

FDI and Economic Growth: The Role of Local Financial Markets*

Laura Alfaro	Areendam Chanda
Harvard Business School	NC State University

Sebnem Kalemli-Ozcan**	Selin Sayek
University of Houston	Bentley College

April 2001

Abstract

The purpose of this paper is to examine the various links among foreign direct investment, financial markets and economic growth. We model an economy with a continuum of agents indexed by their level of ability. Agents have two choices: they can work for the foreign company in the FDI sector and use their inherited wealth to earn a return or they can choose to undertake entrepreneurial activities, which are subject to a fixed set-up cost. Financial markets allow entrepreneurs in the economy to finance the set-up costs and take advantage of knowledge spillovers from FDI. In addition to the analytical solution of the model, an empirical analysis is also provided using cross-country data from different sets of countries between 1970-1995. To the best of our knowledge there has not been a theoretical and empirical study on the interaction between financial markets and FDI spillovers prior to this study. Our empirical evidence suggests that FDI plays an important role in contributing to economic growth. However, the level of development of local financial markets is crucial for these positive effects to be realized.

JEL Classification: F23, F36, F43

*We thank Eduardo Borenzstein, Ross Levine and Edmundo Murrugarra for their help with the data and Bent Sorensen and Alex Hoffmaister for valuable comments and suggestions. We received valuable comments from the participants of the macro seminar at Brandeis University and University of Houston.

**Corresponding Author: Sebnem Kalemli-Ozcan, Department of Economics, University of Houston, Houston, Texas, 77204, Sebnem.Kalemli-Ozcan@mail.uh.edu.

1 Introduction

“In a trade English capital is instantly at the disposal of persons capable of understanding the new opportunities and making good use of them. In countries where there is little money to lend enterprising traders are long kept back, because they cannot at once borrow the capital, without which skill and knowledge are useless.”

Bagehot, 1873.

The past decade was marked by the increasing role of foreign direct investment (FDI) in total capital flows (See Table1). In 1998, more than half of all private capital flows to developing countries was accounted by FDI.¹ This change in the composition of capital flows has been synchronous with a shift in emphasis among policy-makers in developing countries to attract more FDI, especially following the 1980s debt crisis and the recent turmoil in the emerging economies. The rationale for increased efforts to attract more FDI stems from the belief that FDI has several positive effects which include productivity gains, technology transfers, the introduction of new processes, managerial skills and know-how to the domestic market, employee training, international production networks, and access to markets.² Domestic firms may benefit from accelerated diffusion of new technology if foreign firms introduce new products or processes to the domestic market. In some cases, domestic firms might benefit solely from observing these foreign firms. In other cases, technology diffusion might occur from labor turnover as domestic employees move from foreign to domestic firms.³ All these benefits, together with the direct capital financing it provides, suggest that FDI can play an important role in modernizing the national economy and promoting growth. However, domestic conditions are crucial in determining not only the quantity but also the quality of FDI. These conditions include the policy environment of the local country, productive assets available, and infrastructure.

Among such conditions, we believe that the development of local financial markets in particular can adversely limit the economy's ability of taking advantage of such potential FDI spillovers. Limited access to credit markets restricts entrepreneurial development. If entrepreneurship allows greater assimilation and adoption of best technological practices made available by FDI, then the absence of well-developed financial markets limits the potential positive FDI externalities.

Figure 1 shows data on FDI against data on financial development. We use the logarithms of FDI as a share of GDP and a measure of financial development (private credit extended in the economy as a share of GDP) introduced by King and Levine (1993). As the figure suggests, there is a positive relationship between the two variables. However, it is also apparent that there is a

wide variation in both variables given the other. Indeed, if financial development plays an important role in influencing the effects of FDI on output, one can expect countries with the same levels of FDI to have very different outcomes in terms of income levels.

In this paper we formalize the mechanism through which the trickle down effect of FDI depends on the extent of the development of the financial sector. It is then shown empirically that this is indeed an important channel via which FDI enhances growth. To the best of our knowledge, there has not been a theoretical and empirical study on the interaction between financial markets and FDI spillovers prior to this study.

We model an economy populated by agents who are differentiated by their ability level. Agents have two choices. They can work for the foreign company in the FDI sector and use their inherited wealth to earn a return. Or they can choose to set up their own firm, which will benefit from a spillover due to FDI. However, starting a firm requires a setup cost, which must be partly financed through borrowing from financial institutions. Due to inefficiencies in the financial sector, the borrowing rate is assumed to be higher than the lending rate. Under this scenario, more developed financial institutions make it easier for entrepreneurs to set up business. This not only spurs entrepreneurial activity but also enables entrepreneurs to reap the spillovers from FDI. This implies that FDI will have effects in the local economy that go beyond the direct increase in capital.

The model provides a benchmark for empirical analysis. We examine whether economies with better-developed financial markets are able to benefit from FDI to promote their economic growth. We find that FDI plays an important role in contributing to economic growth. However, the development level of local financial markets is crucial for these positive effects to be realized.

There have been some studies that theoretically develop and empirically test the relationship between FDI and economic growth. Borensztein, et al (1998), using a data set of FDI flows from industrialized countries to sixty-nine developing countries, show that FDI is an important vehicle for the transfer of technology and higher growth. However, higher productivity is only possible when the host country has a minimum threshold stock of human capital. Likewise, Xu (2000) using data on US multinational enterprises (MNE's), finds that a country needs to reach a minimum human capital threshold level in order to benefit from the technology transfer of US MNEs, and that most LDCs do not meet this threshold requirement. Carkovic and Levine (2000) find no effect of FDI on economic growth. To the best of our knowledge none of these studies, and nor any other, have empirically investigated the relationship between financial markets, FDI and output in the context of a well-defined theoretical model.⁴

The rest of the paper is organized as follows. A benchmark model is developed in Section 2. The data is defined in Section 3, the empirical results are discussed in Section 4, and Section 5 concludes.

2 A Conceptual Framework

We present a stylized model to illustrate how improvements in the financial markets influence the effects of FDI on domestic production. We assume a small open economy. The economy is populated with a continuum of agents of total mass 1. Each agent lives for one period.⁵ There are two sectors of production in the economy, described further below.

2.1 Production

The two sectors are distinguished by their ownership, the technology and the inputs used. The “foreign production” sector, whose output is denoted Y^{FDI} , is assumed to be wholly owned by foreign investors and uses foreign capital and domestically supplied labor. We assume, following Razin, et al. (1999), home investors lack direct access to foreign capital markets and cannot challenge the foreign direct investors in this sector.⁶ We assume that FDI is attracted to the country due to cost of capital differences.⁷

Production is perfectly competitive and technology is assumed to be Cobb-Douglas constant returns to scale,

$$Y_t^{FDI} = AL_t^b (K_t^{FDI})^{1-b} \quad (1)$$

where $0 < b < 1$, L_t denotes the domestic labor, K_t^{FDI} is the stock of foreign capital, and A is a productivity parameter. Optimality conditions in the foreign production sector imply that foreign capital is paid its marginal product which is given by the international rate of interest, r ,

$$r = (1 - b)AL_t^b (K_t^{FDI})^{-b} \quad (2)$$

Rearranging we get an expression for the stock of foreign capital,

$$K_t^{FDI} = \left(\frac{(1 - b)A}{r} \right)^{\frac{1}{b}} L_t \quad (3)$$

The foreign firm hires workers up to the point where the marginal productivity of an extra worker equals the wage, w ,

$$w = \mathbf{bA}^{\frac{1}{b}} \left(\frac{(1-\mathbf{b})}{r} \right)^{\frac{1-b}{b}} \quad (4)$$

The second sector, the output of which is denoted by Y^{DOM} , is composed of a number of firms, each of which is owned by a local entrepreneur. Production in each firm requires a fixed capital investment. In addition to the fixed capital investment, output is positively affected by the entrepreneur's ability and by the amount of foreign capital in the economy.⁸

Local entrepreneurs benefit from spillovers from the FDI sector. This assumption is central to the model.⁹ Potential entrepreneurs can take advantage of better managerial practices, networks, access to markets, and other spillovers from the foreign firms located in the domestic country. The foreign firm does not internalize these positive effects. Output in this sector is given by:

$$Y_t^{DOM} = \int_{\mathbf{e}_t^*}^1 Y_t^i d\mathbf{e} \quad (5)$$

where $[\mathbf{e}_t^*, 1]$, denotes the mass of agents that work for the domestic firm and \mathbf{e}_t^* will be determined endogenously. Y_t^i is the amount produced by entrepreneur $i \in \widehat{\mathbf{I}}[\mathbf{e}_t^*, 1]$:

$$Y_t^i = \mathbf{e}_t^i B (K_t^{FDI})^q S^g \quad (6)$$

where $0 < \mathbf{g} < 1$, $0 < \mathbf{q} < 1$, is associated with an entrepreneur of ability level \mathbf{e}_t^i , S is the fixed capital investment and B is a productivity parameter. We assume that the fixed investment S exceeds the resources owned by any single individual at any point in time. Local entrepreneurs can borrow the difference between their endowment and S in the local market.¹⁰ In the financial market, there is a wedge $-\mathbf{d}$ - between the lending rate, r and the borrowing rate i . The difference \mathbf{d} reflects the inefficiencies in the financial sector.¹¹ This wedge could reflect taxes, interest ceilings, required reserve policies, as King and Levine (1991) mention, or in general high intermediation costs due to labor regulation, high administration costs, low technology, etc.

