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Essays on the Macroeconomic Impact of Financial Openness

by

Barry O'Donnell

Submitted to the Department of Economics
in fulfilment of the requirements for the degree of

Doctor of Philosophy

at the

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Summary

This thesis uses new data to examine the impact of a quantitative measure of international financial integration on various indicators of macroeconomic performance. Proponents of greater openness to financial flows maintain that more rapid economic development is an inevitable consequence of such an experience. In contrast, skeptics argue that any potential benefits of increasing financial openness are outweighed by the costs associated with greater economic instability and vulnerability caused by volatile capital flows. In general, the results presented in this thesis provide reasonably strong support for the view that greater financial openness hinders macroeconomic performance in developing countries.

The measure of international financial integration created in this study follows an alternative conceptual path to most existing measures. Instead of examining the particular policy implemented by each country regarding its capital account, I focus on actual stocks of both the assets and liabilities of FDI, portfolio equity, and debt transactions as a means of deriving a quantitative indicator of financial openness. Information on such data is taken from a new dataset constructed by Philip Lane and Gian Maria Milesi-Ferretti who calculate the underlying stocks by accumulating the corresponding flows with appropriate valuation adjustments. In effect, countries who exhibit high values for this measure can be assumed to be relatively open, in the sense that they have been experiencing a large amount of financial inflows and outflows.

Chapter Three examines the impact of financial openness on the levels and volatility of per capita GDP growth and gross domestic investment. It also investigates whether these relationships depend on the level of economic development, financial development, the degree of political stability, and macroe-

conomic policies. In general, the results do not provide much support for the view that increasing financial openness enhances macroeconomic performance. This seems to be particularly the case in developing countries where greater financial openness was found to be significantly associated with lower per capita GDP growth and higher output volatility. In addition, it does not appear to be the case that developing countries that have strong economic, financial, institutional, and macroeconomic characteristics are more likely to reap the predicted benefits of greater financial openness.

One frequently asserted benefit of greater financial openness is that it may force countries to implement more disciplined economic policies than might be the case if the capital account is relatively closed. As a result, this might have beneficial consequences for the conduct of both monetary and fiscal policy. Chapter Four focuses on the impact of financial openness on inflation levels and volatility while Chapter Six assesses whether greater openness to international capital flows disciplines fiscal policy or affects fiscal size. With respect to inflation, there is almost no evidence of a significant relationship between financial openness and inflation levels or volatility. Moreover, the degree of financial system strength does not appear to influence the relationship between these variables. With respect to fiscal policy, there is almost no evidence of a direct relationship between financial openness and fiscal size. In terms of fiscal discipline, there is some mixed evidence to suggest that greater financial openness lowers budget deficits, particularly in developing countries. In contrast, however, greater financial openness appears to increase levels of government debt in developing countries.

Chapter Five assesses the hypothesis that international financial integration should lead to the more rapid development of the financial system. Extending

the work of Klein and Olivei (2001) by examining the impact of a volume-based measure of financial openness on three indicators of financial development, I find little evidence of a positive and statistically significant relationship between financial openness and financial depth in the full sample or industrial country subsample. Moreover, greater openness to international flows of capital appears to *hinder* financial deepening in developing countries. I also examine the impact of the same rules-based indicator of capital account liberalisation used by Klein and Olivei (2001). Evidence of a positive relationship between capital account openness and financial development was found for both the full sample and industrialised subsample but the relationships are not statistically significant when outliers are omitted from the samples. One possible explanation for this absence of a relationship is that international financial integration may only lead to financial deepening when an efficient legal and institutional environment is already in place. This viewpoint, however, is not supported by robustness tests where interactions between both international financial integration measures and the quality of the bureaucracy are insignificant.

Chapter Seven investigates the view that greater openness to international flows of capital may expose countries to more instability in the nominal and/or real exchange rate. Evidence to suggest that financial openness has a direct impact on exchange rate volatility is almost non-existent. The results do suggest, however, that the relationship between financial openness and real effective exchange rate volatility depends on the level of economic development - both the cross-sectional and panel data outcomes suggest that greater financial openness is associated with higher volatility in poorer countries.

Finally, Chapter Eight summarises the main findings of this thesis and considers the implications for the current policy debate on capital flows.

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Chapter 1

Introduction

1.1 Setting the Context

The makeup of the world economy has changed dramatically over the last three decades. The forces of globalisation - the whirlwind of technological change and removal of restrictions on trade in goods, services, and capital - have forced policymakers to radically change the way they think about policies for economic development. This thesis is concerned with one particular aspect of globalisation - the increasing level of capital flows across national borders. The opening of domestic capital markets to foreigners has been one of the most widespread and controversial policies in recent decades. Views on this issue have changed since the early 1990s when the general consensus was that capital account liberalisation was helping developing countries to attain higher levels of economic growth, create more employment opportunities, reduce poverty, and improve the quality of life for the majority of citizens.

This consensus, however, has been challenged by a series of financial and currency crises, starting with the collapse of the European Exchange Rate Mechanism (ERM) in 1992-93 but then appearing in a far more serious form in developing countries with the Mexican crisis in 1994, the East Asian crisis of 1997-98, and the Russian and Latin American crises in 1998-2000. All of these crises were characterised by large and swift outflows of capital as financial markets lost confidence in the ability of the domestic authorities to avert a crisis. These financial and currency crises have had severe macroeconomic consequences resulting in greater instability and social conflict. This has focused greater attention on the risks associated with free capital mobility. Some commentators have gone as far as to suggest the need for controls on capital movements as a response to the financial and economic turmoil caused by the excessive volatility of capital

flows.[1]

Theoretical predictions about the effects of free capital mobility depend on whether capital markets are assumed to be perfect or imperfect (Eichengreen, 2002). If capital markets are assumed to be perfect, international capital flows will benefit both borrowers and lenders and the case for free capital mobility becomes the same as the case for free trade. Many commentators, however, argue that the perfect-markets paradigm is less likely to apply to capital markets, in comparison to markets for goods and services. As Rodrik (1998a) puts it, "*Financial markets are fundamentally different*". Market failures arising from asymmetric information, moral hazard, incompleteness of contingent markets, and bounded rationality are a widespread feature of financial markets, particularly those in developing countries. This can lead to the inefficient intermediation of capital inflows and, in some cases, severe macroeconomic crises.

This does not necessarily imply that capital controls are beneficial. Restrictions on capital movements insulate domestic financial intermediaries from foreign competition, thus hindering the development of the domestic financial system. They also protect governments from market discipline. Moreover, controls give policymakers the power to determine the allocation of resources within the economy, thus leaving open the possibility of rent-seeking and resource dissipation by interest groups seeking privileged access to foreign capital (Eichengreen, 2002). The biggest problem, however, is that the effectiveness of restrictions tends to diminish quite quickly over time. As international financial markets become more interconnected, it becomes easier for market participants to find ways of circumventing any restrictions on capital movements. Thus, for many countries, greater international financial integration is now becoming a fact of

[1]See Krugman (1998).

life.

Fueling the debate over the merits of international financial integration is the mixed set of results presented in the empirical studies. Two recent papers by Rodrik (1998a) and Edwards (2001) highlight the divergence between recent findings. The former study finds no association between capital account liberalisation and growth, thus leading the author to suggest a rethink over the consensus that capital account liberalisation is largely beneficial. In contrast, Edwards (2001), using an alternative, and, in his view, superior measure of capital account openness, finds a positive impact of capital account openness on growth. This only applies, however, to high-income countries.

One of the main reasons why empirical studies examining the impact of capital account liberalisation have provided inconclusive outcomes is due to the difficulty of measuring the policy. Quantifying the extent and effectiveness of all the various types of controls on different capital transactions is very difficult. Most studies rely on a rules-based indicator of capital account liberalisation constructed from information reported by the IMF in their narrative descriptions of restrictions on capital movements. The disadvantage with this type of measure, however, is that it does not distinguish between different types of restrictions and it provides little information on their intensity.

The main innovation of this thesis is the construction of a new quantitative indicator of international financial integration based on the estimated stocks of foreign assets and liabilities. Information on such data is taken from a new dataset compiled by Philip Lane and Gian Maria Milesi-Ferretti who calculate the underlying stocks of foreign assets and liabilities by accumulating the corresponding flows with appropriate valuation adjustments.[2] Focusing on the stocks

[2]Subsequent to the empirical work presented in this thesis, the IMF (2001) and Edison,

of financial assets and liabilities as opposed to the underlying flows is a better way of measuring financial openness as flows are more susceptible to temporary disturbances in the political and policy climate and, thus, may exhibit greater volatility. If this gross stock measure is high, it indicates that a country is relatively open, in the sense that it has been experiencing a large amount of financial inflows and outflows. Thus, focusing on the stocks of gross capital flows as a means of developing a volume-based measure of financial openness provides the opportunity to compare empirical outcomes using this measure with previous findings using existing indicators of international financial integration.

1.2 Aims and Structure of Thesis

The aim of this thesis is to widen the empirical debate over the macroeconomic impact of international financial integration. A brief review of existing measures of international financial integration and a full description of the variables used in the construction of the new financial openness measure are contained in Chapter Two.

This new volume-based indicator is then used to examine the impact of financial openness on a wide range of macroeconomic indicators. Chapter Three examines the impact of financial openness on the levels and volatility of per capita GDP growth and gross domestic investment. This chapter seeks to answer a number of questions. Is there a statistically significant and robust positive relationship between financial openness and growth and investment? Does this

Levine, et al (2002) have recently used the same indicator to examine the impact of financial openness, and its interaction with various aspects of the financial and institutional environment, on economic growth. The IMF (2001) also focus on the impact of financial openness on private investment, technology transfers, and financial development. Part of the statistical analysis presented in the IMF (2001) is taken from Edison, Levine, et al (2002).

come at the expense of greater growth and investment volatility? Do these relationships vary between high- and low-income countries? Are certain financial, institutional, and macroeconomic characteristics required to be in place before greater financial openness leads to higher growth and investment or lower volatility?

In Chapter Four, I examine the impact of financial openness on the level and volatility of inflation. One frequently asserted benefit of greater financial openness is that it may force countries to implement more disciplined economic policies than might be the case if the capital account is relatively closed. This might have beneficial consequences for the conduct of monetary policy and the degree of effort exerted to keep inflation under control. I also examine the hypothesis that the relationship between financial openness and inflation levels and volatility may be influenced by the degree of financial system strength. Countries with weak financial systems are particularly vulnerable to short-term capital flow volatility. In effect, weak financial systems with inadequate prudential supervision cannot efficiently intermediate large and rapid flows of short-term capital. As a result, greater openness to international capital flows may lead to higher inflation levels and volatility. The tendency for this to be observed, however, might be expected to decline in countries with deeper financial systems.

Chapter Five extends the work of Klein and Olivei (2001) who show a statistically significant and economically relevant effect of open capital accounts on three alternative measures of financial depth that is limited to richer countries. In contrast to the rules-based indicator of capital account liberalisation used in this paper, I examine the impact of the volume-based measure of financial openness on the same three measures of financial depth. For comparison purposes, I

also examine the impact of a rules-based indicator of capital account openness on the financial depth measures.

In Chapter Six, I examine the impact of financial openness on the degree of fiscal activism and fiscal discipline. Greater openness to international flows of capital may force governments to adopt a more disciplined fiscal stance for fear of being penalised by the international capital markets. Two indicators of fiscal discipline are analysed in the empirical analysis: the budget balance and government debt. I also examine the impact of financial openness on four indicators of fiscal size: total expenditure, government consumption, current revenue, and tax revenue.

Chapter Seven examines the impact of financial openness on various measures of real and nominal exchange rate volatility. For many developing countries, the experience of greater financial openness has brought with it the attendant problem of greater exposure to short-term capital flows. Such flows tend to be driven largely by short-term factors such as interest rate differentials on liquid instruments and they can be sometimes sensitive to irrational market sentiment in financial markets. The latter situation arises from market failures such as asymmetric information and bounded rationality which are widespread in financial markets. As a result, short-term capital flows tend to be excessively volatile. This can have serious consequences for exchange rate stability. In effect, greater openness to international flows of capital may expose countries to more instability in the nominal and/or real exchange rate. Finally, Chapter Eight offers some concluding remarks.

Chapter 2

Measuring Financial Openness

2.1 Introduction

One of the main reasons why empirical work examining the impact of capital account liberalisation has provided inconclusive outcomes is the difficulty of measuring the policy. Attempting to identify and quantify the various types of capital controls that exist across a wide set of countries is an ambitious task. In reality, no completely satisfactory measure is yet available. Therefore, creating alternative indicators of international financial integration and examining their impact on economic performance is an important line of research as it allows comparison with the results using existing indicators. The measure of international financial integration created in this study follows an alternative conceptual path to most existing measures. Instead of examining the particular policy implemented by each country regarding its capital account, I focus on actual stocks of capital flows as a means of deriving a quantitative indicator of financial openness. In effect, countries who exhibit high values for this measure can be assumed to be relatively open, in the sense that they have been experiencing a large amount of financial inflows and outflows. While this measure provides a reasonably good indication of the degree of financial openness, theoretical and practical challenges exist which render it a less than fully satisfactory measure. These challenges will be described in detail below.

The rest of this chapter is organised as follows. Section Two describes some of the existing measures of capital account openness and their limitations while Section Three presents the quantitative indicator of financial openness used in all of the empirical work in this thesis. Finally, Section Four provides a comparison between the new volume-based indicator of financial openness and existing rules-based indicators of capital account openness.

2.2 Measures of Capital Account Openness[1]

Given the fact that the main innovation of this thesis is the construction of an alternative indicator of international financial integration, it is worthwhile to describe some of the different measures of capital account openness used in recent empirical work. Most empirical papers use rules-based indicators of capital account liberalisation to gauge whether a country allows capital to flow freely across its borders. Quantifying the extent and effectiveness of various types of controls on capital movements is a difficult task. The most widely used index of capital account openness in previous studies is a binary measure based on the restrictions on capital flows as reported annually in the International Monetary Fund's *Annual Report on Exchange Rate Arrangements and Exchange Restrictions* by national authorities. In most studies, these annual observations, which begin in 1967, are transformed into a variable measuring the proportion of years when a country had restrictions in place.[2]

This measure has many limitations. First, although it provides a good indication of the presence or absence of capital controls in general, it is limited by a lack of information on the intensity of such controls. For example, a country might liberalise some, but not all categories of their capital account, and, in accordance with the restriction measure, it could be labeled as closed (IMF, 2001). In addition, as the data do not distinguish between different types of cap-

[1] For a comprehensive review of all existing measures of international financial integration, see Edison, Klein, et al (2002).

[2] In 1996, a new system was set up for this report which contains more detail on capital account restrictions but it is not backwardly compatible with the earlier indicator. This measure of capital account liberalisation has been previously used in empirical studies by Alesina et al (1994), Grilli and Milesi-Ferreti (1995), Rodrik (1998a, 1999), Kraay (1998), Klein and Olivei (1999), Chanda (2000), Gruben and McLeod (2000), Arteta et al (2001), Edison, Klein et al (2002), and Edison, Levine, et al (2002).

ital controls, it is not possible to investigate whether some forms of controls may be superior to others in terms of their ability to enhance economic performance. A second limitation is that the data ignore the fact that legal restrictions on capital mobility are frequently circumvented, thus rendering obsolete measures of capital account openness in some countries. Third, the measure refers exclusively to restrictions on resident-owned capital transfers and takes no account of restrictions on capital transfers by nonresidents (Eichengreen, 2002).

One attempt to go beyond this measure is Quinn (1997) who attempts to capture the intensity of enforcement of restrictions on both the capital account and current account through a careful reading of the narrative descriptions in the *Annual Report on Exchange Rate Arrangements and Exchange Restrictions.* With respect to Quinn's measures of capital account liberalisation, the intensity of restrictions for both capital account receipts and capital account payments are calculated for each country. For both categories, the values range between 0 and 2, the latter indicating that transactions are free of controls or taxes. The sum of the values for the two categories is an overall indicator of capital account openness that ranges between 0 and 4. These indicators are available annually from 1950-1997 for 21 OECD countries, and for the years 1958, 1973, 1982, and 1988 for 43 non-OECD countries. This index has two main advantages over the restrictions based measure. First, it provides some information about the intensity of controls on capital flows. Second, as the index covers more than one time period, as opposed to a particular period of time, it allows researchers to examine whether countries that open their capital accounts experience changes in economic performance (Edwards, 2001).[3]

[3]This measure of capital account liberalisation has been previously used in empirical studies by Quinn (1997), Kraay (1998), Edwards (2001), Arteta et al (2001), Edison, Klein, et al (2002), Quinn et al (2002), and Edison, Levine, et al (2002).

Another indicator of capital account openness which attempts to measure the intensity of capital controls is that created by Montiel and Reinhart (1999). Using information contained in the annual report of a country's central bank, the authors create an indicator ranging from zero to two for 15 developing countries over the period 1990-96. Higher values reflect stronger restrictions on capital account transactions. Other studies have created restrictiveness measures that focus on controls on the purchase and sale of equities. Henry (2000) and Bekaert and Harvey (2000) determine liberalisation dates for equity markets from a variety of sources while, in more recent work, Edison and Warnock (2001) focus on the intensity of controls on foreign ownership of domestic equities. One of the biggest drawbacks with these extended restrictiveness measures is the relatively small country and time period coverage which limits their usefulness in any broad cross-sectional study of the impact of capital controls.

An alternative approach to measuring international financial integration is the construction of indicators which attempt to quantify the extent of capital mobility from the value of economic variables. Three different sets of variables have been considered so far: national savings and investment rates, interest rate differentials, and international flows of capital.[4] Feldstein and Horioka (1980) attempt to measure the extent of capital mobility within a country by examining the degree of correlation between savings and investment - theoretically, countries with extensive capital controls should exhibit a high correlation between the two variables. Empirical evidence supporting this view is presented by the authors for the period 1960-74. This paper has been criticised, however, by Obstfeld (1986) and Bayoumi (1990) who provide explanations for why a high

[4]Only the latter set of variables has been used in empirical studies examining the macroeconomic impact of capital account liberalisation (Edison, Klein, et al 2002).

correlation between savings and investment may exist even with high capital mobility.

