Chapter 3

The Role of the Sectoral Composition of Foreign Direct Investment on Growth

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1. Introduction

Following the rapid increase in the 1990s, foreign direct investment (FDI) has become the most stable and largest component of capital flows into developing countries (World Bank, 2005). The second half of the 1990s also marked significant changes in the sectoral distribution of FDI flows in many countries. In particular, FDI flows in services rose to overtake FDI in manufacturing in several developed and developing countries (Figure 3.1). Such countries have made considerable progress in their investment and trade policies, opening up the services sector to foreign participation and provoking a significant shift in the composition of FDI towards services. Most of FDI in services has been directed to infrastructure and financial sectors, in response to developing country efforts to privatize and liberalize these sectors. In fact, the share of these two sectors in FDI stock has reached to one-third in developed and almost 20 percent in developing countries.

　　Although there is a significant increase in FDI in services sector globally, the sectoral compositions of FDI still vary significantly among countries depending on the characteristics of the country and the policies related with the sector. For example, in East Asia and the Pacific — mostly led by China — and Canada, manufacturing sector is still the main sector, whereas in many African countries the primary sector continues to be the leading sector in the composition of FDI. In other countries, services sector has become the dominant sector.
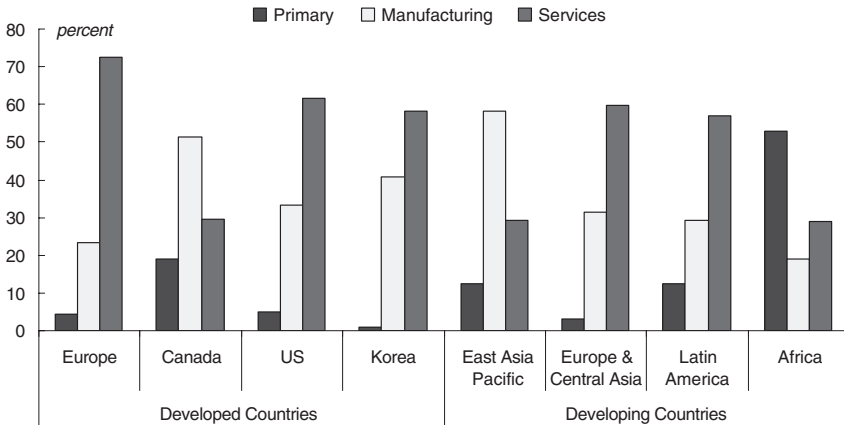
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Figure 3.1: FDI inflow stock by sector, 2004.
Source: Global Development Finance, World Bank.
Note: For Africa, total FDI stock data is for 2002.

In light of this evident shift and differences among countries, more analysis is needed to understand the implications of the sectoral composition of FDI in terms of its impact in the recipient economy since it may partly explain differential experience among countries. As discussed in detail in the next section, FDI in each sector has different characteristics in terms of motivation, financing and more importantly linkages to the rest of the economy. In terms of linkages, for example, primary sector is mostly capital intensive and the scope for linkages between foreign companies and the rest of the economy is often limited. On the other hand, FDI flows in manufacturing sector may have a larger impact in the economy through a broad range of potential linkage-intensive activities. Conventionally defined, services sector includes a wide range of different activities such as finance, infrastructure (such as electricity, water, and telecommunications), wholesale and retail, real estate as well as tourism. FDI in the sector is mostly to serve the domestic market hence potential forward linkages for the sector are quite strong, while backward linkages may vary by industry. Hence, the composition of FDI may influence the impact of FDI inflows in an economy.

This chapter tries to understand whether or not the sectoral composition of FDI matters while contributing to the economic growth of the recipient country using a data set from various international institutions and country sources. It starts by looking into the correlation among the sectoral pattern of FDI and economic growth for a sample of 33 countries. The analysis is based on the premise that the growth effects of FDI may be elusive not only due to the characteristics of the recipient

economy, i.e. the absorptive capacity, but also due to the characteristics of the flows themselves. The appropriate measure of the sectoral composition of FDI is an open field, and the chapter also tries to shed light by discussing alternative measurements regarding the composition, its evolution, and also the absolute trends in the sectoral FDI flows.

The rudimentary correlation analysis we complete suggests that the sectoral composition of the FDI flows may play a significant role in influencing economic growth. Our empirical evidence also shows that both the level of FDI and the sectoral composition of these flows are important contributors to economic growth. The results suggest that as the sectoral composition of FDI gets skewed towards the manufacturing sector, there is a significant and positive effect on economic growth. On the contrary, the results indicate that as the sectoral composition of FDI gets skewed towards the services or the primary sector, there is a negative and mostly insignificant effect on economic growth.

The rest of the chapter is organized as follows: the literature survey is provided in Section 2; details about the data and empirical results are presented in Section 3 and Section 4 concludes the chapter.

2. The Literature Survey

The vast amount of literature on the impact of FDI on economic growth lacks robust results, and the shift of the sectoral composition of FDI as well as its variation among countries may partially explain that. The literature shows that the positive impact of FDI is not immediate but FDI has generated positive spillovers and economic growth in some countries, some industries, and during some periods.[1] Although most macroeconomic studies support the positive growth impact of FDI, they only identify the linkage in combination with other factors. Some of these factors are related to the 'absorption' capacity of the country that receives the foreign investment, such as level of development (Blomstrom, Lipsey, & Zejan, 1994), or endowment of human capital (Borensztein, de Gregorio, & Lee, 1998). Other studies highlight the importance of supportive business environment in the country in order to convert the technology and knowledge spillovers from FDI into economic growth. For example, factors such as trade openness (Balasubramanyam, Salisu, & Sapsford, 1996) or domestic financial market development (Alfaro, Chanda, Kalemli-Ozcan, & Sayek, 2004) are shown to be

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[1]See Caves (1996) for an extended discussion on multinational enterprises (1996), their evolution and effects. Furthermore, see Lipsey (2002) and Lim (2001) for an extended literature survey on the relationship between the FDI and economic growth.