2.2 Households and Occupational Choice

The economy is populated by a continuum of agents of total mass 1 who live for one time period. They are all endowed with one unit of labor but they differ in their ability level. For example, upon birth, individual i at time t is endowed with ability level \mathbf{e}_t^i , where \mathbf{e}_t^i is i.i.d., uniformly distributed over $\mathbf{e}_t^i \in \widehat{\mathbf{I}}(0, 1)$. \mathbf{e}_t^i is realized at the beginning of the period. Agents are all endowed with some initial wealth b_{t-1}^i , on which they can earn the international return r at the end

of the period should they choose to invest it in capital markets. Initially, we assume that $b_{t-1}^i = b_{t-1}$ for all i . All individuals consume and leave bequests b_t^i , at the end of the period t . At the beginning of period t , each agent faces two choices. They can choose to work for the foreign firm in the FDI sector. Alternatively, the agent can become an entrepreneur and work in the domestic-production sector.

If the agent chooses to work for the foreign company, they inelastically supply their labor endowment and earn a wage w . The wage w is independent of the agent's ability level. Agents who choose to work for the foreign company earn an income stream equal to the wage plus the return on their level of assets, $w + (1+r)b_{t-1}$, i.e. the wage plus a return on their assets. Those who choose to produce must pay their loans at the end of the period and therefore earn a net income of $Y_t^i - (1+i)(S - b_{t-1})$. An individual chooses to work for the foreign company if the income he or she earns is higher than that in the entrepreneurial sector:

$$w + (1+r)b_{t-1} > Y_t^i - (1+i)(S - b_{t-1}) \quad (7)$$

Alternatively, he or she chooses to start a firm if the inequality above is reversed and is indifferent between the two occupations if,

$$w + (1+r)b_{t-1} = Y_t^i - (1+i)(S - b_{t-1}) \quad (8)$$

The above equation characterizes the break even level of ability and therefore also the measure of people that work for the foreign sector. Substituting for output, Y_t^i , using equation (6), we obtain:

$$w + (1+r)b_{t-1} = \mathbf{e}_t^i B \left(K_t^{FDI} \right)^q S_g - (1+i)(S - b_{t-1}) \quad (9)$$

With a uniform distribution for the ability level, we obtain the following expression for \mathbf{e}_t^i ,

$$\mathbf{e}_t^i = \frac{(1+i)(S - b_{t-1}) + w + (1+r)b_{t-1}}{B \left(K_t^{FDI} \right)^q S_g} \quad (10)$$

Let \mathbf{e}_t^* denote the value of ability that satisfies the above condition. This means that the total amount of labor employed in the FDI sector will be,

$$L_t = \int_0^{\mathbf{e}_t^*} \mathbf{e}_t di = \mathbf{e}_t^* \quad (11)$$

From equations (3) and (11), we can rewrite the amount of foreign capital as

$$K_t^{FDI} = \left(\frac{(1-\mathbf{b})A}{r} \right)^{\frac{1}{q}} \mathbf{e}_t^* \quad (12)$$

Substituting this expression into equation (10) and rearranging provides an explicit form for the threshold level of entrepreneurial ability,

$$\mathbf{e}_t^* = \left[\frac{(I+i)(S - b_{t-1}) + \mathbf{b} \frac{1}{b} \left(\frac{I - \mathbf{b}}{R} \right)^{\frac{1-b}{b}} + (I+r)b_{t-1}}{B \left(\frac{A(I - \mathbf{b})}{r} \right)^{\frac{q}{b}} S^g} \right]^{\frac{1}{1+q}} \quad (13)$$

2.3 Comparative Statics

The above model allows us to understand how FDI will impact output, and how this effect depends on the local financial market conditions. More FDI generates higher output via two channels: First, it increases production in the FDI sector. Secondly, it also raises output in the domestic sector through spillovers. Note that the total output in the economy is:

$$Y_t = Y_t^{FDI} + \int_{\mathbf{e}_t^*}^1 Y_t^i d\mathbf{e} \quad (14)$$

which implies,

$$Y_t = Y_t^{FDI} + \left(\frac{1 - \mathbf{e}_t^{*2}}{2} \right) B (K_t^{FDI})^q S^g \quad (15)$$

The total effect of FDI on output is therefore the sum of the private marginal product of FDI in its own sector plus the difference between the social and the private marginal product:

$$\frac{\partial Y_t}{\partial K_t^{FDI}} = \frac{\partial Y_t^{FDI}}{\partial K_t^{FDI}} + \frac{\partial \left[\left(\frac{1 - \mathbf{e}_t^{*2}}{2} \right) B (K_t^{FDI})^q S^g \right]}{\partial K_t^{FDI}} \quad (16)$$

which is equivalent to,

$$\frac{\partial Y_t}{\partial K_t^{FDI}} = r + \left(\frac{1 - \mathbf{e}_t^{*2}}{2} \right) B \mathbf{q} (K_t^{FDI})^{q-1} S^g > 0 \quad (17)$$

Financial intermediation in this model affects the social marginal product of FDI. The total effect is therefore,

$$\frac{\partial^2 Y_t}{\partial K_t^{FDI} \partial \mathbf{d}} = -\mathbf{e}_t^* B \mathbf{q} (K_t^{FDI})^{q-1} S^g \frac{\partial \mathbf{e}_t^*}{\partial \mathbf{d}} + \left(\frac{1 - \mathbf{e}_t^{*2}}{2} \right) B \mathbf{q} (\mathbf{q} - 1) (K_t^{FDI})^{q-2} S^g \frac{\partial K_t^{FDI}}{\partial \mathbf{e}_t^*} \frac{\partial \mathbf{e}_t^*}{\partial \mathbf{d}} \quad (18)$$

equivalently,

$$\frac{\partial^2 Y_T}{\partial K_t^{FDI} \partial \mathbf{d}} = -B \mathbf{q} (K_t^{FDI})^{q-1} S^g \frac{\partial \mathbf{e}_t^*}{\partial \mathbf{d}} \left[\mathbf{e}_t^* + \frac{(1 - \mathbf{e}_t^{*2})(1 - \mathbf{q})}{2 \mathbf{e}_t^*} \right] < 0 \quad \text{if } \frac{\partial \mathbf{e}_t^*}{\partial \mathbf{d}} > 0 \quad (19)$$

In order to fully analyze the above equation we need to study how financial market inefficiencies affect the decision of becoming an entrepreneur. Observe that higher the value of the parameter \mathbf{d} , which denotes higher inefficiencies in the financial sector, the less attractive it is to undertake entrepreneurial activity. Using the definition of \mathbf{d} , $i = r + \mathbf{d}$, we can rewrite equation (13) as,

$$\mathbf{e}_t^* = \left[\frac{(1 + r + \mathbf{d})(S - b_{t-1}) + \mathbf{b} A^{\frac{1}{b}} \left(\frac{(1 - \mathbf{b})}{r} \right)^{\frac{1-b}{b}} + (1 + r)b_{t-1}}{B \left(\frac{A(1 - \mathbf{b})}{r} \right)^{\frac{q}{b}} S^g} \right]^{\frac{1}{1+q}} \quad (20)$$

From this expression it follows that $\frac{\partial \mathbf{e}_t^*}{\partial \mathbf{d}} > 0$. As expected, higher financial costs reduce the number of entrepreneurs. Conversely, an improvement in the efficiency of the financial sector tends to reduce the threshold level of entrepreneurship, thereby leading to an increase in the number of entrepreneurs in society. This implies that an improvement in the efficiency of the financial sector increases the social marginal product of foreign capital. As is evident in equation (18), there are essentially two effects working here. First, an improvement in the financial sector increases the number of entrepreneurs in society. This increase in the number of entrepreneurs raises the social marginal product of FDI since the two are complements. Secondly, there is a direct effect of the number of entrepreneurs on the amount of foreign capital stock. As the number of entrepreneurs rise, the number of laborers fall. The decline in the number of laborers implies that the stock of foreign capital will decline. Overall, higher efficiency of the local markets raises the social marginal product of foreign capital in the domestic sector.¹² The model above shows in a very simplified form, how better financial markets can lead to greater effects of FDI on output. In practice, however financial markets affect not only the financing of investment, but also the day to day to conduct of business. This channel is important but often neglected in the literature.¹³

The overall results suggest that higher levels of FDI generate more output in the economy, and the magnitude of this positive effect is influenced by the financial market inefficiencies. In the following sections an empirical analysis based on these findings is carried out in order to understand the interaction between FDI, local capital markets and output growth.

3 Data

This section describes the data used in the empirical analysis, specifically the measures of FDI, financial market development, economic growth, and a number of controlling variables used in the growth regressions.