A number of authors have suggested using onshore-offshore interest differentials to measure capital mobility. Edwards (1985) and Edwards and Khan (1985) argue that time series data on domestic and international interest rates could be used to assess the degree of openness of the capital account. Haque and Montiel (1991) have provided expansions that allow for the estimation of the degree of capital mobility even in cases where there is not enough data available on domestic interest rates. Each of these approaches assumes that the effective interest rate is a weighted average of that which would prevail in open and closed capital account regimes, respectively. This estimated weight indicates the extent to which the domestic money market is open and uncontrolled. Dooley et al (1997) have developed a model for determining the degree of capital mobility by taking into account the costs of undertaking disguised capital flows. They argue that the extent of international financial integration may be increasing, even in the face of continuing capital controls, if these costs have declined significantly over time.

The main drawback with this approach is that interest rate differentials are available only in countries with well-developed offshore or currency forward markets. Thus, empirical studies using this approach would be largely confined to industrial countries. In addition, Eichengreen (2002) notes that interest rate differentials are not only influenced by restrictions on capital movements but also by their interaction with a broad range of policies and circumstances, making it difficult to separate out the influence of the former.

2.3 Quantitative Indicator of Financial Openness

Most empirical work examining the macroeconomic impact of capital mobility use two measures of international financial integration: (a) proxies for government restrictions on capital flows or (b) measures of actual international capital flows. As mentioned already, the biggest disadvantage with the former type of indicator stems from the difficulty in accurately gauging the magnitude and effectiveness of controls on capital movements. In particular, the increasingly sophisticated global financial marketplace has significantly reduced the effectiveness of capital controls, thus undermining the usefulness of existing rules-based measures of capital account liberalisation. This problem emphasises the relevance of constructing more accurate indicators of international financial integration. As an alternative to the widely used restrictions-based measure constructed from information reported by the IMF and refined by Quinn (1997), I construct an indicator based on the estimated stocks of foreign assets and liabilities to proxy for international financial openness. Although this measure provides no information on either the existence or intensity of capital controls, it does examine one of the consequences of capital account liberalisation, namely increased ownership of foreign assets in the country and liabilities elsewhere (IMF, 2001). The advantage with this measure is that data are widely available for a large number of countries and they are not subjective measures of capital account restrictions (Edison, Levine, et al 2002). This measure, which for the rest of the study will be labeled *Cap Vol*, is computed by using the stock measures of both the assets and liabilities of FDI, portfolio equity, and debt transactions. Information on such data is taken from a new dataset constructed by Philip Lane and Gian Maria Milesi-Ferretti who calculate the underlying stocks by accumulating the corresponding flows with appropriate valuation ad-

justments.[5],[6]

The following variables are used in the construction of the financial openness measure ($CapVol$)[7]:

- **Foreign direct investment assets (CFDIAH):** estimate of stock of direct investment assets (cumulative flow adjusted for relative price variations).

- **Foreign direct investment liabilities (CFDILH):** estimate of stock of direct investment liabilities (cumulative flow adjusted for relative price variations).

- **Portfolio equity investment assets (CEQAR):** estimate of stock of portfolio equity assets (cumulative flow adjusted for stock market price variations).

- **Portfolio equity investment liabilities (CEQLR):** estimate of stock of portfolio equity liabilities (cumulative flow adjusted for stock market price variations).

- **Debt Assets (ASSETS2):** sum of cumulative flows of portfolio debt

[5]The methodology used for the estimation of these variables is explained in detail in Lane and Milesi-Ferretti (2001b).

[6]Subsequent to the empirical work presented in Chapter Three, the IMF (2001) and Edison, Levine, et al (2002) have recently used the same indicator to examine the impact of financial openness, and its interaction with various aspects of the financial and institutional environment, on economic growth. The IMF (2001) also focus on the impact of financial openness on private investment, technology transfers, and financial development. Part of the statistical analysis presented in the IMF (2001) is taken from Edison, Levine, et al (2002).

[7]In the dataset, there are a number of different estimates for each of the six components that make up my financial openness indicator. The reasons for choosing the particular estimates described below are explained in detail in Lane and Milesi-Ferretti (2001b).

assets, other assets and net errors and omissions (for the latter only when net outflows are positive).[8]

- **Debt Liabilities:** For industrial countries, the sum of the stock of portfolio debt liabilities and other investment liabilities (**IPPDL+IPOL**). For developing countries, gross external debt from the World Bank's Global Development Financial database (**DEBTWB**).[9]

Thus, to calculate the level of financial openness over the relevant time period, I simply sum the average level of each of these six variables as a percentage of GDP.[10] Focusing on the stocks of financial assets and liabilities as opposed to the underlying flows is a better way of measuring financial openness as capital flows are more susceptible to temporary disturbances caused by factors that are unrelated to international financial integration and, thus, may not be an accurate measure of financial openness. Since the stock measure accumulates flows over a long period of time it should not vary much with short-run changes in the economic and political environment.[11] If this gross stock measure is high, it indicates that a country is relatively open, in the sense that it has been experiencing a large amount of financial inflows and outflows. I construct a measure

[8]The choice of variables used as estimates for debt assets follows Lane and Milesi-Ferretti (2001b). In contrast, Edison, Levine, et al (2002) use the stock of portfolio debt assets (IPPDA) when constructing their stock-related measure of financial openness.

[9]The choice of variables used as estimates for debt liabilities in both the industrial and developing countries follows Lane and Milesi-Ferretti (2001a, 2001b). Edison, Levine, et al (2002) only use the stock of portfolio debt liabilities (IPPDL) when constructing their stock-related measure of financial openness.

[10]Most of the empirical work in this study focuses on the time period 1981 to 1998. The only exception is Chapter Five which examines the relationship between financial openness and financial depth over the period 1981 to 1995.

[11]Kraay (1998) constructs a financial openness indicator based on capital flows which he defines as the sum of capital inflows and outflows as a ratio of GDP.

of financial openness for 63 industrialised and developing countries.[12] The list of countries is presented in the appendix.

There are, however, some limitations with this quantitative measure of international financial integration. First, it is not the case that one can infer from a high value of financial openness ($CapVol$) that a country has little or no controls on capital flows. Inflows and outflows of capital are endogenous and they are influenced by a wide range of economic and policy outcomes. These include monetary, fiscal and exchange rate policies; the national and international economic and financial climate; and political circumstances (Eichengreen, 2002). Thus, similar to the way in which the volume of exports and imports gives little information on the extent and nature of trade tariffs within a country, the volume of capital flows is not likely to be an informative indicator of the pervasiveness of capital controls. Moreover, since the state of the macroeconomy may directly influence capital flows, any empirical analysis of this relationship may produce a spurious, positive relationship between burgeoning macroeconomic performance and increasing financial openness.[13] Despite these drawbacks, however, focusing on the average level of gross capital stocks over a given period of time gives a good indication of how open a country has been to capital movements.

Another problem with this measure, albeit less significant, is the issue of

[12]The distinction between "industrial" and "developing" countries follows the classification used in Lane and Milesi-Ferretti (2001b). The dataset compiled by Lane and Milesi-Ferretti (2001b) contains information for 70 countries. I do not, however, construct a measure of financial openness for seven of these countries: Belgium-Luxembourg, Algeria, Hong Kong, Iran, Panama, Syrian Arab Republic, and Kuwait. This is due to extensive missing observations and, in the case of Belgium-Luxembourg, a warning by Lane and Milesi-Ferretti (2001b) about the reliability of the estimated stocks of equity liabilities.

[13]This issue is examined in detail in the empirical work through the use of instrumental variables estimation.

missing data. All of the empirical work in this study focuses on the 1980s and 1990s to avoid the problem of missing data which afflict most developing countries in the 1970s. FDI and portfolio equity data are available for all 63 countries in the dataset from 1981 onwards. Four industrial countries, however, have missing debt liability data for the 1980s. These are Denmark, Iceland, New Zealand, and Portugal. To overcome this problem, I simply average the portfolio debt and other investment liability data (**IPPDL+IPOL**) as a percentage of GDP over the period 1990-1998. When calculating the financial openness measure for the developing countries, I use gross external debt (**DEBTWB**) from the World Bank's Global Development Financial database as a measure of debt and other liabilities. In the case of Israel and Saudi Arabia, however, no such gross external debt data is available. Instead, I use a measure of gross external debt taken from the OECD External Debt Statistics (**DEBTOECD**).

Given that most of the empirical work in this study focuses on the time period 1981 to 1998, it is worth presenting the financial openness data for each country during this period. Tables 2.1 and Table 2.2 present the data for the set of industrial and developing countries, respectively. In each table, the countries are ranked in descending order of magnitude according to their value of financial openness ($CapVol_{81-98}$) over the period 1981-1998. Thus, it is no surprise to find that in the industrial country subset, the two countries with the largest levels of financial openness over this period are two of the biggest financial centres in the world: the United Kingdom and Switzerland (364 percent and 310.8 percent, respectively). In addition, Singapore has by far the largest level of financial openness (316.2 percent) in the developing country subset.

I also present in both tables the value of each of the three components that comprise the financial openness measure ($CapVol_{81-98}$) for every country, i.e.,

the accumulated stock of foreign direct investment (FDI), portfolio equity, and debt transactions.[14] In addition, I include in brackets the ranking for each country among its particular subset for these three components. One might expect countries who rank quite high in terms of the level of financial openness over this period to also exhibit a reasonably high ranking for each of the three components. One way of formally testing the ordinal correlation between the financial openness measure and each of the three components is through the use of Spearman's formula for rank correlation.[15] Values for this formula range from 0 to 1. In the industrial country subset, the rank correlations between the financial openness data and FDI, portfolio equity, and debt transactions are 0.59, 0.5, and 0.93, respectively. In the developing country subset, the rank correlations are 0.56, 0.13, and 0.95, respectively.[16] Thus, in both subsets, there is a much stronger relationship between the rankings for $CapVol_{81-98}$ and Debt_{81-98} than is the case for either $CapVol_{81-98}$ and FDI_{81-98} or $CapVol_{81-98}$ and Equity_{81-98}.

The correlation coefficients between $CapVol_{81-98}$ and the three components are quite high in all cases. In the industrial country subset, the pairwise correlations between $CapVol_{81-98}$ and FDI_{81-98}, Equity_{81-98}, and Debt_{81-98} are 0.75, 0.86, and 0.94, respectively. Likewise, the same correlations in the developing country subset are 0.77, 0.63, and 0.95. All correlations are significant at the

[14]These variables are also calculated as percentages of GDP.

[15]The formula is given by $r_{rank} = 1 - 6\sum D^2/N(N^2-1)$

where D = difference between ranks of corresponding values of X and Y and N = the number of pairs of values (X,Y) in the data.

[16]The reason for the very low rank correlation between $CapVol_{81-98}$ and Equity_{81-98} is due to the fact that many developing countries exhibit a value of 0 for Equity_{81-98}. Thus, the level of financial openness for many developing countries over this period is simply the sum of FDI_{81-98} and Debt_{81-98}.

95 percent confidence level or better. These outcomes suggest that the empirical findings in this thesis regarding the relationship between financial openness ($CapVol_{81-98}$) and various aspects of the macroeconomy over the period 1981 to 1998 are likely to be replicated if any of the three components are used as the regressor of interest instead of $CapVol_{81-98}$.

2.4 Comparison of Rules-based and Quantitative Measures of International Financial Integration

One would hope to find that the quantitative indicator of international financial integration based on the accumulated stocks of capital flows is correlated with existing measures of capital account liberalisation based on published regulations. This section offers some evidence that enables a comparison between the new volume-based measure of financial openness and two alternative rules-based indicators of capital account openness. The first rules-based indicator of capital account liberalisation is constructed from information reported in the data appendix to Cottarelli and Giannini (1997). Using annual data taken from the IMF's publication *Annual Report on Exchange Rate Arrangements and Exchange Restrictions*, I generate a simple 0/1 dummy variable for each country for each year.[17] This dummy variable takes the value 1 if the country had no capital controls in place. Then, for each country, I calculate the variable $CapIMF_{81-94}$ which represents the proportion of years between 1981 and 1994 in which the country had unrestricted capital mobility.[18]

[17]For IMF members, the capital controls index is taken from the IMF's *Exchange Arrangements and Exchange Restrictions* under the heading "Restrictions on payments for Capital transactions". For non-IMF members, information is taken from domestic sources.

[18]The reason for focusing on this particular time period is that the data reported in Cottarelli and Giannini (1997) only go as far as 1994. In addition, a new system was set

The second rules-based indicator of capital account openness is constructed by Quinn (1997) who attempts to capture the intensity of enforcement of restrictions on the capital account through a careful reading of the narrative descriptions in the *Annual Report on Exchange Rate Arrangements and Exchange Restrictions*. The nature of this indicator is described in detail in Section 2.2. This measure attempts to improve upon the IMF-restriction measure by providing information about the magnitude of restrictions, rather than simply designating countries as open or closed. A drawback with this measure, however, is that it is only available for the developing countries for two years (1982, 1988) over the sample period that I examine.[19] This makes it difficult to compare with either the quantitative measure of financial openness or the IMF-restriction measure. Nevertheless, I average the measure over the two years available for the developing countries and the period 1981 to 1994 for the industrial countries. This measure ranges in value from 0 to 4, the latter indicating a completely open capital account. Although data is available for 64 countries in total, only 48 of these countries have information for all three measures of international financial integration. Thus, I limit my comparison to these 48 countries. For the purposes of comparison, the new quantitative indicator of financial openness ($CapVol$) is calculated for the period 1981-1995.

As one would expect, evidence of a positive relationship between both rules-based indicators of capital account openness is evident from the scatterplot in Figure 1 and, indeed, the correlation coefficient is 0.75 and statistically significant at the 95 percent confidence level. Figures 2 and 3 present evidence on the relationship between financial openness ($CapVol_{81-95}$) and both rules-based

up by the IMF in 1996 for this report which contains more detail on capital account restrictions but it is not backwardly compatible with the earlier indicator.

[19]It is available annually from 1950-1997 for the industrial countries.

measures of capital account openness. An expected positive relationship is exhibited in both figures and the correlation coefficient between $CapVol_{81-95}$ and $CapIMF_{81-94}$ is 0.5 while it is 0.47 in the case of the Quinn Measure. Both coefficients are significant at the 90 percent confidence level or better. Thus, countries that have had a large number of years over the period 1981-1994 with open capital accounts have, on average, higher values of stocks of capital flows. The fact that $CapVol_{81-95}$ is not perfectly correlated with either measure of capital account openness suggests that these indicators are capturing different aspects of international financial integration. This further emphasises the relevance of examining the impact of this new financial openness measure ($CapVol$) on the macroeconomic environment.

2.A List of countries*

Australia*	Argentina	Malaysia
Austria*	Bahrain	Mauritius
Canada*	Bolivia	Mexico
Denmark*	Botswana	Morocco
Finland*	Brazil	Oman
France*	Chile	Pakistan
Germany*	China	Paraguay
Greece*	Colombia	Peru
Iceland*	Costa Rica	Philippines
Ireland*	Cote d'Ivoire	Saudi Arabia
Italy*	Dominican Republic	Singapore
Japan*	Ecuador	South Africa
Netherlands*	Egypt	Sri Lanka
New Zealand*	El Salvador	Taiwan
Norway*	Guatemala	Thailand
Portugal*	India	Trinidad and Tobago
Spain*	Indonesia	Tunisia
Sweden*	Israel	Turkey
Switzerland*	Jamaica	Uruguay
United Kingdom*	Jordon	Venezuela
United States*	Korea, Rep.	Zimbabwe

Note: An asterisk indicates an industrialised country

2.B Tables and Figures

Table 2.1: Ranking of CapVol for Industrial Countries over 1981-98

Country	Ranking	$CapVol_{81-98}$	FDI_{81-98}	$Equity_{81-98}$	$Debt_{81-98}$
United Kingdom	1	364	49.8 (**2**)	38 (**3**)	276.2 (**1**)
Switzerland	2	310.8	41.7 (**4**)	59.7 (**1**)	209.4 (**2**)
Netherlands	3	270.9	70.3 (**1**)	38.9 (**2**)	131.7 (**4**)
Denmark	4	170	13.6 (**14**)	6.3 (**12**)	150.1 (**3**)
Sweden	5	159	32.1 (**6**)	14.4 (**6**)	112.5 (**7**)
Canada	6	143.8	34.1 (**5**)	14.5 (**5**)	95.2 (**12**)
Portugal	7	138	13.2 (**15**)	3.5 (**16**)	121.3 (**5**)
Austria	8	132.9	9.2 (**18**)	5.2 (**15**)	118.5 (**6**)
France	9	132.4	19.1 (**8**)	9.5 (**8**)	103.8 (**8**)
New Zealand	10	130	43.8 (**3**)	1.5 (**18**)	84.7 (**14**)
Ireland	11	117.6	15 (**12**)	0 (**20**)	102.6 (**9**)
Finland	12	117	14.6 (**13**)	6.5 (**11**)	95.9 (**11**)
Germany	13	108.1	12.2 (**16**)	10.1 (**7**)	85.8 (**13**)
Iceland	14	105.3	6 (**20**)	1.3 (**19**)	97 (**10**)
Norway	15	104.4	17.4 (**9**)	5.4 (**14**)	81.6 (**15**)
Spain	16	90.3	16.9 (**10**)	7 (**10**)	66.4 (**17**)
Australia	17	90	27.8 (**7**)	16.2 (**4**)	46 (**21**)
Italy	18	89.5	7.9 (**19**)	2.9 (**17**)	78.7 (**16**)
United States	19	78.5	15.3 (**11**)	8.2 (**9**)	55 (**19**)
Japan	20	70.5	5.6 (**21**)	5.9 (**13**)	59 (**18**)
Greece	21	17.2	12.1 (**17**)	0 (**20**)	5.1 (**20**)

Note: All variables are calculated as a percentage of GDP. Numbers in brackets indicate the ranking for each country for the three components of financial openness.