crucial. Although these and many other studies indicate that FDI can generate overall economic growth when certain conditions are in put, there is also a strand of studies arguing that the effect of FDI on economic growth tends to be weak and most of these studies suffer from reverse causality (Rodrik, 1999; Carkovic & Levine, 2003). Firm-level studies add more doubt to the dispute since some studies fail to find significant positive effect of foreign presence in the industry (Aitken & Harrison, 1999; Djankov & Hoekman, 2000; Konings, 2001), whereas some others provide convincing evidence of positive spillovers (Keller & Yeaple, 2003; Javorcik, 2004).[2]

Theoretically, FDI is expected to contribute to economic growth by providing much-needed capital in productive areas of the economy. In addition, FDI is believed to generate additional impact through externalities in the form of technology transfers and spillovers. The externalities may lead to improvements in productivity and efficiency in many ways. When the foreign firm is more efficient than the domestic firms, domestic firms can improve their productivity by copying the technology and management skills of the foreign firm as it penetrates the market. Even if the foreign firm is not more efficient, domestic firms might be forced to improve their efficiency because of the increased competition from foreign firms — through so-called horizontal spillovers. This said, the increased market share of the foreign company might also crowd out the domestic firms and push them to less efficient production levels. However, the potential positive impact is not limited to the industry that receives the FDI; it may be diffused to the rest of the economy through the interactions with local suppliers and consumers — backward and forward linkages, respectively. When the necessary conditions are in put, the aggregate positive spillovers may further accelerate the economic growth of the country. The impact of FDI may obviously vary greatly depending on characteristics of the sector and its linkages to the rest of the economy. As discussed earlier, the linkage potential differs across the primary, manufacturing and services sectors. There are various other sector specific factors that may influence the impact of foreign investment, ranging from motivation to financing of the investment. In addition, different sectors may require different conditions to cause positive impact in the economy.

The impact of FDI in primary sector, for example, is not always expected to be positive. Major part of FDI in primary sector comes as mega-projects with huge amounts of capital flowing into a country. These projects have limited linkages to

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[2]Each study uses data for different countries. See Görg and Strobl (2001) for an extended literature survey on firm level studies. Furthermore, while earlier studies concentrated on identifying horizontal spillovers, the more recent studies have focused on identifying the vertical spillovers. The difference as such could explain the differential results obtained in the literature.

domestic economy as they usually use few local intermediate goods and are mostly export-oriented. In addition, FDI flows to the sector tend to be more volatile (World Bank, 2005). Most investments are large and sensitive to world commodity prices. Also, in general the financing composition is highly skewed towards intercompany loans. Domestic ownership requirement (or restriction on foreign ownership) encourages intercompany loans while limiting the equity component of FDI and intercompany loans tend to be as volatile as private debt flows (World Bank, 2004c). In addition, high resource flows to the sector tend to reduce the competitiveness of the country in other sectors (Dutch disease), increase rent-seeking behavior, and could cause deterioration of institutions (Sachs & Warner, 2001; Sala-i-Martin & Subramanian, 2003). This might be particularly problematic for countries with high reliance on the sector. On the other hand, investment in the sector might be particularly important for many countries with insufficient capital and technology. Furthermore, the sector usually brings large foreign currency earnings, contributing to balance of payments financing. The overall effect depends on whether the positive or negative effects outweigh. In fact, a negative economic impact is not the inevitable outcome. In the presence of solid institutions, there is anecdotal evidence that FDI in primary sector may generate positive impact in a country.[3]

Contrary to primary sector, FDI in manufacturing sector has much larger potential to affect the recipient economy as the linkages to the recipient economy are better defined. Foreign firms in manufacturing sector invest rather than export to a country for either efficiency-seeking or market-seeking purposes, or a combination of both. When it is purely efficiency seeking, FDI is more likely to bring in the technology and know-how that is compatible with the country. It usually generates significant employment and provides training. Foreign firm usually use some level of local intermediate products. Hence, FDI has significant horizontal and backward linkages. In addition, foreign company exports increase the total exports, and in turn the foreign currency receipts of the country. This said, these linkages are less significant when FDI comes through enclave type of arrangements, such as export-processing zones, and the possibility of the crowding out effect increases as foreign firms also serve the domestic market. In summary, FDI in manufacturing is expected to have significant impact in the recipient economy, where the direction of effect depends on the conditions enlisted above.

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[3]With strong policy and right institutional framework, Botswana has become a middle-income country within one generation by the help of large FDI flows into its diamond and other mining industries. Export receipts and government revenues boosted by the FDI were invested wisely to create initial momentum in economic growth (UNCTAD, 2003; Coolidge & Rose-Ackerman, 1997).

Unlike the primary and manufacturing sectors, where output is tradable, services are mostly nontradable and require close proximity between producers and consumers.[4] Therefore, much of the FDI in the sector is market-seeking, where forward linkages of FDI are well defined and potential impact of FDI in the sector is immense. For example, in the highly capital-intensive infrastructure sector, FDI can provide the necessary funding and technology to improve capacity to meet increasing demand, as well as improve the quality and lower the cost of the services. In the same vein, FDI in the banking sector can have an important impact on both the efficiency and stability of the banking system through increased competition and increased access to global financial markets.[5] If FDI in the sector improves these services in a country, almost all other sectors will be positively affected. However, FDI in the sector may also have notable negative effects. It has significant crowding-out potential. Due to less than competitive market structure and capital intensity of the main industries in the sector, foreign investors command superior market power. Hence, the impact of FDI is highly dependent on the existence of an appropriate and stable regulatory system that maintains appropriate incentives for foreign investors to improve the supply capacity and ensure the provision of services in infrastructure and banking sectors. In addition, most of the FDI in the sector come through mergers and acquisitions in developed countries and privatization deals in developing countries both of which are not necessarily associated with new investments (Klein, 2000). Moreover, with the exception of business services and tourism, FDI in services do not generate foreign currency; instead, companies repatriate their earnings periodically.