There are several sources for data on FDI. An important source is the IMF publication “International Financial Statistics” (IFS) which reports the Balance of Payments statistics on FDI. The net FDI inflows, reported in the IFS, measures the net inflows of investment to acquire a lasting management interest (10 percent 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. The gross FDI figures reflect the sum of the absolute values of inflows and outflows accounted in the balance of payments financial accounts. Our model focuses on the inflows to the economy, therefore we prefer using the net inflow measure.

It is very difficult to construct accurate and comparable measures of financial services data for a broad cross-section of countries over several decades, hence our selection of countries were initially restricted by the availability of stock market data. Following King and Levine (1993), Levine and Zervos (1998), and Levine et al. (2000a) we construct several financial market series, spanning from the stock market to the volume of lending in an economy. The stock market data closely follows Levine and Zervos (1998). Stock market liquidity is measured as the value of stock trading relative to the size of the economy, labeled as “value traded”. In order to capture the relative size of the stock market we use the average value of listed domestic shares on domestic exchanges in a year as a share of the size of the economy (the GDP). This series is labeled as “capitalization”. Following King and Levine (1993), we also model the liquidity in the market by using the relative share of broad money in the economy (i.e. the share of M2 in GDP). All data is from the World Bank, World Development Indicators (WDI 2000), and the stock market data match the Emerging Market Database managed by Standard & Poor’s. The restrictiveness of the availability of stock market measures, accompanied by those of FDI data, allows us to use 39 countries for a period of 1981-1997 in our initial analysis, with a well-representation of both high and low income countries, high and low FDI recipient countries and a wide-range of financial market development. The list of countries is given in the Data Appendix.¹⁴

An additional measure for financial market development is the private credit extended in the economy, also obtained from WDI (2000). This variable measures the financial resources provided to the private sector—such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable—that establish a claim for repayment. This measure

closely follows the “private credit” measure used by King and Levine (1993). Our second sample is a group of 41 countries, spanning the period 1977-1997, for which this indicator is available along with complementary data on other controls. The majority of countries included are advanced economies, allowing a robustness check for how sensitive the empirical results are to the level of development of the economy. The country list is given in the Data Appendix.

In a recent study, Levine et al. (2000a) construct a more elaborate “private credit” measure, which excludes lending by the central bank and development banks. For further robustness checks a similar variable is calculated following their procedure. A third sample of 49 countries, covering the period 1970-1995, for which this variable was available, was compiled. This sample is dominated by developing countries and given in the Data Appendix.

Growth rate of output is measured as the growth of real per capita GDP, PPP adjusted, and the data is obtained from WDI (2000). “Gross domestic investment” data from WDI (2000), which consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories is used as the domestic investment measure.

Inflation, measured as the percentage change in the GDP deflator, is used as a proxy for macroeconomic stability. The data is from WDI (2000). Whereas, the institutional stability and quality in the economies are proxied by using data from the International Country Risk Guide (ICRG), a monthly publication of Political Risk Services, reporting data on the risk of expropriation, level of corruption, the rule of law, and the bureaucratic quality in an economy.¹⁵ Following the economic growth literature we also use assassinations, coups, revolutions and the black market premium as control variables. This data is obtained from Barro and Lee (1994) and updated from WDI (2000). A detailed description of all the data is included in the Data Appendix.¹⁶

The government consumption data for the initial sample of 39 countries is obtained from Barro and Lee (1994), and measures government consumption net of defense and education spending. When undertaking robustness checks we were forced to use the aggregate government spending data (including military and education spending) to preserve our sample size.¹⁷

Two different measures are used to capture the trade openness of the economy; Sachs and Warner openness index, and the share of total trade (exports plus imports) within the total output (GDP). The trade share data is obtained from WDI (2000). Since the share of trade in GDP is highly correlated with the share of FDI inflows in GDP we prefer using the Sachs-Warner openness index in a major portion of our analysis.¹⁸

Human capital is measured as the “secondary school enrollment”, obtained from WDI (2000), and is similar to Barro and Lee (1994) series.¹⁹ For our 49 country sample, we used the average

years of schooling in the total population as a measure of human capital instead of secondary school enrollment, since it is available. Finally, the population data is also obtained from WDI (2000).

4 Empirical Analysis

Table 2 presents descriptive statistics for investment, growth and financial development data. There is considerable variation in the share of FDI in GDP across countries, ranging from 0.03% in Japan to 10% in Singapore. GDP growth also shows variation, ranging from -3% for Nigeria to 7% for Korea. The financial development variable also ranges extensively; capitalization of the stock market ranges from 1% for Uruguay to 140% for South Africa, value traded ranges from close to 0% for Uruguay to 59% for Malaysia. Finally, the liquidity measure (M2/GDP) ranges from 14% for Argentina to 102% for Japan. The private credit data, inclusive of the credit extended by the central bank and development banks ranges from 12% for Nigeria to 171% for Japan. The more elaborate private credit measure, exclusive of the central bank lending, ranges from 4% for Ghana to 123% for the United States.

4.1 Growth and FDI: Financial Markets as a Channel

The purpose of our empirical analysis is to examine the financial markets channel through which FDI may be beneficial for growth, as shown in section 2. The theoretical model shows that improvements in financial markets increase output by increasing the marginal product of FDI. This result suggests that *one should observe transitional growth effects*. In an influential paper, Mankiw, Romer and Weil (1992) (MRW) derived an empirical specification based on the assumption that countries were unlikely to be at their steady states and therefore transitional dynamics should be more important. We employ a specification similar to theirs. As a starting exercise, we look at the direct effect of FDI on economic growth and based on MRW, estimate the following equation by OLS:

$$GROWTH_i = \mathbf{b}_0 + \mathbf{b}_1 INITIAL\ GDP_i + \mathbf{b}_2 FDI_i + \mathbf{b}_3 CONTROLS_i + \mathbf{n}_i$$

This is a cross-section regression with 39 countries where the variables are averaged over the time period 1981-1997. The regression results in Table 3 show that FDI has a positive significant effect on growth (Columns (1)-(4)). Column (1) shows that FDI has a significant effect after controlling for initial income, human capital, population growth and dummies for Africa and Latin America. This finding is robust to the addition of other independent variables that are typically used in growth regressions. In column (2) we add institutional and political variables (risk of expropriation and number of assassinations, respectively) and the black market premium

for foreign exchange. We also tried other institutional and political rights variables, which gave same qualitative results for all the columns. We also add inflation to control for macroeconomic stability and the Sachs-Warner openness index. Columns (3) and (4) repeat the same exercise for the 41-country sample. The 41-country sample includes a lot of advanced economies, which allows us to check the sensitivity of the results to the level of development of the countries in the sample. In addition, this sample allows us to do robustness checks since it has different financial market development indicators compared to the 39 country sample as we demonstrate next.

Our main finding, that is the positive significance of FDI, is robust to the inclusion of other variables using both samples, whereas the significance of some remaining variables may change. Government consumption is negatively significant only in column (2). The Latin America dummy is not robust to the inclusion of the additional variables. The Africa dummy and population growth are always negatively significant and openness_index is only significant with the 41-country sample. We also use EU, Asia, East Asia, South East Asia and West Europe dummies, which turn out to be insignificant. Most of these results are consistent with the growth literature with the exception of the insignificance of some of the variables. This is probably due to our limited sample.

The regressions in Table 4 examine the role of FDI on growth through financial markets. Following the model developed in section 2, we interact FDI with financial markets and use this as a regressor. To ensure that the interaction term does not proxy for FDI or the level of development of financial markets, both of the latter variables were also included in the regression independently. Thus, we run the following regression:

$$GROWTH_i = b_0 + b_1 FDI_i + b_2 (FDI_i * FINANCE_i) + b_3 FINANCE_i + b_4 CONTROL_i + \epsilon_i$$

As shown in the Table 4 the interaction term turns out to be positive and significant in all columns. Each of the regressions uses a different indicator for financial market development and a different sample: Column (1) uses capitalization, column (2) uses value traded and column (3) uses M2/GDP.²⁰ The main result is that the interaction term is significant. Financial market indicators are insignificant and FDI is negative and insignificant in general. However only in column (1) and (6) FDI was negatively significant. This can be due to the fact that with no financial markets FDI does not have any impact on growth. It is also possible that with no financial markets FDI is not channeled efficiently and has a negative effect on growth.²¹ In fact, the results suggest that there is a threshold level of the development of financial markets below which FDI will not have any beneficial effects on growth. Calculations based on our sample for the year 1997 reveals that only 9 out of 39 countries were above the threshold level for the

measure of “capitalization”.²² The significance of the interaction term is robust to the inclusion of other determinants of growth. Results are similar to Table 3 with a higher significance for openness.

For a robustness check and inclusion of further financial development measures, we repeat the above exercise for the second sample of 41 and third sample of 49 countries. The results, reported in Table 4 columns (4), (5) and (6), show that the importance of financial markets in allowing the positive spillovers of FDI to be realized remains unchanged and the other results are consistent with previous estimations. The human capital variable used in column (4) and (5) is measured as the total secondary school enrollment as in the first three columns, whereas in column (6) it is measured as the average years of schooling in the total population.

