Determinants of Investment Flows into Emerging Markets

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Abstract

The understanding of foreign investment flows is important for emerging market policy makers, since such flows make up a considerable part of the balance of payments, and since such flows tend to be very volatile. Sudden stops or reversals of investment flows have, indeed, played an important part in recent emerging market crises. This paper presents a study of emerging market investment flows and their determinants. Using first a relatively simple cross-country framework to study investment flows in the year 2000 and then a panel-data framework to study such flows for the time period 1980 to 1997, a number of variables emerge as significant in determining investment flows. In general, large open economies with a high growth rate attract more flows than small closed economies with a sluggish growth rate. In addition, the results suggest that sound fiscal policies together with moderate debt levels results in higher levels of foreign investment. The business cycle in the developed countries also has an impact on such flows.

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Contents

1 Introduction

Capital flows towards developing economies resumed in the beginning of the 1990s after an important period of stagnation. Despite this resurgence, the last decade can be characterised as one of booms and busts in foreign investment flows towards emerging markets. Therefore, the relevance of understanding capital flows is still increasingly important. This paper is an attempt to try to understand what seems to be driving capital flows towards these economies. This is a very relevant question in terms of policy issues. Different analysts have argued that in small open economies, policy makers have their hands tied in regards to capital flows. Literature has emphasised that, in the presence of asymmetric information due to high information costs, capital flows may be more sensitive to news and rumours rather than to actual country fundamentals. As a consequence, rational equilibria may arise where herding behaviour prevails. Increasing globalisation should, nevertheless, bring these information costs down. This should imply that country fundamentals may be more discernible, and capital flows should, therefore, with time become more sensitive to fundamentals.

With these ideas in mind we specifically study portfolio and FDI flows to developing economies. As opposed to previous decades, these types of capital flows constitute the most important ones. The paper presents the stylised facts of these flows and compares their behaviour between developed and developing economies. FDI and portfolio flows to developing countries have grown at a fast pace especially since the 1990s. While FDI has had a relatively constant growth, portfolio flows to developing countries have presented huge volatility in sharp contrast to developed economies where these flows have grown constantly. Portfolio flows have prevailed over FDI flows in developed economies, while in emerging economies FDI has dominated over portfolio investment for most of the 1990s. Reversals of capital flows have, furthermore, been important and have come with huge macroeconomic costs for developing economies.

One problem with trying to identify fundamental economic determinants of investment flows, is that many such determinants are only published with annual frequency, and that

the time series available for developing countries are relatively short. Studies, like this one, aiming to identify such determinants of this reason generally takes the form of a cross-country study.

The empirical part of this study has as objective to try to determine the drivers behind FDI as well as portfolio investment flows. The initial objective was to study the components of portfolio flows as well, including equity flows, and private and public debt flows, but the data for such flows turned out to be inadequate.

Using both cross-sectional analysis and panel data techniques we try to identify the determinants for both types of flows. For the cross-sectional analysis we use data for 40 and 46 developing countries for portfolio and FDI flows respectively. Data for investment flows are from the year 2000, while for the explanatory variables we use a three-year average from 1998 to 2000. The size of the economy (measured as nominal GDP in US-dollar terms) and the level of government debt to revenues turn out as significant explanatory variables. In addition, for FDI, the level of development of the economy (GDP per capita) is also significant in explaining the flows.

The disadvantage of a cross-sectional analysis is that business cycle effects and other time series properties of the data cannot be studied. For this reason we use a panel-data technique on a dataset covering 1975 to 2000. The number of countries in this study is, however, much more limited than in the cross-section analysis, since good quality data for the period only exist for a smaller number of countries. The results show that both portfolio and FDI flows go to big countries that are growing. Growth in the developed (i.e. capital suppliers) and fiscal imbalances in the recipient economy affect portfolio flows negatively. Quite puzzling and robust was the finding that countries who export more receive less portfolio flows. For FDI flows, low external interest rates, open recipient economies, and fiscal balance foster flows to developing economies.

In addition to the static panel-data framework, we also used dynamic panels. Besides confirming most of the previous results, the dynamic approach additionally sheds some

evidence in favour of the conventional wisdom that sees FDI flows as *cold* and portfolio flows as *hot*.

The rest of the paper is structured as follows. Chapter 2 outlines the basic concepts related to the balance of payments and briefly reviews some relevant literature. In chapter 3, we present the evolution for FDI and portfolio investment over time, making special reference to the 1990s. Chapter 4 examines the potential drivers for these investment flows, and discusses the datasets used. In chapter 5 the results of the cross-section analysis are presented, and chapter 6 presents the results of the panel-data analysis. Chapter 7, finally, concludes the paper.

2 Foreign Investment Flows: Basic Concepts and Previous Research

The understanding of foreign investment flows is important for policy makers, forecasters and researchers alike, and this is particularly the case for emerging markets. Investment flows make up an important part of the balance of payments, and the large fluctuations in such flows have, among emerging economies, ignited a number of balance-of-payment crises over the past two decades. The sharp reduction in foreign investment inflows was, indeed, the main reason for the Mexican crisis of 1994 and 1995, and it played an important part in most of the emerging market crises that was to follow. Investment flows not only constitute one of the main ingredients in the balance of payments, but also one of the most volatile. Understanding foreign investment flows is, therefore, crucial in any balance-of-payments analysis.

In section 2.1 the basic balance-of-payments concepts are briefly rehearsed, with the emphasis on the financial account. In section 2.2 the literature on the determinants of investment flows is reviewed.

2.1 Some Basic Concepts

The aim of this section is to give the reader a very brief rehearsal of the main components of the balance of payments in general and the financial account in particular.[1]

[1] For a further discussion of these concepts, see IMF (2003).

Figure 2.1: The main components of the balance of payments.

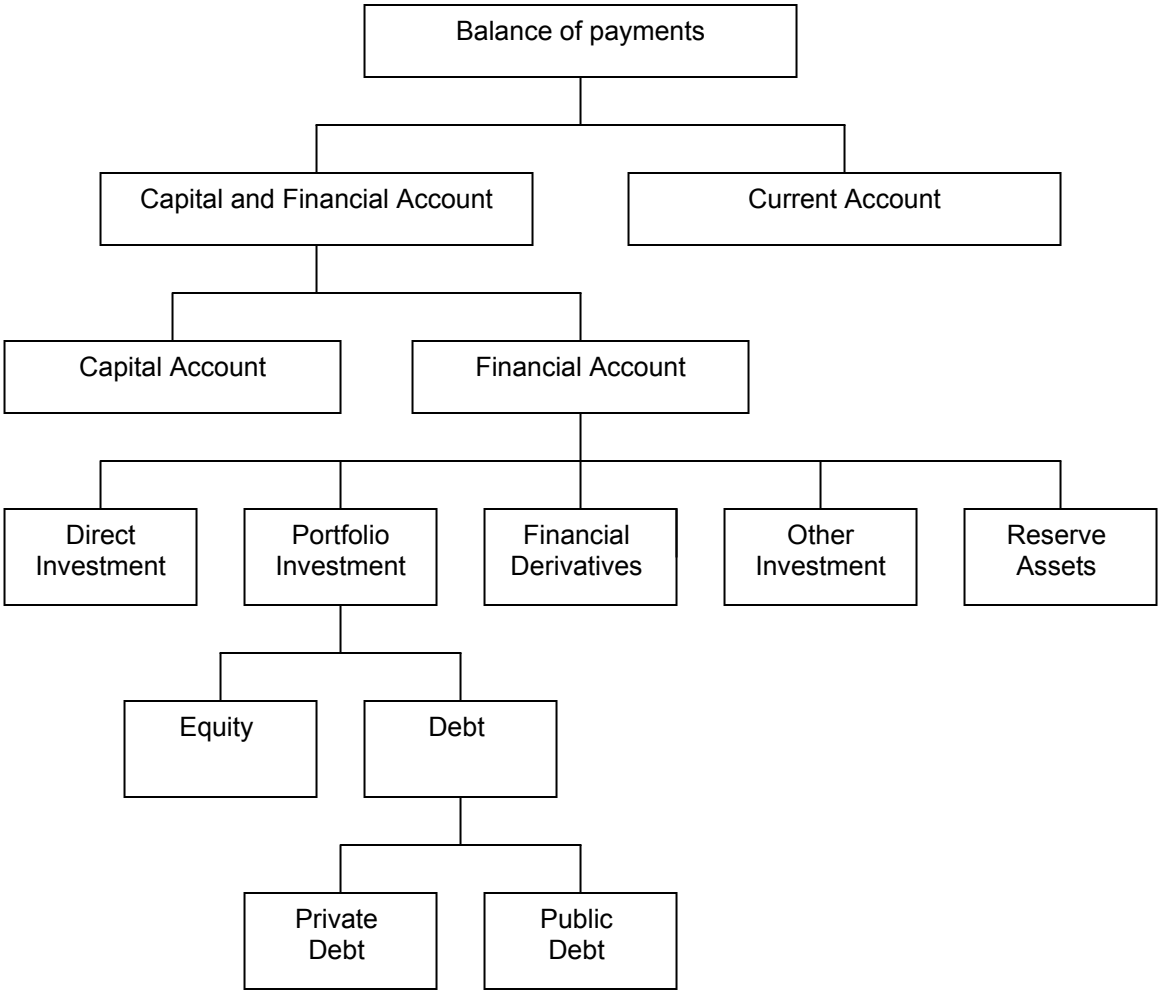


Figure 2.1 shows the main components of the balance of payments. The two main groups of accounts are the current account, and the capital and financial account. The former covers all the transactions different from financial ones that occur between resident and non-resident entities. The capital account comprises capital transfers and acquisition/disposal of non-produced, non-financial assets.[2] The financial account has the following components: direct investment, portfolio investment, financial derivatives, other investment, and reserve assets. Direct investment covers all the transactions

[2] Capital transfers have two components: general government, subdivided into debt forgiveness and other, and other, subdivided into migrants' transfers, debt forgiveness and other transfers. Acquisition/disposal of non-produced, non-financial assets covers intangibles such as patented entities, leases, goodwill, etc.

between direct investors and direct investment enterprises. Portfolio investments covers all the transactions in equity and debt securities and can be classified as bonds and notes, money market instruments and financial derivatives that generate financial claims and liabilities. Financial derivatives cover financial instruments that are linked to other financial instruments, indicators or commodities. Other investments are classified as short and long-term trade credits, loans, currency and deposits, and other account receivables and payables. Finally, the reserve assets consists of those assets that are available for use in meeting balance of payments needs. Such items are usually monetary gold, SDRs, the reserve position in the Fund, foreign exchange assets and others.