The number of empirical studies that cast the relationship of FDI in different sectors and its impact on growth is slim due to data limitations. Almost all firm-level studies mentioned above use manufacturing-sector data without conclusive results. Existing literature on the impact of services sector FDI usually looks at the impact of liberalization in the services sector. For instance, privatization and increased competition in the telecommunications sector has increased the capacity and reliability of services in developing countries depending on their sequence of occurrence (Carsten, Mattoo, & Rathindran, 2002). Country case studies highlight the importance of an appropriate regulatory system for positive

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[4]Not all services are nontradable or require physical proximity. For example, some information-technology services (software programming, database, and customer support) and business process services (call centers) are not location-bound and can be provided without proximity to customers. However, with exceptions in mind, services are conventionally portrayed as intangible, invisible, and perishable, requiring simultaneous production and consumption.

[5]See Goldberg (2004) for a discussion on the FDI in the financial sector.

impact of liberalizations in infrastructure sector.[6] Similarly in banking sector, foreign-owned banks are typically found to have better-quality loan portfolios, higher net worth, and a higher ratio of income to costs than domestic banks (Clarke, Cull, D'Amato, & Molinari, 2000) and the efficiency of the sector increases by penetration of the foreign companies (Claessens, Demirgüç-Kunt, & Huizinga, 2001). The findings suggest that effective supervision and regulation of domestic financial markets are important to ensure the benefits of foreign entry in financial markets (World Bank, 2001; International Monetary Fund, 2000). The analysis closest to ours in spirit is where Alfaro (2003) studies the differential growth effects of FDI to these broad categories of sectors by analyzing the contribution of increased FDI to each sector on economic growth. Along these lines Chakraborty and Nunnenkamp (2006) study the role of FDI in generating increased economic activity in the sector in which it occurs, as well as the overall economy using sectoral FDI data for India. As will be discussed below, the approach followed in this chapter differs from the one explored in both papers, where rather than testing for the role of the level of FDI to each sector we hypothesize that it is the composition of FDI flows alongside aggregate FDI inflows that influence the growth prospects of the host country.

3. Data and Empirical Investigation

In this section, we describe the data that will be used in the analysis, specifically the measures of the sectoral composition of FDI, the levels of FDI, economic growth, and a number of control variables commonly used in the growth regressions. In Section 3.1, alternative ways of measuring the sectoral composition and pattern of FDI are discussed, whereas in Section 3.2 the variables used in the econometric growth analysis are introduced.

3.1. Sectoral Pattern of FDI

Sectoral FDI data is collected from the U.N. Economic Commission for Latin America and the Caribbean, based on country sources for Latin American

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[6]In Peru, lack of such a framework led to increased prices of telecom services as well as uneven provision of services to poorer parts of the country. In Argentina, Mexico, and Venezuela, despite the sharp increase in investments in the telecom sector immediately after privatization, the capacity of the sector subsequently fell below the regional average (UNCTAD, 2004). In the electricity sector, Chile suffered an energy crisis in 1998 due to weaknesses in their regulatory and institutional frameworks (Gabriele, 2004). In 2004, Argentina also experienced electricity shortages following the problems that arose after the government imposed the price freeze in 2002.

countries; National Bureau of Statistics of China; ASEAN for other Asian countries; and OECD, UNCTAD, and country sources for other countries. The official institutions (International Monetary Fund and OECD) recommend United Nations International Standard Industrial Classifications (ISIC) to be used (see the appendix) but in each country classification may vary to some extend. Though the international classification standards are implemented in the data collection by national authorities, the fact that the analysis given below uses data collected from various sources requires that one keeps this drawback in mind when interpreting the results.

Two alternative routes can be taken in depicting the sectoral pattern of FDI flows; one focuses on the magnitude of the *absolute* level of FDI flows in each sector, while the alternative focuses on the *relative* level of FDI flows in each sector. In more detail, the former measures depict the extent of FDI flows in a certain sector, scaled by an alternative size measure. For example, one could look at the FDI flows to a sector as a share of the GDP or alternatively as a share of the economic activities in that specific sector. Given the objective of correlating these alternative measures of sectoral FDI patterns with economic growth we start by discussing simple correlations among these alternative measures.

Studying the relationship between economic growth and these absolute patterns of sectoral FDI flows provides insight into the differential contribution of each sector's investment to economic growth.[7] Figures 3.2a–3.2c show the simple correlation between the FDI in each sector as a share of that sector's GDP and the overall economic growth rate. The figures are suggestive of a positive relationship between economic growth and all types of FDI, regardless of the sector of investment. However, the correlation coefficients are statistically insignificant, suggesting that in fact, statistically, there is no correlation between FDI and economic growth, regardless of the sector in which FDI occurs. With no implication of statistical significance though, one observes a slightly stronger relationship between services sector FDI and economic growth, with the simple correlations being 8%, 10%, and 18% between economic growth and the primary sector FDI, manufacturing sector FDI, and services sector FDI, respectively.[8] In an effort to identify possible directions of relationship, the figures are based on the imputation of the average of FDI flows in each sector between 1996 and 1999 and the

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[7]Alfaro (2003) undertakes such an analysis, and finds that manufacturing FDI contributes positively and significantly to economic growth, whereas FDI in the primary sector contributes negatively to economic growth and the FDI in the services sector does not contribute significantly to economic growth.