The strong positive correlation between the domestic investment ratio and the growth rate of an economy is one of the few consistent results to have emerged from the multitude of cross-country growth regressions that have appeared in the past decade. One could argue that the reason FDI appears significant in the above analysis is because the domestic investment ratio was not included. The model in Section 2 in fact suggests that FDI and financial markets interact to promote domestic investment as well by increasing the number of entrepreneurs in society. Therefore, for further robustness checks, we add domestic investment to the list of independent variables, and the results are reported in Table 5.

With the inclusion of domestic investment FDI becomes insignificant in column (1) and (2) for the 39 country and 41 country samples respectively. This suggests that FDI might work its effect on growth through domestic investment. When we include the interaction with financial markets in growth regressions reported in columns (3)-(5) the results improve and the interaction term turns out to be significant. This holds unchanged for different financial market indicators and for different samples. A final issue of robustness is about interacting FDI with human capital since this term is shown to have a significant positive effect on economic growth by the previous research.²³ Column (6) reports the results for this regression. We find that both FDI and schooling have positive significant effect, however the interaction term (FDI*schooling) does not. Notice that we are using a different human capital variable, thus our result may not be comparable with previous findings.

4.2 Domestic Investment and FDI

Table 5 raises the question of whether or not FDI affects growth through domestic investment. Table 6 shows the supporting evidence, that FDI does in fact significantly increase domestic investment. Results through columns (1)-(4) show that FDI increases total investment more than one for one. Since the data on domestic investment includes foreign owned

investments as well, a coefficient exceeding 1 suggests that FDI does have an impact on domestic investment over and above the accounting effect. In other words a coefficient of 1 would suggest that FDI has no impact on domestic investment.²⁴ All regressions reported in Table 6 find the coefficients on FDI to range from 1.12 to 1.42 according to the different sets of control variables. Similar results are reported for the second sample of countries, where the coefficients on FDI range from 1.01 to 1.27 depending on the different sets of control variables. One could argue however, that the coefficient being greater than one may simply reflect an omitted variable problem. For example, it might be the case that there is some variable that leads to greater FDI also leads to greater domestic investment. However the likely candidates for such variables are already controlled for in the regressions.

4.3 Endogeneity Issues

So far there has been no discussion of the endogeneity problem. Theoretically it is completely plausible that both the magnitude of FDI and the efficiency of financial markets increase with higher growth rates. This would lead to an overstatement of the effects of each of the two variables and their interaction on growth since we use the average values of these variables to estimate the coefficients in Table 4. Thus we need to construct instruments for both. For financial markets we will use variables that are not subject to reverse causality; such as shareholder rights, creditor rights, enforcement of legal-political rights, etc. These variables were constructed by La Porta et al. (1997, 1998) and known as LLSV variables. The rationale for using such instruments is explained in depth by La Porta et al. (1997). Briefly though it can be explained as follows; when the legal system provides protection for investors, they will be more inclined to purchase securities issued by firms, directly or via intermediaries. Similarly, financial intermediaries will be more willing to lend and invest beyond the close circle of client firms. La Porta et al. argue that shareholder rights vary systematically across countries, and consider four main legal traditions where these variables based upon: Common Law, French, German, and Scandinavian tradition, with the most extensive shareholder rights in Common Law countries. In two recent studies these variables have been used to instrument for financial market development. Kalemli-Ozcan et al. (1999) use LLSV variables as instruments for their capital market integration measure in an IV regression framework and thus provide solid empirical evidence for an important mechanism through which a developed and reliable financial system, backed by a legal environment that protects investor rights, enhances specialization in industrial production. Levine et al. (2000a,b) also use LLSV variables together with legal origin dummies to instrument for their liquidity, banking and stock market indicator variables, once again to show the causal link between financial development and growth.

Table 7 reports the results of the IV regressions using LLSV variables as instruments for financial markets. The LLSV variables used in the empirical analysis include the “one share one vote” variable, “cumulative voting or proportional representation” variable, “proxy by mail” variable, as well as the “efficiency of judicial systems” measure. These variables are defined in detail in the data appendix. The results in columns (2)-(4) use different variables as instruments. Column (2) uses judicial efficiency and cumulative voting. Column (3) also adds proxy by mail. Column (4) uses proxy by mail together with one share one vote instead of cumulative voting. All these columns show that the interaction term is still positive and significant and results are very similar to the OLS results in column (1).

Among the few consistently significant determinants of FDI are real exchange rates and lagged FDI. Real exchange rates, either through altering relative costs or relative wealth, impact the foreign investment decisions of multinational firms. In a model with imperfect capital markets, Froot and Stein (1991) link FDI decisions with real exchange rate variations as, for example, a depreciation of the domestic currency increases the relative wealth of foreign firms, which leads them to increase their investment abroad. Similarly, Blonigen (1999), assuming imperfections in the goods market, shows that the real exchange rate influences the relative wealth of firms thus generating foreign investment flows. In the empirical literature, Klein and Rosengren (1994) find that the real exchange rate is a significant determinant of FDI. Likewise, Wheeler and Mody (1992) find supporting evidence that FDI is self-reinforcing, i.e. that existing stock of foreign investment is a significant determinant of current investment decisions. This result is further reinforced in several country level studies in the literature.²⁵ Along these lines real exchange rates are used as instruments for FDI in the following analysis, where the real effective exchange rate is calculated as the ratio of the local price index to the US price index converted to the local currency.

Column (5) controls for both the endogeneity problem in FDI and in financial market indicators by instrumenting FDI with one-period lagged FDI and exchange rates levels and instrumenting financial markets with LLSV variables used in column (2). The results show the finding that FDI promotes growth through financial markets.

5 Conclusion

Following the debt crisis in the 1980s and the recent turmoil in emerging markets in the late 1990s, developing countries have changed their attitude towards FDI as it is believed that FDI can contribute to the development efforts of a country. In general, multinational firms' decision to extend production to another country is driven by lower costs and higher efficiency

considerations. From the host country's perspective though, the benefits of FDI are not restricted to improved use of its resources, but also stem from the introduction of new processes to the domestic market, learning-by-observing, networks, training of the labor force, and other spillovers and externalities. Due to the "growth-development" benefits FDI seems to convey, different countries and regions have pursued active policies to attract FDI. Most countries, including both developed and emerging nations have established investment agencies, and have policies that include both fiscal and financial incentives to attract FDI as well as others that seek to improve the local regulatory environment and the cost of doing business.

Though such policies can be very effective in attracting foreign investment, local conditions can limit the potential benefits FDI can provide to the host country by not generating benefits that go beyond the "capital" FDI brings and the wages it generates. In this paper we focused, in particular, on the role of local financial markets, and the link between FDI and growth. We believe that the non-development of local financial markets in particular can adversely limit the economy's ability of taking advantage of such potential FDI benefits. While bad financial markets may mean that a country is not in a position to cope with unregulated short term capital flows, our work suggests that the full benefits of long term stable flows may also not be realized in the absence of well functioning financial markets.

Our empirical evidence suggests that FDI plays an important role in contributing to economic growth. The level of development of local financial markets is crucial for the positive effects to be realized and to the best of our knowledge this has not been shown before. We also provide evidence that the link between FDI and growth is causal, where FDI promotes growth through financial markets. The result of this paper suggests that countries should weigh the cost of policies aimed at attracting FDI versus those that seek to improve local conditions. These two set of policies need not be incompatible, better local conditions not only attract foreign companies but also allow the host economies to maximize the benefits of foreign investments.

Data Appendix

A2.1 Countries in the Samples

1. Sample of 39 countries, ranging from developing to advanced countries.
2. Sample of 41 countries, dominated by advanced countries.
3. Sample of 49 countries, dominated by developing countries.

List: Algeria (3), Argentina (1,2,3), Australia (1,2,3), Austria (1,2,3), Bangladesh (1), Belgium (1,2), Bolivia (3), Brazil (1,2,3), Canada (1,2,3), Chile (1,2,3), Colombia (1), Costa Rica (3), Cote d'Ivoire (1), Denmark (1), Dominican Republic (3), Ecuador (2,3), Egypt (1,2,3), El Salvador (3), Finland (2), France (1,2), Gambia (3), Ghana (3), Greece (1,2,3), Guatemala (3), Guyana (3), Haiti (3), Honduras (3), India (1,2,3), Indonesia (1,2), Ireland (2), Israel (1,2,3), Italy (1,2,3), Jamaica (3), Japan (1,2), Jordan (1,2), Kenya (2,3), Korea (1,2), Malaysia (1,2,3), Mauritius (3), Mexico (1,2,3), Nepal (3), Netherlands (1,2,3), New Zealand (2), Niger (3), Nigeria (1,2,3), Norway (1,2), Pakistan (2,3), Panama (3), Paraguay (3), Peru (2,3), Philippines (1,2,3), Portugal (1,2), Rwanda (3), Senegal (3), Sierra Leone (3), Singapore (1,2), South Africa (1), Spain (1,2), Sri Lanka (2,3), Sudan (3), Sweden (1,2,3), Thailand (1,2,3), Togo (3), Trinidad Tobago (3), Turkey (1,2), United Kingdom (1,2,3), United States (1,2,3), Uruguay (1,2,3), Venezuela (1,2,3), Zimbabwe (1).