Table 2.2: Ranking of CapVol for Developing Countries over 1981-98

Country	Ranking	$CapVol_{81-98}$	FDI_{81-98}	$Equity_{81-98}$	$Debt_{81-98}$
Singapore	1	316.2	81.8 (**1**)	37.1 (**1**)	197.3 (**1**)
Cote d'Ivoire	2	181.4	10.5 (**21**)	0.8 (**13**)	170.1 (**2**)
Saudi Arabia	3	164.9	18.7 (**10**)	0 (**23**)	170.1 (**3**)
Jamaica	4	160.6	43.1 (**3**)	0 (**23**)	117.5 (**5**)
Bahrain	5	147	29.8 (**5**)	0 (**23**)	117.2 (**6**)
Jordan	6	144.1	9.2 (**25**)	0 (**23**)	134.9 (**4**)
Bolivia	7	122.1	16.8 (**12**)	0 (**23**)	134.9 (**7**)
Venezuela	8	110.9	8.5 (**30**)	1.4 (**11**)	101 (**8**)
Malaysia	9	110.1	37.8 (**4**)	0 (**23**)	72.3 (**15**)
Egypt	10	107.5	22.2 (**7**)	0 (**23**)	85.3 (**11**)
Ecuador	11	106.3	13.5 (**18**)	0 (**23**)	92.8 (**10**)
Trinidad and Tobago	12	103.6	65.9 (**2**)	0.1 (**22**)	37.7 (**35**)
Morocco	13	102.4	6.1 (**34**)	0.5 (**18**)	95.8 (**9**)
Costa Rica	14	100.5	24.1 (**6**)	0 (**23**)	76.4 (**14**)
Tunisia	15	95.9	21.2 (**9**)	4.5 (**4**)	70.2 (**16**)
Chile	16	90	17.2 (**11**)	4.5 (**4**)	66.3 (**18**)
Philippines	17	89.7	8.7 (**28**)	0.3 (**21**)	80.7 (**12**)
Uruguay	18	86.4	8.6 (**30**)	0 (**23**)	77.8 (**13**)
Mexico	19	85.7	14.7 (**16**)	4 (**6**)	67 (**21**)
Oman	20	85.1	16.2 (**14**)	0 (**23**)	68.9 (**17**)
Peru	21	76.2	11.9 (**19**)	0.6 (**16**)	63.7 (**22**)

Note: All variables are calculated as a percentage of GDP. Numbers in brackets indicate the ranking for each country for the three components of financial openness.

Table 2.2 - continued

Country	Ranking	$CapVol_{81-98}$	FDI_{81-98}	$Equity_{81-98}$	$Debt_{81-98}$
Sri Lanka	22	75	7.4 **(33)**	0 **(23)**	67.6 **(19)**
Indonesia	23	74.1	6 **(35)**	0.6 **(16)**	67.5 **(20)**
Thailand	24	68.4	10 **(24)**	5.1 **(2)**	53.3 **(23)**
Argentina	25	65.2	9 **(26)**	1.8 **(8)**	54.4 **(22)**
Dominican Republic	26	63.9	16.6 **(13)**	0 **(23)**	47.3 **(28)**
El Salvador	27	61.6	8.8 **(27)**	0 **(23)**	52.8 **(24)**
Colombia	28	60	14.2 **(17)**	0.2 **(29)**	45.6 **(29)**
Pakistan	29	57.8	4 **(38)**	1.1 **(12)**	52.7 **(25)**
Mauritius	30	55.2	5.7 **(36)**	0.4 **(20)**	49.1 **(26)**
South Africa	31	54.1	7.6 **(32)**	4.1 **(5)**	42.4 **(31)**
Israel	32	53.8	8.4 **(31)**	4.9 **(3)**	40.5 **(32)**
Turkey	33	51.3	2.3 **(39)**	0.8 **(13)**	48.2 **(27)**
Guatemala	34	50.1	15.2 **(15)**	0 **(23)**	34.9 **(37)**
Brazil	35	48.5	10.5 **(21)**	1.7 **(9)**	36.3 **(36)**
Paraguay	36	48.4	8.7 **(28)**	0 **(23)**	39.7 **(33)**
Zimbabwe	37	47	1.3 **(40)**	0.3 **(21)**	45.4 **(30)**
Korea, Rep.	38	45.5	4.8 **(37)**	1.6 **(10)**	39.1 **(34)**
Botswana	39	44.6	22.2 **(7)**	0.5 **(18)**	21.9 **(41)**
China	40	43.6	10.1 **(23)**	0 **(23)**	33.5 **(38)**
Taiwan	41	40	11.1 **(20)**	2.6 **(7)**	26.3 **(39)**
India	42	27	0.9 **(41)**	0.7 **(15)**	25.4 **(40)**

Note: All variables are calculated as a percentage of GDP. Numbers in brackets indicate the ranking for each country for the three components of financial openness.

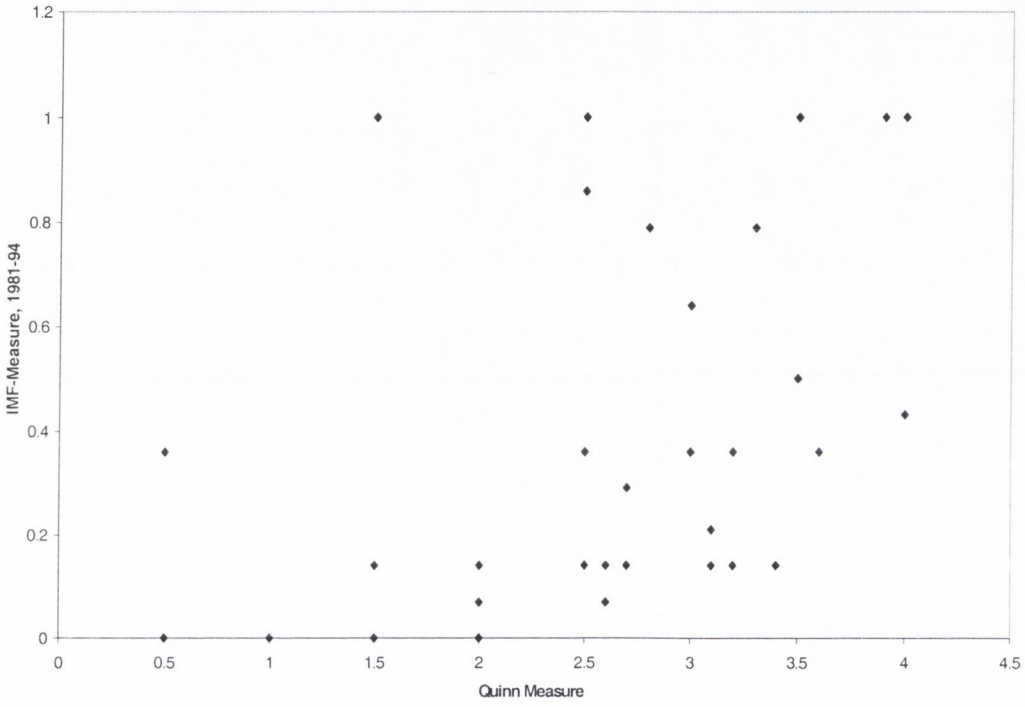

Figure 2.1: Scatterplot between alternative measures of capital account openness

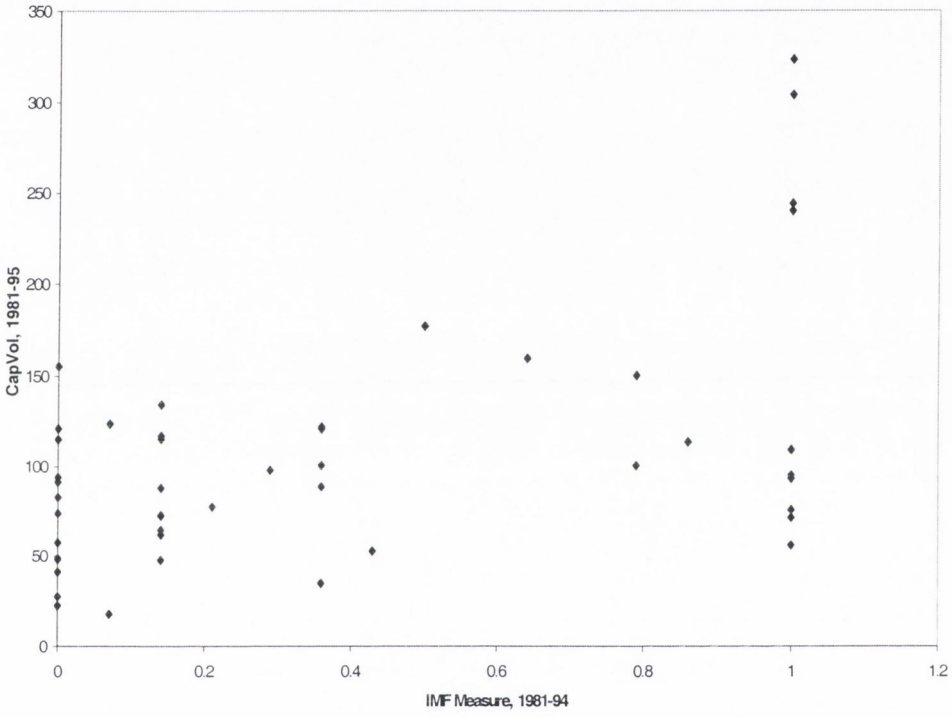

Figure 2.2: Scatterplot between IMF-Measure and Financial Openness

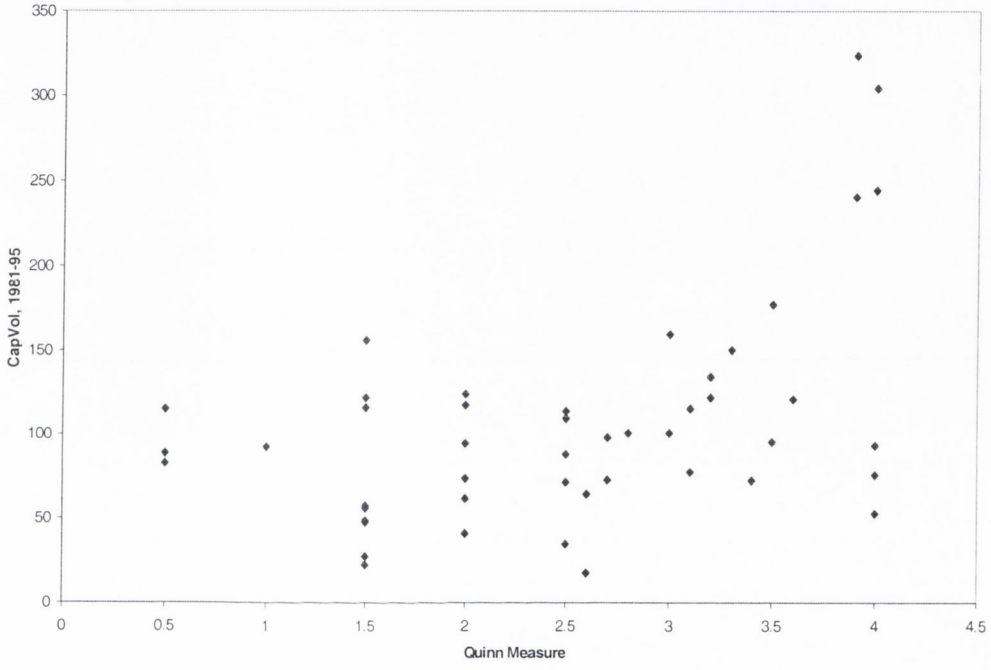

Figure 2.3: Scatterplot between Quinn-Measure and Financial Openness

tegration (Aizenman, 2002). Increasing financial openness is an inevitable consequence for developing countries who engage in trade integration. Thus, the challenge for these countries is to reduce the depth and frequency of financial and currency crises.

A large number of empirical papers have been written in recent years examining the impact of international financial integration on various indicators of economic performance. The mixed set of results presented in these papers has further enlivened the debate over the merits of free capital mobility. The lack of empirical consensus in this area may be partly explained by the difficulty of accurately measuring the degree of international financial integration for a given country. Much of the empirical work in this area has focused on qualitative indicators of capital account liberalisation which attempt to give some information on the existence or not of controls on capital movements. The aim of this chapter is to examine the impact of an alternative, volume-based measure of financial openness on the levels and volatility of per capita GDP growth and gross domestic investment.[3] Focusing on the impact of this indicator on the volatility of growth and investment is a new contribution to the literature. This openness measure has been constructed by using the stock data of foreign direct investment, portfolio equity, and debt transactions developed by Lane and Milesi-Ferretti (2001b). In addition to examining the direct effects of this financial openness measure, I also examine the crucial issue of sequencing - are

[3]Subsequent to this chapter, the IMF (2001) and Edison, Levine, et al (2002) have recently used an almost identical indicator to examine the impact of financial openness, and its interaction with particular aspects of the financial and institutional environment, on economic growth. The IMF (2001) also focus on the impact of financial openness on private investment, technology transfers, and financial development. Part of the statistical analysis in the IMF (2001) is taken from Edison, Levine, et al (2002).

certain economic, financial, and institutional conditions required before greater financial openness leads to higher growth and investment or lower volatility?

To anticipate my conclusions, greater financial openness is significantly associated with lower growth and higher growth volatility in developing countries. In addition, it does not appear to be the case that developing countries who have strong economic, financial, and institutional environments are more likely to reap the predicted benefits of greater financial openness.

The remainder of the chapter is divided into five sections. The next section reviews some of the recent empirical evidence. Section 3.3 focuses on the empirical relationship between financial openness and growth and investment levels. Section 3.4 examines the impact of financial openness on growth and investment volatility. Section 3.5 provides a summary of the results while section 3.6 offers some concluding remarks.

3.2 Previous Empirical Studies

3.2.1 Growth and Investment Levels[4]

Empirical studies on the impact of capital account mobility have not produced conclusive outcomes. Table 3.1 summarises the main findings of the recent research in this area. Each row of this table presents information on one study. One of the biggest problems facing researchers in this area is how to construct an accurate measure of capital mobility. The majority of studies rely on a binary indicator of capital account liberalisation constructed from information reported by the IMF. This variable reflects the proportion of years for which a country is classified as having had a liberalised capital account. Using this indi-

[4]For a comprehensive review of the empirical work on capital account liberalisation and growth, see Edison, Klein, et al (2002).

cator, Alesina et al (1994), Grilli and Milesi-Ferretti (1995), Kraay (1998), and Rodrik (1998a) find no evidence to suggest that countries with more open capital accounts have grown faster or invested more. In contrast to these findings, Quinn (1997), using a more refined and, therefore, presumably more informative version of the binary measure of capital controls, presents evidence of a strong positive correlation between capital account openness and real per capita GDP growth over the period 1960-1989. Using the same indicator of capital account openness in a panel data analysis, Quinn et al (2001) find that capital account liberalisation only boosts economic growth in richer countries - emerging markets with little form of a welfare state suffer diminished growth from opening their capital account.

Klein and Olivei (2001) view financial depth as an endogenous variable in the process linking capital account liberalisation and economic growth. Using the rules-based indicator of capital account openness, they find that capital account liberalisation has a substantial impact on growth via the deepening of a country's financial system for the periods 1986-1995 and 1976-1995. This applies, however, only to a sub-sample of industrialsed countries. The authors find no evidence of financial liberalisation promoting financial depth, and therefore economic growth, outside members of the OECD.

Kraay (1998) is one of the first studies to examine the hypothesis that the effects of international financial integration on economic performance may depend on the existence of various economic, financial, and institutional conditions.[5] He finds no empirical evidence to support this view.[6] Edwards (2001),

[5] As far as I am aware, this is the first paper that attempts to gauge the degree of capital mobility by measuring actual capital inflows and outflows as a percentage of GDP. Kraay also uses rules-based indicators of capital account openness.

[6] Although he does not report the results, Rodrik (1998a) interacts his capital account

using Quinn's measure of capital account openness, finds that capital account liberalisation boosts growth in high-income countries but slows it in low-income countries during the 1980s. In addition, when Edwards uses the IMF-based indicator instead of Quinn's measure, significance on the part of capital account openness disappears. It is tempting therefore to assume that the lack of empirical evidence in previous studies is down to the particular measure of capital account openness used.

Arteta et al (2001) point out some problems with Edwards' methodology and, also using Quinn's indicator, they examine whether the relationship between capital account liberalisation and economic growth is affected by the degree of financial and institutional development within a country. They find no evidence to support Edwards' findings of different growth effects of capital account liberalisation between high- and low-income countries. With respect to the sequencing argument, however, they find some evidence to support the view that the beneficial impact of capital account openness on growth is contingent on the absence of major macroeconomic imbalances. In a recent survey of the literature in this area, Edison, Klein, et al (2002), using three alternative indicators of capital account openness, present evidence suggesting that the growth-enhancing effects of capital account liberalisation are primarily to be found among the East Asian countries.

Finally, Edison, Levine, et al (2002), using a wide array of measures of international financial integration, including the volume-based indicator of financial openness used in this chapter, find no evidence to suggest that greater international financial integration, or its interaction with various measures of

liberalisation indicator with measures of financial depth and institutional strength and finds no impact on growth, investment, or inflation.

economic, financial, and institutional strength, has any impact on real per capita GDP growth.[7]

3.2.2 Growth and Investment Volatility

Empirical work examining the impact of international financial integration on the volatility of economic performance is very scarce. This is quite surprising given the number of macroeconomic and financial crises suffered by many developing countries during the 1990s. The difficulties associated with large and swift movements of capital across international borders have been particularly evident throughout much of the last decade. As countries become more financially open, there may be a tendency for capital flows to become more short-term and easily reversible.[8] In addition, such short-term capital flows may be influenced largely by short-term factors such as interest rate differentials on liquid instruments rather than by reference to long-term factors such as the rate of return on investment. As a consequence of the more rapid and transitory nature of capital flows, the direct beneficial effects of greater financial openness may be obscured by higher levels of macroeconomic instability.[9]

[7]In addition to using the stocks of financial assets and liabilities computed by Philip Lane and Gian-Maria Milesi-Ferretti to construct a measure of financial openness, Edison, Levine, et al (2002) also use the capital flow data to construct an alternative financial openness measure. They also break down both these measures into their individual components in order to examine the impact of FDI and portfolio stocks and flows on economic growth.

[8]This is not, however, confirmed by Kraay (1998) who examines the relationship between financial openness and the volatility of capital flows. He finds modest evidence suggesting that financially open economies owe more short-term bank debt relative to FDI inflows of capital and that these short-term flows are somewhat more volatile than long-term flows. Despite this shift in the composition of external obligations, he finds that the overall volatility of net flows of capital is not significantly higher in financially open economies.

[9]This may have indirect consequences for growth and investment levels. Empirical work by Pindyck and Solimano (1993) and Ramey and Ramey (1995) finds that countries with

Despite the potential difficulties associated with volatile capital flows, greater openness to international flows of capital may actually help to reduce output and investment volatility. Increasing financial diversification may be an optimal response in that it provides a way of dampening the impact of external shocks on output.[10] This is the income-smoothing effect of greater financial openness in times of weak macroeconomic performance. In addition, an important determinant of volatility is the degree of macroeconomic policy stability. The policy discipline hypothesis suggests that greater international financial integration may force governments into adopting more prudent macroeconomic policies. Thus, output and investment volatility may decline in response to a more stable and predictable macroeconomic policy environment.