[8]No weight is attached to these magnitudes, given the simple nature of the correlations, where no other controlling factor is taken into account.
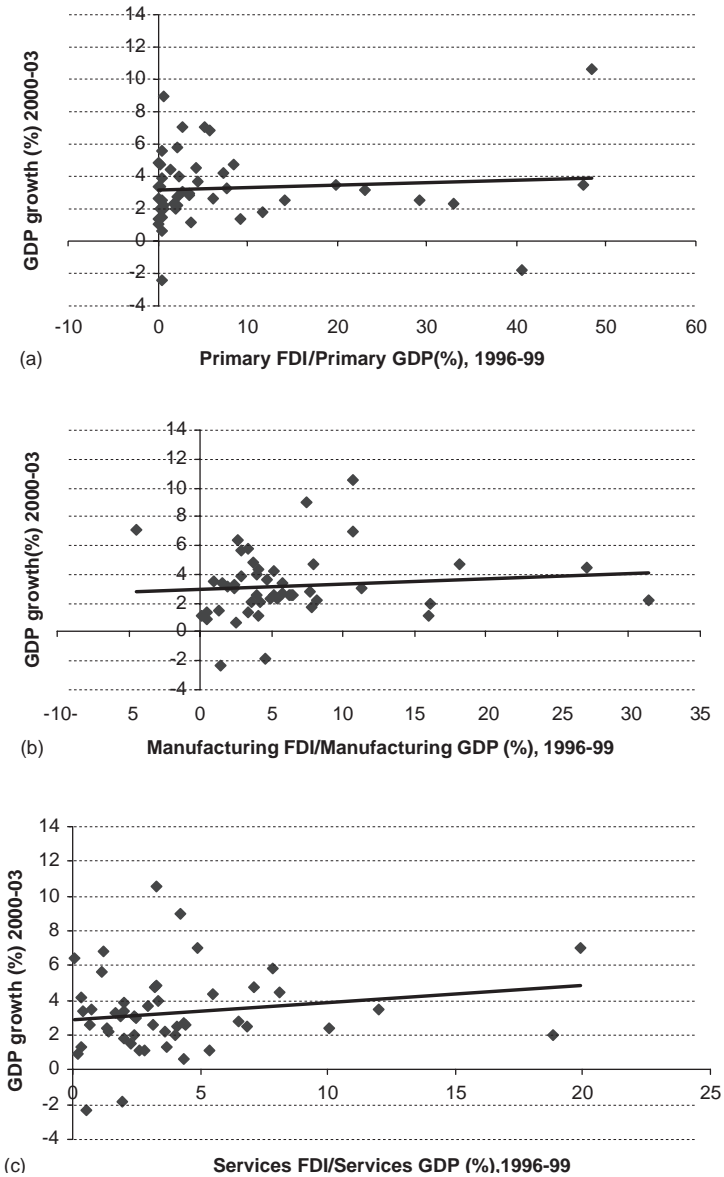
(a)

(b)

(c)

Figure 3.2: (a) Economic Growth and Primary FDI. (b) Economic Growth and Manufacturing FDI. (c) Economic Growth and Services FDI.

Note: Primary sector is approximated by agriculture sector GDP; Authors' calculations.

averages of economic growth between 2000 and 2003. This allows us to rule out the possibility of economic growth in a country attracting more FDI in each sector, and is suggestive of a possible causal relationship from the FDI flows to economic growth.

The correlation between overall economic growth and the FDI flows to each sector does not differentiate between the possibilities of horizontal or vertical spillovers. Depending on the relative magnitude as well as the sign of these linkages, FDI can have different impact in the sector that receives the investment and the overall economy. As discussed earlier, the immediate effect of FDI is expected to be in the recipient sector through effects such as increased investment and higher competition for the domestic firms among others. Moreover, through the interactions with the suppliers and consumers — which vary among sectors, FDI can affect the rest of the economy. To gauge such differential effects, we complement the above discussion by looking into the correlation between the same measures of FDI flows in each sector with the growth of economic activity in the relevant sector.

The simple correlations in Table 3.1 are suggestive that the positive correlation between the sectoral FDI flows and the sectoral economic growth prevails, the comparative magnitudes of the simple correlations seem to be different from those with the overall economic growth. However, similar to the above-reported correlation coefficients, none of those in Table 3.1 are statistically significant, which suggests a lack of any correlation of either within sector growth and FDI specific to that sector or FDI in any sector and economic growth. As above, though with no statistical significance discussion, the simple correlation between primary sector FDI and growth in the primary sector GDP is 10%, while simple correlation between manufacturing sector FDI and growth in the manufacturing sector GDP is 12% and the simple correlation between services sector FDI and growth in the services sector GDP is the lowest at 7%. Interestingly, however, these correlations

Table 3.1: Simple correlations between the sectoral FDI inflows and economic growth.

	Sectoral GDP growth (2000–2003)	Overall GDP growth (2000–2003)
Primary FDI/primary sector GDP (1996–99)	0.104	0.084
Manufacturing FDI/manufacturing sector GDP (1996–99)	0.120	0.097
Services FDI/services sector GDP (1996–99)	0.068	0.175

in comparison with those with overall economic growth suggest that the horizontal effects, i.e. the intra-industry effects, might be different from the vertical, i.e. inter-industry effects. As in primary and manufacturing sectors, the intra-industry effect of FDI can be greater than its effects on the overall economy; or as in services sector, FDI may have a greater impact in overall economy compared. However, one should exert caution, as stating such effects robustly requires an in-depth econometric analysis.

To the extent that the impact of FDI flows on economic growth varies depending on the sector that receives it, one can also envisage that the sectoral composition of FDI flows will have an impact on the economic growth. In other words, while the magnitude of FDI flows might be important in generating economic activity, the sectoral composition of these flows might also exert additional and independent growth effects. We start by calculating the FDI sectoral shares, as the share of net FDI inflows into a specific sector in the aggregate net FDI inflows to that country.

As a way to create a measure for the composition of FDI and its impact on economic growth, we calculated the correlation between the sectoral compositions, i.e. share measures of FDI, and economic growth. Formulating the composition of FDI is not an easy task, however. As several countries experienced significant repatriation over the years, the share measures calculated as the share of FDI in the sector in total FDI, can have extremely high negative percentage values. Table 3.2 provides the simple relationship between the average share FDI measures and growth both for the recipient sector and overall economy, suggestive of a change in the direction of relationship when one considers share measures rather than the magnitude of FDI activities, as was depicted earlier. Furthermore, not only do the signs of correlation change, but the significance also alters. The results suggest that even if the absolute level of FDI in each sector does not seem to have a

Table 3.2: Simple correlations between measures of the composition of FDI and economic growth.