A2.2 Data Sources and Descriptions

Foreign Direct Investment: The net FDI inflows measure the net inflows of investment to acquire a lasting management interest (10 percent 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: IMF "International Financial Statistics".*

Output levels and growth: Output level and growth data is the growth of real per capita GDP, PPP adjusted. *Source: WDI (2000).*

Value traded: Value of stock trading relative to the size of the economy. *Source: WDI (2000) and Emerging Market Database.*

Capitalization: Captures the size of the stock market, measures the average value of listed domestic shares on domestic exchanges in a year as a share of the size of the economy (the GDP). *Source: WDI (2000) and Emerging Market Database.*

Liquidity: Money and quasi-money (M2) as a share of GDP. *Source: WDI (2000).*

Private credit: The financial resources provided to the private sector—such as loans, purchases of nonequity securities and other accounts receivable—that establish a claim for repayment (used in the second sample). *Source: WDI.*

Private credit by private sector: This variable measures the financial intermediary credits to the private sector relative to GDP, and it includes only credits issued by deposit money banks and other financial intermediaries, excluding credit to the public sector and gross claims of one group of intermediaries on another. Used in the third sample. *Source: Levine et al. (2000a) calculations using IFS data.*

One share: is equal to one if the company law or commercial code of the country requires that ordinary shares carry one vote per share, zero otherwise. Equivalently, this variable equals one when the law prohibits the existence of both multiple-voting and non-voting ordinary shares and does not allow firms to set a maximum number of votes per shareholder irrespective of the number of shares she owns, and zero otherwise. *Source: Original source is the Company Law or Commercial Code; secondary source is La Porta et al. (1997,1998).*

Cumulative voting or proportional representation: is equal to one if the company law of commercial code allows shareholders to cast all of their votes for one candidate standing for election to the board of directors (cumulative voting) or if the company law or commercial code allows a mechanism of proportional representation in the board by which minority interests may name a proportional number of directors to the board and zero otherwise. *Source: Original source is the Company Law or Commercial Code; secondary source is La Porta et al. (1997,1998).*

Domestic Investment: “Gross domestic investment” measuring the outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. *Source: WDI (2000).*

Inflation: Percentage changes in the GDP deflator. *Source: WDI (2000).*

Government Consumption: In the first two data sets the government consumption is measured as the government consumption net of defense and education spending, whereas the third data-set uses a measure inclusive of the military and education spending (due to data availability). *Sources: WDI (2000), and Barro and Lee (1994).*

Trade Openness: Sachs and Warner dummy variable, as well as exports plus imports as a share of GDP. *Sources: Sachs and Warner (1995) and WDI (2000) respectively.*

Human Capital: In the first and second data set human capital is measured as “secondary school enrollment” *Sources: WDI (2000), Barro and Lee (1994).* The third data set uses human capital measured as the average years of secondary schooling in total population. *Source: Barro and Lee (1994).*

Efficiency of judicial system: Assesses the “efficiency and integrity of the legal environment as it affects business, particularly foreign firms”. *Source: Original source is the Business International Services; secondary source is La Porta et al. (1997,1998).*

Corruption: Corruption within the political system, i.e. financial corruption in the form of demands for special payments and bribes connected with import and export licenses, exchange controls, tax assessments or loans. It also captures corruption in the form of excessive patronage, job reservations, “favor-for-favors”, secret party funding, suspiciously close ties between politics and business; all of which could lead to inefficient control of the economy, and increased incentives for black market development. *Source: ICRG.*

The rule of law: The law sub-components assess the strength and impartiality of the legal system while the “order” sub-component assesses the observance of law in the system. *Source: ICRG.*

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

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

Assassinations: The number of any politically motivated murder or attempted murder of a high government official or politician. *Source: WDI (2000)*

Coups: The number of extra-constitutional or forced changes in the top government elite and/or its effective control of the nation's power structure in a given year. The term “coup” includes, but is not exhausted by, the term “successful revolution”. Unsuccessful coups are not counted. *Source: WDI (2000).*

Revolutions: The number of any illegal or forced change in the top governmental elite, any attempt at such a change, or any successful or unsuccessful armed rebellion whose aim is independence from the central government. *Source: WDI (2000).*

Black market premium: It is calculated as the premium in the parallel exchange market relative to the official market (i.e. the formula is $(\text{parallel exchange rate}/\text{official exchange rate} - 1) * 100$). The values for industrial countries are added as zero. *Source: WDI (2000).*

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

References

- Aghion, Philippe and Patrick Bolton, 1997. A Trickle Down Theory of Growth and Debt Overhang. *Review of Economic Studies* 64, 151--172.
- Acemoglu, D. and F. Zilibotti, 1997. Was Prometheus Unbound by Chance? Risk, Diversification and Growth. *Journal of Political Economy* 105, 709--751.
- Aitken, B.J. and A. Harrison, 1999. Do Domestic Firms Benefit from Direct Foreign Investment? Evidence from Venezuela. *American Economic Review* 89, 605--618.
- Barro, R. and J-W Lee, 1996. International Measures of Schooling Years and Schooling Quality. *American Economic Review* 86, 218--23.
- Barro, R. and Sala-i-Martin, 1995. *Economic Growth*, McGraw-Hill Inc.
- Barro, R. and Sala-i-Martin, 1997. Technology Diffusion, Convergence and Growth. *Journal of Economic Growth* 2, 1--26.
- Beck, Thorsten, R. Levine and N. Loayza, 2000b. Finance and the Sources of Growth. *Journal of Financial Economics* 58, 261--300.
- Blomstrom, M. and A. Kokko, 1996. The Impact of Foreign Investment on Host Countries: a Review of the Evidence. *World Bank Research Paper*, 1745.
- Borensztein, E. J. De Gregorio and J-W. Lee, 1998. How Does Foreign Direct Investment Affect Economic Growth? *Journal of International Economics* 45, 115--35.
- Branstetter, Lee, 2000. Is Foreign Direct Investment a Channel of Knowledge Spillovers? Evidence from Japan's FDI in the United States. *NBER Working Paper* 8015.
- Carkovic, Maria and Ross Levine, 2000. Does Foreign Direct Investment Accelerate Economic Growth? *University of Minnesota, Working Paper*.
- Caves, Richard, 1996. *Multinational Enterprise and Economic Analysis*, Cambridge University Press.
- Coe, David T, Elhanan Helpman and Alexander Hoffmaister, 1995. North-South R&D Spillovers. *NBER Working Paper*, 5048.
- Froot, K. and J. Stein, 1991. Exchange Rates and Foreign Direct Investment: an Imperfect Capital Market Approach. *Quarterly Journal of Economics* 106, 1191--1217.
- Galor, O. and J. Zeira, 1993. Income Distribution and Macroeconomics. *Review of Economic Studies* 60, 35--52.
- Grossman, G. and E. Helpman, 1991. *Innovation and Growth in the Global Economy*, Cambridge: MIT Press.
- Grossman, G. and E. Helpman, 1995. Technology and Trade, in Grossman, G.M. and Rogoff, K. (Eds) *Handbook of International Economics Volume III*.

- Hull, Leslie and Tesar, Linda, 2000. Risk, Specialization and the Composition of International Capital Flows. Working Paper.
- International Monetary Fund, 1998. Balance of Payments Statistics Yearbook.
- Kalemli-Ozcan, Sebnem, Bent E. Sorensen, and Oved Yosha, 1999. Risk Sharing and Industrial Specialization: Regional and International Evidence. Brown University Working Paper, 99-16.
- King, R. and R. Levine, 1993a. Finance and Growth: Schumpeter Might be Right. Quarterly Journal of Economics 108, 717--738.
- King, R. and R. Levine, 1993b. Finance, Entrepreneurship and Growth: Theory and Evidence. Journal of Monetary Economics 32, 513--542.
- Klein, M. and Rosengren, E., 1994. The Real Exchange Rate and Foreign Direct Investment in the United States: Relative Wealth vs. Relative Wage Effects. Journal of International Economics 36, 373--89.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, 1997. Legal Determinants of External Finance. Journal of Finance 52, 1131--1150.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, 1998. Law and Finance. Journal of Political Economy 106, 1113--1155.
- Levine, R., N. Loayza and T. Beck, 2000b. Financial Intermediation and Growth: Causality and Causes. Journal of Monetary Economics, 46:1, 31--77.
- Levine, R. and S. Zervos, 1998. Stock Markets, Banks and Economic Growth. American Economic Review 88, 537--558.
- Lipsey, Robert, 1999. The Role of Foreign Direct Investment in: Feldstein, M. (Ed), International Capital Flows, NBER.
- Mankiw, Gregory N., David Romer and David N. Weil, 1992. A Contribution to the Empirics of Economic Growth. Quarterly Journal of Economics, 407--437.
- Markusen, James and Keith Maskus, 1999. Discrimination among Alternative Theories of FDI. NBER Working Paper 7164.
- Obstfeld, Maurice, 1994. Risk-Taking, Global Diversification, and Growth. American Economic Review 84, 1310--1329.
- Razin, A., E. Sadka and C. Yuen, 1999. An Information-Based model of FDI: the Gains From Trade Revisited. NBER Working Paper 6884.
- Sachs J. and Warner A., 1995. Economic Reform and the Process of Global Integration. Brookings Papers on Economic Activity, 1--118.