2.2 The Literature on the Determinants of Investment Flows

Economic literature seems to agree on the primary driving forces behind international investment: better risk diversification and higher returns.[3] However, according to López Mejía (1999) the responsiveness of private capital increased during the 1990s because of both internal and external factors.

The relevance of internal and external factors has been at the heart of the economic debate on capital flows (*pull* vs. *push* factors). In a series of influential works, Calvo et. al.(1993, 1994 and 1996) argue that although *pull* factors were important in the flows of the early 1990s, the main determinants were *push* factors. Low international interest rates, which in turn favoured the creditworthiness position of emerging markets, and recessions in major industrial economies, which made more appealing international investments, played important roles in the early inflows of the 1990s according to the authors. Chuhan et. al. (1993) investigated U.S. portfolio flows to Latin America and Asia. As suggested by previous works, they find that the drop in interest rates and the slowdown in economic activity were important in explaining capital flows towards these economies. However, their results suggest that domestic factors are at least as important in determining the flows for Latin America. In contrast, for Asia, country-specific factors

[3] López Mejía (1999), Moreno (2002) and others.

are estimated to be three or four times more important than global factors. Fernández-Arias (1996) develops an international portfolio model in which he explicitly models country creditworthiness. His empirical estimations lead him to conclude that the surge in portfolio investment was greatly determined by this variable. However, he argues, favouring the push hypothesis, that country creditworthiness improved basically because of lower international interest rates. In this way he overcomes the problems found in Chuhan et. al. (1993) where creditworthiness is entirely a domestic variable. Hernández and Rudolph (1995) use a partial adjustment model together with internal and external variables to analyse capital inflows during the beginning of the 1990s. They conclude that domestic factors play an important role and that policy makers should aim to have sound fundamentals in order to attract capital flows. Favouring domestic factors, Claessens et. al. (1998) look at capital inflows in East and Central Europe and former USSR countries in the 1991-1997 period. Their empirical results show the importance of structural reforms as well as the country creditworthiness.

Despite the lack of a uniform explanation for the push vs. pull debate, the World Bank (1997) and Montiel and Reinhart (1999) provide explanations that might be conciliatory. The World Bank (1997), using panel data, finds that countries with strong fundamentals have received the largest proportion of capital flows. However, they mention that the downturn in U.S. interest rates during 1990-1993 contributed significantly to these early inflows. Looking at portfolio investment for Latin America and East Asia, their results show that there was a high degree of co-movement in flows during 1990-1993 that was related to movement in interest rates in the U.S. Since then, they mention that there has been a decline in the co-movement of portfolio flows to both regions, suggesting the importance of pull factors. In second place, Montiel and Reinhart contribute to this debate by suggesting that external factors can explain the size and timing of the inflows while domestic factor can explain to which countries the flows went.

An important strand of literature has focused exclusively on FDI determinants. For Latin America and the Caribbean, Duran (1999) used panel data and time series techniques in order to identify the driving forces behind FDI for the period 1970-1995. This study

finds the following factors as FDI catalysts: i) size and growth rate of the domestic economy; ii) domestic savings level; iii) country's solvency; iv) foreign trade openness; v) the existence of sunk costs, especially in those countries that have received large flows of FDI in the past; and finally vi) macroeconomic stability.

In a recent paper, Levy-Yeyati et. al. (2002) examine how business cycles and interest rate cycles in developed countries affect FDI flows to developing countries. The answer should be empirical, since according to the authors, two effects are in place: an income effect in which FDI flows increase during the positive part of the cycle due to higher profits, and a substitution effect in which FDI decreases since domestic marginal productivity of capital is relatively higher (investors' arbitrage) during the boom. Using a gravity model for the period 1980 to 1999 they look at the determinants of bilateral FDI, finding that FDI flows from the US and Europe move counter cyclical to the business cycle in the source country and that interest rate cycles are important determinants of this flows. Additionally, they find that FDI and local investment are negatively correlated indicating that the two forms are substitutes.

Under a different spirit, Fernández-Arias and Hausmann (2000) try to prove the following proposition: "Capital inflows tend to take the form of FDI in countries that are safer, more promising and with better institutions and policies".[4] Their econometric results suggest that capital flows, in general, tend to go to developed countries that are more open, less volatile, with better institutions and with developed financial markets. However, these same forces reduce the share of capital flows that take the form of FDI, therefore, implying that FDI flows to poorer, more volatile and less open economies whose financial system and institutions are weak. Following seminal contributions by Coase (1937) and Williamson (1985), they argue that firms are market substitutes and that they enlarge their scope operations when they find inefficient or nonexistent markets. Hence, in less developed economies, capital flows take the form of FDI due to the fact that foreign firms prefer to have control rather than rely on locals market.

[4] Fernández-Arias and Hausmann (2000) p. 4.

For Latin America, Aguilar and Vallejo (2002) identify the forces behind bilateral FDI, making special reference to the role played by regional integration agreements. Estimating a gravity model, they conclude that the size and development of both the domestic and foreign economies, the distance between them and the existence of a common language are determinants of bilateral FDI. Additionally, they find that different regional integration agreements have different effects upon bilateral FDI both in terms of creation and flow deviation. Finally, their empirical results are not significant for infrastructure and for a common border, and the results are ambiguous in the case of institutional characteristics.

Recently, Garibaldi et. al. (2002) studied FDI and portfolio investment flows to 26 transition economies in Eastern Europe and the former Soviet Union. Their regression results for FDI indicate that these flows can be well explained in terms of standard economic fundamentals. However, portfolio flows are poorly explained by fundamentals. The only country characteristics that seem robust are financial market infrastructure and an indicator of the protection of property rights. When these variables are included in their regression, none of the country fundamentals they control for are significant. According to the authors, these poor results can be a consequence of measurement problems or the problem of disentangling the determinants of demand and supply of portfolio when secondary markets are still very small.

Certainly, a great number of important studies have been omitted from this brief survey. However, the intention was that the reader could get the idea of what has been the debate in this field. With this in mind, the next sections of this paper take an empirical approach to the determinants of capital flows.

3 International Foreign Investment Flows Over Time

In this chapter we take a look at the behaviour of FDI and portfolio flows over time, especially from 1990 onwards. These two types of investment flows are currently the most important ones. However, this does not necessarily hold for the previous decades. During the 1980s and the beginning of the 1990s, bank lending, trade related flows and official lending played a prominent role for financing developing countries.[5] Both FDI and portfolio flows are deeply concentrated in middle-income markets while low-income countries have mostly been excluded from this process. FDI and portfolio flows have grown throughout time at a much greater pace than trade flows. Between 1975 and 2001, for developing countries, on average, the value of exports increased by a factor of 4 while FDI flows increased by a factor of 25 and portfolio flows by a factor of 42. The sharp increase of portfolio flows is explained partially by the growing securitisation of global finance that started in the 1980s. In contrast to growth of these private flows, Griffith-Jones and Ocampo (2000) mention that official development finance, in particular, bilateral aid, has been lagging behind. The 1990s ended the capital flows famine that predominated in developing countries through out the 1980s. Just by 1993, private capital flows into developing economies had increased to USD 149 billion net inflows from the annual average of USD 3 billion outflows form 1982 to 1989.[6] Table 3.1 and 3.2 shows the fast pace at which FDI and portfolio flows have evolved.[7]

It is worth noticing that the impressive growth of FDI flows started in the second half of the 1980s led by Asia and the Pacific. The surge in Latin American FDI flows started only in the 1990s due to the huge macroeconomic problems in the region during the 1980s. The late flows to East and Central Europe were a consequence of the transition from planned to market economies at the beginning of the 1990s. The inflows of the 1970s and the early 1980s were mainly motivated by natural resource extraction and

[5] For more detailed information see World Bank (1997) for the composition of flows in developing countries, and for Latin America, see Gavin, Hausmann and Leiderman (1996).
[6] Kahler (1998).
[7] In line with many other studies, the flows in this chapter are all expressed in current US dollars. For comparative purposes it might have been better to express the flows in constant US dollars. This does, however, not have any impact on the general discussion and the conclusion.

import substitution while the later flows can be characterized as efficient-seeking investments related to globalisation of production.[8] Grieg-Gran (2002) points out that FDI flows into Asia have been heavily concentrated towards China and Hong Kong, although South Korea, Singapore and Malaysia were also important recipients. The main investor in this region is Japan followed by the U.S. For Latin America and the Caribbean, FDI flows have been skewed towards Brazil, Mexico and Argentina and have come mainly form the U.S. and Europe. Regions like South Asia, the Middle East and sub-Saharan Africa have not received much foreign investment.

Table 3.1: Foreign direct investment inflows, yearly average (USD millions)

	1980-1985	1986-1990	1991-1996	1997-2001
World	58,808	157,075	255,880	897,576
Latin America and the Caribbean	6,997	7,900	29,354	89,318
Asia and the Pacific	9,744	16,648	59,242	108,286
East and Central Europe	28	235	8,165	24,169

Note: These are not net inflows, but gross inward FDI flows

Source: UNCTAD

Table 3.2: Portfolio investment flows, yearly average (USD millions)

	1975-79	1980-85	1986-90	1991-96	1997-2000
Industrial Countries	30,358	70,183	248,853	499,228	1,119,175
Developing Countries	1,048	3,353	4,904	73,289	74,260
Latin America and Caribbean	439	941	3,197	42,008	14,747
Asia and the Pacific	281	2,135	1,370	22,235	39,115

Note: These are net inflows

Source: IFS

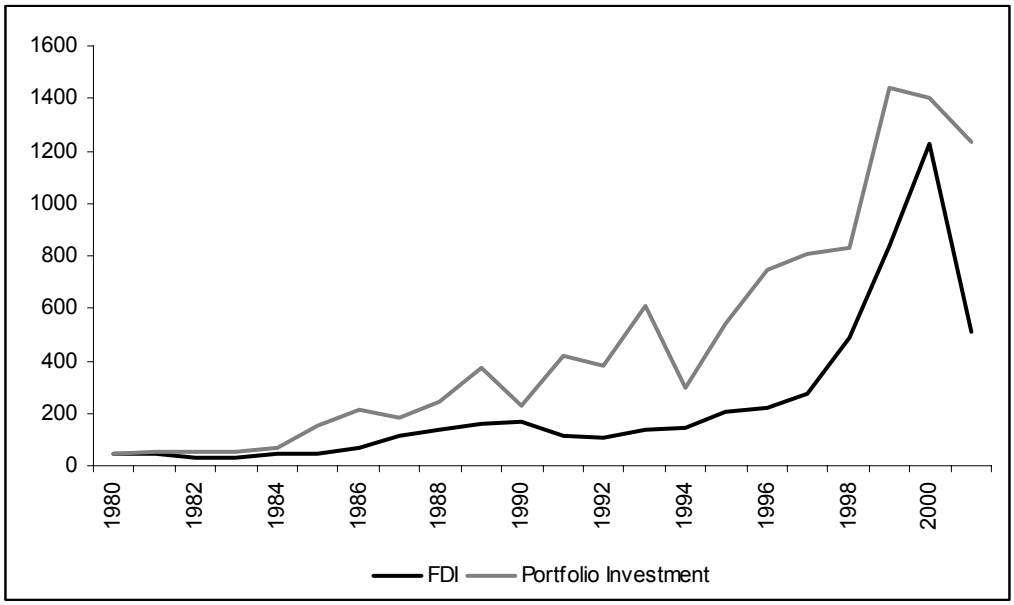
[8] World Bank (1997).

