACH COUNTRY

All in all we have collected sectoral FDI for 18 countries, only Mexico and Korea had sectoral FDI inflows throughout the whole 20-year period. Available years for each country's sectoral FDI inflow is specified in parenthesis below.

Argentina (92-02), *Brazil* (96-02), *Chile* (92-02 and 06-10), *Colombia* (94-02), *Czech Republic* (93-10), *Estonia* (00-10), *Greece* (90-92 and 01-10), *Hungary* (99-10), *Korea* (90-10), *Mexico* (90-10), *Peru* (92-02), *Poland* (94-09), *Portugal* (90-10), *Slovak Republic* (00-09), *Slovenia* (06-10), *Thailand* (05-10), *Tunisia* (90-03) and *Turkey* (92-10).

For the following countries FDI inflows into the tertiary sector were more scarce and available for only the following years.

Czech Republic (03-10), *Greece* (04-10), *Mexico* (99-10), *Poland* (94-09), *Portugal* (96-07), *Slovak Republic* (04-09) and *Turkey* (00-10)

DATA SOURCES AND DESCRIPTIONS

Each variable is presented with respective proxy and source.

Growth (endogenous)

Proxy: Real GDP per capita growth in %

Source: World Bank, World Development Indicators

Growth (lagged) (predetermined)

Proxy: Real GDP per capita growth in %

Source: World Bank, World Development Indicators

FDI Primary (endogenous)

Proxy: FDI inflows in millions of USD as % of total GDP

Source: OECD International Direct Investment Database and UNCTAD World Investment Directory

FDI Manufacturing (endogenous)

Proxy: FDI inflows in millions of USD as % of total GDP

Source: OECD International Direct Investment Database and UNCTAD World Investment Directory

FDI Services (endogenous)

Proxy: FDI inflows in millions of USD as % of total GDP

Source: OECD International Direct Investment Database and UNCTAD World Investment Directory

Schooling (endogenous)

Proxy: Tertiary School enrolment as % of total

Source: World Bank, World Development Indicators

Openness (endogenous)

Proxy: Import plus exports as % of GDP

Source: World Bank, World Development Indicators

Political Stability (IV)

Proxy: “p_polity” combines several indicators which measure perceptions of the democracy from 0 to 10 minus several indicators that measure perceptions of autocracy from 0 to 10.

Source: Quality of Governance Institute, Gothenburg University and World Bank, Marshall and Jagers (2002)

Infrastructure (IV)

Proxy: Telephone lines per 100 people

Source: World Bank, World Development Indicators

Inflation (endogenous)

Proxy: GDP deflator in %

Source: World Bank, World Development Indicators

Natural resources (IV)

Proxy: Total Natural Resources Rents % of GDP

Source: World Bank, World Development Indicators

Market size (IV)

Proxy: Total population in millions

Source: World Bank, World Development Indicators

Technology (IV)

Proxy: High-technological exports % of GDP

Source: World Bank, World Development Indicators

Private Credit (endogenous)

Proxy: Domestic Credit to private sector as % of GDP

Source: World Bank, World Development Indicators

Government Spending (endogenous)

Proxy: Government spending as % of GDP

Source: World Bank, World Development Indicators