- Saint-Paul, G., 1992. Technological Choice, Financial Markets and Economic Development. *European Economic Review*.
- UNCTAD, 2000. Cross-border Mergers and Acquisitions and Development.
- Wheeler, D. and A. Mody, 1992. International Investment Location Decisions: the Case of US Firms. *Journal of International Economics* 33, 57--76.
- World Bank, 2000. World Bank Development Report.
- Wurgler, J., 2000. Financial Markets and the Allocation of Capital. *Journal of Financial Economics* 58, 187--214.
- Xu, Bin, 2000. Multinational Enterprises, Technology Diffusion, and Host Country Productivity Growth. *Journal of Development Economics* 62, 477--493.

Figure 1²⁶

Log(FDI/GDP) versus Log(Private Credit) - 1975:1995

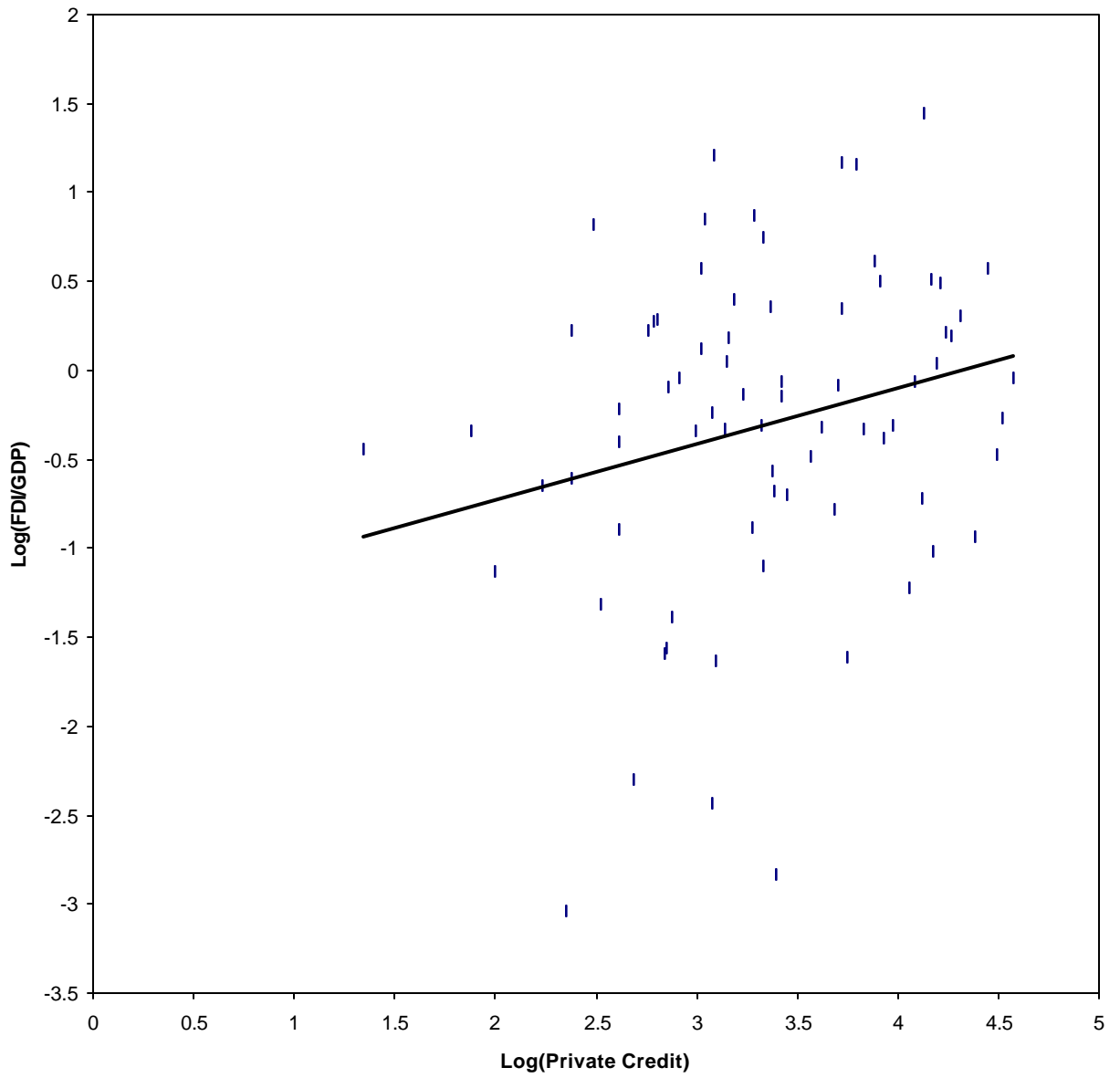


Table 1: FDI Facts

	Value (billion dollars)			Annual Growth		
	1982	1990	1999	86-90	91-95	96-96
FDI inflows	58	209	865	24	20	32
FDI inward stock	594	1,761	4,772	18	9	16
Gross product foreign affiliates	565	1,419	3,045	16	7	15

Notes: The data is from UNCTAD, World Investment Report, 2000.

Table 2: Descriptive Statistics

Sample 1: 39 countries (both developed and developing)			
	Mean	Max	Min
Growth	0.02	0.07	-0.03
FDI/GDP	0.01	0.10	0.00
Investment/GDP	0.22	0.39	0.13
Capitalization	0.34	1.40	0.01
Value Traded	0.13	0.59	0.00
M2/GDP	0.51	1.02	0.14

Sample 2: 41 countries (mostly developed)			
	Mean	Max	Min
Growth	0.02	0.06	-0.02
FDI/GDP	0.01	0.09	0.00
Investment/GDP	0.23	0.39	0.15
M2/GDP	0.48	0.98	0.15
Private Sector Credit	0.54	1.71	0.12

Sample 3: 49 countries (mostly developing)			
	Mean	Max	Min
Growth	0.01	0.05	-0.03
FDI/GDP	0.01	0.05	0.00
Private sector Credit	0.34	1.23	0.04

Notes: For the 39 country sample the variables are averages for the time period 1981-1997, for the 41 country sample they are averages for 1977-1997 and for the 49 country sample they are averages for 1970-1995.

Table 3: Growth and FDI
Dependent Variable—Average annual per capita growth rate

	(1)	(2)	(3)	(4)
Observations	39	39	41	41
log (Initial GDP)	-0.02 (4.10)	-0.02 (3.80)	-0.01 (2.66)	-0.02 (3.95)
FDI/GDP	0.33 (2.57)	0.28 (2.31)	0.37 (2.81)	0.28 (2.51)
Schooling	0.03 (0.59)	0.03 (0.72)	-0.01 (0.01)	-0.02 (0.29)
Population Growth	-0.01 (3.32)	-0.01 (3.47)	-0.76 (2.59)	-0.66 (2.65)
Government Consumption	-0.1 (1.75)	-0.1 (2.2)	-0.01 (0.37)	0.01 (0.31)
Latin American Dummy	-0.01 (2.17)	-0.01 (0.71)	-0.01 (2.49)	-0.06 (1.11)
African Dummy	-0.04 (4.63)	-0.03 (3.82)	-0.04 (3.06)	-0.03 (3.15)
Institutions	–	-0.02 (0.77)	–	–
Black Market Premium	–	-0.02 (0.11)	–	-0.01 (0.60)
Political Rights	–	-0.04 (0.01)	–	-0.04 (1.37)
Inflation	–	-0.01 0.01	–	0.04 (0.21)
Openness	–	0.01 (1.78)	–	0.02 (2.68)
R^2	0.66	0.71	0.56	0.70

Notes: All regressions have a constant term. t-values are in parentheses. In Columns (1) and (2) we use the first sample of 39 countries. The growth rate, FDI/GDP, population growth, and inflation are averages for 1981-1997, risk of expropriation proxying for institutional quality is averaged over 1985-1995 and number of assassinations, proxying for political rights, is averaged over 1980-1993, and Sachs index for openness, which is average for 1981-1992. The following variables capture initial values: log of initial real per capita GDP, PPP adjusted, measured in 1981, log of secondary schooling enrollment, in 1986, government consumption, net of defense and military spending, as a share of GDP is the average for 1975-1980, the initial black market premium is the average of 1980-1985 and is used as log (1+ market premium). In Columns (3) and (4) we use the second sample of 41 countries. The growth rate, FDI/GDP, population growth, and inflation are averages for 1977-1997, risk of expropriation proxying for institutional quality is averaged over 1985-1995 and number of assassinations, proxying for political rights, is averaged over 1977-1993, and Sachs index for openness, which is average for 1977-1992. The following variables capture initial values: log of initial real per capita GDP, PPP adjusted, measured in 1977, log of secondary schooling enrollment, measured in 1975, government consumption, net of defense and military spending, as a share of GDP for 1977, the initial black market premium in 1975, and is used as log (1+ black market premium). Schooling (total secondary school enrollment) is used in log form in the regressions to smooth the effect of outliers.