As far as I am aware, Quinn et al (2001) is the only study to examine the impact of international financial integration on the volatility of growth. Using the more nuanced indicator of capital account openness first presented in Quinn (1997), they find evidence of a negative relationship between capital account liberalisation and growth volatility over the period 1950 to 1997 that is limited to advanced industrial nations. They find no evidence to suggest that this relationship exists in emerging market nations. I focus on this issue by examining the impact of financial openness on the volatility of per capita GDP growth and gross domestic investment over the period 1981-1998.

higher volatility have lower growth. Thus, it may be the case that countries that frequently experience sudden and destabilising capital flows are more likely to have higher economic volatility that may translate into lower levels of growth and/or investment.

[10] More frequent external shocks, of course, may be a consequence of greater financial openness.

3.3 Financial Openness and Levels of Growth and Investment

To start, I compute simple correlations between the financial openness measure ($CapVol_{81-98}$) and the average level of per capita GDP and gross domestic investment (as a percentage of GDP) over the period 1981 to 1998. The outcomes are presented in Table 3.2.[11] There is a negative correlation between financial openness and per capita GDP growth while gross domestic investment exhibits a very small positive correlation coefficient. In both cases, however, the correlation coefficients are insignificant. This absence of an obvious relationship between financial openness and either growth or gross domestic investment is also evident from the scatterplots presented in figures 3.1 and 3.2. It also worth noting from Table 3.2 that rich, well-educated countries tend to be more financially open than poorer, less-educated countries. Moreover, countries with deeper financial systems, stronger political institutions, greater nonfinancial openness, and smaller black market premiums[12] tend to be more open to international flows of capital. Indicators of all these aspects of the macroeconomic environment are significantly positively associated with the measure of financial openness ($CapVol_{81-98}$).

For the cross-sectional analysis, I regress, in turn, the average level of per capita GDP growth and gross domestic investment (as a percentage of GDP) over the period 1981 to 1998 on $CapVol_{81-98}$, using ordinary least squares (OLS) and weighted least squares (WLS) estimation, with standard errors corrected for heteroskedasticity by the White procedure. Following the procedure in Edwards

[11]The data appendix provides detailed information on the variables used in this chapter.

[12]Following Arteta et al (2001), the black market premium indicator is defined as 100 percent minus the black market premium, divided by 100. A higher value, therefore, indicates a more balanced macroeconomic environment.

(2001) and Arteta et al (2001), I weight all observations by real GDP per capita in 1985 when carrying out the weighted least squares regressions. I include three basic control variables in the per capita GDP growth regressions: (a) the level of GDP per capita in 1981 in log form, which is taken to be a measure of initial economic activity. To the extent that countries real income tends to converge, the coefficient on this variable is expected to be negative; (b) the initial years of schooling of the population over 15 years of age in 1980.[13] One would expect the coefficient on the human capital variable to be positively associated with growth; and (c) the average level of gross domestic investment (as a percentage of GDP) over the period 1981 to 1998 - its coefficient is expected to be positive.[14] In the gross domestic investment regressions, the following three basic control variables are included: the level of GDP per capita in 1981 in log form, the measure of human capital in 1980, and the average level of trade openness between 1981 and 1998. This specification follows the procedure of Aizenman and Marion (1998). One would expect initial GDP per capita to exhibit a negative coefficient while the latter two variables are expected to be positive. I focus on two samples in the regression analysis: the full sample and a subsample of developing countries.

A frequent argument put forward by many skeptics of international financial integration is that many emerging countries are simply not prepared for it. According to this view, many poor countries have not reached the level of development that is required to efficiently handle large and rapid movements of capital. In particular, it is often argued that the benefits of increasing financial

[13]The following countries, therefore, are excluded from these regressions due to missing human capital data: Cote d'Ivoire, Morocco, Oman, Saudi Arabia, Taiwan, and Zimbabwe

[14]The choice of basic regressors follows the procedure of Arteta et al (2001). These three control variables are the only ones that Levine and Renelt (1992) found to be robust across specifications for cross-country growth regressions.

openness can only be realised when there is a supportive policy environment in place to mitigate against the adverse effects of volatile capital movements. To examine this hypothesis, I introduce individually into the growth and investment regressions a number of interaction terms to examine the hypothesis that the beneficial effects of greater financial openness may be contingent on the existence of certain characteristics. First, in the full sample regressions, I interact financial openness with (a) per capita GDP in 1981 and (b) a 0/1 dummy variable that takes the value of one if a country is classified as "industrialised" to examine whether financial openness has different effects in high- and low-income countries.

Second, it may be the case that the beneficial impact of financial openness on growth and investment only exists in countries with strong financial and political environments. To assess this hypothesis, I introduce, in turn, into the cross-sectional regressions two variables capturing the quality of the financial and political environment, respectively, as well as interaction terms between these variables and the degree of financial openness. As an indicator of financial depth, I use the ratio of claims by financial intermediaries to the private sector divided by GDP (PRIVO). This measure isolates credit issued to the private sector, as opposed to credit issued to governments, government agencies, and public enterprises.[15] As an indicator of political stability, I use an index of

[15]To check the validity of the results relating to PRIVO, I re-run the same regressions using an alternative indicator of financial depth which is defined as the ratio of liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and nonbank financial intermediaries) divided by GDP (LLY). This measures the overall size of the financial intermediary sector. I do not report the results as they are very similar to the outcomes using the private credit measure. Both financial depth variables are only available as averages over five year periods, e.g. 1981-85, 1986-91, etc. Thus, in these regressions, both variables are averaged over the period 1981 to 1995.

government anti-diversionary policies (GADP) which serves as a proxy for the absence of corruption and the quality of the bureaucracy.[16]

Third, to analyse the hypothesis that any beneficial impact of increasing financial openness on growth and investment only occurs in countries that have already undertaken wide-ranging trade liberalisation measures and eliminated major macroeconomic imbalances, I also introduce individually into the regressions two further interaction terms: (a) an interaction between financial openness and an indicator of nonfinancial openness (SW), as constructed by Sachs and Warner (1995), and (b) an interaction term representing financial openness and the black market premium (BMP).[17] In most regressions, these interaction terms are statistically insignificant. Thus, for the sake of brevity, I do not report these outcomes.

3.3.1 Real GDP per capita Growth

Before delving into the empirical evidence, it is worth considering the predictions of the theory for the effects of financial openness on economic growth. Three main benefits of international financial integration were noted in the introduction: (a) greater risk diversification opportunities; (b) a more efficient

[16]Once again, to check the validity of these outcomes, I re-run the same regressions using an alternative indicator of institutional strength which is defined as the degree to which governments do not repudiate contracts (GOVREP). I do not report the results as they are very similar to the outcomes using the GADP measure. With respect to GADP, since this index starts only in 1984, I use the average value over 1984-1995. The variable GOVREP is an index scaled from 0 to 10, with lower scores reflecting a higher risk of repudiation. I would like to thank Michael Klein for generously sharing the GOVREP data with me.

[17]The Sachs-Warner measure is averaged over the period 1981 to 1995. Following Arteta et al (2001), the black market premium indicator is defined as 100 percent minus the black market premium, divided by 100. A higher value indicates a more balanced macroeconomic environment. The black market premium indicator is averaged over the period 1981 to 1998.

global allocation of resources; and (c) greater discipline on domestic policymakers. Although the gains from international risk sharing have been shown to be quite small (see Tesar, 1995), Kraay (1998) argues that the opportunity for diversification "*enable[s] agents to undertake riskier projects with commensurately higher returns, resulting in higher domestic GDP growth*".[18]

Unrestricted flows of capital should lead to a more efficient global allocation of savings, and help channel resources into their most productive uses, thus increasing economic growth and welfare. For many developing countries, access to global savings means, in part, increased foreign direct investment which is vital for the development of many of these countries. This presumes that a strong financial and institutional environment is already in place to efficiently intermediate all types of capital inflows. If such factors are not in place, however, as is the case in many developing countries, then capital flows may actually end up hindering economic growth rather than boosting it.

Perhaps the most obvious growth benefit of international financial integration is the policy discipline argument. Greater financial openness may force developing countries to implement more disciplined economic policies than might be the case if the capital account is relatively closed. This should increase confidence in the state of the economy, thus potentially triggering further inflows of capital.[19]

Full Sample Tables 3.3 and 3.4 present the full sample outcomes for the average growth rate of per capita GDP. All control variables - per capita GDP in 1981, human capital, and average gross domestic investment - are regularly sig-

[18]See Obstfeld (1994) and Acemoglu and Zilibotti (1997).

[19]It may be the case, however, that a country implements overly-disciplined national economic policies, possibly in response to concerns over the volatility of capital flows. Such actions may actually end up hindering economic growth.

nificant and always exhibit their anticipated sign. In the basic OLS regression specification in column (1) of Table 3.3, the coefficient on the financial openness indicator ($CapVol_{81-98}$) is negative but insignificant at standard confidence levels. I test the robustness of this result by looking for leverage points in the regression. Leverage points are observations which are influential in determining the statistical significance of key results. I determine the leverage points of the regression by using observation specific dummy variables. This is where a dummy variable is used for country i, effectively excluding it from the dataset for that regression.[20] This is then repeated for each country in turn. In effect, the regressions indicate how the statistical significance of financial openness ($CapVol_{81-98}$) changes when each country's data are excluded in turn. Thus, we can see which countries are influential.[21] The outcome for $CapVol_{81-98}$ in the OLS regression in column (1) is robust to the removal of any one country.

$CapVol_{81-98}$ becomes positive but remains insignificant in the weighted least squares (WLS) regression in column (2). Due to the possible presence of reverse causality, however, the coefficients on $CapVol_{81-98}$ in the OLS and WLS regressions may be biased upwards; it may be the case that greater output levels lead to increased capital flows (particularly capital inflows). The results of a two-stage regression that instruments for the measure of financial openness are presented in column (3). I use three instruments for the financial openness indicator ($CapVol_{81-98}$): the initial level of financial openness in 1981 ($CapVol_{81}$), a 0/1 dummy variable that takes the value of one if a country is classified as "industrialised", and the average level of trade openness (exports plus imports divided by GDP) between 1975 and 1980.[22] The adjusted R^2 for the first stage

[20] Kennedy (1998, p226)

[21] Davidson and Mackinnon (1993, p32-39) also emphasise the importance of identifying influential observations in OLS regressions.

[22] The choice of trade openness as an instrument follows Edison, Klein, et al (2002) who

regression (which is not reported) is 0.67. The two-stage regression results are almost identical to the OLS outcomes with $CapVol_{81-98}$ remaining negative and insignificant.[23]

The result of a formal test concerning the possible endogeneity of the financial openness variable is presented in the row labeled "Hausman Test". The p-value is obtained using the artificial regression technique discussed in Davidson and MacKinnon (1989).[24] The p-value on the coefficient on the instrumented regressors is 0.9, suggesting that the OLS estimates in column (1) are consistent.

When I interact financial openness with per capita GDP in 1981, I find strong support for the hypothesis that financial openness has different growth effects in high- and low-income countries.[25] In the OLS regression in column (4), $CapVol_{81-98}$ and the interaction term are significant at the 95 percent confidence level (negative and positive, respectively). A positive coefficient on the

include, among others, imports as a proportion of GDP in 1976 in the set of instruments for their three financial liberalisation measures. Many other variables which have been used in previous studies as instruments for indicators of capital account liberalisation were considered as potential instruments for $CapVol_{81-98}$: a measure of capital account liberalisation over the period 1975-1980, the average level of government consumption as a percentage of GDP over 1975-1980, the average government budget balance as a percentage of GDP over 1975-1980, the average ratio of liquid liabilities to GDP (LLY) in 1976-80, a dummy variable for whether the country is landlocked, a dummy for whether it is an island, distance from the equator, and the share of the population speaking English. None of these variables, however, were statistically significant or increased the adjusted R^2 when included as a regressor in the first stage regression.

[23]Edison, Levine, et al (2002) find a positive but insignificant association between their stock-related measure of financial openness and per capita GDP growth for the period 1980-2000.

[24]Davidson and MacKinnon (1993) refer to this endogeneity test as the Durbin-Wu-Hausman test.

[25]I do not report the WLS outcomes as they are very similar to the OLS results.

interaction term suggests that the growth effects of greater financial openness increase with the initial level of economic development. Furthermore, since the coefficient on $CapVol_{81-98}$ is negative, greater financial openness may actually *hinder* growth at very low levels of development. I find the same outcome in the two-stage regression in column (5). Wald F-tests are carried out to test the null hypothesis that both $CapVol_{81-98}$ and the interaction term are jointly insignificant. The relevant F-tests allow me to reject the null hypothesis in both columns (4) and (5). There is no evidence from the Hausman test to suggest that the OLS estimates are inconsistent.

An important question is at what level of initial per capita real GDP does the total effect of an increase in financial openness become positive. Simple calculations reveal that the 'turning point' occurs at a level of log per capita real GDP equal to 4 ($10,000) - any country with a value of log per capita real GDP in 1981 greater than 4 experiences an increase in per capita GDP growth when financial openness ($CapVol_{81-98}$) rises. Only 20 countries out of the full sample of 57 countries have a value of log per capita real GDP in 1981 greater than 4. All of these are industrial with the exception of Bahrain and Trinidad

Tobago.[26],[27]

In columns (6) and (7), I use a dummy variable representing the industrialised countries in place of per capita GDP when constructing the interaction term. I continue to find support for the notion that increasing financial openness only boosts growth in high-income countries. $CapVol_{81-98}$ and the interaction term exhibit negative and positive coefficients, respectively, but only the latter variable is significant in the OLS and IV regressions. The F-tests also allow me to reject the null of joint insignificance in both cases. Thus, similar to the

[26]The same outcome is found when I use the regression result in column (4) of Table 3.3 to evaluate the size of the partial derivative $dY/dCapVol_{81-98} = b1 + b2X$ where $b1$ is the coefficient on $CapVol_{81-98}$, $b2$ is the coefficient on the interaction term, and X is log per capita real GDP in 1981. A one standard deviation increase in financial openness in a country for which log per capita real GDP in 1981 equals its 25th percentile value (3.3) will lead to a decline in per capita real GDP growth of -1.4 percent. Similarly, at the median level of log per capita real GDP in 1981 (3.7), a one standard deviation increase in $CapVol_{81-98}$ will lead to a decline in per capita real GDP growth of -0.7 percent. At the 75th percentile value of log per capita real GDP in 1981 (4), a one standard deviation increase in financial openness has no impact on per capita real GDP growth. It must be noted that given that the mean level of per capita real GDP growth in this full sample of 57 countries is 1.9 percent, the economic significance of these partial derivatives is quite substantial.

[27]Interestingly, this outcome is in direct contrast to the outcomes in Edison, Levine, et al (2002) who use a very similar stock-related measure of financial openness. They find that financial openness only promotes growth in sufficiently *poor* countries. In other words, the signs on the financial openness indicator and its interaction with the initial level of per capita GDP are positive and negative, respectively. The sample of 57 countries examined in their analysis is different to the 57 countries analysed in these growth regressions. Also, in addition to initial income and initial schooling, they use the government balance and inflation as control variables. For comparision purposes, I carried out the same OLS and IV regressions excluding the eight countries in my sample not included in the Edison, Levine, et al (2002) sample. $CapVol_{81-98}$ and the interaction term continue to exhibit negative and positive coefficients, respectively, but they are now only significant at the 86 percent confidence level.

findings of Edwards (2001) but in contrast to Edison, Levine, at al (2002), it would appear that increasing financial openness positively affects growth only after a country has achieved a certain degree of economic development.

Columns (1) and (2) in Table 3.4 examine the hypothesis that the relationship between financial openness and growth is affected by the level of financial development (PRIVO) while columns (3) and (4) focus on the role of institutional strength (GADP) in mediating this relationship. Evidence to support these views is non-existent. Both PRIVO and GADP exhibit positive coefficients in all regressions but they are never significant with the exception of the latter in the IV regression in column (4). Both $CapVol_{81-98}$ and the interaction terms exhibit anticipated negative and positive coefficients, respectively, in the OLS regressions but they are insignificant. The coefficients change sign in the IV regressions but they remain insignificant.[28] In addition, the F-test in all cases except column (1) allows me to reject the null hypothesis that the coefficients on $CapVol_{81-98}$ and the interaction term are jointly insignificant.[29] The outcomes for the financial depth indicators are in line with previous findings by Kraay (1998), Rodrik (1998a), Arteta et al (2001), Quinn et al (2001), and Edison, Levine, et al (2002) while the findings for the political stability indicators are similar to Kraay (1998) but in contrast to Arteta et al (2001) and Edison, Levine, et al (2002).

An important issue is the size and economic significance of the individual coefficients on $CapVol_{81-98}$ and the interaction terms. This can be evaluated by examining the size of the partial derivative $dY/dCapVol_{81-98} = b1 + b2X$

[28]These outcomes are robust to the exclusion of any one country in a formal test for leverage points.

[29]Replacing PRIVO and GADP with alternative indicators of financial depth (LLY) and institutional strength (GOVREP) makes no difference to the outcomes.

where Y is per capita real GDP growth, $b1$ is the coefficient on $CapVol_{81-98}$, $b2$ is the coefficient on the interaction term, and X is any one of the indicators of financial and institutional strength. The partial derivatives reveal that a one standard deviation increase in financial openness will have a negative impact on per capita GDP growth at almost any level of financial depth and institutional strength. For example, in the case of the political stability measure (GADP), a one standard deviation increase in financial openness in a country for which GADP equals its 25th percentile value (0.5) will lead to a decline in per capita real GDP growth of -0.7 percent. Similarly, at the median level of GADP (0.7), a one standard deviation increase in $CapVol_{81-98}$ will lead to a decline in per capita real GDP growth of -0.4 percent. Even at the 75th percentile value of GADP (0.9), a one standard deviation increase in financial openness will lead to a -0.1 percent decline in per capita real GDP growth.[30]

Developing country subsample Tables 3.5 and 3.6 present the growth outcomes for a subsample of developing countries. All three control variables exhibit their anticipated sign in all the regressions but only the initial level of per capita GDP and gross domestic investment are regularly significant. In the basic OLS regression in column (1), $CapVol_{81-98}$ is negative and insignificant. A formal investigation searching for leverage points, however, reveals that this outcome is not robust to the exclusion of Singapore - a country with a high level of financial openness and average per capita GDP growth over this time period.[31] Thus, I re-run the regression omitting Singapore from the developing country subsample.