The surge in investment inflows during the late 1980s and early 1990s has, in many cases, been related to state restructuring policies that usually implied privatisation of state enterprises in developing countries as well as a deregulation process. The World Bank (1997) estimated that privatisations in developing countries had generated some USD 112 billion of which nearly 42 percent came from foreign investment, particularly taking the form of FDI. In regards to the way FDI has taken place, Grieg-Gran (2002) mentions the fact that worldwide FDI has taken the form of mergers and acquisitions (M&A) while in developing countries, greenfield investment, where a new facility is established, has predominated. However, Grieg-Gran (2002) also notes that the share of M&A sales in total FDI flows to developing countries increased from 7 percent in 1991 to 28 percent in 1998.

Portfolio flows have evolved in a different pattern. For industrial countries, growth has been relatively constant and characterized by its huge size, as illustrated by figure 3.1. Developing countries faced an enormous surge in portfolio flows during the first half of the 1990s, as shown by figure 3.2. Table 3.2, furthermore, suggests that Latin America and the Caribbean were privileged in the first part of the 1990s while Asia and the Pacific were favoured in the second half of the decade. The Mexican Crisis of 1994 and 1995 led to a large decline in portfolio flows to Latin America, and in a similar manner, the Asian Crisis of 1997 generated a significant fall in the inflows into the Asian emerging markets. These two crises in particular showed the mixed blessing of capital flows. Episodes of real appreciation, bubbles in asset prices, domestic lending booms, weakening financial institutions, a sudden reversal of expectations, and bank and currency collapses repeated through out the decade.[9] The growth in portfolio flows has, furthermore, been deeply associated with the development of mutual funds and pension funds, which have become important players in the emerging market arena.

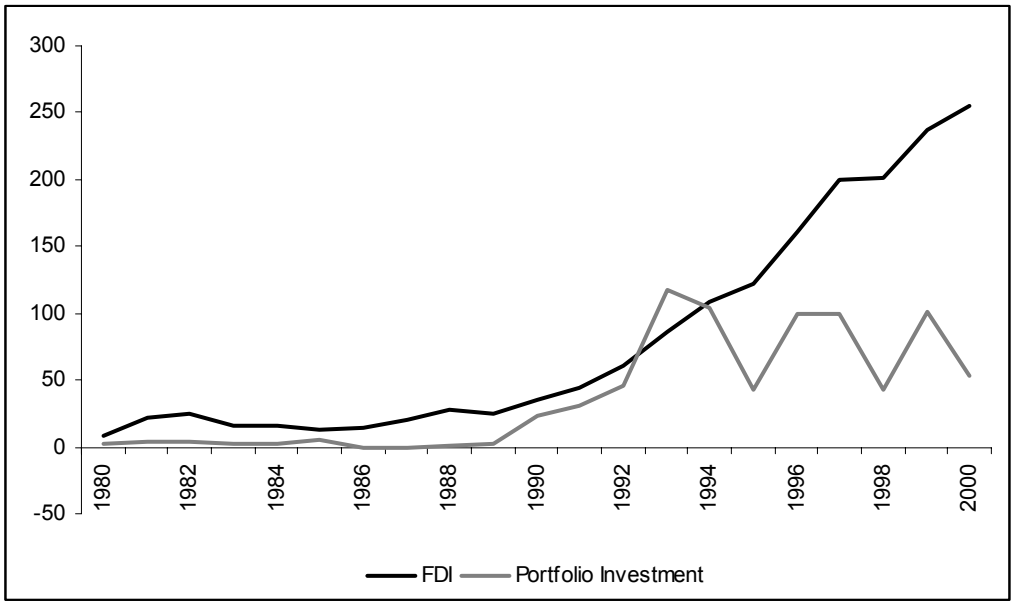
[9] See Velasco and Cabezas (1998).

Figure 3.1: FDI and portfolio investment flows into industrial countries (USD billions)



Source: UNCTAD and IFS

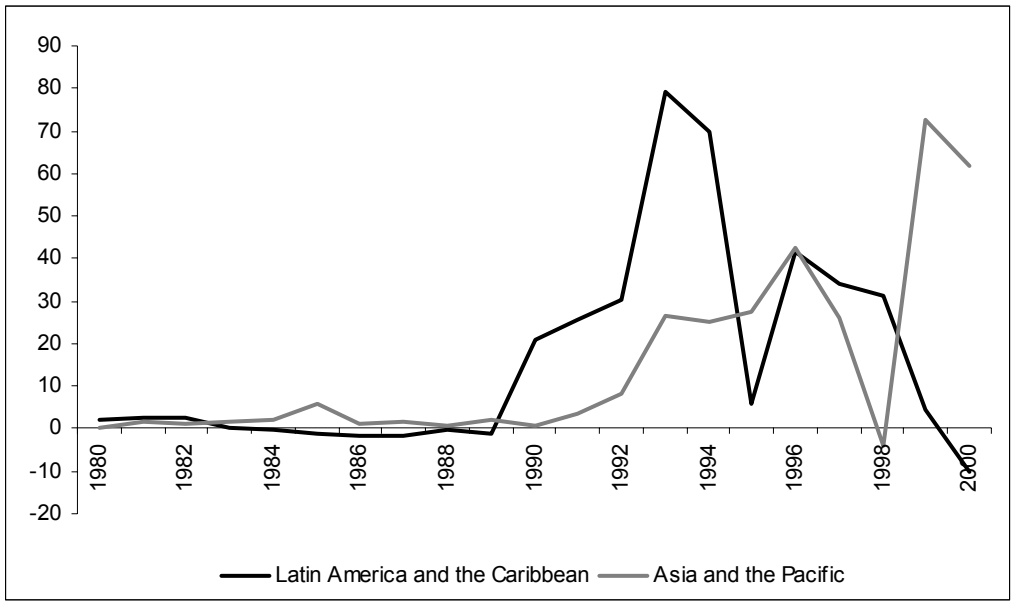
Figure 3.2: FDI and portfolio investment flows into developing countries (USD billions)



Note: Data for 2001 not included because of large inconsistencies in the data for China

Source: UNCTAD and IFS

Figure 3.3: Portfolio investment flows into Latin America and Asia (USD billions)



Note: Data for 2001 not included because of large inconsistencies in the data for China

Source: IFS

While FDI inflows to developing countries have been relatively stable, portfolio flows to these markets have been volatile as evidenced by figures 3.2 as well as by figure 3.3. This volatility is particularly related to emerging markets and has not been observed in industrial countries. Volatility in the demand for emerging market assets has become a very relevant question, both for economic policy and for economic theory. Although there are different approaches that relate volatility to the fundamentals of the recipient economy, Calvo (1996 and 1999), Calvo and Vegh (1999) and others have argued in a different way that is quite appealing. In the first place, they argue that returns on emerging markets assets depend, like everywhere else, on domestic policy. Policies in these types of countries tend to be highly volatile, thus, making it more difficult and costly to determine the state of nature of these economies. In the second place, they argue that in the globalised economy, investors diversify their portfolio placing their funds in a large number of emerging markets to reduce their risk exposure. For risk hedging purposes, it is essential that returns are not perfectly correlated and, hence, the

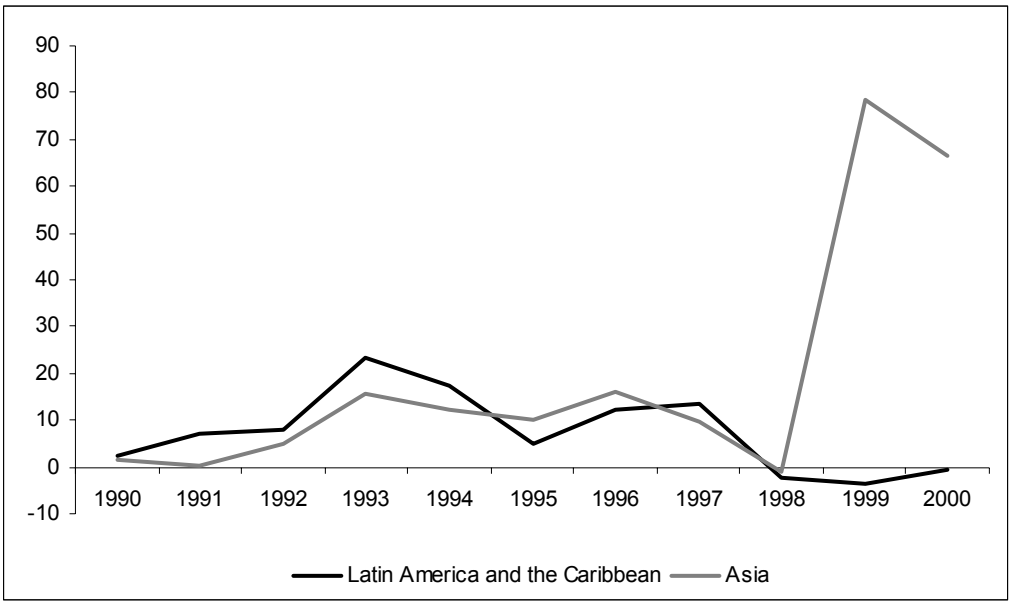
advantage of diversification is not related to knowing the country characteristics. Under this circumstance of high fixed costs and high diversification, Calvo (1996) shows that investors will become very sensitive to news or rumours, therefore exacerbating herding behaviour. Negative rumours might lead investors to liquidate their stock market shares or to refuse to roll over short-term debts, therefore, generating important macroeconomic effects in the domestic economies. Calvo (1999), furthermore, argues the importance of asymmetric information in a model in which some investors are more informed about what is going on in emerging markets than others. The uninformed investors only observe prices and occasionally, the investment strategy followed by informed investors. If uniformed investors see informed investors selling their emerging market assets, for example, to meet margin calls, they might misinterpret this signal and sell the securities they have in these types of assets. This *Wall Street confusion*, which bears no relation to fundamentals, might lead to a collapse of emerging markets' output. [10]

Like with the other flows, equity flows have had a positive trend being increasingly important in industrial countries. For developing countries, there has lately been a sharp contrast between equity inflows to Asia and the Pacific and to Latin America and the Caribbean. After 1998, investors favoured Asia while inflows to Latin America continued with their downward trend. The bust in equity investment after the Asian crises was so pronounced that the stock market capitalization[11] as a percentage of GDP, declined on average 67% for Indonesia, Malaysia, South Korea and Thailand. It is worth mentioning that equity flows were fostered in great extent by the liberalization of restrictions. The World Bank (1997), in reference to the entry restrictions, mentions the fact that in 1991, 26 percent of emerging stock markets could be classified as having free entry while 11 percent were closed. By 1994, 58 percent of emerging stock markets were open and only 2 percent remained closed. The removal of what Bekaert (1995) has called

[10] This type of argument corresponds to *second-generation* models of currency crises where fundamentals still matters but not as much. Multiple equilibria, expectations, sunspots and sell-fulfilling prophecies are emphasized.