	Sectoral GDP growth (2000–2003)	Overall GDP growth (2000–2003)
Primary FDI/total FDI (1996–99)	0.47[*]	0.38[*]
Manufacturing FDI/total FDI (1996–99)	−0.10	0.05
Services FDI/total FDI (1996–99)	−0.45[*]	−0.38[*]

Note: The significance level of the correlation coefficient is denoted by *. * denotes significance at 1% level.

statistically significant correlation with the economic growth performance of the sector or the overall economy, the sectoral composition of FDI flows might have a statistically significant, and possibly different sign and size of correlation with economic performance. These preliminary results are indicative of a positive, zero, and negative correlation between a sectoral composition of FDI skewed towards more primary, manufacturing, and services sectors, respectively, and both sectoral and overall economic growth performance.

   Another way to eliminate these outliers that are mostly due to high levels of repatriation of earnings, is to impute the share of each sector's net FDI inflows as a share of the *absolute* value of net FDI flows. This imputation is based on the premise that the share of the net inflows in the total value of FDI-related transactions, not whether the flows are net positive or negative inflows, is important. For example, assume there is a 100 unit net FDI inflows in the manufacturing sector, no FDI inflows in the primary sector, and -200 units of net FDI inflows (on account of repatriations) in the services sector. The total absolute value of net FDI transactions are taken as 300 units, where the share of manufacturing sector is 33% and the share of services sector is imputed as -66%. Higher absolute values of this sectoral share measure should be interpreted as suggesting increased extent of foreign firm activity, whether it is an inflow in the current period or a repatriation of previous inflow-related economic returns. The same observations discussed for Table 3.2 are evident in the analysis using these alternative sectoral composition measures, as can be seen from Table 3.3, which report the correlations among this alternative sectoral composition measure and economic growth.

Table 3.3: Simple correlations between alternative measures of the composition of FDI and economic growth.

	Sectoral GDP growth (2000–2003)	**Overall GDP growth (2000–2003)**
Primary FDI/absolute value of the total FDI (1996–99)	0.48*	0.39*
Manufacturing FDI/absolute value of the total FDI (1996–99)	-0.10	0.08
Services FDI/absolute value of the total FDI (1996–99)	-0.48*	-0.42*

Note: The significance level of the correlation coefficient is denoted by *. * denotes significance at 1% level.

The above exercise highlights the importance of the composition of FDI in order to understand its impact on growth, but also the importance of the choice of the measure of this pattern. Both the interpretation and the implications of the analysis may differ depending on the measure used in the analysis. In Section 4, we limit the econometric analysis to one of these above-discussed measures, and warn the reader against generalizing these results as they are limited by the choice of the measure capturing the pattern of the sectoral FDI flows.

3.2. Econometric Specification and Control Variables

The purpose of our empirical analysis is to examine the differential growth effects of FDI in the three main sectors of investment, namely, primary, manufacturing, and services sector. In other words, we are investigating the effects of not only the level of FDI inflows on the economic growth of the host economy, but also the possible effects of the sectoral composition of these FDI flows. In doing so, the exercise below is based on a growth regression analysis, where alongside the extent of FDI and its sectoral composition several control variables are included.

The empirical growth analysis literature is abundant. However, in an influential paper, Mankiw, Romer, and Weil (1992) (MRW) derive an empirical specification based on the assumption that countries are unlikely to be at their steady states, and therefore transitional dynamics should be more important. In this vein we follow the same specification. We study the direct effect of the level of FDI flows, as well as the direct effects of the sectoral composition of these FDI flows on economic growth. Therefore, based on MRW, we estimate the following equation:

$$\text{Growth}_i = \beta_0 + \beta_1 \text{InitialGDP}_i + \beta_3 \text{FDI}_i + \beta_4 \text{FDI\_comp}_i + \beta_5 \text{Control}_i + \varepsilon_i \quad (1)$$

The choice of the control variables is based on previous economic growth studies.[9] The growth rate of output is measured as the growth of real per capita GDP in constant dollars; data are obtained from the World Bank (2004b). FDI is also taken from the World Bank, World Development Indicators database, measured as the net FDI inflows. The net FDI inflows measure the net inflows of investment to acquire a lasting management interest (10% or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments.

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[9]For a detailed overview of the theory and the evidence regarding economic growth, see Barro and Sala-i-Martin (1995).

The control variables for the econometric analysis are complied from various sources. Gross domestic investment measure consists of the outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Macroeconomic stability is proxied by inflation, measured as the percentage change in the GDP deflator. The financial market depth is measured by either the share of money and quasi-money in GDP (M2 as a share of GDP), as the share of private sector credit of the whole financial sector in GDP, or as a share of private sector credit extended by only deposit banks as a share of GDP. Openness to international trade is measured as the ratio of the sum of exports plus imports to total output. Government consumption is captured by the ratio of central government expenditure as a share of GDP. All of these data are obtained from World Bank's (2004) World Development Indicators.

The institutional stability and quality in the economies are proxied by using data from the International Country Risk Guide (ICRG). The ICRG reports data on the risk of expropriation, level of corruption, the rule of law, and the bureaucratic quality in an economy, and is a monthly publication of Political Risk Services.

Finally, human capital is measured as the 'average years of secondary schooling', obtained from Barro and Lee (1996). Table 3.4 provides a list of the variables included in the analysis, for which a detailed description and sources are provided in the appendix.

Table 3.4: List of variables.

Dependent variable:
- Real GDP per capita growth rate

Independent variables:
- FDI sectoral composition indicators
- Net FDI inflows (as a share of GDP)

Control variables:
- Initial real GDP per capita
- Government consumption (as a share of GDP)
- Domestic investment (as a share of GDP)
- Liquid liabilities (as a share of GDP)
- Inflation rate
- Human capital
- Openness
- Corruption
- Regional dummy variables

3.3. Empirical Findings: Cross-Sectional Analysis

As discussed above, based on MRW, we estimate equation (1) as stated above:

$$\text{Growth}_i = \beta_0 + \beta_1 \text{InitialGDP}_i + \beta_3 \text{FDI}_i + \beta_4 \text{FDI\_comp}_i + \beta_5 \text{Control}_i + \varepsilon_i \quad (1)$$

Initially a cross-sectional analysis is undertaken, where the analysis is carried out for the period 1990–2003. As discussed in the previous sections, a priori we expect the manufacturing sector to play a positive role in generating growth, the primary sector to play a negative role in generating growth, and are ambiguous about the effect of the services sector on growth. Since the sum of the three sectoral share measures constructed adds up to one, only two are included in each regression. The pair combination choice is driven by the correlation among the three sectoral shares; given the very high negative correlation among the services and manufacturing share measures, we include one or the other in the analysis. Table 3.5a reports the findings when we include manufacturing and primary sector shares, while Table 3.5b reports the findings when we include services and primary sector shares.