[30] I also carried out regressions examining the impact of nonfinancial openness (SW) and the black market premium (BMP) on the relationship between financial openness and growth. There is no evidence to suggest that either variable affects this relationship.

[31] This can also be seen in figure 3.1.

In the new OLS regression presented in column (2), $CapVol_{81-98}$ remains negative but it is now highly significant.[32] This is also the case in the WLS regression in column (3). The two-stage regression is presented in column (4). In this case, the instruments for the financial openness indicator ($CapVol_{81-98}$) are the initial level of financial openness in 1981 ($CapVol_{81}$) and the average level of trade openness (exports plus imports divided by GDP) between 1975 and 1980. $CapVol_{81-98}$ remains negative and highly significant. The Hausman test indicates a p-value of 0.2, suggesting that the OLS estimates are consistent. Thus, there is strong evidence to suggest that greater financial openness directly *hinders* per capita GDP growth in developing countries. This is in sharp contrast to Quinn et al (2001) who find that capital account openness has a positive direct effect on growth in a sample of 48 emerging countries.

Table 3.6 focuses on the role of financial depth and institutional strength in mediating the relationship between financial openness and growth in developing countries.[33] The financial depth indicator (PRIVO) is positive but only significant in the IV regression. $CapVol_{81-98}$ is insignificant in both the OLS and IV regressions but the interaction term is negative in both cases and significant at the 90 percent level in the latter. The F-tests reject the null hypothesis that the coefficients on $CapVol_{81-98}$ and the interaction term are jointly insignificant. The introduction of the financial depth variable and its interaction with financial openness has no impact on the overall explanatory power of the regressions.

Columns (3) and (4) in Table 3.6 provide no evidence to suggest that the degree of political stability has any role in mediating the relationship between financial openness and growth in developing countries.[34] The direct effect of

[32]This new result is itself robust to the exclusion of any one country.

[33]I continue to exclude Singapore from the regression sample.

[34]I continue to exclude Singapore from the regression sample.

GADP is positive but never significant. $CapVol_{81-98}$ and the interaction term exhibit anticipated negative and positive coefficients, respectively, in the OLS regression but they are insignificant. The signs change in the IV regression but they remain insignificant. Once again, the F-tests reject the null hypothesis that the coefficients on $CapVol_{81-98}$ and the interaction term are jointly insignificant. The Hausman tests provide no evidence of inconsistent OLS estimates. In addition, there is no impact on the overall explanatory power of the regressions when this variable is included. Like the outcomes in the full sample, the size of the partial derivatives indicate that an increase in financial openness will have a negative impact on per capita real GDP growth at almost any level of financial depth and institutional strength.[35]

3.3.2 Gross Domestic Investment

The link between financial openness and gross domestic investment is not immediately obvious. Increased risk diversification opportunities as a result of financial liberalisation may not increase domestic investment, since both inflows and outflows of capital will rise as both domestic residents and foreigners diversify their portfolios. In addition, Kraay (1998) notes that standard models of international portfolio choice suggest that investment will only increase in liberalising countries where risk-adjusted rates of return exceed the world average. Thus, in countries with low risk-adjusted returns, investment will decline as capital stocks are reallocated to high-return countries.[36] The policy discipline

[35]There is no evidence to suggest that either the degree of nonfinancial openness (SW) or the black market premium (BMP) have any influence on the relationship between financial openness and growth among developing countries.

[36]One would expect developing countries in particular to experience increased inward investment as a result of financial liberalisation due to higher risk-adjusted rates of return.

hypothesis does suggest the possibility of greater investment levels as capital inflows increase in response to domestic governments pursuing more prudent economic policies.[37]

Full Sample Tables 3.7 and 3.8 present the full sample outcomes for average gross domestic investment levels. GDP per capita and human capital exhibit negative and positive coefficients, respectively, but they are not regularly significant. Trade openness, however, is always positive and highly significant. In the basic OLS regression in column (1) of Table 3.7, the coefficient on the financial openness indicator ($CapVol_{81-98}$) is negative but insignificant. A formal investigation searching for leverage points, however, reveals that the outcome in column (1) is not robust to the exclusion of Switzerland. Thus, I re-run the regression omitting Switzerland from the sample. $CapVol_{81-98}$ remains negative but it is now significant at the 99 percent confidence level, suggesting that increasing financial openness *hinders* gross domestic investment levels.[38] This is also the case in the WLS regression in column (3).

In the two-stage regression in column (4), the financial openness indicator ($CapVol_{81-98}$) is now instrumented by the initial level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries.[39] $CapVol_{81-98}$ remains negative but it becomes insignificant. The Hausman test provides no evidence of inconsistent OLS estimates.

When I interact financial openness with per capita GDP in 1981 or a dummy

[37]Once again, however, overly-disciplined macroeconomic policies may actually retard investment levels.

[38]This new result is itself robust to the exclusion of any one country.

[39]Given that the average level of trade openness over 1981-98 is now a regressor in these regressions, I do not include the measure of trade openness over 1975-80 as an instrument for $CapVol_{81-98}$.

variable representing the industrialised countries in columns (5)-(8), I find no support for the hypothesis that greater financial openness has different investment effects in high- and low-income countries. In all regressions except column (5), $CapVol_{81-98}$ and the interaction terms exhibit anticipated negative and positive coefficients, respectively, but they are insignificant.

Columns (1) and (2) in Table 3.8 examine the hypothesis that the relationship between financial openness and investment is affected by the level of financial development. The direct effect of the financial depth variable (PRIVO) is positive and significant in both regressions. $CapVol_{81-98}$ and the interaction term exhibit positive and negative coefficients, respectively, in the OLS regression and the latter variable is significant at the 90 percent confidence level.[40] In the IV regression, however, both variables exhibit negative coefficients and they are insignificant. The Hausman test provides no evidence of inconsistent OLS estimates. Thus, overall, there is little evidence to suggest that the relationship between financial openness and investment is contingent on the degree of financial depth.[41] These outcomes are in line with previous findings by Kraay (1998) and Rodrik (1998a). The introduction of the financial depth variable and its interaction with financial openness, however, does lead to a large increase in the explanatory power of the regressions and the F-tests reject the null hypothesis that the coefficients on $CapVol_{81-98}$ and the interaction term are jointly zero.

The size of the partial derivative in the case of PRIVO reveals that an increase in financial openness will lead to a decline in gross domestic investment at any level of PRIVO. For example, a one standard deviation increase in financial openness in a country for which PRIVO equals its 25th percentile value (0.3)

[40]This is not robust, however, to the exclusion of Jamaica.

[41]This is also the case when I replace PRIVO with an alternative measure of financial depth (LLY) and re-run the regressions.

will lead to a decline in gross domestic investment (as a percentage of GDP) of -0.6 percent. Similarly, at the median level of PRIVO (0.51), a one standard deviation increase in $CapVol_{81-98}$ will lead to a decline in investment of -1.4 percent. At the 75th percentile value of PRIVO (0.9), a one standard deviation increase in financial openness will lead to a -2.8 percent decline in gross domestic investment. Given that the mean level of gross domestic investment (as a percentage of GDP) in this full sample of 57 countries is 23 percent the economic significance of these partial derivatives is quite significant.

Columns (3) and (4) in Table 3.8 focus on the role of institutional strength in mediating the relationship between financial openness and investment. The direct effect of GADP is positive but only significant in the OLS regression. In the OLS outcome, $CapVol_{81-98}$ and the interaction term exhibit positive and negative coefficients, respectively, and they are significant at the 90 percent confidence level or better. This outcome is robust to the exclusion of any one country in a formal test using observation-specific dummy variables. This pattern of coefficients suggests that the extent to which greater financial openness boosts gross domestic investment *declines* in countries with greater political stability.[42] In the IV regression, however, the coefficient on $CapVol_{81-98}$ changes sign and neither variable is significant. There is no evidence from the Hausman test to suggest that the OLS estimates are inconsistent. Once again, the

[42]This is illustrated further when I evaluate the size of the partial derivative. A one standard deviation increase in financial openness in a country for which GADP equals its 25th percentile value (0.5) will lead to an increase in gross domestic investment of 2.1 percent. At the median level of GADP (0.7), a one standard deviation increase in $CapVol_{81-98}$ will lead to a smaller increase in investment of 0.14 percent. At the 75th percentile value of GADP (0.9), however, a one standard deviation increase in financial openness leads to a decline in investment of -2.1 percent. Once again, the economic significance of these partial derivatives is quite large.

introduction of GADP and its interaction with financial openness leads to a large improvement in the overall explanatory power of the regressions. In all cases, the F-tests allow me to reject the null hypothesis that the coefficients on $CapVol_{81-98}$ and the interaction term are jointly insignificant.[43],[44]

Developing country subsample Tables 3.9 and 3.10 present the developing country subsample outcomes for gross domestic investment. GDP per capita is negative and regularly significant. Human capital is never significant and frequently changes sign. Trade openness is negative and always significant. In the basic OLS and WLS regressions in columns (1) and (2), $CapVol_{81-98}$ is negative but insignificant. $CapVol_{81-98}$ remains negative in the IV regression but it becomes significant at the 90 percent confidence level. The Hausman test provides no evidence to suggest that the OLS outcomes are inconsistent. The OLS outcome is robust to the exclusion of any one country in a formal test for leverage points.

Columns (1) and (2) in Table 3.10 provide no evidence to suggest that the degree of financial depth affects the relationship between financial openness and investment in developing countries. The financial depth variable (PRIVO) exhibits a positive coefficient and it is significant in both the OLS and IV regressions. Both $CapVol_{81-98}$ and the interaction term exhibit unanticipated negative coefficients in both regressions but they are never significant. Given that both coefficients are negative, the size of the partial derivative will become more negative as the level of financial depth (PRIVO) increases. The F-tests

[43] A similar pattern of results is found when I replace GADP with an alternative measure of institutional strength (GOVREP) and re-run the regressions.

[44] There is no evidence to suggest that either the degree of nonfinancial openness or the black market premium have any influence on the relationship between financial openness and gross domestic investment.

allow me to reject the null hypothesis that the coefficients on $CapVol_{81-98}$ and the interaction term are jointly insignificant. The introduction of the financial depth variable and its interaction with financial openness, however, does lead to a large increase in the overall explanatory power of the regressions.[45]

Columns (3)-(5) examine the role of political stability in mediating the relationship between financial openness and investment in developing countries. In the basic OLS regression in column (3), $CapVol_{81-98}$ and the interaction term exhibit unanticipated positive and negative coefficients, respectively, and they are significant at the 90 percent confidence level or better. This outcome, however, is not robust to the exclusion of Singapore. Thus, I re-run the regressions excluding Singapore. The OLS and IV results are presented in columns (4) and (5). $CapVol_{81-98}$ and the interaction term now exhibit anticipated negative and positive coefficients, respectively, but they are insignificant. The results of the Hausman test suggest that the OLS estimates in column (4) may be inconsistent. Once again, there is a very large increase in the overall explanatory power of the regressions when the political stability variable is introduced and the F-tests allow me to reject the null hypothesis that the coefficients on $CapVol_{81-98}$ and the interaction term are jointly insignificant.[46]

[45] An identical pattern of results is found when I replace PRIVO with an alternative measure of financial depth (LLY) and re-run the regressions.

[46] In the unreported regressions, there is no evidence to suggest the relationship between financial openness and gross domestic investment in developing countries is contingent on the degree of trade distortions or macroeconomic imbalances.

3.4 Financial Openness and the Volatility of Growth and Investment

In this section, I examine the relationship between financial openness and the volatility (standard deviation) of growth and investment. One of the possible consequences of increasing financial openness is greater uncertainty. This may come about through a shift in the composition of external obligations towards more short-term and easily reversible forms of finance. This may make some developing countries more vulnerable to financial and currency crises. As a result, economic performance may exhibit greater volatility. The tendency for this to be observed, however, might be expected to decline in countries who have a strong economic, financial, and institutional environment.

To start, I report simple correlations between the financial openness measure ($CapVol_{81-98}$) and the volatility of per capita GDP growth and gross domestic investment (as a percentage of GDP) over the period 1981 to 1998. The outcomes are presented in Table 3.2. There is a negative correlation between financial openness and per capita GDP growth while gross domestic investment exhibits a small positive correlation coefficient. In both cases, however, the correlation coefficients are insignificant. This absence of an obvious relationship between financial openness and either growth or gross domestic investment volatility can also be seen in the scatterplots presented in figures 3.3 and 3.4.

For the cross-sectional analysis, I regress, in turn, the volatility (standard deviation) of per capita GDP growth and gross domestic investment (as a percentage of GDP) on $CapVol_{81-98}$, using ordinary least squares (OLS) and weighted least squares (WLS) estimation, with standard errors corrected for heteroskedasticity by the White procedure. The time period under consideration is 1981 to 1998. Following the procedure of Lane (2002), three basic control variables are

included in all regressions: (a) average per capita GDP in log form - this is a proxy for the level of development. Low-income countries are more likely to experience greater growth and investment volatility; (b) total population in log form as a proxy for country size - larger countries have more scope for sectoral and regional diversification and therefore may experience less volatility (Lane, 2002); (c) trade openness - more open economies are more vulnerable to external shocks and, therefore, may experience greater output and investment volatility. All three control variables are averaged over the period 1981 to 1998. I also include in all regressions a dummy variable representing the oil-exporting countries to take account of the possibility that volatility in these countries may be higher as a consequence of their dependence on world oil price levels which tend to be volatile.[47]

In a similar fashion to the procedure in Section 3.3, I also examine the hypothesis that the relationship between financial openness and the volatility of per capita GDP growth and gross domestic investment is affected by the quality of financial and political institutions, the degree of nonfinancial openness, and the existence of macroeconomic imbalances. I introduce, in turn, into the volatility regressions the same variables as those used in Section 3.3, as well as interaction terms between such variables and the degree of financial openness.[48]

[47]These oil-exporting countries are Oman, Saudi Arabia, Trinidad and Tobago, and Venezuela. This dummy variable was not included in the *level* regressions as only the latter two countries were included in the sample due to data availability constraints

[48]Once again, for the sake of brevity, I do not report the results examining the impact of the nonfinancial openness and black market premium indicators.

3.4.1 Volatility of per capita GDP Growth

Full Sample Tables 3.11 and 3.12 present the outcomes for the volatility of per capita GDP growth. All three basic control variables exhibit their anticipated sign but they are not regularly significant. The oil dummy is positive and highly significant in all regressions. In the baseline OLS regression in column (1) of Table 3.11, the coefficient on $CapVol_{81-98}$ is negative but insignificant. When I estimate the basic regression specification by weighted least squares (WLS), $CapVol_{81-98}$ remains negative and insignificant.[49] These outcomes are robust to the exclusion of any one country in a formal test for influential observations.

To take account of the possible existence of reverse causality, I also carry out instrumental variables estimation - it may be the case that countries with lower levels of output volatility experienced greater flows of capital during the period 1981 to 1998. Thus, there may be a downward bias on the financial openness coefficient in the OLS estimation. The results of a two-stage regression that instruments for the measure of financial openness are presented in column (3). I use two instruments for the financial openness indicator ($CapVol_{81-98}$): the initial level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. The coefficient on $CapVol_{81-98}$ in the IV regression becomes more negative indicating that there is no downward bias when using OLS. The financial openness coefficient remains insignificant, however. The Hausman test reveals a p-value on the coefficient on the instrumented regressor of 0.1, suggesting that the OLS estimates in column (1) may be inconsistent.

When I interact financial openness with per capita GDP in 1981, I find no support for the hypothesis that greater financial openness has different output

[49] I continue to weight all observations by real GDP per capita in 1985.

volatility effects in high- and low-income countries. In the OLS regression in column (4), $CapVol_{81-98}$ and the interaction term exhibit anticipated positive and negative coefficients, respectively, but they are insignificant.[50] The coefficients change sign in the IV regression but they remain insignificant. The outcome of the Hausman test provides no evidence to suggest that the OLS estimates are inconsistent. The F-tests allow me to reject the null hypothesis of joint insignificance on the part of $CapVol_{81-98}$ and the interaction term.[51]

In columns (6) and (7), I use a dummy variable representing the industrialised countries in place of per capita GDP when constructing the interaction term. I now find strong support for the notion that the impact of financial openness on output volatility may be contingent on the level of economic development. $CapVol_{81-98}$ and the interaction term are significant at the 90 percent confidence level or better (positive and negative, respectively) in both columns. The F-test also allows me to reject the null hypothesis of joint insignificance. There is no evidence from the Hausman test to suggest inconsistent OLS esti-

[50] By 'anticipated' I mean that the extent to which greater financial openness leads to higher output volatility may decline in richer countries.

[51] The regression result in column (4) of Table 3.11 can be used to evaluate the size of the partial derivative. A one standard deviation increase in financial openness in a country for which log per capita real GDP in 1981 equals its 25th percentile value (3.3) will lead to an increase in growth volatility of 2.1. Similarly, at the median level of log per capita real GDP in 1981 (3.7), a one standard deviation increase in $CapVol_{81-98}$ will lead to an increase in growth volatility of 0.7. At the 75th percentile value of log per capita real GDP in 1981 (4), however, a one standard deviation increase in financial openness has no impact on growth volatility. Thus, like the outcome for growth levels, increasing financial openness is only associated with lower growth volatility in countries who have acheived a reasonably high level of economic development.

mates.[52]

Table 3.12 provides no evidence to suggest that the relationship between financial openness and output volatility is affected by either the level of financial development or the degree of institutional strength. The financial depth variable (PRIVO) exhibits a negative coefficient in both regressions but it is insignificant. $CapVol_{81-98}$ and the interaction term exhibit anticipated positive and negative signs in the OLS regression in column (1) but they are insignificant. The coefficients change sign in the IV regression but they remain insignificant. The Hausman test provides evidence to suggest that the OLS estimates may be inconsistent. The F-tests reject the null hypothesis that the coefficients on $CapVol_{81-98}$ and the interaction term are jointly zero. The inclusion of the financial depth variable has little impact on the overall explanatory power of the regressions.[53],[54]

Columns (3) and (4) of Table 3.12 focus on the role of political stability in mediating the relationship between financial openness and output volatility. The direct effect of GADP is negative but only significant in the IV regression. In the OLS regression, $CapVol_{81-98}$ and the interaction terms exhibit anticipated positive and negative coefficients, respectively, but they are insignificant. The coefficients change sign in the IV regression but they remain insignificant. The

[52]I do not report the weighted least squares (WLS) results as they are very similar to the OLS outcomes.