[11] Market capitalization is defined as the share price times the number of shares outstanding in a country's stock exchange market at the end of the year.

Figure 3.4: Equity investment flows into Latin America and Asia (USD billions)



Note: Data for 2001 not included because of large inconsistencies in the data for China

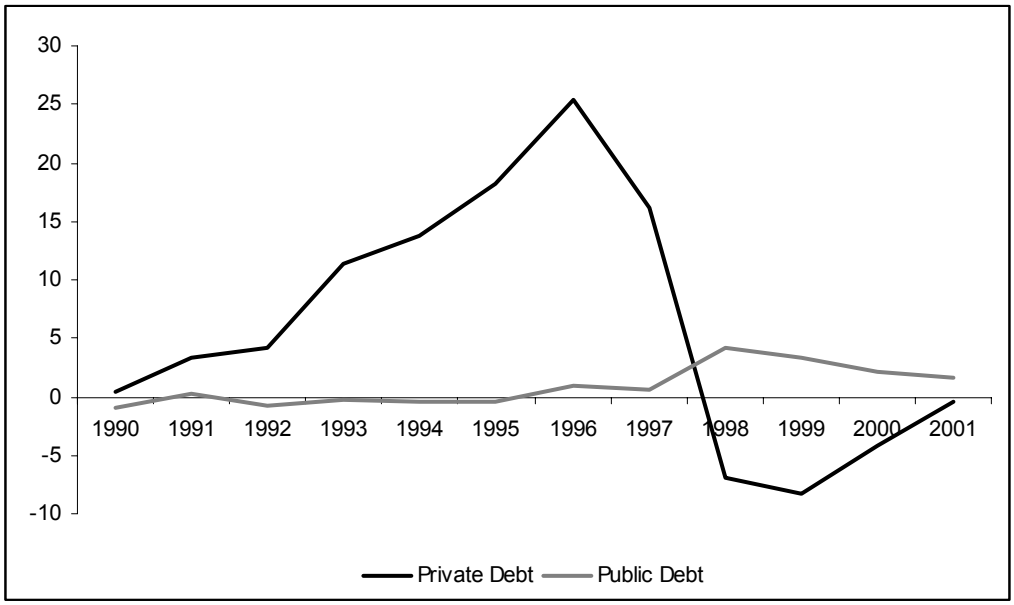
Source: IFS

indirect barriers should continue to foster equity market integration. Among these types of barriers, he mentions lack of availability of adequate information on these markets as well as on the financial health of the companies, slow and inefficient settlement systems, poor accounting standards, and minimal investor protection. McCulloch and Petri (1998) makes an interesting point on the incentives investors have in placing their funds in emerging equity markets. They argue, according to the capital asset pricing model (CAPM), that besides the distribution of the expected return, the benefit of adding additional securities to the portfolio lies on the way its performance is correlated to the other assets included. They mention the fact that stocks in emerging markets are risky but are not highly correlated to the performance of stocks in developed countries, therefore, reducing the systematic risk of the portfolio. Harvey (1995) finds similar results, but he mentions that the correlation between emerging market returns and global risk factors appears to be changing over time towards less segmentation.

For debt flows the story is quite diverse. In industrial countries, private debt flows have followed an upward trend all over the 1990s while public debt flows have remained more or less constant. In developing countries, private debt flows increased significantly through out the first half of the 1990s and were showing a downward trend in the second half of the decade. Public debt flows have been characterized by large shifts throughout the 1990s, even if in the last part of the decade, a clear downward trend has been present. In Asia and the Pacific, flows have been mainly private and were very important up until 1997, the year in which they began their sharp downward trend, explained by the Asian Crisis and the financial sector collapse in the region, as illustrated by figure 3.5. For Latin America and the Caribbean, public debt flows were the dominant until 1996, when they started declining, which is shown by figure 3.6.

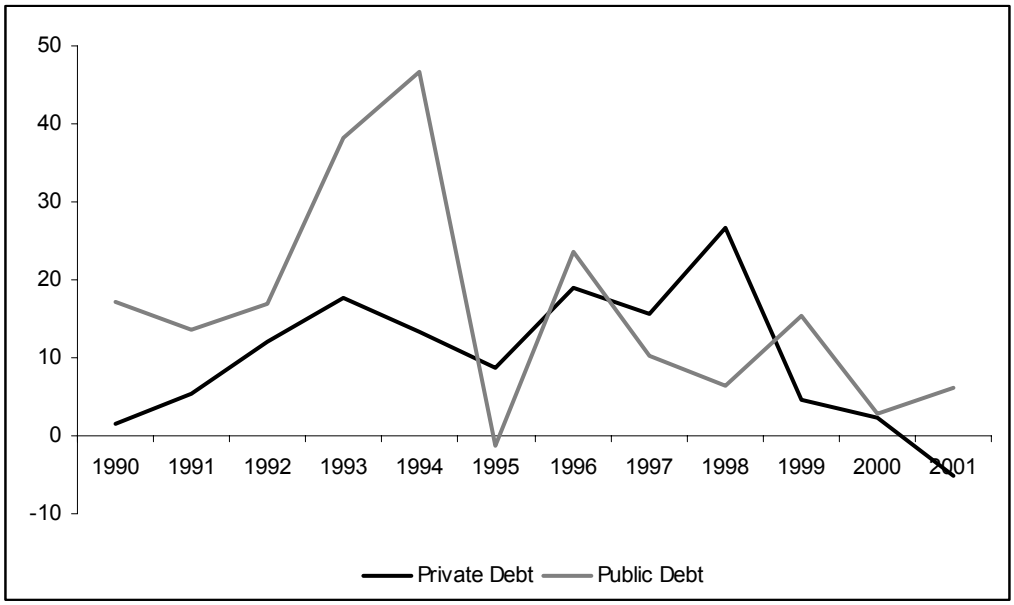
The relative importance of portfolio flows and FDI inflows has been very different across regions. In industrial countries, portfolio inflows have been more important than FDI inflows. On the contrary, for Asia and the Pacific, FDI flows have dominated from the second half of the 1980s. Finally, for Latin America and the Caribbean, the first half of the 1990s has been the only period in which portfolio flows have dominated FDI flows. In general, FDI has prevailed over portfolio investment in developing countries.

Figure 3.5: Debt inflows to Asia and the Pacific (USD billions)



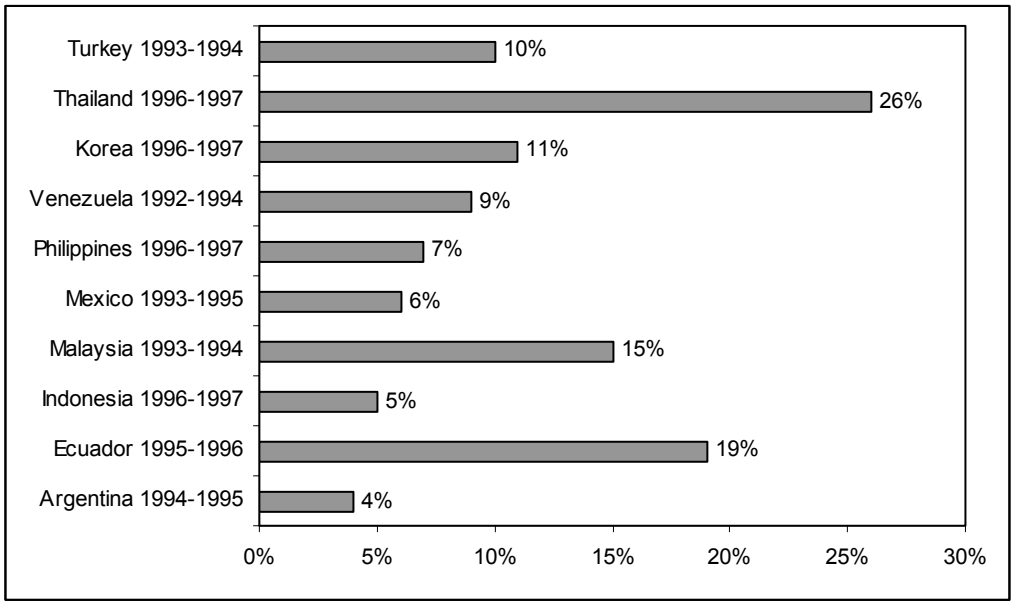
Source: IFS

Figure 3.6: Debt inflows to Latin America and the Caribbean (USD billions)



Source: IFS

Figure 3.7: Large reversals in net capital flows (as a percent of GDP)



Source: Calvo and Reinhart (1999)

As stressed above, portfolio flows have been volatile, especially to developing countries. In general, volatility in capital flows comes with a high macroeconomic cost for the recipient economy. By national accounts, a sudden halt in capital flows has to be compensated either by a reserve loss or by closing the current account deficit. Since reserve loss response is limited, the important adjustment takes places in the current account, which implies a considerable output cost. As Calvo (1998) argues, the negative effects are larger the higher is the marginal propensity to spend on non-tradables. Furthermore, he mentions that this credit crunch may result in bankruptcies and destruction of human capital and local credit channels. Some examples are quite illustrative. Thailand, in the period 1996-1998, suffered a reversal in net capital flows equivalent to 28 percent of GDP, which generated a collapse in the growth rate from 9.2 percent in 1995 to -1.4 percent in 1997. Turkey's reversal in capital flows was of 10 percent of GDP between 1993 and 1994 which implied a strong decline in growth rates from 8.0 percent in 1993 to -5.5 percent in 1994. Figure 3.7 illustrates these and some other examples.

In this section, we presented a brief overview of FDI and portfolio flows during the past two decades. Although inflows have shown an upward trend over time, this blessing has recently become a curse to many countries due to the volatility they present and the potentially severe consequences of a sharp decline. This volatility has been of great concern to both policy makers and academics because of its strong macroeconomic impact.