Table 4: Growth and FDI: The Role of Financial Markets
 Dependent Variable—Average annual per capita growth rate

	(1) Capit.	(2) Value.	(3) M2/GDP	(4) M2/GDP	(5) Privcr.	(6) Privcr.
Observations	39	39	39	41	41	49
log (Initial GDP)	-0.02 (5.42)	-0.02 (5.20)	-0.02 (3.71)	-0.02 (3.83)	-0.02 (4.26)	-0.01 (4.05)
FDI/GDP	-0.60 (2.26)	-0.36 (1.46)	-0.95 (1.57)	-0.77 (1.39)	-0.71 (1.55)	-0.01 (2.39)
(FDI/GDP)*Financ. Markets	0.67 (2.84)	1.28 (2.2)	1.72 (2.08)	1.55 (2.00)	1.28 (2.21)	0.01 (2.56)
Financial Markets	0.01 (1.48)	0.03 (1.60)	-0.01 (1.22)	-0.02 (1.72)	0.02 (0.02)	-0.02 (0.93)
Schooling	0.01 (0.43)	0.03 (1.01)	0.01 (0.034)	-0.01 (0.17)	-0.01 (0.12)	0.01 (3.30)
Population Growth	-0.01 (5.41)	-0.01 (5.12)	-0.01 (3.45)	-0.62 (2.55)	-0.68 (3.00)	0.01 (0.04)
Government Consumption	-0.1 (2.86)	-0.07 (2.04)	-0.06 (1.47)	0.01 (0.21)	0.01 (0.10)	-0.03 (0.90)
Latin American Dummy	0.01 (0.18)	0.01 (0.45)	-0.03 (0.42)	-0.05 (0.98)	-0.01 (0.24)	-0.01 (2.46)
African Dummy	-0.03 (4.50)	-0.03 (3.96)	-0.03 (3.10)	-0.03 (2.65)	-0.03 (2.66)	-0.02 (2.98)
Institutions	-0.01 (0.74)	-0.01 (0.08)	-0.02 (0.76)	– –	– –	– –
Black Market Premium	0.02 (1.20)	0.01 (0.93)	-0.02 (0.11)	-0.01 (0.08)	0.01 (0.56)	– –
Political Rights	-0.03 (1.05)	-0.02 (0.58)	-0.03 (0.75)	-0.04 (1.61)	-0.04 (1.57)	-0.01 (0.03)
Inflation	-0.01 (0.86)	-0.01 (0.92)	– –	– –	-0.01 (0.45)	– –
Openness	0.02 (2.76)	0.01 (2.58)	0.02 (2.68)	0.02 (3.24)	0.01 (2.76)	0.01 (0.33)
R^2	0.83	0.83	0.75	0.73	0.75	0.63

Notes: All regressions have a constant term. t-values are in parentheses. The first three columns use the 39-country sample. Financial market development is measured as capitalization (capit.) in column (1), value traded (value.) in column (2) and log(M2/GDP) in column (3). Inflation is not used in column (3) since it is highly correlated with M2/GDP. Column (4) and (5) uses the 41-country sample. The financial market variables are M2/GDP and private sector credit respectively. Column (6) uses the 49-country data set. See the data section for the detailed definitions of these. The data for columns (1)-(5) are described in Table 3. Variables used in column (6) are averages for 1970-1995 for 49 countries. Assassinations are used as a proxy for political rights and it is averaged for 1971-1993. Schooling is average years of schooling in total population and used in log form. Government consumption is defined as a share of GDP. For this sample openness is measured as share of trade in GDP. We also used East Asia and OECD dummies, which were insignificant.

Table 5: Growth and FDI—Robustness: Domestic Investment and Human Capital
 Dependent Variable—Average annual per capita growth rate

	(1)	(2)	(3) Capit.	(4) M2GDP	(5) Priver.	(6) Schooling
Observations	39	41	39	39	41	49
log (Initial GDP)	-0.01 (2.11)	-0.01 (3.14)	-0.02 (3.59)	-0.01 (1.78)	-0.01 (3.46)	-0.01 (3.38)
Investment/GDP	0.04 (3.15)	0.01 (2.98)	0.02 (2.00)	0.04 (3.25)	0.01 (2.76)	-- --
FDI/GDP	0.14 (1.18)	0.14 (1.31)	-0.54 (2.14)	-0.88 (1.67)	-0.79 (1.88)	0.83 (2.20)
(FDI/GDP)*Financ. Markets	-- --	-- --	0.57 (2.49)	1.42 (2.00)	1.21 (2.31)	-- --
Financial Markets	-- --	-- --	0.01 (1.22)	-0.01 (1.99)	-0.01 (0.76)	-- --
(FDI/GDP)*Schooling	-- --	-- --	-- --	-- --	-- --	-0.34 (1.42)
Schooling	0.01 (0.28)	-0.03 (0.43)	0.01 (0.17)	-0.03 (0.84)	-0.01 (0.25)	0.01 (3.72)
Population Growth	-0.01 (4.73)	-0.92 (3.85)	-0.01 (6.01)	-0.01 (4.73)	-0.92 (4.12)	-0.01 (0.03)
Government Consumption	-0.04 (0.86)	0.01 (0.87)	-0.07 (1.76)	0.02 (0.06)	0.01 (0.62)	-0.01 (0.08)
Latin American Dummy	-0.01 (0.20)	0.02 (0.42)	0.2 (0.39)	-0.01 (0.76)	0.01 (0.22)	-0.02 (4.17)
African Dummy	-0.02 (2.05)	-0.02 (2.48)	-0.02 (2.99)	-0.01 (1.70)	-0.02 (2.01)	-0.02 (4.36)
Institutions	-0.01 (0.72)	-- --	-0.01 (0.72)	-0.01 (0.46)	-- --	-- --
Black Market Premium	-0.01 (0.65)	-0.01 (0.49)	0.01 (0.64)	-0.02 (1.16)	0.01 (0.58)	-- --
Political Rights	-0.02 (0.55)	-0.03 (1.04)	-0.02 (0.74)	-0.02 (0.54)	-0.03 (1.40)	-0.01 (0.29)
Inflation	-0.01 (0.81)	-0.01 (0.54)	-0.02 (1.08)	-- --	-0.02 (1.10)	-- --
Openness	-0.02 (0.28)	0.01 (1.30)	-0.01 (0.98)	0.04 (0.41)	0.01 (1.65)	-0.01 (1.30)
R^2	0.78	0.76	0.85	0.81	0.80	0.60

Notes: Column (1) uses the 39-country sample. Investment in column (1) measures log of total domestic investment averaged over 1981-1997. Column (2) uses the 41-country sample, where investment ratio is averaged for 1977-1997, and is in non-log form. Column (3) uses capitalization for financial markets and column (4) uses log(M2/GDP) from the 39-country sample and column (5) uses private credit from the 41-country sample. Using the 49-country sample Column (6) tries a different interaction term by interacting FDI/GDP with schooling. t-values are in parentheses.

Table 6: Domestic Investment and FDI
Dependent Variable—Investment/GDP

	(1)	(2)	(3)	(4)
Observations	39	39	41	41
log (Initial GDP)	-2.54 (2.10)	-4.77 (3.54)	-1.17 (1.73)	-2.45 (1.74)
FDI/GDP	1.42 (3.40)	1.12 (3.36)	1.27 (2.92)	1.01 (2.72)
Schooling	0.91 (0.65)	1.09 (0.96)	0.74 (0.28)	0.44 (0.20)
Population Growth	1.05 (1.10)	1.21 (1.58)	1.45 (1.51)	1.91 (2.33)
Government Consumption	-0.28 (1.88)	-0.33 (2.72)	-0.10 (0.76)	-0.12 (1.07)
Latin American Dummy	-4.69 (2.65)	-1.65 (0.87)	-4.18 (2.32)	-3.05 (1.61)
African Dummy	-10.1 (3.92)	-6.71 (3.02)	-8.84 (2.13)	-6.54 (1.84)
Institutions	–	-0.43 (0.68)	–	–
Black Market Premium	–	0.12 (0.3)	–	-1.78 (0.27)
Political Rights	–	-1.76 (1.79)	–	-0.87 (0.95)
Inflation	–	2.75 (0.5)	–	9.29 (1.57)
Openness	–	9.48 (3.91)	–	7.08 (3.06)
R^2	0.57	0.74	0.45	0.62

Notes: The dependent variable is total domestic investment divided by GDP. All regressions have a constant term. t-values are in parentheses. First two columns use the 39-country sample, whereas the last two use the 41-country sample. See notes to Tables 1 and 2 for the definitions of other variables.