[53]I calculated the partial derivative for various percentile values of PRIVO and as the signs of the coefficients on $CapVol_{81-98}$ and the interaction term in the OLS regression suggest, greater financial openness will only lead to a decline in output volatility in countries with deep financial systems. The economic significance of the partial derivatives, however, is quite small.

[54]Replacing PRIVO with an alternative indicator of financial depth (LLY) makes no difference to the outcomes.

Hausman test reported in column (4) provides no evidence to suggest that the OLS estimates may be inconsistent. The F-tests reject the null hypothesis that the coefficients on $CapVol_{81-98}$ and the interaction term are jointly zero. The introduction of the political stability indicator and its interaction with financial openness leads to an increase in the overall explanatory power of the regressions.[55],[56],[57]

Developing country subsample Tables 3.13 and 3.14 present the developing country subsample outcomes for output volatility. Average output per capita exhibits an unanticipated positive sign in most regressions but it is not regularly significant. Trade openness and country size exhibit negative coefficients but they are also not regularly significant. The oil dummy is positive but never significant. In the basic OLS and WLS regressions in columns (1) and (2) of Table 3.13, the coefficient on the financial openness indicator ($CapVol_{81-98}$) is positive and significant at the 95 percent confidence level or better. This result is robust to the exclusion of any one country in a formal test for influential observations. Thus, increasing financial openness would appear to be associated with *greater* output volatility in developing countries. This is in contrast to the findings of Quinn et al (2001) who find a statistically insignificant negative association between capital account liberalisation and growth volatility in their sample of 47 emerging market nations.

[55]Evaluating the partial derivative for various percentile values of GADP reveals that greater financial openness leads to increased output volatility at any level of institutional strength. Once again, however, the size of the partial derivative is quite small.

[56]Replacing GADP with an alternative indicator of institutional strength (GOVREP) reveals a similar pattern of results.

[57]I also carried out regressions examining the impact of nonfinancial openness and the black market premium on the relationship between financial openness and output volatility. There is no evidence to suggest that either variable influences this relationship.

The two-stage regression is presented in column (3). As an instrument for $CapVol_{81-98}$, I use the initial level of financial openness in 1981 ($CapVol_{81}$).[58] $CapVol_{81-98}$ remains positive but it becomes insignificant. The Hausman test indicates a p-value of 0.22, thus providing no evidence to suggest that the OLS estimates are inconsistent.

Columns (1) and (2) of Table 3.14 provide no evidence to suggest that the relationship between financial openness and output volatility in developing countries is affected by the level of financial development. The financial depth indicator is negative but insignificant in both regressions. Both $CapVol_{81-98}$ and the interaction term exhibit unexpected positive coefficients in the OLS regression but they are insignificant. In the IV regression, the coefficient on $CapVol_{81-98}$ changes sign but both variables remain insignificant. The F-tests reject the null hypothesis that the coefficients on $CapVol_{81-98}$ and the interaction terms are jointly insignificant in all cases. The introduction of the financial depth variable and its interaction with financial openness does not increase the overall explanatory power of the regressions.[59],[60]

Columns (3) and (4) in Table 3.14 examine the role of institutional strength in mediating the relationship between financial openness and output volatility in developing countries. The direct effect of the institutional variable (GADP) is negative but insignificant in both regressions. In the OLS regression, $CapVol_{81-98}$ and the interaction term exhibit anticipated positive and negative coefficients, respectively, but they are insignificant. Both of these variables change sign in

[58] A simple regression of $CapVol_{81-98}$ on a constant and $CapVol_{81}$ produces an adjusted R^2 of 0.47 for this developing country subsample.

[59] Since both $CapVol_{81-98}$ and the interaction term exhibit positive coefficients in the OLS regression, the size of the partial derivative will increase for larger values of financial depth.

[60] Replacing PRIVO with an alternative indicator of financial depth (LLY) makes no difference to the outcomes.

the IV regression but they remain insignificant. The Hausman test provides no evidence of inconsistent OLS estimates and the F-tests reject the null hypothesis that the coefficients on $CapVol_{81-98}$ and the interaction term are jointly insignificant.[61]

I also examined the role of nonfinancial openness (SW) and the black market premium (BMP) in influencing the relationship between financial openness and output volatility. For the sake of brevity, I do not report these results. The direct effects of both SW and BMP exhibit predicted negative coefficients in all regressions but only the latter variable is significant. In the regressions pertaining to the nonfinancial openness indicator (SW), the direct effect of $CapVol_{81-98}$ is insignificant. The interaction term representing financial openness and the SW indicator, however, is positive and significant in both the OLS and IV regressions, suggesting that the combination of greater financial openness *and* nonfinancial openness is associated with *increased* output volatility in developing countries. This outcome is robust to the exclusion of any one country in a formal test for leverage points.

With respect to the outcomes for the black market premium (BMP) indicator, $CapVol_{81-98}$ and the interaction term exhibit unanticipated negative and positive coefficients, respectively, and they are significant in all cases. These outcomes are robust to the exclusion of any one country in a formal test for influential observations. The direct effect of the black market premium indicator exhibits an expected negative coefficient and it is significant. Thus, it would appear that the extent to which greater financial openness reduces output volatility in developing countries declines the lower is the black market premium.

[61] Replacing GADP with an alternative indicator of institutional strength (GOVREP) reveals a similar pattern of results.

3.4.2 Volatility of Gross Domestic Investment

Full Sample Tables 3.15 and 3.16 present the full sample outcomes for the volatility of gross domestic investment (as a percentage of GDP). All four control variables exhibit their anticipated sign and are regularly significant. In the basic OLS regression specification in column (1) of Table 3.15, the coefficient on the financial openness indicator ($CapVol_{81-98}$) is negative but insignificant.[62] $CapVol_{81-98}$ remains negative and insignificant in the WLS regression. Instrumental variables estimation is carried out to take account of the possible existence of reverse causality - it may be the case that countries with lower investment volatility experienced greater levels of capital flows. In the two-stage regression in column (3), I continue to use the initial level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries as instruments for $CapVol_{81-98}$. The two-stage results indicate that, like the OLS outcome, $CapVol_{81-98}$ is negative and insignificant. The Hausman test reveals a p-value on the coefficient on the instrumented regressor of 0.14, suggesting that the OLS estimates are consistent.

When I interact financial openness with per capita GDP in 1981, I find no support for the hypothesis that greater financial openness has different effects on investment volatility in high- and low-income countries. In the OLS regression in column (4), $CapVol_{81-98}$ and the interaction term exhibit anticipated positive and negative coefficients, respectively, but they are insignificant. The coefficients change sign in the IV regression but the variables remain insignificant. The relevant F-tests allow me to reject the null hypothesis of joint insignificance on the part of $CapVol_{81-98}$ and the interaction term.[63]

[62] This outcome is robust to the exclusion of any one country in a formal test for leverage points.

[63] I calculated the partial derivative for various percentile values of log per capita real GDP

In columns (6) and (7), I use a dummy variable representing the industrialised countries in place of per capita GDP when constructing the interaction term. The direct effect of $CapVol_{81-98}$ is positive but insignificant in all cases. The interaction term, however, is negative and significant at the 95 percent confidence level in the OLS regression. Significance disappears, however, in the IV regression. The F-test also allows me to reject the null hypothesis of joint insignificance. There is no evidence from the Hausman test to suggest inconsistent OLS estimates.

Columns (1) and (2) in Table 3.16 provide no evidence to suggest that the relationship between financial openness and investment volatility is affected by the level of financial development. The financial depth variable exhibits an unanticipated positive coefficient in the OLS regression but it becomes negative in the IV regression. It is insignificant in all cases, however. $CapVol_{81-98}$ and its interaction with PRIVO exhibit anticipated positive and negative coefficients, respectively, in the OLS regression but they are insignificant. The signs of these variables change in the IV regression but they remain insignificant. The Hausman test provides evidence to suggest that the OLS estimates may be inconsistent. The F-tests allow me to reject the null hypothesis that the coefficients on $CapVol_{81-98}$ and the interaction term are jointly zero in all cases. The inclusion of the financial depth variable does not increase the overall explanatory power of the regressions.[64]

in 1981 but their size is very small, thus reducing the economic significance of these outcomes.

[64]The regression result in column (1) can be used to evaluate the size of the partial derivative. A one standard deviation increase in financial openness in a country for which PRIVO equals its 25th percentile value (0.25) will lead to an increase in investment volatility of 0.14. At the median level of PRIVO (0.51), a one standard deviation increase in $CapVol_{81-98}$ will lead to a decrease in investment volatility of -0.35. At the 75th percentile value of PRIVO (0.8), a one standard deviation increase in financial openness will lead to a decrease in invest-

Columns (3) and (4) in Table 3.16 focus on the role of political stability in mediating the relationship between financial openness and investment volatility. The direct effect of GADP is insignificant in both regressions. In the OLS regression, $CapVol_{81-98}$ and the interaction term exhibit anticipated positive and negative coefficients, respectively, and they are significant at the 99 percent confidence level. These OLS outcomes are robust to the exclusion of any one country in a formal test for leverage points. This pattern of coefficients suggests that increasing financial openness is more likely to be associated with *lower* investment volatility in countries with stronger political institutions.[65] Significance disappears, however, in the IV regressions. The Hausman test provides evidence to suggest that the OLS estimates in column (3) are inconsistent. In all cases, the F-tests allow me to reject the null hypothesis that the coefficients on $CapVol_{81-98}$ and the interaction term are jointly insignificant.[66]

ment volatility of 3.5. Given that the mean level of investment volatility in this sample is 3.6, the economic significance of these partial derivatives is quite substantial.

[65]This is illustrated when I evaluate the size of the partial derivative. A one standard deviation increase in financial openness in a country for which GADP equals its 25th percentile value (0.5) will lead to an increase in gross domestic investment volatility of 0.7. At the median level of GADP (0.7), a one standard deviation increase in $CapVol_{81-98}$ will lead to a smaller increase in investment volatility of 0.35. At the 75th percentile value of GADP (0.9), however, a one standard deviation increase in financial openness leads to a decline in investment volatility of -0.35. Given that the mean level of investment volatility is 3.6, the economic significance of these partial derivatives is reasonably small.

[66]I also carried out regressions examining the impact of nonfinancial openness and the black market premium on the relationship between financial openness and investment volatility. There is some evidence to suggest that increasing financial openness is more likely to *reduce* investment volatility in countries with fewer trade distortions. There is no evidence, however, that the black market premium has any influence on this relationship.

Developing country subsample Tables 3.17 and 3.18 present the developing country subsample outcomes for investment volatility. With the exception of trade openness which is positive and almost always significant, the other control variables are generally insignificant. The oil dummy is positive but not regularly significant. In the basic OLS regression in column (1) of Table 3.17, the coefficient on the financial openness indicator ($CapVol_{81-98}$) is positive but insignificant. This outcome, however, is not robust to the exclusion of Singapore. When I re-run the OLS regression omitting Singapore, $CapVol_{81-98}$ is positive and significant at the 94 percent confidence level in column (2).[67] $CapVol_{81-98}$ remains positive in the WLS regression but it is insignificant. The sign on $CapVol_{81-98}$ changes in the IV regression but it remains insignificant. The Hausman test indicates a p-value of 0.01, suggesting that the OLS estimates in column (2) are inconsistent. Thus, there is only weak evidence of a positive and significant relationship between financial openness and investment volatility in developing countries.

Columns (1) and (2) in Table 3.18 examine the impact of financial development on the relationship between financial openness and investment volatility in developing countries.[68] The financial depth indicator exhibits a negative coefficient in both regressions and it is significant in the IV regression. $CapVol_{81-98}$ and the interaction term exhibit anticipated positive and negative coefficients, respectively, but they are insignificant.[69] The coefficients change sign in the IV

[67]This new result, however, has two leverage points: Taiwan and Cote d'Ivoire. The latter country is the biggest leverage point. When it is excluded from the sample, $CapVol_{81-98}$ becomes insignificant.

[68]Singapore is excluded from all remaining regressions in this subsample.

[69]Evaluating the partial derivative at various values of PRIVO reveals that an increase in financial openness will increase investment volatility at any level of financial depth. Once again, the economic significance of these results is quite substantial.

regression and the interaction term becomes significant.[70] The outcome of the Hausman test suggests that the OLS estimates in column (1) are inconsistent.

There is no evidence from columns (3) and (4) in Table 3.18 to suggest that the degree of institutional strength has any influence on the relationship between financial openness and gross domestic investment volatility. The direct effect of GADP is negative and insignificant in both regressions. $CapVol_{81-98}$ and the interaction term exhibit unanticipated negative and positive coefficients in both regressions but they are insignificant.[71] The outcome of the Hausman test suggests that the OLS estimates are inconsistent.[72]

3.5 Summary of Results

There is strong evidence to suggest that greater financial openness is directly associated with lower levels of per capita GDP growth in developing countries. There is also evidence to suggest that increasing financial openness positively affects growth only after a country has achieved a certain degree of economic development. There is almost no evidence, however, to suggest that the relationship between financial openness and growth is contingent on the existence of certain economic, financial, and institutional characteristics.

With respect to gross domestic investment levels, there is some evidence to suggest that greater financial openness is associated with *lower* gross domestic investment levels in both the full sample and developing country subsample.

[70] This IV regression, however, is not robust to the exclusion of Taiwan. When this country is excluded from the sample, the direct effect of PRIVO and its interaction with financial openness continue to exhibit the same signs but the latter variable is no longer significant.

[71] These outcomes are robust to the exclusion of any one country from the sample.

[72] I also carried out regressions examining the impact of nonfinancial openness and the black market premium on the relationship between financial openness and investment volatility. There is no evidence to suggest that either variable influences this relationship.

The level of economic development, however, does not appear to affect this relationship. There is some weak evidence in the full sample to suggest that countries who exhibit greater financial openness *and* more stable political environments have lower levels of investment. In general, however, the relationship between financial openness and average gross domestic investment levels does not appear to be influenced by any economic or financial characteristics.

With respect to output volatility, there is evidence of a positive and significant association between financial openness and output volatility for the developing country subsample. This does not apply, however, to the full sample. There is also some evidence to suggest that the relationship between financial openness and output volatility is contingent on the level of economic development. There is little evidence, however, to suggest that this outcome may reflect the existence of certain economic, financial, and institutional characteristics.

Evidence of a direct relationship between financial openness and investment volatility is non-existent in both the full sample and developing country subsample. There is only weak evidence to suggest that the level of economic development influences this relationship. In the full sample, there is mixed evidence suggesting that greater financial openness *reduces* investment volatility in countries with more stable bureaucracies and smaller trade distortions. These outcomes, however, are not found in the developing country subsample.

3.6 Conclusion

Theory suggests that increasing financial openness should boost economic performance. The macroeconomic crises experienced by many developing countries in the 1990s and the lack of conclusive empirical evidence do not provide strong support for this view. This chapter attempts to widen the empirical side of

the debate by examining the impact of a new quantitative indicator of financial openness, and its interaction with many aspects of the macroeconomic environment, on economic performance. In addition, the impact of financial openness on macroeconomic volatility is also considered.

In general, the results provide reasonably strong support for the view that increasing financial openness hinders macroeconomic performance. This seems to be particularly the case in developing countries where greater financial openness was found to be significantly associated with *lower* per capita GDP growth and *higher* output volatility. Moreover, there is some evidence in the full sample to suggest that gross domestic investment levels are *lower* in more financially open economies. Crucially, however, it does not appear to be the case that countries who have stronger economic, financial, and institutional environments are more likely to reap the predicted benefits of greater financial openness. Given the current widespread opposition to economic globalisation in poorer countries, these findings suggest that such concerns may rationally reflect the costs associated with the new global order. Despite this pessimistic conclusion, much more empirical and theoretical work needs to be done before unambiguous predictions regarding the impact of financial openness can be made.

In terms of the future research agenda in this area, examining the macroeconomic impact of financial openness over time will be an important extension. Most empirical work in this area has been of a cross-sectional nature. It is important, however, to get some idea of how changing levels of financial openness over time impact on the macroeconomic environment. Quinn et al (2002) have already carried out this type of analysis for growth levels using a restrictions-based indicator of capital account openness.

Constructing measures of short-term capital flows and examining their im-

pact on economic performance should also be part of future work in this area. As mentioned already, it may be the case that capital flows become more short-term and easily-reversible as financial openness increases. This can have serious consequences for the macroeconomic environment.[73] Another important and related research issue is the impact of capital flow volatility - does greater financial openness inevitably mean more volatile capital flows and to what extent does capital flow volatility affect economic performance?

[73]See Obstefeld and Rogoff (1996) for an extensive discussion of the theory underlying free capital mobility.

3.A Data sources

- **CapVol$_{81-98}$**: for details about the variables used in the construction of the financial openness measure see chapter two.

- **Growth**: real per capita GDP growth in current US dollars (average 1981-1998). Source: World Bank, World Development Indicators.

- **Investment**: gross domestic investment (as a percentage of GDP) (average 1981-1998). Source: World Bank, World Development Indicators.

- **Growth Volatility**: standard deviation of real per capita GDP growth in current US dollars over the period 1981 to 1998.

- **Investment Volatility**: standard deviation of gross domestic investment (as a percentage of GDP) over the period 1981 to 1998.

- **GDP per capita:** the logarithm of real per capita GDP in 1981. Source: World Bank, World Development Indicators.

- **Human Capital**: average years of schooling of the population over 15 years of age. This variable is available quinquennially for the years 1960-1990. I use the average over 1976-80. Source: data appendix to Levine et al. (2000).

- **Trade Openness:** ratio of exports plus imports to GDP (average 1981-1998). Source: World Bank, World Development Indicators.

- **Country Size:** total population (average 1981 to 1998). Source: World Bank, World Development Indicators.

- **Financial Depth**: Two measures: (a) LLY- ratio of liquid liabilities to GDP (average 1981-1995) and (b) PRIVO - ratio of claims on the

nonfinancial private sector to GDP (average 1981-1995). These data are taken from the data appendix to Levine et al. (2000).

- **Political Stability**: Two measures: (a) GADP - index of the absence of corruption and the quality of the bureaucracy. Source: International Country Risk Guide. Since this index starts only in 1984, I use the average value over 1984-1994. (b) GOVREP - the degree to which governments do not repudiate contracts. For most countries, this variable reflects the strength of reputation in 1982. Source: correspondence with Michael Klein.

- **Nonfinancial openness**: Sachs-Warner openness dummy (average 1981-1995). This is defined as a binary variable equal to one if *none* of the five following criteria holds: the country had average tariff rates higher than 40 percent, its nontariff barriers covered on average more than 40 percent of imports, it had a socialist economic system, the state had a monopoly of major exports, and its black market premium exceeded 20 percent. Source: Sachs and Warner (1995).