4 Potential Determinants of the Different Investment Flows

Building on the literature review in chapter 2 as well as on intuition we will in this chapter define a set of variables that we believe are the most likely determinants of FDI as well as portfolio flows. These variables are defined and discussed in section 4.1. A cross-country study such as the one that will be presented in the next chapter of this paper is naturally limited to the availability of data. For the empirical investigation we will use two different datasets; one which is spanning the time period 1996 to 2001 and which contains a rich variety of potential explanatory variables; and one for the time period 1975 to 2000 but with a more limited set of potential explanatory variables. These two data sets are discussed in section 4.2.

4.1 Potential Underlying Determinants

Based on the literature reviewed in chapter 2, we have identified a set of potential determinants for FDI and portfolio investment flows. We classify the variables as *push* and *pull* variables, where the former represent external factors and the latter internal or domestic factors with respect to the country receiving foreign investment.

Push variables, consequently, refer to those that are exogenous to the recipient country and that *take place* in countries that are capital suppliers, i.e. mostly industrial countries. Hence, these variables should be related to business cycles in developed countries. As discussed in chapter 2, the influence of push variables may be both positive and negative due to the presence of income and substitution effects.[12] Growth rates, industrial production indexes and interest rates in developed countries are good proxies for these types of variables.[13]

[12] See Levy-Yeyati et. al (2002).
[13] See Levy-Yeyati et. al (2002), Dasgupta and Ratha (2000), Singh and Jun (1995), and Chuhan et. al (1993).

Pull variables, on the contrary, are those that *take place* in the host country. We classify these variables in six broad categories: Market size, country conditions, openness variables, liquidity variables, government finance indicators, and vulnerability indicators.

First, *market size* variables are expected to affect capital flows in a positive way, since larger countries should receive more flows than smaller countries. Good proxies for market size are host country GDP[14], absorption and private consumption. All of these variables should have a positive sign on the regressions. In line with other studies, we have also chosen to include GDP per capita in this group of variables, even if this in fact measures economic development rather than market size. Per capita GDP is, nevertheless, correlated with market size.

Second, positive *country conditions* should generate higher inflows. Countries that have a stable macroeconomic environment characterised by high and sustained growth rates and low and stable inflation rates should receive more flows than more volatile economies. Natural proxies used in the literature are: GDP growth rates[15], industrial production indexes, interest rates, inflation rates, domestic savings to GDP, and credit to GDP. This last variable has been emphasised by Albuquerque et. al. (2002) as a sign of financial depth. All the variables except inflation are expected to have a positive correlation with investment inflows. Other variables that can be envisaged here include average wages and rates of return on the domestic stock market.

Third, *openness variables* consider the relation of host economies with the rest of the world. The empirical literature has ascertained that open economies attract more flows than heavily protected economies. Following this reasoning, we would like to have indicators that are proxies for openness. Economic growth literature has constructed indicators representing openness, one of the most famous being the dummy created by Sachs and Warner (1995). However, as Rodriguez and Rodrik (1999) point out, this variable and others used by literature are quite misleading. The variables we use here are

[14] See Bevan and Estrin (2000), Duran Lima (1999) Vallejo and Aguilar (2002) and others.
[15] See Durán Lima (1999), Albuquerque et. al (2002) Dasgupta and Ratha (2000) and others.

quite simple: Exports plus imports to GDP and exports plus imports. Tariffs, the existence of trade agreements and other types of agreements regulating the openness of an economy or an area could also be good proxies. These were, however, not taken into account here due to problems with data availability. Although the proxies chosen here are far from being the best, they should capture the essence of openness.

Fourth, as a measurement of *liquidity*, we consider the proxies exports and export growth. Exports are the main source of foreign exchange for most countries. This proxy should have a positive sign and should be especially relevant for portfolio flows. Another very natural proxy could be international reserves. However, we did not include this variable since it could result in severe endogenity problems due to the fact that capital flows directly affect reserve accumulation[16]. Thus, we would not know if capital flows enter as a consequence of high levels of reserves or if the high reserve levels are a consequence of capital inflows.

Fifth, *government finance* is an important issue that is expected to affect capital flows. High fiscal deficits imply increasing government liabilities. More liabilities could lead to the necessity to increase taxes and might in an extreme case lead to the eventual default on international debt. Hence, large fiscal deficits increase the country risk and should, therefore, hold back potential investment flows. Different indicators, such as fiscal balance, government debt to GDP and to revenues, and government expenditure to GDP should be good proxies. Of the studies we found, only for FDI, Albuquerque et. al. (2002) use government consumption to GDP proxying for tax pressure, and Garibaldi et. al. (2002) use the fiscal balance. None of the studies deal with the relationship between government finance and portfolio flows.

[16] This is can be easily shown, using balance-of-payments accounting. Abstracting from *errors and omissions*,

$$CI_t = CAD_t + \Delta R$$

were *CI* stands for capital inflows, *CAD* for current account deficit and ΔR for reserve accumulation.

Sixth, *vulnerability indicators* are another type of variables that should be taken into consideration. Vulnerable countries make investment riskier, therefore, being susceptible of receiving less flows. External debt, external debt to GDP, dollarisation indicators and the ratio of M2 to official foreign exchange reserves could be good indicators. Unfortunately we had to drop a dollarisation indicator since information was not available for several countries. A negative sign should be expected on these indicators. The ratio M2 to international foreign exchange reserves tries to capture excess liquidity in the economy. High levels are perceived as dangerous, as evidenced in the early warnings indicators literature. As with fiscal variables, there is not much research that has been done in this area.

4.2 The Data Sets Used in the Study

We are using two different datasets in this study. The first is built using data from Moody's Investors Service, and the second is defined by a dataset used in Téllez (2004).

Moody's Dataset

This dataset consists of yearly observations for the period 1996 to 2001 for 53 developing countries. The dependent variables, that is, FDI and portfolio flows, were built using data from the *Balance of Payments Statistics/International Investment Position Statistics* (BOPS), published by the IMF.

The explanatory variables are classified in the six groups discussed in the previous section: A first set was used as proxies for market size, including nominal GDP, GDP per capita in US dollar terms as well as PPP adjusted GDP per capita (also in US dollars). A second set of variables proxied for country conditions, including real GDP growth, inflation, gross domestic savings to GDP and domestic credit to GDP. A third set of variables was used as openness indicators, including exports plus imports and the ratio of exports plus imports to GDP. The fourth set of variables that proxied for liquidity are

exports in US dollars and export growth (also based on exports in US dollars). The fifth set of variables focused on government finance and was composed by government tax revenue to GDP, government fiscal balance to GDP, government debt to GDP, government debt to revenue, and the Institutional Investor's Creditworthiness Index (CWI).[17] Finally, the following vulnerability indicators were included: external debt in USD billions, external debt to GDP, external debt to current account receipts, debt service ratio, and an external vulnerability indicator. The debt service ratio is defined as interest payments on government debts plus current-year repayment of principal to current account receipts. The external vulnerability indicator is defined as short-term external debt plus currently maturing long-term external debt plus non-resident foreign currency deposits over one year to official foreign exchange reserves.

Téllez (2004) Dataset

This database has yearly information that covers the period 1975 to 2000 for 60 countries and includes both developed and developing countries. For our purpose, we just used developing countries. The original dataset contains a large set of potential explanatory variables from which we defined a subset that we considered useful. The dependent variables also come from this source. The data used in Téllez (2004) draws form different sources like the World Development Indicators, IFS, Datastream Advance, Easterly et. al (1994), Easterly and Sewadeh (2001), Freedom House (2003) and others. For specific information about variables, please see Téllez (2004).

The explanatory variables are classified in the same six groups as earlier: First, as indicators for market size we include nominal GDP in US dollars, nominal GDP per capita in US dollars, GDP per capita in constant 1995 US dollars and relative per capita income adjusted by PPP. Second, the country condition variables are GDP growth rate, GDP per capita growth rate, and the growth rate of PPP adjusted GDP per capita, as well

[17] This index is published by the Institutional Investor magazine and consists of a survey done with between 75 and 100 bankers that are asked to rate each country in regards as to what they perceive as the default risk. The index uses a scale of 0 to 100 where 100 represents no risk of default. The figures used here are the average between the March and the September survey.

as inflation, savings to GDP and domestic real interest rate. Third, as openness indicators, the variables available are exports plus imports to GDP and the export plus imports in US dollar terms. Fourth, as liquidity variables we used exports in US dollars as well as the growth rate of exports. Fifth, for government finance the only indicator available was government consumption to GDP. Using WDI information, we complemented the data using the indicator tax revenue to GDP and we calculated the difference between government expenditure to GDP and tax revenue to GDP. No good proxies for a vulnerability measure could be derived from the dataset, and this last group of variables was, therefore, omitted.

Téllez (2004) has two further variables that we thought could have an impact on investment flows, which are an index of civil liberties and another of political rights. Both indexes, constructed by Freedom House (2003), use a one-to-seven scale in which one represents the highest degree of political rights or civil liberties. We included these two variables in the second group, representing country conditions.

This dataset was, finally, complemented with some additional external variables: US Treasury Bill rate, yield on 10-year US Government bonds, US GDP growth rate, US industrial production index and an index for industrial production in developed countries.

Table 4.1 summarises the two data sets used.

Table 4.1: The two data sets used in the empirical study

	Moody's data set	Téllez (2004) dataset
Dependent variables	FDI Portfolio investment	FDI Portfolio investment
Explanatory variables		
i) Market size	Nominal GDP GDP/capita (nominal) GDP/capita PPP adj.	Nominal GDP Nominal GDP/capita Constant GDP/capita Income/capita PPP adj.
ii) Country conditions	Real GDP growth Inflation Domestic savings/GDP Domestic credit/GDP	Real GDP growth GDP/capita growth PPP adj. GDP/cap. growth Inflation Domestic savings/GDP Real interest rates Index of civil liberties Index of political rights
iii) Openness	Exports + Imports (Exports + Imports)/GDP	Exports + Imports (Exports + Imports)/GDP
iv) Liquidity	Exports Exports growth	Exports Exports growth
v) Government finance	Tax revenues/GDP Fiscal balance/GDP Government debt/GDP Gvmt debt/Revenues Creditworthiness index	Gvmt consumption/GDP Tax revenue/GDP (Expenditure – Revenue)/GDP
vi) Vulnerability	External debt External debt/GDP External debt/CA receipts Debt service ratio Vulnerability indicator	
Push variables		US T-Bill rate Yield on 10Y US Gvmt Bonds US GDP Growth rate US industrial production index Ind. prod. of dvlping countries

Note: All variables in USD, apart from ratios and indices. FDI and portfolio flows come from IMF data in the Moody's dataset, but were included in the Téllez (2004) dataset.