Table 3.5a shows results for a selection of control variables that are widely used in the empirical growth literature. These controls include, but are not limited to, initial income, financial market depth, level of openness, inflation rate, quality of institutions, and government spending. In column I, we control for the initial level of economic activity and expect to find a negative effect on account of conditional convergence. The result is as expected, suggesting the validity of a conditional convergence, where the poorer countries grow faster. We also control for the depth of local financial markets and, as discussed in King and Levine (1993) and many others, we expect to find a positive effect on growth. As expected we find that deeper the local financial markets are, higher the growth rate is across countries. Furthermore, in column I we find that FDI level itself does not have a significant effect on economic growth, whereas the composition of these FDI flows are found to be significant. We find a positive effect of increased shares of manufacturing FDI in total FDI on economic growth and a negative effect of increased shares of the primary sector in FDI on growth.

The negative effect of a change in the composition of FDI flows in favor of the primary sector suggests that the above-discussed negative effects outweigh the possible positive effects of increased capital stock in capital-deficient economies. This result can be interpreted as the negative effect of extractive industries on economic growth. Three possible factors that could be driving this

Table 3.5a: Growth effects of the sectoral composition of FDI inflows Dependent variable: Growth of Real GDP per capita (1990–2002).

Independent variable	I	II	III	IV	V	VI	VII
Initial income	−0.95	−1.03	−1.13	−1.53	−1.03	−1.36	−0.20
	−2.21**	−2.42**	−2.68**	−2.64**	−2.21**	−2.37**	−0.48
Share of manufacturing	0.001	0.002	0.002	0.001	0.002	0.001	0.001
FDI in total FDI	2.07**	2.03**	2.07**	1.60*	1.68*	1.78*	1.72*
Share of primary sector	−0.01	−0.02	−0.02	−0.02	−0.03	−0.02	−0.01
FDI in total FDI	−1.77*	−1.89*	−2.27**	−2.01**	−2.61**	−2.05**	−0.60
FDI as a share of GDP	0.15	0.27	0.39	0.31	0.42	0.34	0.38
	1.17	1.41	1.82*	1.49	2.01**	1.67*	2.47**
Financial Markets	1.62	0.83	1.33	1.70	1.07	1.91	0.34
	2.01**	2.17**	1.74*	2.56**	1.20	3.13***	0.57
Openness	—	−0.84	−1.35	−1.51	−1.02	−1.48	−2.05
	—	−1.23	−1.84*	−2.16**	−1.18	−2.14**	−4.27***
Inflation	—	—	−0.004	−0.004	−0.004	—	−0.005
	—	—	−3.35***	−2.67**	−3.27***	—	−4.70***
Institutions	—	—	—	0.47	—	0.72	—
	—	—	—	1.53	—	2.28**	—
Transition	—	—	—	—	−1.18	—	—
	—	—	—	—	−1.91*	—	—
Government	—	—	—	—	—	−0.11	0.00
	—	—	—	—	—	−1.78*	0.01
Investment	—	—	—	—	—	—	0.28
	—	—	—	—	—	—	3.26***
R^2	0.34	0.38	0.49	0.56	0.51	0.60	0.68
Number of observation	39	39	39	38	39	38	39

Note: This table excludes the services share in the total FDI. We included initial human capital in the regressions and the results remained qualitatively unchanged. Institutions are measured using the corruption index from the ICRG FDI as a share of GDP and the financial markets indicators are logged. Liquid liabilities are used as the financial market indicators. The significance level of the correlation coefficients are denoted by *, **, and ***. * denotes significance at 10% level, ** denotes significance at 5% level, and *** denotes significance at 1% level.

negative effect can be discussed. First of all, foreign investment in such industries could create a crowding out effect for the domestic firms. Such crowding out could change the market structure of the industry, increasing inefficiencies due to high concentration rates of ownership. Furthermore, such market structure alterations could increase rent-seeking activity and could cause significant deterioration in the institutions of the local economy. This crowding out effect can also be interpreted as a Dutch Disease problem, where significant inflows in such natural resource-related industries could alter the real exchange rate and create negative incentives for production in the tradable goods sectors (Sachs & Warner, 2001; Sala-i-Martin & Subramanian, 2003). In addition, the investment usually comes in the form of intercompany loans, rather than long-term investment equity component. This adds to the volatility of the investments, and given the large share of such investments in gross capital formation and their influence on exchange rates, volatility may cause further economic difficulties in some countries.

The positive effect of a change in the composition of FDI flows in favor of the manufacturing sector is as expected. The manufacturing sector investments are expected to create more backward and forward linkages in the local economy by nature. Production of final goods in the manufacturing industry could create backward linkages with the local producers via demand for locally supplied intermediary inputs, through the turnover in the local labor market, and connections built through possible outsourcing activities. Such positive spillover effects are found in some micro-based analysis of the effect of FDI on the local economy, where most of these studies are limited to the manufacturing sector itself.

In columns II through VII, additional control variables are included in the analysis. The findings regarding the composition of FDI are robust to the inclusion of additional control variables, except for the change in the significance level of the share of primary sector variable in column VII. The impact of the level of FDI, parallel to the findings of the literature, although always positive has a significance level that is not robust across specifications. However, generally speaking, the results reported in Table 3.5a suggest a positive and significant effect of FDI levels on growth, regardless of the composition of the foreign investment flows. They also suggest that the composition plays a significant role in influencing economic growth, with a positive effect of a compositional change favoring manufacturing and negative effects of a compositional change favoring the primary sector.