- **Black Market Premium**: defined as per cent premium over the official exchange rate. Source: World Bank, World Development Indicators. Following Arteta et. al (2001), the black market premium indicator is defined as 100 percent minus the black market premium, divided by 100. A higher value indicates a more balanced macroeconomic environment.

- **Oil Dummy:** dummy variable taking the value of 1 if a country exports oil. Source: World Bank, World Development Indicators.

- **Government consumption**: total government consumption, as a percentage of GDP, averaged over 1975-80. Source: World Bank, World

Development Indicators.

- **Budget balance**: the overall budget balance, including grants, as a percentage of GDP, averaged over 1975-1980. Source: World Bank, World Development Indicators.

- **Distance to the equator**: Source: Cross-National Time-Series Data Archive.

- **Landlocked nation dummy**: Source: Cross-National Time-Series Data Archive

- **Island nation dummy**: Source: Cross-National Time-Series Data Archive

- **Language variable**, corresponding to the fraction of the population speaking English. Source: Cross-National Time-Series Data Archive

3.B Tables and Figures

Table 3.1: Previous studies on Capital Mobility and Growth and Investment

Source	Number of Countries	Years	Growth	Investment
Alesina et al. (1994)	20 (all OECD)	1950-89	no effect	no effect
Grilli and Milesi-Ferretti (1995)	61	1966-89	no effect	no effect
Quinn (1997)	64	1975-89	positive	-
Rodrik (1998)	95	1975-89	no effect	no effect
Kraay (1998)	Two groups: 117 and 64	1985-97	no effect	no effect
Chanda (2000)	116	1976-95	positive	-
Klein and Olivei (2001)	92	1986-95	positive	-
Edwards (2001)	62	1980s	positive	-
Arteta et al. (2001)	59	1973-92	mixed	-
IMF (2001)	57	1980-99	no effect	positive
Quinn et al. (2001)	76	1960-98	mixed	-
Edison, Klein, et al. (2002)	Two groups: 89 and 52	1976-95	positive	-
Edison, Levine, et al. (2002)	57	1980-2000	no effect	-

Table 3.2: Correlation Matrix bewteen Financial Openness and Economic Indicators

	Correlation	P-value	No. of countries
Per capita GDP Growth	-0.15	0.5	63
Gross Domestic Investment (as a % of GDP)	0.01	0.99	63
Per capita GDP Growth Volatility	-0.13	0.5	63
Gross Domestic Investment Volatility	0.07	0.7	63
initial per capita GDP	0.44	0.01	63
Human capital	0.33	0.02	57
Private Credit	0.48	0.01	59
Liquid Liabilities	0.4	0.01	59
Corruption	0.44	0.01	54
Degree of Contract Enforcement	0.43	0.01	54
Sachs-Warner measure	0.26	0.06	56
Black Market Premium indicator	0.25	0.07	56

Note: Detailed information about these variables is provided in the data appendix.

Table 3.3: Growth - Basic regressions - Full Sample

	(1) OLS	(2) WLS	(3) IV
constant	5.1 (1.5)	9.5 (2.2)**	5.1 (1.5)
Log GDP per capita, 1981	-2.6 (-2.6)***	-3.2 (-2.6)***	-2.6 (-2.4)**
Human Capital, 1980	0.4 (2.7)***	0.3 (2.1)**	0.4 (2.7)***
Investment, 1981-1998	0.2 (5.4)***	0.1 (2.8)***	0.2 (5.2)***
$CapVol_{81-98}$	-0.001 (-0.3)	0.001 (0.5)	-0.001 (-0.3)
Hausman Test - p-value			0.9
Adjusted R^2	0.39	0.3	0.39
No. of observations	57	57	57

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. WLS denotes weighted least squares regressions where the weight used is GDP per capita in 1985. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and the average level of trade openness (exports plus imports divided by GDP) between 1975 and 1980. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level.

Table 3.3 - continued

	(4) OLS	(5) IV	(6) OLS	(7) IV
constant	13.8 (3.1)***	19.2 (2.3)	6.1 (2.1)**	6.3 (2.2)**
Log GDP per capita, 1981	-4.8 (-3.9)***	-6.2 (-2.9)***	-2.8 (-3.5)***	-2.9 (-3.5)***
Human Capital, 1980	0.3 (2.4)**	0.3 (2.3)**	0.2 (1.8)*	0.2 (1.9)*
Investment, 1981-1998	0.2 (6.4)***	0.2 (6.8)***	0.2 (6.4)***	0.2 (6.1)***
$CapVol_{81-98}$	-0.12 (-2.2)**	-0.2 (-1.9)*	-0.01 (-1.4)	-0.007 (-1.2)
$CapVol_{81-98}$*Log GDP-PC, 1981	0.03 (2.2)**	0.05 (1.9)*		
$CapVol_{81-98}$*Industrialised			0.01 (2.1)**	0.01 (2.1)**
F-test	2.6 (0.1)	2.1 (0.1)	2.9 (0.1)	2.9 (0.1)
Hausman Test - p-value		0.4		0.35
Adjusted R^2	0.45	0.42	0.47	0.46
No. of observations	57	57	57	57

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$), a dummy variable representing the industrialised countries, and the average level of trade openness (exports plus imports divided by GDP) between 1975 and 1980. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level. F-test indicates test of null hypothesis that $CapVol_{81-98}$ and interaction term are jointly insignificant (probability in parentheses).

Table 3.4: Growth - Role of Financial Depth and Institutional Strength - Full Sample

	(1) OLS	(2) IV	(3) OLS	(4) IV
constant	5.9 (1.6)*	6.3 (1.5)	11.4 (3.9)***	10.9 (3.6)***
Log GDP per capita, 1981	-2.5 (-2.2)**	-2.7 (-2.3)**	-4.4 (-4.2)**	-5.1 (-4.2)***
Human Capital, 1980	0.3 (2.1)**	0.2 (1.8)*	0.06 (0.5)	0.1 (0.5)
Investment, 1981-1998	0.2 (3.3)***	0.1 (2.9)***	0.1 (2.8)***	0.1 (2.1)**
$CapVol_{81-98}$	-0.002 (-0.3)	0.004 (0.3)	-0.02 (-1.2)	0.003 (0.1)
PRIVO	1.1 (0.9)	1.6 (0.9)		
$CapVol_{81-98}$*PRIVO	0.0001 (0.1)	-0.005 (-0.4)		
GADP			5.6 (1.5)	9.3 (1.7)*
$CapVol_{81-98}$*GADP			0.02 (1.1)	-0.006 (-0.1)
F-test	0.2 (0.9)	0.2 (0.8)	1.1 (0.4)	0.4 (0.7)
Hausman Test - p-value		0.6		0.4
Adjusted R^2	0.26	0.25	0.49	0.46
No. of observations	55	55	55	55

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$), a dummy variable representing the industrialised countries, and the average level of trade openness (exports plus imports divided by GDP) between 1975 and 1980. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level. F-test indicates test of null hypothesis that $CapVol_{81-98}$ and interaction term are jointly insignificant (probability in parentheses).

Table 3.5: Growth - Basic Regressions - developing countries

	(1)	(2)	(3)	(4)
	OLS	OLS	WLS	IV
constant	4.9	5.5	5.5	6.6
	(1.3)	(1.9)	(1.7)*	(2.3)**
Log GDP per capita, 1981	-2.7	-2.2	-2.1	-2.7
	(-2.4)**	(-2.4)**	(-2.1)**	(-2.9)***
Human Capital, 1980	0.3	0.2	0.3	0.2
	(1.3)	(0.9)	(1.7)*	(1.2)
Investment, 1981-1998	0.3	0.2	0.2	0.2
	(6.9)***	(7.2)***	(5.2)***	(6.4)***
$CapVol_{81-98}$	-0.01	-0.03	-0.03	-0.02
	(-1.1)	(-4.1)***	(-2.8)***	(-2.2)**
Hausman Test - p-value				0.2
Adjusted R^2	0.56	0.66	0.64	0.64
No. of observations	36	35	35	35

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. WLS denotes weighted least squares regressions where the weight used is GDP per capita in 1985. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and the average level of trade openness (exports plus imports divided by GDP) between 1975 and 1980. Singapore was found to be an outlier in a formal test using observation-specific dummies and, therefore, is excluded in the regressions presented in columns (2)-(4). * (**, ***) indicates statistical significance at the 10% (5%, 1%) level.

Table 3.6: Growth - Role of Financial Depth and Institutional Strength - developing countries

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
constant	4.4	1.8	8.3	-2.8
	(1.3)	(0.4)	(1.2)	(-0.2)
Log GDP per capita, 1981	-1.8	-1.7	-3.6	-2.3
	(-1.9)*	(-1.5)	(-2.2)**	(-0.9)
Human Capital, 1980	-0.1	-0.1	0.2	-0.1
	(-0.1)	(-0.6)	(0.8)	(-0.1)
Investment, 1981-1998	0.2	0.2	0.2	0.2
	(2.8)***	(2.6)***	(2.1)**	(1.9)*
$CapVol_{81-98}$	-0.02	0.02	-0.02	0.08
	(-1.1)	(0.8)	(-0.5)	(0.6)
PRIVO	5.6	12.1		
	(1.2)	(2.4)**		
$CapVol_{81-98}$*PRIVO	-0.04	-0.1		
	(-0.9)	(-1.9)*		
GADP			5.5	17.5
			(0.7)	(1.3)
$CapVol_{81-98}$*GADP			0.004	-0.2
			(0.1)	(-0.8)
F-test	8.3	6.4	2.9	2.5
	(0.01)	(0.01)	(0.1)	(0.1)
Hausman Test - p-value		0.15		0.4
Adjusted R^2	0.56	0.49	0.56	0.49
No. of observations	33	33	33	33

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and the average level of trade openness (exports plus imports divided by GDP) between 1975 and 1980. Singapore was found to be an outlier in a formal test using observation-specific dummies and, therefore, is excluded from all regressions. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level. F-test indicates test of null hypothesis that $CapVol_{81-98}$ and interaction term are jointly insignificant (probability in parentheses).

Table 3.7: Investment - Basic regressions - Full Sample

	(1)	(2)	(3)	(4)
	OLS	OLS	WLS	IV
constant	34.5	35.6	23.8	34.7
	(2.9)***	(3.1)***	(1.5)	(3.1)***
Log GDP per capita, 1981	-4.2	-4.5	-0.4	-4.2
	(-1.2)	(-1.3)	(-0.1)	(-1.2)
Human Capital, 1980	0.2	0.3	-0.2	0.3
	(0.5)	(0.8)	(-0.5)	(0.8)
Trade Openness, 1981-1998	0.06	0.07	0.05	0.08
	(6.4)***	(7.1)***	(4.2)***	(4.8)***
$CapVol_{81-98}$	-0.01	-0.02	-0.02	-0.03
	(-1.5)	(-2.7)***	(-3.5)***	(-1.4)
Hausman Test - p-value				0.62
Adjusted R^2	0.29	0.31	0.27	0.31
No. of observations	57	56	56	56

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. WLS denotes weighted least squares regressions where the weight used is GDP per capita in 1985. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. Switzerland was found to be an outlier in a formal test using observation-specific dummies and, therefore, is excluded in the regressions presented in columns (2)-(4). * (**, ***) indicates statistical significance at the 10% (5%, 1%) level.

Table 3.7 - continued

	(5)	(6)	(7)	(8)
	OLS	IV	OLS	IV
constant	33.6	61.4	37.2	39.6
	(1.5)	(1.9)*	(2.9)***	(3.1)***
Log GDP per capita, 1981	-3.9	-11.1	-4.8	-5.2
	(-0.7)	(-1.3)	(-1.3)	(-1.4)
Human Capital, 1980	0.3	0.2	0.2	0.1
	(0.8)	(0.4)	(0.6)	(0.4)
Trade Openness, 1981-1998	0.07	0.08	0.08	0.1
	(6.8)***	(6.6)***	(4.2)***	(3.8)***
$CapVol_{81-98}$	0.01	-0.4	-0.03	-0.06
	(0.1)	(-0.9)	(-1.5)	(-1.5)
$CapVol_{81-98}$*Log GDP per capita, 1981	-0.007	0.09		
	(-0.2)	(0.9)		
$CapVol_{81-98}$*Industrialised			0.01	0.03
			(0.5)	(0.9)
F-test	3.6	3.9	3.6	3.3
	(0.1)	(0.1)	(0.1)	(0.1)
Hausman Test - p-value		0.17		0.15
Adjusted R^2	0.3	0.23	0.3	0.28
No. of observations	56	56	56	56

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. Switzerland was found to be an outlier in a formal test using observation-specific dummies and, therefore, is excluded in the regressions presented in columns (5)-(8). * (**, ***) indicates statistical significance at the 10% (5%, 1%) level. F-test indicates test of null hypothesis that $CapVol_{81-98}$ and interaction term are jointly insignificant (probability in parentheses).

Table 3.8: Investment - Role of Financial Depth and Institutional Strength - Full Sample

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
constant	35.6 (4.4)***	35.9 (4.4)***	31.7 (3.5)***	36.2 (3.4)***
Log GDP per capita, 1981	-5.5 (-2.2)**	-4.9 (-1.9)*	-8.6 (-2.8)***	-6.9 (-2.1)**
Human Capital, 1980	-0.2 (-0.8)	-0.2 (-0.6)	-0.3 (-1.1)	-0.3 (-1.2)
Trade Openness, 1981-1998	0.07 (7.7)***	0.07 (6.6)***	0.06 (6.1)***	0.07 (6.1)***
$CapVol_{81-98}$	0.003 (0.1)	-0.03 (-0.5)	0.1 (1.8)*	-0.01 (-0.1)
PRIVO	11.7 (3.9)***	8.7 (1.7)*		
$CapVol_{81-98}$*PRIVO	-0.04 (-1.8)*	-0.006 (-0.1)		
GADP			29.4 (3.6)***	16.5 (1.4)
$CapVol_{81-98}$*GADP			-0.1 (-2.3)**	-0.02 (-0.1)
F-test	7.2 (0.01)	4.1 (0.01)	5.6 (0.01)	4.5 (0.02)
Hausman Test - p-value		0.6		0.6
Adjusted R^2	0.52	0.5	0.49	0.45
No. of observations	54	54	54	54

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level. F-test indicates test of null hypothesis that $CapVol_{81-98}$ and interaction term are jointly insignificant (probability in parentheses).

Table 3.9: Investment - Basic Regressions - developing countries

	(1)	(2)	(3)
	OLS	WLS	IV
constant	49.1 (3.8)***	55.6 (7.5)***	48.1 (3.7)***
Log GDP per capita, 1981	-8.9 (-2.3)**	-10.1 (-5.2)***	-7.9 (-2.1)**
Human Capital, 1980	0.6 (0.9)	0.2 (0.7)	0.5 (0.8)
Trade Openness, 1981-1998	0.09 (5.4)***	0.08 (6.5)***	0.1 (3.9)***
$CapVol_{81-98}$	-0.04 (-1.5)	-0.02 (-1.5)	-0.09 (-1.9)*
Hausman Test - p-value			0.15
Adjusted R^2	0.4	0.34	0.33
No. of observations	36	36	36

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. WLS denotes weighted least squares regressions where the weight used is GDP per capita in 1985. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) . * (**, ***) indicates statistical significance at the 10% (5%, 1%) level.

Table 3.10: Investment - Role of Financial Depth and Institutional Strength- developing countries

	(1)	(2)	(3)	(4)	(5)
	OLS	IV	OLS	OLS	IV
constant	35.6	35.9	33.4	45.3	99.2
	(3.7)***	(3.8)***	(3.7)***	(2.7)***	(2.4)**
Log GDP per capita, 1981	-6.1	-5.3	-10.3	-12.1	-17.8
	(-1.9)*	(-1.7)*	(-3.6)***	(-3.3)***	(-2.8)***
Human Capital, 1980	-0.1	-0.2	0.1	0.3	1.1
	(-0.3)	(-0.3)	(0.2)	(0.7)	(1.5)
Trade Openness, 1981-1998	0.08	0.08	0.07	0.07	0.05
	(4.3)***	(4.7)***	(3.9)***	(3.7)***	(2.1)**
$CapVol_{81-98}$	-0.001	-0.04	0.1	-0.01	-0.5
	(-0.1)	(-0.8)	(1.7)*	(-0.1)	(-1.5)
PRIVO	16.7	13.6			
	(3.5)***	(2.7)***			
$CapVol_{81-98}$*PRIVO	-0.06	-0.02			
	(-1.5)	(-0.3)			
GADP			34.8	22.9	-38.7
			(3.2)***	(1.3)	(-0.9)
$CapVol_{81-98}$*GADP			-0.2	0.04	0.9
			(-1.9)*	(0.2)	(1.5)
F-test	3.1	3.7	1.9	0.5	1.5
	(0.1)	(0.1)	(0.2)	(0.6)	(0.2)
Hausman Test - p-value		0.25			0.03
Adjusted R^2	0.58	0.56	0.6	0.51	0.25
No. of observations	34	34	34	33	33

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$). Singapore was found to be an outlier in a formal test using observation-specific dummies in column (3) and, therefore, is excluded in the regressions presented in columns (4) and (5). * (**, ***) indicates statistical significance at the 10% (5%, 1%) level. F-test indicates test of null hypothesis that $CapVol_{81-98}$ and interaction term are jointly insignificant (probability in parentheses).

Table 3.11: Volatility of Growth - Basic regressions - Full Sample

	(1)	(2)	(3)
	OLS	WLS	IV
constant	10.9	13.6	9.9
	(4.9)***	(4.9)***	(4.4)***
Log GDP per capita, 1981-98	-1.6	-2.3	-1.3
	(-3.7)***	(-3.7)***	(-2.9)***
Total Population, 1981-98	-0.3	-0.3	-0.3
	(-1.4)***	(-1.8)*	(-1.2)
Trade Openness, 1981-98	0.003	0.005	0.006
	(1.2)	(2.1)**	(1.9)*
Oil	2.3	2.5	2.3
	(6.6)***	(7.3)***	(6.6)***
$CapVol_{81-98}$	-0.001	-0.002	-0.005
	(-0.8)	(-1.5)	(-1.5)
Hausman Test - p-value			0.1
Adjusted R^2	0.25	0.21	0.23
No. of observations	63	63	63

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. WLS denotes weighted least squares regressions where the weight used is GDP per capita in 1985. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level.