5 Cross-Section Analysis

In this chapter we conduct a cross-section analysis using the Moody's dataset to identify possible determinants of FDI and portfolio investment flows. The period 1996 to 2001 can be described as one of deep volatility in capital flows, and especially in portfolio flows. This volatility poses a challenge for empirical research since conventional econometric models may not fit the data. Trying to avoid this problem, we estimated a cross-section for the flows of year 2000[18] using a three-year average[19] of the explanatory variables. The objective of these first estimations was to get an initial idea of what drives FDI and portfolio flows to emerging markets using a simple procedure. The results gave some positive information but were far from being informative.

A very common problem in the estimation of cross-section is, nevertheless, the possible existence of heteroskedasticity. Although OLS estimators are unbiased in the presence of heteroskedasticity, they are inefficient. If the form of this problem is known, GLS estimation is appropriate. However, the nature of the problem is usually unknown. White (1980) proposes a covariance matrix estimator, which is consistent in the presence of heteroskedasticity and does not depend on a particular structure.[20] Furthermore, he proposes a test in which also no formal structure on the nature of heteroskedasticity is imposed. The null hypothesis states that errors are homoskedastic and independent of the regressors. Following this approach, we estimated the OLS model for both flows and

[18] We chose to use 2000 as the year to study, since this year did not include any major emerging market crisis. Recall that the Asian crisis happened in 1997. In 1998 we had the Russian crisis, in 1999 the Brazilian crisis and in 2001 the Argentine crisis. We did, nevertheless, run the regression over the whole sample period with all the years 1996 to 2001 in a pooled dataset. The results, which are not reported here, were very similar, with the same explanatory variables turning up as significant. We, therefore, concluded that our results were relatively robust for the whole period studied.

[19] An average for the years 1998 to 2000. The reason for using an average is that we assume that investors are interested in the long-term trend of the fundamentals rather than their value in a certain year. Using a three-year average is, on the other hand, rather arbitrary. This could have been a four-year or a five-year average as well.

[20] Following White's (1980) notation, the estimator proposed is $(X'X/n)^{-1}\hat{V}(X'X/n)^{-1}$ where

$$\hat{V} = n^{-1}\sum \hat{\varepsilon}^2{}_{in} X_i' X_i .$$

tested for the existence of heteroskedasticity. Whenever this problem existed, we proceeded to correct it under this strategy.

The results for portfolio flows, as was the case with FDI flows, were not very revealing. Heteroskedasticity was found and corrected in this cross-section for 40 countries. Table 5.1 presents the regressions results, for which just two variables were significant: nominal GDP in US-dollar terms, and the ratio of government debt to revenues. The former variable just indicates that larger economies receive more portfolio investment, while the latter says that countries with fiscal problems receive less investment. Poor fiscal performance make portfolio investment riskier since it could imply future profit taxes (in the case of equity) or the eventual default on debts (debt securities).

Table 5.1: Cross-section regression results for portfolio flows (year 2000)

Explanatory variable	Dependent variable: Portfolio flows
GDP	25.516***
	(15.082)
Government debt/Revenue	-14.172**
	(7.108)
No of observations	40

Note:
i) Standard error in parenthesis.
ii) * Significant at 1%, ** Significant at 5%,*** Significant at 10%, **** Significant at 15%.
iii) A Constant term is included but not reported.

The results for FDI although simple, were satisfactory in the sense that they provided an initial idea of some of the determinants of these flows. For the analysis we used 46 countries. The White test suggested the presence of heteroskedasticity so we corrected for this problem. Table 5.2 reports the estimations results for this flow. The variables that turned out to be significant were nominal GDP in US-dollar terms, GDP per capita in USD and the ratio of government debt to revenues, or the ratio government interest payments to government revenue. All of them were significant at a 5% level and were correctly signed. The significance of nominal GDP and GDP per capita suggests that FDI goes to large and developed countries. The two fiscal variables stress the fact that investors prefer countries, which have a sound fiscal policy. An inconsistent fiscal policy might lead to tax hikes or other type of measures that makes the investments in these type of countries riskier.

Table 5.2: Cross-section regression results for FDI flows (year 2000)

Explanatory variable	Dependent variable: FDI flows	
GDP	34.841*	36.067*
	(4.699)	(4.794)
GDP/capita	0.1288**	0.1572**
	(0.0642)	(0.0711)
Government debt/Revenues		-73.432**
		(33.317)
Gvmt interest payment/Revenues	-6.911**	
	(3.300)	
No of observations	46	46

Note:
i) Standard error in parenthesis.
ii) * Significant at 1%, ** Significant at 5%,*** Significant at 10%, **** Significant at 15%.
iii) A Constant term is included but not reported.

6 Panel-Data Analysis

In this chapter we conduct a panel-data study of foreign investment flows to identify the variables that drive such capital flows into emerging markets. Using a panel-data framework allows us to study the time-series properties of the data. In particular, possible business-cycle effects on both the recipient and the foreign country can be analysed.

In section 6.1 the panel-data framework used for the analysis is briefly introduced. Section 6.2 and 6.3 presents the results of the studies of portfolio and FDI flows respectively. In section 6.4 a dynamic panel approach is discussed and the results yielded using such a framework are presented. Section 6.5 discusses the limitations of these studies and of the panel data framework in general.

6.1 The Panel Data Framework

The econometric framework used in the analysis was a static panel data framework. We began by running the standard OLS pooled model and corrected for heterocedasticity and autocorrelation.

This model can be written for individual *i* as follows:[21]

$$y_i = X_i\beta + e_i \tag{6.1}$$

where $i = 1, 2,\ldots, N$, and

$$E[e] = 0 \tag{6.2}$$

[21] This has been taken from Judge et. al. (1985). See also Greene (1999).

$$E\left[e_i e_j'\right] = \frac{\sigma_{ij}}{1-\rho_i\rho_j}\begin{bmatrix} 1 & \rho_j & . & . & \rho_j^{T-1} \\ \rho_i & 1 & . & . & \rho_j^{T-2} \\ . & . & . & . & . \\ . & . & . & . & . \\ \rho_i^{T-1} & \rho_i^{T-2} & . & . & 1 \end{bmatrix} \tag{6.3}$$

$$e_{ij} = \rho_i e_{i,t-1} + \zeta_{it} \tag{6.4}$$

where $y_i = (y_{i1},...,y_{iT})$ is a vector of dependant variables, *X* is a matrix of explanatory variables, β is a vector of parameters to be estimated, and e is the disturbance vector that follows the above conditions together with $E[\zeta_{it}] = 0$, $E[\zeta_{it}\zeta_{jt}] = \sigma_{ij}$, and $E[\zeta_{it}\zeta_{is}]=0$ for all $t \neq s$. "This model assumes that coefficients are the same for all individuals, the disturbance vector for a given individual follows a first order autoregressive process, that the disturbance can be different for different individuals, and that the disturbances for different individuals are contemporaneously correlated".[22] However, this model requires a set of assumptions that may be too stringent, specifically assuming that all coefficients are constant. Therefore, we also estimated the model under the assumption that the slope coefficients are constant but that the intercept may change according only to individuals.

This model can be expressed as follows:

$$y_{i\,t} = \overline{\beta_1} + \eta_i + \sum_{k=2}^{K} \beta_k X_{kit} + \varepsilon_{i\,t} \tag{6.5}$$

where *i* = 1, 2,…, *N*, and *t* = 1, 2,…, *T*. In this model, $\overline{\beta_1}$ is the *average intercept* while η_i is the individual effect that captures the possibility of a changing intercept over individuals. The correct estimation for this last model depends on whether we assume

[22] Judge et. al. (1985), p. 518.

that η_i is assumed to be fixed or random. If we assume that η_i is fixed, the dummy variable model will be the appropriate one. On the contrary, if η_i is assumed to be random, we should estimate the model using an error component model. The Breusch-Pagan Lagrange multipliers test and the Hausman specification test helped us on the selection of the appropriate model (i.e. pooled vs. individual effects, and fixed vs. random effects).

Obviously, further panel data techniques are available. However, this framework is simple and provides us with alternatives different to the standard OLS estimations.[23] Baltagi (2000), and Hsiao (1986) argue that these essential panel data techniques have some advantages like: i) providing larger number of data points which increase the degrees of freedom and reduce collinearity, thus, resulting in more efficient estimates; ii) the possibility to control for individual heterogeneity; iii) letting us investigate issues that cannot be addressed through either time series or cross-sectional sets; and iv) the possibility of taking into account the diversity of individuals is a way to control for the effects of omitted or unobserved variables.

6.2 Determinants of Portfolio Investment

Using the econometric framework outlined in the previous section, we estimated the relationships between the potential explanatory variables and the investment flows, starting with the analysis of the portfolio flows.

For the analysis we used the dataset defined by the Téllez (2004), hoping to capture the business cycle effects that were not possible to analyse in the cross-country framework used in the previous chapter. The time period in the panel, nevertheless, had to be reduced, as a consequence of poor fiscal data, especially in the first years of the dataset.

[23] In this static approach to panel data, further assumptions can be made that will result in different models: i) slope coefficients remain constant while the intercept varies over individuals and time (fixed or random), ii) variable slope coefficients over individuals (fixed SUR model, or random Swamy model), and iii) variable slope coefficients varying over individuals and time.

In addition, in order to use the same source for each time series, the most recent years had to be omitted as well. For these reasons the time period studied was restricted to 1980 to 1997. The panel now covered 12 countries and 18 yearly observations per country.

We used the specification tests outlined earlier to choose the appropriate model. The Hausman test suggested that the random effects model was not the appropriate one. The Breusch-Pagan's test null hypothesis was, furthermore, not rejected, suggesting that no individual effects exist. Furthermore, an F test, for which the null hypothesis is that all η_i are 0, was not rejected. This lead us to estimate the pooled model correcting for heteroskedasticity and autocorrelation of order 1 as described in the previous section. This type of specification makes sense since it indicates that portfolio investors do not discriminate between countries, a result which is in line with Calvo's (1996) proposition about globalised investors. The estimation results are presented in Table 6.1.

We tried a large number of alternative models, but only one yielded significant results. This model used as explanatory variables PPP adjusted GDP per capita (as a proxy for market size), GDP growth (as a proxy for country conditions), exports (as a proxy for liquidity), the difference between government consumption and tax revenues in relation to GDP (as a proxy for government finance), and the U.S. GDP growth rate to represent external business cycle effects. All parameter estimates were significant at the 1 percent level, and all were correctly signed apart from exports. The fact that exports have the incorrect sign is rather puzzling, and we have no good explanation to this.