Table 7: Growth and FDI: The Role of Financial Markets—Causality
 Dependent Variable—Average annual per capita growth rate

	(1) OLS.	(2) IV	(3) IV	(4) IV	(5) IV.
Observations	41	41	41	41	41
log (Initial GDP)	-0.02 (4.26)	-0.02 (3.66)	-0.02 (3.69)	-0.02 (3.74)	-0.02 (3.84)
FDI/GDP	-0.71 (1.55)	-1.62 (1.97)	-1.56 (1.94)	-1.52 (1.84)	-1.58 (1.87)
(FDI/GDP)*Financ. Markets	1.28 (2.21)	2.45 (2.33)	2.37 (2.33)	2.32 (2.21)	2.41 (2.24)
Financial Markets	0.0002 (0.02)	-0.01 (0.27)	-0.02 (0.55)	-0.01 (0.48)	-0.03 (0.21)
Schooling	-0.001 (0.12)	0.001 (0.05)	0.002 (0.04)	0.002 (0.03)	0.001 (0.06)
Population Growth	-0.68 (3.00)	-0.71 (2.93)	-0.71 (2.94)	-0.71 (2.95)	-0.71 (2.95)
Government Consumption	0.0001 (0.10)	-0.0001 (0.26)	-0.0001 (0.15)	-0.0001 (0.16)	-0.0001 (0.29)
Latin American Dummy	-0.001 (0.24)	0.002 (0.31)	0.001 (0.20)	0.001 (0.19)	0.002 (0.35)
African Dummy	-0.03 (2.66)	-0.02 (1.83)	-0.02 (1.90)	-0.02 (1.90)	-0.02 (1.83)
Black Market Premium	0.001 (0.56)	0.03 (1.14)	0.03 (1.08)	0.02 (1.03)	0.03 (1.12)
Political Rights	-0.04 (1.57)	-0.01 (1.58)	-0.05 (1.69)	-0.05 (1.68)	-0.01 (1.58)
Inflation	-0.01 (0.45)	-0.02 (0.85)	-0.02 (0.79)	-0.02 (0.77)	-0.02 (0.85)
Openness	0.01 (2.76)	0.02 (2.40)	0.02 (2.64)	0.02 (2.62)	0.02 (2.47)
R^2	0.75	0.72	0.73	0.73	0.72

Notes: All columns use the 41-country sample. Column (2) shows the results from IV regression where financial markets (private credit) term is instrumented by LLSV variables. The instruments are judicial efficiency and cumulative voting. The efficiency of judicial system assesses the “efficiency and integrity of the legal environment as it affects business, particularly foreign firms”. Cumulative voting or proportional representation is defined to be one if the company law of commercial code allows shareholders to cast all of their votes for one candidate standing for election to the board of directors (cumulative voting) or if the company law or commercial code allows a mechanism of proportional representation in the board by which minority interests may name a proportional number of directors to the board and zero otherwise. Column (3) adds proxy by mail as an additional instrument. Column (4) keeps proxy by mail as instrument and uses one vote instead of cumulative voting. Column (5) uses lagged FDI and exchange rate to instrument FDI/GDP in addition to the instruments for financial markets used in column (2). Column (1) is the respective OLS regression. All regressions have a constant term. t-values are in parentheses. See notes to Table 1 for the definitions of other variables.

¹ World Development Report (2000).

² See Grossman and Helpman (1991, 1995), Barro and Sala-i-Martin (1995, 1997) and Caves (1996). Using a panel on Venezuelan plants, Aitken and Harrison's (1999) find that the gains from foreign investment are mostly captured by joint ventures. Branstetter (2000) finds evidence that FDI increases the flow of knowledge spillovers both from and to Japanese multinationals undertaking direct investment in the U.S.

³ Hull and Tesar (2000) show that FDI via multinationals can cause greater risk diversification.

⁴ The interaction between financial markets and growth itself has been studied extensively recently. See King and Levine (1993a,b), Beck, Levine and Loayza (2000a, 2000b), Levine and Zervos (1998), Wurgler (2000). These studies show positive effects of financial market development on growth theoretically and empirically. Obstfeld (1994), Acemoglu and Zilibotti (1997), Saint-Paul (1992) theoretically show how capital market integration induces specialization in production, which in turn will promote growth. See Kalemli-Ozcan et al. for the empirical evidence on this issue.

⁵ Aghion and Bolton (1997) also adopt a similar approach in that they assume economic life is relegated to only one period.

⁶ Alternatively, foreign firms can be thought of as owning the technology to produce in this sector and because of its special characteristics (asset specific) they choose to directly produce in the country rather than to license the technology.

⁷ Our objective is to model the effects of foreign production on local output and the role of financial markets and not the specific decision to invest abroad. See Caves (1999) for a survey on the rationale behind multinational firms.

⁸ The assumption of entrepreneurial ability is important to rule out corner solutions as will be evident later.

⁹ Blomstrom and Kokko (1997) mention three different means of such spillovers from the MNF to the local markets. The first one is due to linkages in the market. Backward and forward linkages between the foreign and domestic firms create an environment where the foreign processes can be easily learned by the domestic firms. Training of the local workers in the FDI industry also allows such spillovers. Finally, they define “demonstration effects”, which are possible due to the competition between the domestic firms and the MNF. Similar effects are mentioned in Aitken and Harrison (1999).

¹⁰ One can justify this assumption by considering that due to information asymmetries or sovereign risk it is costly or impossible for entrepreneurs to finance abroad or directly through the stock market. Razin et al. (1999) adopt a similar assumption to focus on the effects of foreign production in the local economy.

¹¹ Galor and Zeira (1993) adopt a similar strategy to allow for capital market imperfections.

¹² Improvements in the financial markets have a positive effect on the marginal product of FDI capital for $1 - q + qe > 0$. The assumption of $q < 1$ clearly helps remove any ambiguity in this condition. However, this restriction is necessary only for $e = 0$. Further, empirically, a value of $q > 1$ seems highly implausible. For example, estimates of R&D spillovers by Coe, Helpman and Hoffmaister (1995) show that a \$100 increase in the U.S. or Japanese R&D domestic capital stock increases real GDP of developing countries by almost 25 dollars.

¹³ We work out a more complete version of the model where such effects are also incorporated by assuming that they have a negative influence on sector specific productivities. The qualitative results remain unchanged and are available upon request.

¹⁴ The coverage of both developed and developing countries is important in the analysis as is evident from the stylized fact that the share of developing countries in total FDI is around 30% in 1999, for the last two decades this share has fluctuated between 15-45%, and most FDI occurs between developed countries (see Lipsey, 1999).

¹⁵ For the 39 and 41 country samples risk of expropriation proxying for institutional quality is used and it is averaged over 1985-1995.

¹⁶ For the 39-country sample the number of assassinations, proxying for political rights, is used and averaged over 1980-1993. The same variable is used in 41-country sample averaged over 1977-1993. And it is used as averaged over 1971-1993 in the 49-country sample. Black market premium is used as initial value in 1980-1985 for the 39-country sample as is also used as an initial value in 1980 for the 41-country sample.

¹⁷ For the 39-country sample government consumption is used as initial value from 1975-1980. For the 41-country sample initial value is used from 1977.

¹⁸ For the 39-country sample, the Sachs-Warner index for openness is averaged for 1981-1992 and for the 41-country sample it is averaged over 1977-1992.

¹⁹ For the 39-country sample, the 1986 value of this variable is used as an initial value. For the 41-country sample, initial value in 1975 is used.

²⁰ See the data section for detailed definitions.

²¹ Similarly, Borenzstein et al. find FDI to have a negative, and in some cases significant effect, when they interact FDI with human capital.

²² The threshold level was 0.89, which was obtained by taking a total derivative of the OLS regression equation. It should be noted, however, that the capitalization variable measures size but not necessarily healthy financial markets.

²³ See Borenzstein et al (1998) and Xu (2000).

²⁴ The coefficient here reflects the effect on investment and not output. In the theoretical model the elasticity of output with respect to spillover was assumed to be less than one.

²⁵ Markusen and Maskus (1999) use different FDI determinants, like lagged FDI, to discriminate among alternative FDI theories. Borenzstein et al. (1998) used these variables as instruments for FDI in their work.

²⁶ Countries in this graph: Algeria, Argentina, Australia, Austria, Barbados, Benin, Bolivia, Brazil, Burkina Faso, Cameroon, Canada, Central African Republic, Chad, Chile, Congo, Costa Rica, Cote d'Ivoire, Dominican Republic, Ecuador, Egypt, El Salvador, Fiji, Finland, France, Gabon, Gambia, Ghana, Guatemala, Haiti, Honduras, India, Indonesia, Ireland, Israel, Italy, Jamaica, Jordan, Kenya, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mauritius, Mexico, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Portugal, Rwanda, Senegal, Spain, Sri Lanka, Sweden, Syrian Arab Republic, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, United Kingdom, United States, Uruguay, Venezuela.