In column II, we add the level of openness of the economy, measured as the ratio of the sum of export and imports to GDP. Although insignificant, we find that the effect of increased openness on growth is negative. In column III, we include the inflation rate, as a proxy for macroeconomic instability. As expected,

we find a negative and significant effect of inflation on economic growth. This finding is robust across regressions. In column IV, we include a measure of institutional quality, measured as corruption. We expect a positive relationship on account of the measurement of the index. As expected, there is a positive effect of less corruption on economic growth, however the significance level is not found to be robust. In column V, we test for regional differences in the growth patterns of economies in our sample. Given the increased role of FDI in the transition economies over the past decade we include a dummy to capture these economies. We find that there is a significant regional effect. In column VI, we include the government-spending variable, expecting a negative effect. Finally in column VII, we control for domestic investment to ensure that the finding of a positive effect of FDI on growth is not driven by the omission of domestic investment from the analysis. We find that the effect of FDI on growth is in fact strengthened, as well as a positive impact of domestic investment on growth. The only result that changes is the significance of the primary sector share in total FDI, which becomes insignificant but continues to play a negative role. This finding requires further analysis.

Table 3.5b runs the same regressions with the services and the primary sector shares variables, replacing the manufacturing sector share with services sector share. The finding of the negative effect of primary sector FDI is robust to the inclusion of the manufacturing or services sector in the analysis, as is evident in the negatively significant coefficient on the primary sector share measure in both Tables 3.5a and 3.5b. As expected from the highly negative correlation between the share of manufacturing and services sectors in FDI, we find that a change in the composition of FDI flows in favor of the services sector creates a detrimental effect on economic growth. This finding is robust across regressions with different sets of control variables, as is evident from Table 3.5b.

The negative effect of the services sector FDI on economic growth can be explained by the nature of such investments. Although, investment in the services sector are dominantly in non-traded goods which seem to have very strong forward linkages to the local economy, different sub-sectors within the services industry could play different roles in influencing domestic growth. The FDI activity in infrastructures was mostly driven by privatization-led mergers and acquisitions (M&As), which do not necessarily increase the total investment in the local economy. Similarly, as discussed above, pricing behavior of multinational enterprises (MNEs), and the status of the institutional and regulatory environment in the local economy could generate a dominating negative effect of the services sector FDI on economic growth. Foreign investments in the banking sector are usually found to exert a positive effect on the efficiency of the financial system but with no link to the local economic growth.

Table 3.5b: Growth effects of the sectoral composition of FDI inflows Dependent variable: Growth of Reel GDP per capita (1990–2002)

Independent variable	I	II	III	IV	V
Initial income	−0.94	−1.02	−1.12	−1.02	−1.37
	−2.21**	−2.42**	−2.69**	−2.21**	−2.37**
Share of services sector FDI in total FDI	−0.001	−0.002	−0.002	−0.001	−0.001
	−2.41**	−2.16**	−2.20**	−1.68*	−1.85*
Share of primary sector FDI in total FDI	−0.01	−0.02	−0.02	−0.03	−0.02
	−1.83*	−1.96**	−2.32**	−2.64**	−2.09**
FDI as a share of GDP	0.15	0.26	0.39	0.41	0.33
	1.14	1.41	1.83*	2.00*	1.67*
Financial Markets	1.60	1.81	1.32	1.06	0.88
	1.99**	2.16**	1.73*	1.19	3.06***
Openness	—	−0.86	−1.37	−1.05	−1.50
	—	−1.25	−1.85*	−1.18	−2.14**
Inflation	—	—	−0.004	−0.004	−0.003
	—	—	−3.36***	−3.29***	−2.33**
Institutions	—	—	—	—	0.73
	—	—	—	—	2.30**
Transition	—	—	—	−1.14	—
	—	—	—	−1.78*	—
Government	—	—	—	—	−0.11
	—	—	—	—	−1.74*
R^2	0.34	0.38	0.49	0.51	0.59
Number of Observations	39	39	39	39	38

Note: This table excludes the manufacturing share in the total FDI. (See notes for table 5a). The significance level of the correlation coefficients are denoted by *,**, and ***. * denotes significance at 10% level, ** denotes significance at 5% level, and *** denotes significance at 1% level.

4. Conclusions

FDI flows have increased significantly over the past decade, especially the inflows to developing countries. This phenomenon is the result of the joint influences of both demand and supply side factors. On the supply side the improved business cycle conditions among many of the industrialized countries during the early 1990s have contributed to the increasing FDI inflows worldwide. On the demand side, local authorities have significantly improved their efforts to attract

more FDI; these efforts are evident in the many investment promotion agencies established and the number of FDI-favoring laws and regulations introduced each year in several economies. These efforts by the local authorities are mostly due to the positive effects of FDI that are envisaged. Despite this belief of positive spillover effects from foreign to local firms, the empirical evidence is not yet conclusive, other than stating that there are necessary conditions that allow countries to benefit from the FDI they attract. Our belief is that the lack of a robust finding regarding the positive relationship between FDI and economic growth is mostly on account of the aggregation of FDI data, that the results will be much stronger if one considers not only the effect of increased quantities of FDI but also the sectoral composition of these FDI flows.

We believe that the sectoral composition of the FDI flows play a significant role in influencing economic growth. FDI in the primary sector is expected to generate mostly negative effects on the local economy through the following factors which are expected to dominate: effect on the market structure, possible Dutch disease effects through influence on the real exchange rate, and low linkages of the industry with the local economy by nature. Accordingly, it is expected that as the share of the primary sector FDI in total FDI flows increases, it will be detrimental to the local economy's growth rate. Contrary to the primary sector FDI, due to its deeper backward and forward linkages, it is expected that FDI in the manufacturing sector will generate positive growth effects in the local economy. Forming a priori expectation regarding the influence of FDI in the services sector on economic growth is much less straightforward, given the different impacts of sub-sectors such as infrastructure, financial sector, tourism, and real-estate investments.