Table 6.1: Regression results for portfolio flows (time period 1980 – 1997)

Explanatory variable	Dependent variable: Portfolio flows
GDP/capita (PPP adjusted)	0.4882* (0.0750)
Real GDP growth	53.9729* (7.1478)
Exports	-0.01573* .0067
(Expenditure - Revenue)/GDP	-21.0428* (9.6267)
U.S. GDP growth	-40.0900* (9.8905)
No of observations	216
Wald $\chi^2(5)$	353.03
Prob > χ^2	0.0000

Note:
i) Standard error in parenthesis.
ii) * Significant at 1%, ** Significant at 5%,*** Significant at 10%, **** Significant at 15%.
iii) A Constant term is included but not reported.

As discussed earlier, the business cycle effect of source countries, which is a *push factor*, can have a positive or negative sign. To check for robustness, we also used the U.S. industrial production index and an industrial production index for developed countries. The parameter estimates remained significant at the 1 percent level with unchanged signs. To understand this negative influence of external business cycles on capital flows, it is worth paraphrasing the explanation Levy-Yeyati et. al. (2002) give to this phenomenon for FDI flows. During expansions in source countries, firms should have higher earnings to invest both at home and abroad. Thus, FDI outflows should increase in response to this income effect. However, to the extent that marginal productivity of capital tends to behave procyclical, expansions should induce a substitution effect that reduces FDI outflows as investments abroad become less attractive. The authors concluded that the

substitution effect is a result of investors' arbitrage between different investment options. This result was also found earlier by Calvo et. al. (1993) when they examined portfolio flows to Latin America. They also mention the fact that investors take into account financing costs at home and abroad. To the extent that source countries can undertake counter cyclical monetary policy, FDI could, indeed, increase during recessions at the source country.

Even though our proxy for government finance is far from being a precise measure of the fiscal deficit, since governments have other sources for financing their budgets, we believe that it captures the essence of sound fiscal management. The negative sign in the coefficient tells us that an increasing gap between expenditures and income from taxes, is a clear sign of unbalance, hence investors should be less inclined to invest in these type of countries. Obviously, such an imbalance may become more critical in countries in which governments have a high external debt and taxes are collected in national currency. We believe this result is quite important and has not been stressed enough in the empirical literature. On theoretical grounds, in perfect markets, one could think that higher deficits are financed by portfolio flows. However, due to the lack of contract enforcement in an international setting, investors are not willing to finance completely these countries since there are strong incentives for default. Penalties and reputation can justify that contracts take place, but higher deficits necessarily imply lower debt ceilings.[24] Our results confirm this type of intuition in which countries are credit constrained by international financial markets.

The interpretation of the rest of the variables is more intuitive. Large countries receive more portfolio investment flows than small countries, and faster growing economies receive more than those that are stagnant.

[24] For a clear exposition of these issues, see Obstfeld and Rogoff (1997).

6.3 Determinants of Foreign Direct Investment

We now turn to study the determinants of FDI flows into emerging markets. Following the same procedure as in the case of portfolio flows, we estimated the model using the Téllez (2004) dataset but with FDI flows as explanatory variable.

Even though we had to omit some countries from the sample, due to lack of data, we ended up with 23 countries, which meant 528 observations. As before, we estimated the specifications described in section 6.1, and the fixed effects model was the one chosen since the Breusch-Pagan test null hypothesis was rejected. An F test rejected the hypothesis that all η_i were 0, and the Hausman test suggested with a high degree of certainty that the error component model was inadequate. As opposed to the specification used for portfolio flows, this one indicates that foreign direct investors do care about specific country characteristics.

The estimation results are presented in table 6.2. The variables that explained FDI flows for the period 1980 to 1997 were the following: PPP-adjusted GDP per capita (proxy for market size), GDP growth (proxy for market conditions), the ratio of exports plus imports to GDP (proxy for openness), the ratio of the gap between government expenditures and revenue to GDP (proxy for government finance), and the yield on the 10-year U.S. Government bond. All the variables have the correct sign and, and all are statistically significant at the 1 percent level, apart from the government finance variable, which is significant at the 5 percent level.

Table 6.2: Regression results for FDI flows (time period 1980 – 1997)

Explanatory variable	Dependent variable: FDI flows
GDP/Capita (PPP adjusted)	0.09724*
	(.0275)
Real GDP growth	0.0023*
	0.0003
(Exports + Imports)/GDP	25.7832*
	(3.3373)
(Expenditure - Revenue)/GDP	-1299.237**
	690.2304
Yield on 10-year US Gvmt Bonds	-41.9436*
	(18.6376)
No of observations	414
Wald $\chi^2(3)$	61.77
Prob > χ^2	0.000

Note:
i) Standard error in parenthesis.
ii) * Significant at 1%, ** Significant at 5%,*** Significant at 10%, **** Significant at 15%.
iii) A Constant term is included but not reported.

The results suggest that large and open countries that are growing receive more FDI than small, closed and stagnant countries. Our results, furthermore, suggest that flows seem to favour countries that have prudent fiscal policies. Countries who suffer from unbalanced fiscal accounts are prone to tax hikes or to fiscal reforms aimed at collecting more taxes. Empirical literature, like Cummins and Hubbard (1994), has found the pervasive effects of high tax rates on FDI flows. For FDI flows, as well as portfolio flows, the substitution effect predominates in relationship to business cycles in source nations. This result agrees with results obtained by Levy-Yeyati et al (2002) in which they find the same effect for FDI inflows to developing countries.

In our regression, we also included the Freedom House indices of political rights and civil liberties, but none of these turned out to be significant. This result differs from Biswas (2002) in which a strong relationship between FDI flows and political variables is found for a panel of 44 developing countries for the period 1983 to 1990. However, Albuquerque et. al. (2002), using also the Freedom House indexes, obtain less clear results.

6.4 An Alternative Econometric Approach: Dynamic Panels

An alternative approach to the normal static panel data framework is to use a dynamic panel data framework, in which lags of the dependent and independent variables are included in the model. This could be written as,

$$y_{it} = \sum_{k=1}^{p} \alpha_k y_{i(t-k)} + \delta'(L) x_{it} + \lambda_t + \eta_i + v_{it} \qquad (6.6)$$

where y_{it} is the independent variable, x_{it} is a vector of explanatory variables, $\delta'(L)$ is a vector of associated polynomials in the lag operator and λ_t and η_i are specific time and individual specific effects. We assume that the disturbances are serially uncorrelated and treat the individual effects as stochastic. This implies that they are correlated with the lagged dependent variable, and, hence, the OLS estimator is inconsistent. Although the Within Groups estimator can eliminate the source of the inconsistency by transforming the equation and, thereby, eliminate the specific effect, the correlation will not vanish as the sample increases, so this would also be an inconsistent estimator. As Hsiao (1986) points out, a possible estimator can be achieved using Maximum Likelihood estimation for an AR(1) model. However, such a model will depend heavily on the assumptions made in regards to the initial conditions of y_{it}. The most attractive framework developed so far has been based on the Generalized Method of Moments (GMM) and draws on work by Holtz-Eakin et. al. (1988), and Arellano and Bond (1991). The idea is to use

suitably lagged levels of the variables as instruments, after the equation has been first-differenced. Essentially, they exploit the moment conditions $E\left[W_i' \Delta v_i \right] = 0$ where Δv_i is a vector of differenced errors and W_i is a matrix of instruments. The different moment conditions will depend on what is assumed about the correlation between x_{it} and the components of the error term (i.e. predetermined, endogenous or strictly exogenous). This will determine the suitable instruments used in the matrix. Instruments are used in order to address issues of endogeneity between explanatory variables and to deal with the correlation between the new error, the differenced one, and the lagged dependent variable. In a first step, Arellano and Bond (1991) assume that error terms are independent and homoskedastic. The residuals obtained in this step are then used to construct an appropriate variance-covariance matrix relaxing the assumptions of independence and homoskedasticity. However, as the literature suggests, there are very modest efficiency gains from using this two-step estimator. Besides, this procedure results in very small asymptotic standard errors. Therefore, the results we present are based on the one-step estimator. The appropriateness of the assumptions made about the matrix instrument can be tested using the Sargan test, in which the validity of the moment conditions is the null hypothesis. Since the consistency of GMM estimators rely on the assumption that $E\left[v_{it} v_{i(t-2)} \right] = 0$, Arellano and Bond (1991) suggest a test in which the null hypothesis is no serial correlation. First order serial correlation should be accepted while second order serial correlation should be rejected.[25]

A possible disadvantage of this technique for dynamic panel estimations has been emphasised by literature, which has found that first-differenced GMM estimators have poor finite sample properties when the lagged levels of the series are weakly correlated with subsequent first differences.[26] The bias and imprecision of this estimator occurs when the series are highly persistent or close to random walk processes. Arellano and Bover (1995) have proposed the use of additionally suitably lagged first differences of the variables for the equations in levels. These sets of moment conditions can be used as a

[25] The discussion here follows quite closely Bond (2002).
[26] See, for example, Blundell and Bond (1998).

linear GMM estimator in a system of regressions that uses first differences and level equations. As opposed to the difference estimator, this system estimator has virtually no bias and much better precision.[27] The instruments for the difference regression are the same as before. However, for the level regression, lagged *differences* are used. Results are presented for both types of approaches.

With this framework, we estimated our regressions for both portfolio and FDI flows using the Téllez (2004) dataset. This attempt, we believe, links two strands of literature; the determinants strand and another body of literature that focuses on the behaviour of foreign investment flows. In regards to this second field, it is worth mentioning some of the empirical research results. Conventional knowledge characterised FDI as long-term investment, less prone to speculation and hence more difficult to reverse. On the contrary, portfolio investment has been thought of as short-term flows driven by speculation and, hence, easier to reverse. This characterisation of *hot* portfolio and *cold* FDI flows has been tested empirically under a maximum likelihood Kalman Filter technique by Sarno and Taylor (1999).[28] They find that FDI flows and commercial bank credit have high permanent components as opposed to equity flows and bonds that have relatively low permanent components. Using a less sophisticated approach, Claessens et. al. (1995) show that the accounting labels *short term* and *long term* applied to capital flows does not provide any reliable indication as to the actual degree of *coolness* of the flows.

In the dynamic panel framework, as explained above, it is possible to include both lags of the dependent and independent variables in the right-hand side of the equation to be estimated. Using the dynamic specification should be quite interesting in this context. Lags of *cold* flows, such as FDI flows, should be significant, statistically speaking, while lags of *hot* flows should not be significant, or at least the model should include fewer lags for *hot* flows than for *cold* flows. The interesting thing about the empirical results

[27] See Blundell and Bond (1999).
[28] See also Chuhan et al (1996).

presented here, is that they do, indeed, confirm the hypothesis that FDI flows are *cold* while portfolio flows seem to be *hot*.

Table 6.3 presents the results using the dynamic specification for FDI flows for the period 1980 to 1997, using both methodologies. It is quite interesting to see that that three of the four lags included in the model are significant at the 1 percent level in the system estimator, while just one is insignificant at conventional levels. For the difference estimator, the Arellano and Bond (1991) methodology, the third lag is only significant at a 15% level. It is, furthermore, worth noticing that the coefficient of the fourth lag is negative in both estimations, suggesting the possibility of an FDI cycle. The results highlight an inertial component of FDI, suggesting the *coolness* of this flow. In addition, the results suggest that FDI flows generally go to economies that are growing. Although the openness variables were not significant, the results indicate that FDI goes to countries more engaged in export activities. The negative sign in the push variable (the yield of the 10-year U.S. Government Bond) is in line with our past estimations and confirms the prevalence of the substitution effect. In sharp contrast to our static approach, fiscal variables were never significant.

Bowsher (2002) mentions several studies, which have found poor size properties for the Sargan test for values of (N, T) that are empirically relevant. His results imply that the Sargan test based on the full instruments have a zero null rejection frequency and no power in these cases. To overcome this problem, he suggests reducing the number of instruments in cases where T is large relative to N. Following Bowsher (2002) advice, we reduced considerably the number of instruments used. Even with this reduction, for the difference estimator, the Sargan test was accepted (p-value 47%), the test for first-order serial correlation was rejected (p-value 2.6%), and the test for second-order serial correlation was accepted (p-value 77.1%). For the system estimator, the Sargan Test was accepted (p-value 25%), the first order serial correlation was rejected (p-value 2.8%) and the second order was accepted (p-value 58%).

Table 6.3: Regression results for FDI flows using a dynamic panel framework (time period 1980 – 1997)

	Dependent variable: Portfolio flows	
Explanatory variable	GMM-DIF	GMM-SYS
Lags of the dependent variable		
L1	0.7826*	0.8258*
	(0.1179)	(0.1242)
L2	0.0993	0.0965
	(0.1054)	(0.1025)
L3	0.3664****	0.3894***
	(0.2537)	(0.2228)
L4	-0.4327**	-0.3939*
	(0.1804)	(0.1326)
GDP growth	13.7423**	18.4847*
	(5.910)	(6.832)
GDP/capita (PPP-adjusted)	0.0005**	0.0002**
	(0.0002)	(0.0001)
Exports	0.0099****	0.0085***
	(0.0065)	(0.0048)
Yield on 10-year US Govt.	-22.3494*	-11.9336
	(-7.314)	(3.0635)*
No of observations	322	322

Note:
i) Standard error in parenthesis.
ii) * Significant at 1%, ** Significant at 5%,*** Significant at 10%, **** Significant at 15%.

Table 6.4 shows the results of dynamic specification of portfolio flows during the period 1980 to 1997. Contrary to our results for the FDI regressions, portfolio flows seem to be *hot*. Here the analysis yields none significant lags using both approaches.[29] Like in the static approach, exports are incorrectly signed. As in the dynamic regression for FDI flows, none of the fiscal variables were significant. The external business cycle variable (the 10-year U.S. Government Bond yield) also here has a negative sign and was significant at a 5.3 percent level. Finally, for the difference estimator, following Bowsher (2002), we reduced the instruments used and the Sargan test null hypothesis was accepted (p-value 83.5%), the test for first-order serial correlation was rejected (p-value 8.8%) and the test second-order serial was accepted (p-value 24%). For the system estimator, the Sargan test was accepted (p-value81%), the first-order was rejected (p-value 8.6%) and the second-order was accepted (p-value 19.5%).

Overall, the dynamic specifications suggest that FDI flows are *cool* as opposed to portfolio flows that seem to be *hot*. In contrast to the static approach, the dynamic model rejected the proxies for government finance as explanatory variable both for FDI and portfolio flows. For the FDI model, openness was not robust but exports were highly significant. Apart from this, the results were similar to those yielded by the static panel data analysis.

[29] The inclusion of just one lag or more than two still yielded insignificant coefficients.

Table 6.4: Regression results for portfolio flows using a dynamic panel framework (time period 1980 – 1997)

	Dependent variable: Portfolio flows	
Explanatory variable	GMM-DIF	GMM-SYS
Lags of the dependent variable		
L1	0.2307	0.2071
	(0.1698)	(0.1784)
L2	0.0367	-0.0397
	(0.13)	(0.1481)
GDP growth	0.6171*	0.3354***
	(0.0446)	(0.2034)
GDP/capita	0.7508**	1.347*
	(0.0368)	(0.4189)
Exports	-0.0616**	-0.0938*
	(0.031)	(0.0349)
Growth in U.S. GDP	-75.6574**	-82.7109*
	(37.88)	(28.97)
No of observations	192	192

Note:
i) Standard error in parenthesis.
ii) * Significant at 1%, ** Significant at 5%,*** Significant at 10%, **** Significant at 15%.

6.5 Limitations of the Analysis

The empirical analysis conducted in this chapter has a number of limitations worth noticing. Most models for panel data, both static and dynamic, emphasize that the estimators rely on the assumption that the number of countries, *N*, is very large. Unfortunately, lack of appropriate data constrained us from using a large set of countries. In the case of analysing portfolio flows using a static panel defined by the Téllez (2004)

dataset,[30] the number of countries was reduced to only 12 due to lack of data. Nevertheless, in the other cases we were able to use a more adequate number of countries.

It is, furthermore, important to recognize that the analysis was difficult due to the volatile behaviour of capital flows during the last part of the 1990s, as discussed in chapter 3. The volatility of the flows, especially portfolio flows, makes it difficult to obtain desirable results using conventional econometric methods. This period was also a period of deregulation, and many of the changes in investment flows were due to liberalisation and privatisations rather than due to changes in fundamental economic variables. The study conducted here has not dealt with these potential issues.

Finally, in the study conducted here, we also tried to identify the determinants of the different components of portfolio flows, i.e. equity flows, and private and public debt flows. The fact that some such flows were only liberalised recently in many developing economies, and remain strictly regulated in others, made the time series available for the analysis too short for any fruitful study. A problem that we faced is that a considerable amount of specific right hand side variables are needed for the analysis. This is a particular problem for panel-data analysis. An illustrative work is a recent and interesting paper by Griffin et. al. (2003). They deal with this issue using daily data for nine emerging markets analysing equity flows. Understanding the behaviour of these components is, nevertheless, important for both policy makers and researchers, which calls for further research in this field.

[30] See table 5.2.

7 Conclusion

Investment flows constitute an important part of the balance of payments, and it is of this reason crucial for policy makers to understand their behaviour and determinants, both to be able to evaluate the impact of policy decisions on the balance of payments and to be able to correctly forecast this. Investment flows have, indeed, played an important role in recent emerging market crises, and large inflows of portfolio investment, in particular, often turns out to be a curse rather than a blessing, when such flows come to a sudden stop or even reverse.

In this paper we have tried to determine the drivers of FDI as well as portfolio flows. We have used both a cross-country analysis and a panel-data analysis. The results are summarised in table 7.1.

Table 7.1: Determinants of foreign investment flows: Summary
(based on the analysis using the Téllez (2004) dataset)

	Dependent variable:	
	Portfolio investment	FDI .
Cross-Country Study		
Explanatory variables:	GDP Government debt/Revenue	GDP GDP/capita Government debt/Revenue
Panel-Data study		
Explanatory variables:		
Pull variables	GDP/capita Economic growth Exports Fiscal deficit	GDP/capita Economic growth Openness Fiscal deficit
Push variables	U.S. GDP growth	Yield on U.S. Gvmt Bonds

The cross-country analysis used a relatively large number of potential explanatory variables. A three-year average (1998 to 2000) of these variables was used together with data for FDI and portfolio flows from year 2000. A cross-section of 20 and 46 countries was used for the portfolio and FDI studies respectively. The results suggest that GDP and government debt to revenues are significant in explaining both portfolio and FDI flows. In addition, GDP per capita is also a significant explanatory variable for FDI flows, but not for portfolio flows.

The panel-data study used a dataset defined by Téllez (2004). The original dataset, which covered the time period from 1975 to 2000, had to be truncated to 1980 to 1997 due to lack of data for some of the countries studied. Despite this, we had data for only 12 countries for the study of portfolio flows. For FDI flows we used some 23 countries.

The results suggest that both FDI and portfolio investment flows tend to favour larger and faster growing economies rather than smaller and stagnant economies. Fiscal policy is also an important explanatory variable, and countries running prudent fiscal policies tend to attract more foreign investment. In the case of portfolio investment, exports are an important variable. Exports are generally the main source of foreign exchange and are, therefore, important for the liquidity of the country. FDI flows, on the other hand, tend to favour open economies before closed ones.

When it comes to *push* variables, i.e. variables outside of the recipient country, these play an important role both in the case of FDI and portfolio investment. For the latter, U.S. GDP growth turned out as a significant explanatory variable, and for the former, the yield on U.S. Government bonds. In both cases, the sign was negative, indicating the dominance of a substitution effect, whereby foreign companies tend to invest more at home during a boom, while they look for foreign investment opportunities during a down turn.

By using a dynamic panel, we, furthermore, showed that FDI flows are relatively *cold*, while portfolio investment flows are *hot*, i.e. FDI flows have a much larger permanent component while portfolio flows are much less enduring.

We have in this paper aimed to identify a number of variables explaining the variations in FDI and portfolio flows from a set of fundamental economic variables. Nevertheless, fundamentals are not the only variables influencing investment flows. For the FDI case, Albuquerque et al (2002) have found that domestic factors have, indeed, become less important in accounting for the variation in these flows. For portfolio flows, the relevance of pull variables should even be less. Contagion, herding behaviour and other factors under the presence of asymmetric information may to a large extent be explaining the behaviour of such flows. This does not mean that policy makers have their hands tied. On the contrary, the issue poses a huge challenge for the policy makers, as they want to avoid as possible sharp reductions or even reversals of capital flows. As Gavin et. al.(1996) point out, the relevant issue is not so much how to manage the scarcity in capital inflows, but rather how to deal with the volatility inherent to them. Policy makers should play a major role in fostering good fundamentals as a result of sound, transparent and publicly known policies. Good fundamentals affect inflows as reflected in our empirical results. In addition, sound fundamentals can absorb sudden stops at a much lesser cost than unbalanced economies. Unexpected transitory shocks to the capital account of an unbalanced economy may translate into a permanent shock with high output costs. However, good fundamentals take time to consolidate, and their impact on capital flows might not be instantaneous. Finally, not everything is asymmetric information and sound fundamentals. As shown, the influence of external factors continues to be, and should continue to be a main determinant of capital inflows to developing countries as the global economy tends to greater integration. The above policy orientation does not solve the issue of volatile and scarce capita flows. However, it should be able to alleviate some of the threats posed in the current global capital markets with asymmetric information.

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