The cross-sectional empirical evidence discussed in this chapter suggests that both the level of FDI and the sectoral composition of these flows are important contributors to economic growth. The results suggest that as the sectoral composition of FDI gets skewed towards the manufacturing sector, there is a significant and positive effect on economic growth. On the contrary, the results suggest that as the sectoral composition of FDI gets skewed towards the services or the primary sector, there is a negative and mostly significant effect on economic growth. These results should be taken as strong motivation for further studies of the issue, where the time-series feature of the data is also accounted for using panel analysis.[10] Future studies should furthermore test for the possible

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[10]Using the current dataset, we undertook some preliminary panel analysis, where the Hausman test suggested the use of fixed effects. Due to data limitations, we were forced to take 3-year averages of the series, which allowed for at most four data points. Preliminary results suggested supporting evidence to the cross-sectional results presented above. However, a more in-depth analysis is necessary.

endogeneity of the composition of FDI, which could differ along the growth path of economies. Due to lack of appropriate instruments the robustness of the above results to the possible endogeneity bias is not reported.[11] Regardless, the motivational cross-sectional evidence on these differential effects of the sectoral composition of capital flows provided in the chapter, to the best of our knowledge, have not been shown before in such a framework. The result of this chapter suggests that countries should not only focus on attracting more FDI, but should look into policies that will allow maximization of benefits through appropriate composition of the flows.

Much more extensive analysis of the issue is necessary before concluding this discussion. As shown in the chapter, the pattern of the sectoral FDI flows can either be captured through the magnitude of FDI inflow activities or as the sectoral composition of these flows. While the above analysis is based on one such measure of the sectoral composition of the flows, robustness checks of these results using the alternative share measures as well as flows measures remain to be done in future work. In addition, industrial structure plays an important role in the impact of FDI in an economy, and greater disaggregation in sub-sectors may yield different results.

Acknowledgements

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[11]In preliminary testings, following the agregate FDI literature, we use the lagged FDI as a share of GDP and the level of the real exchange rate as instruments (see Wheeler & Mody, 1992; Markusen & Maskus, 2002, regarding evidence that FDI shows very persistent behavior; and Blonigen, 1997, for evidence regarding the relationship between the real exchange rate and the FDI). However, overidentification tests suggest that these instruments are not appropriate instruments for the sectoral composition of the FDI. These preliminary results suggest the necessity of future work to further understand the factors that govern the sectoral composition of the FDI, which will also assist in determination of appropriate instruments for the composition itself.

Appendix

A1. Countries in the Samples

Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Czech Republic, Denmark, Ecuador, Estonia, Finland, France, Germany, Greece, Honduras, Hungary, Iceland, Indonesia, Ireland, Italy, Japan, Kazakhstan, Korea, Lao PDR, Malaysia, Mexico, Morocco, Netherlands, New Zealand, Nicaragua, Norway, Paraguay, Peru, Philippines, Poland, Portugal, Russia, Slovak Republic, Spain, Sweden, Switzerland, Thailand, Trinidad Tobago, Tunisia, Turkey, United Kingdom, United States, Venezuela, and Vietnam.

A2. Data Sources and Descriptions

Foreign direct investment, sectoral level: The International Monetary Fund Balance of Payments Manual (1993) and the OECD's Benchmark Definition of FDI recommend countries to identify the sector classification of FDI according to United Nations International Standard Industrial Classification (ISIC) of all economic activity. ISIC (Rev. 3.1) identifies three main sectors: primary sector including agriculture and mining and quarrying (coal, petroleum and other metals and minerals); manufacturing sector; and services sector including infrastructure (electricity, gas and water as well as transport and telecommunication), construction, wholesale and retail, financing and insurance, real estate and business services, education and health.

The FDI data in this study is collected from the U.N. Economic Commission for Latin America and the Caribbean, based on country sources for Latin American countries; National Bureau of Statistics of China; ASEAN for other Asian countries; and OECD, UNCTAD, and country sources for other countries. This classification may vary to some extent in each country.

Foreign Direct Investment: The net FDI inflows measure the net inflows of investment to acquire a lasting management interest (10% or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital, as shown in the balance of payments. *Source*: World Development Indicators (WDI), World Bank (2004).

Growth and output levels: Both are imputed from the real GDP per capita, constant dollars. *Source*: WDI, World Bank (2004).

Liquidity (M2/GDP): Money plus quasi-money as a share of GDP. Liquid liabilities of the financial system (currency plus demand and interest bearing liabilities of the financial intermediaries and non-blank financial intermediaries)

divided by GDP. *Source*: World Bank Financial Structure Database. (http://www.worldbank.org/research/projects/finstructure/database.htm).

Private sector credit of financial system: The value of credits by financial intermediaries to the private sector divided by GDP. It excludes credits issued by central and development banks. Furthermore, it excludes credit to the public sector and cross claims of one group of intermediaries on another. *Source*: World Bank Financial Structure Database.

Private sector credit extended by banks: Credit by deposit money banks to the private sector as a share of GDP. *Source*: World Bank Financial Structure Database.

Domestic investment: 'Gross fixed domestic investment' measuring the outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. *Source*: World Bank (2004).

Inflation: Annual percentage changes in the GDP deflator. *Source*: World Bank (2004).

Government consumption: Total expenditure of the central government, including both current and capital (development expenditures and excluding lending minus repayments, as a share of GDP. *Source*: World Bank (2004).

Openness: Measured as the trade volume, exports plus imports as a share of GDP. *Source*: World Bank (2004).

Human capital: Human capital measured as the average years of secondary schooling in total population. *Source*: Barro and Lee (1996). Updated version downloadable from: http://www.cid.harvard.edu/ciddata/ciddata.html.

Bureaucratic quality: The institutional strength of the economy. High levels of quality imply that the bureaucracy has the strength and expertize to govern without drastic changes in policy, or interruption in public services. *Source*: ICRG.

Risk of expropriation: The probability that the government may expropriate private property. *Source*: ICRG.

Corruption: This index captures the likelihood that government officials will demand special payments, and the extent to which illegal payments are expected throughout government tiers, and is based on a survey of a panel of international experts. A higher corruption index corresponds to a less corrupt country. *Source*: ICRG.

Real effective exchange rate: Calculated as the ratio of the local price index to the multiplication of the US price index and the official exchange rate. *Source*: International Monetary Fund.

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