Table 3.11 - continued

	(4) OLS	(5) IV	(6) OLS	(7) IV
constant	8.8 (3.2)***	12.5 (3.2)***	6.2 (2.7)***	6.6 (2.8)***
Log GDP per capita, 1981-98	-1.1 (-1.7)*	-1.9 (-2.1)**	-0.01 (-0.1)	-0.2 (-0.3)
Total Population, 1981-98	-0.3 (-1.4)	-0.3 (-1.2)	-0.4 (-2.1)**	-0.4 (-1.9)*
Trade Openness, 1981-98	0.002 (0.6)	0.01 (1.5)	-0.01 (-1.5)	-0.01 (-1.1)
Oil	2.4 (5.7)***	2.2 (6.6)***	1.1 (1.8)*	1.3 (1.9)*
$CapVol_{81-98}$	0.004 (0.7)	-0.01 (-0.9)	0.01 (2.3)**	0.01 (1.7)*
$CapVol_{81-98}$*Log GDP per capita, 1981	-0.001 (-1.1)	0.001 (0.7)		
$CapVol_{81-98}$*Industrialised			-0.02 (-3.1)***	-0.01 (-2.3)**
F-test	1.4 (0.2)	1.1 (0.3)	6.3 (0.01)	4.6 (0.01)
Hausman Test - p-value		0.16		0.5
Adjusted R^2	0.25	0.19	0.37	0.36
No. of observations	63	63	63	63

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level. F-test indicates test of null hypothesis that $CapVol_{81-98}$ and interaction term are jointly insignificant (probability in parentheses).

Table 3.12: Volatility of Growth - Role of Financial Depth and Institutional Strength - Full Sample

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
constant	8.6	7.9	1.2	6.2
	(2.4)**	(2.1)**	(0.4)	(1.5)
Log GDP per capita, 1981-98	-1.2	-0.8	1.6	1.4
	(-1.5)	(-1.1)	(1.5)	(1.1)
Total Population, 1981-98	-0.2	-0.1	-0.2	-0.3
	(-0.6)	(-0.3)	(-1.1)	(-1.2)
Trade Openness, 1981-98	0.004	0.01	0.001	0.005
	(1.5)	(2.1)**	(0.4)	(1.4)
Oil	2.2	2.4	1.1	1.5
	(4.4)***	(4.9)***	(1.5)	(2.7)***
$CapVol_{81-98}$	0.002	-0.01	0.02	-0.03
	(0.5)	(-1.3)	(1.5)	(-0.8)
PRIVO	-0.4	-1.6		
	(-0.3)	(-1.2)		
$CapVol_{81-98}$*PRIVO	-0.003	0.01		
	(-0.7)	(1.1)		
GADP			-3.8	-8.6
			(-1.3)	(-1.7)*
$CapVol_{81-98}$*GADP			-0.02	0.03
			(-1.5)	(0.8)
F-test	0.3	1.1	1.4	0.4
	(0.7)	(0.3)	(0.3)	(0.7)
Hausman Test - p-value		0.06		0.05
Adjusted R^2	0.23	0.13	0.34	0.22
No. of observations	59	59	59	59

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level. F-test indicates test of null hypothesis that $CapVol_{81-98}$ and interaction term are jointly insignificant (probability in parentheses).

Table 3.13: Volatility of Growth - Basic regressions - developing countries

	(1)	(2)	(3)
	OLS	WLS	IV
constant	0.9	9.3	1.9
	(0.3)	(1.4)	(0.5)
Log GDP per capita, 1981-98	1.4	0.7	1.1
	(1.4)	(0.4)	(1.1)
Total Population, 1981-98	-0.3	-1.2	-0.3
	(-1.2)	(-3.1)***	(-1.1)
Trade Openness, 1981-98	-0.01	-0.02	-0.01
	(-2.3)**	(-3.2)***	(-1.2)
Oil	0.6	0.2	0.9
	(0.8)	(0.3)	(1.2)
$CapVol_{81-98}$	0.01	0.02	0.006
	(2.3)**	(3.3)***	(0.8)
Hausman Test - p-value			0.22
Adjusted R^2	0.13	-0.1	0.1
No. of observations	42	42	42

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. WLS denotes weighted least squares regressions where the weight used is GDP per capita in 1985. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$). * (**, ***) indicates statistical significance at the 10% (5%, 1%) level. F-test indicates test of null hypothesis that $CapVol_{81-98}$ and interaction term are jointly insignificant (probability in parentheses).

Table 3.14: Volatility of Growth - Role of Financial Depth and Institutional Strength - developing countries

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
constant	-1.1	2.9	-5.8	1.9
	(-0.2)	(0.4)	(-1.2)	(0.2)
Log GDP per capita, 1981-98	1.9	1.6	3.2	2.8
	(1.9)*	(1.4)	(2.9)***	(2.4)**
Total Population, 1981-98	-0.3	-0.5	-0.1	-0.4
	(-0.6)	(-0.9)	(-0.3)	(-0.9)
Trade Openness, 1981-98	-0.02	-0.02	-0.01	-0.02
	(-1.4)	(-1.3)	(-1.3)	(-1.7)*
Oil	0.1	0.3	0.1	0.2
	(0.2)	(0.4)	(0.1)	(0.4)
$CapVol_{81-98}$	0.01	-0.001	0.02	-0.03
	(1.5)	(-0.1)	(0.9)	(-0.5)
PRIVO	-0.7	-1.6		
	(-0.5)	(-0.9)		
$CapVol_{81-98}$*PRIVO	0.003	0.02		
	(0.2)	(0.8)		
GADP			-2.6	-7.3
			(-0.6)	(-1.1)
$CapVol_{81-98}$*GADP			-0.01	0.06
			(-0.3)	(0.8)
F-test	5.2	1.5	3.3	2.4
	(0.01)	(0.2)	(0.1)	(0.1)
Hausman Test - p-value		0.2		0.2
Adjusted R^2	0.07	0.02	0.15	0.06
No. of observations	38	38	38	38

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. WLS denotes weighted least squares regressions where the weight used is GDP per capita in 1985. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$). * (**, ***) indicates statistical significance at the 10% (5%, 1%) level. F-test indicates test of null hypothesis that $CapVol_{81-98}$ and interaction term are jointly insignificant (probability in parentheses).

Table 3.15: Volatility of Investment - Basic regressions - Full Sample

	(1)	(2)	(3)
	OLS	WLS	IV
constant	10.1	12.7	9.2
	(3.6)***	(3.7)***	(3.1)***
Log GDP per capita, 1981-98	-1.2	-1.2	-0.9
	(-2.3)**	(-2.1)**	(-1.5)
Total Population, 1981-98	-0.5	-0.8	-0.4
	(-1.8)*	(-2.3)**	(-1.7)*
Trade Openness, 1981-98	0.02	0.02	0.02
	(2.3)**	(2.1)**	(2.4)**
Oil	1.7	1.4	1.7
	(3.5)***	(2.7)***	(3.7)***
$CapVol_{81-98}$	-0.003	-0.005	-0.006
	(-1.2)	(-1.5)	(-1.4)
Hausman Test - p-value			0.14
Adjusted R^2	0.37	0.35	0.36
No. of observations	63	63	63

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. WLS denotes weighted least squares regressions where the weight used is GDP per capita in 1985. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level.

Table 3.15 - continued

	(4)	(5)	(6)	(7)
	OLS	IV	OLS	IV
constant	8.6 (1.9)*	12.1 (2.2)**	6.5 (2.1)**	7.3 (2.4)**
Log GDP per capita, 1981-98	-0.8 (-0.9)	-1.6 (-1.4)	0.04 (0.1)	-0.3 (-0.4)
Total Population, 1981-98	-0.5 (-1.7)*	-0.5 (-1.7)*	-0.6 (-1.9)*	-0.5 (-1.7)*
Trade Openness, 1981-98	0.02 (1.9)*	0.02 (2.2)**	0.01 (1.1)	0.01 (1.2)
Oil	1.8 (3.6)***	1.6 (2.4)**	0.8 (1.1)	1.1 (1.4)
$CapVol_{81-98}$	0.001 (0.1)	-0.01 (-0.8)	0.01 (1.5)	0.003 (0.4)
$CapVol_{81-98}$*Log GDP per capita, 1981	-0.001 (-0.4)	0.001 (0.5)		
$CapVol_{81-98}$*Industrialised			-0.01 (-2.3)***	-0.01 (-1.2)
F-test	1.5 (0.2)	1.4 (0.2)	6.3 (0.01)	2.5 (0.1)
Hausman Test - p-value		0.17		0.33
Adjusted R^2	0.36	0.33	0.41	0.4
No. of observations	63	63	63	63

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level. F-test indicates test of null hypothesis that $CapVol_{81-98}$ and interaction term are jointly insignificant (probability in parentheses).

Table 3.16: Volatility of Investment - Role of Financial Depth and Institutional Strength - Full Sample

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
constant	10.9 (2.9)***	10.3 (2.4)**	4.7 (1.2)	11.1 (2.2)**
Log GDP per capita, 1981-98	-1.4 (-1.9)*	-1.1 (-1.2)	-0.5 (-0.4)	-0.7 (-0.4)
Total Population, 1981-98	-0.6 (-1.8)*	-0.5 (-1.5)	-0.5 (-1.7)*	-0.5 (-1.5)
Trade Openness, 1981-98	0.02 (2.2)**	0.02 (2.3)**	0.02 (2.2)**	0.02 (2.3)**
Oil	1.3 (2.3)**	1.6 (2.8)***	1.1 (1.1)	1.7 (2.2)**
$CapVol_{81-98}$	0.005 (1.1)	-0.01 (-0.8)	0.04 (2.4)**	-0.02 (-0.7)
PRIVO	1.1 (1.5)	-0.1 (-0.1)		
$CapVol_{81-98}$*PRIVO	-0.009 (-1.4)	0.002 (0.3)		
GADP			3.4 (1.3)	-2.6 (-0.5)
$CapVol_{81-98}$*GADP			-0.05 (-2.7)***	0.002 (0.5)
F-test	1.3 (0.3)	1.7 (0.2)	3.9 (0.1)	1.5 (0.2)
Hausman Test - p-value		0.1		0.05
Adjusted R^2	0.35	0.29	0.42	0.29
No. of observations	59	59	59	59

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level. F-test indicates test of null hypothesis that $CapVol_{81-98}$ and interaction term are jointly insignificant (probability in parentheses).

Table 3.17: Volatility of Investment - Basic Regressions - developing countries

	(1)	(2)	(3)	(4)
	OLS	OLS	WLS	IV
constant	5.8	-2.2	9.1	0.3
	(1.5)	(-0.5)	(1.1)	(0.1)
Log GDP per capita, 1981-98	0.2	0.2	-1.4	-0.2
	(0.2)	(0.3)	(-0.8)	(-0.3)
Total Population, 1981-98	-0.5	0.3	-0.5	0.2
	(-1.3)	(0.9)	(-0.8)	(0.8)
Trade Openness, 1981-98	0.01	0.03	0.04	0.04
	(1.2)	(3.7)***	(3.9)***	(3.7)***
Oil	0.8	0.7	0.7	1.3
	(1.1)	(0.8)	(0.7)	(1.6)
$CapVol_{81-98}$	0.004	0.01	0.01	-0.001
	(0.6)	(1.9)*	(0.6)	(-0.1)
Hausman Test - p-value				0.01
Adjusted R^2	0.28	0.52	0.35	0.47
No. of observations	42	41	41	41

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. WLS denotes weighted least squares regressions where the weight used is GDP per capita in 1985. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$). Singapore was found to be an outlier in a formal test using observation-specific dummies and, therefore, is excluded in the regressions presented in columns (2)-(4). * (**, ***) indicates statistical significance at the 10% (5%, 1%) level. F-test indicates test of null hypothesis that $CapVol_{81-98}$ and interaction term are jointly insignificant (probability in parentheses).

Table 3.18: Volatility of Investment - Role of Financial Depth and Institutional Strength - developing countries

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
constant	-6.8	-0.9	-1.2	11.8
	(-1.1)	(-0.1)	(-0.2)	(1.1)
Log GDP per capita, 1981-98	0.9	0.7	0.4	-0.1
	(0.9)	(0.6)	(0.3)	(-0.1)
Total Population, 1981-98	0.5	0.3	0.2	0.04
	(1.3)	(0.5)	(0.6)	(0.1)
Trade Openness, 1981-98	0.04	0.04	0.03	0.03
	(2.9)***	(2.2)**	(3.3)***	(2.5)**
Oil	0.1	-0.3	0.5	0.4
	(0.1)	(-0.2)	(0.5)	(0.5)
$CapVol_{81-98}$	0.02	-0.03	-0.02	-0.1
	(1.3)	(-1.2)	(-0.5)	(-1.4)
PRIVO	-1.1	-6.6		
	(-0.4)	(-1.9)*		
$CapVol_{81-98}$*PRIVO	-0.003	0.1		
	(-0.1)	(1.7)*		
GADP			-1.6	-17.3
			(-0.3)	(-1.4)
$CapVol_{81-98}$*GADP			0.05	0.3
			(0.8)	(1.5)
F-test	3.3	1.7	2.2	3.7
	0.1	0.2	0.1	0.1
Hausman Test - p-value		0.02		0.02
Adjusted R^2	0.51	0.36	0.53	0.39
No. of observations	37	37	37	37

Note: White heteroskedasticity-consistent t-statistics in parentheses. OLS denotes ordinary least squares regressions. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$). Singapore was found to be an outlier in a formal test using observation-specific dummies and, therefore, is excluded in all regressions. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level. F-test indicates test of null hypothesis that $CapVol_{81-98}$ and interaction term are jointly insignificant (probability in parentheses).

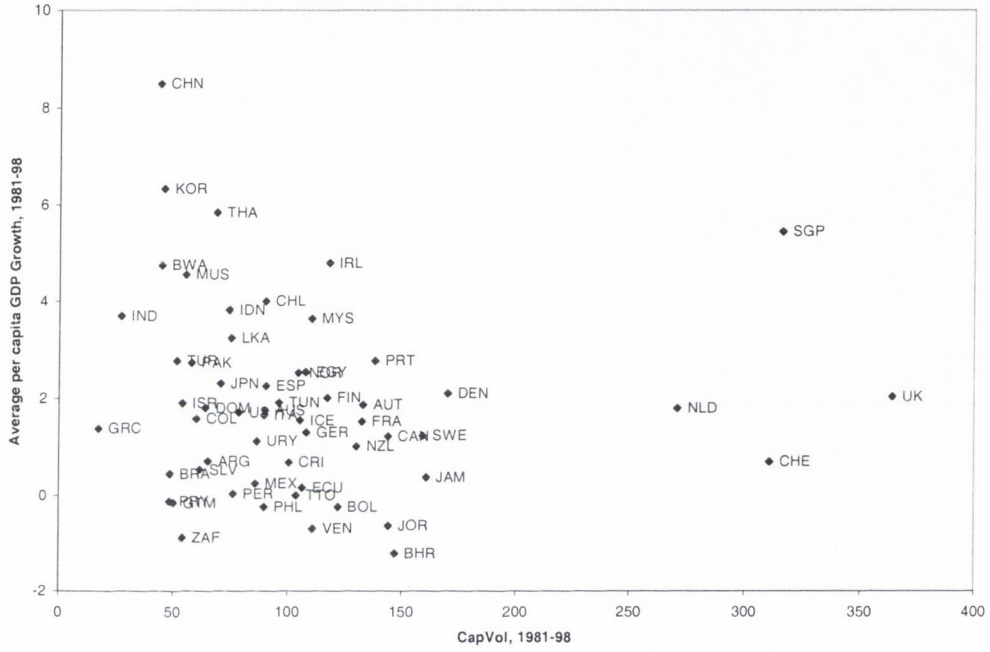

Figure 3.1: Financial openness and Average per capita real GDP growth - 1981-1998

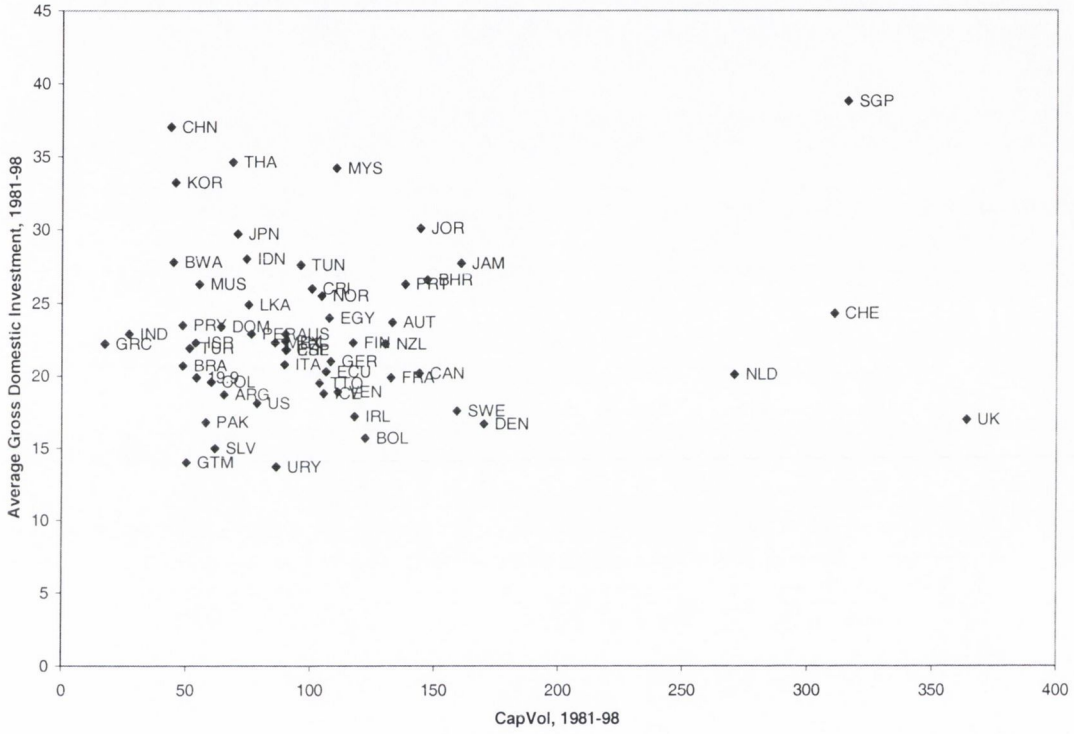

Figure 3.2: Financial openness and Average Gross Domestic Investment (as a percentage of GDP) - 1981-1998

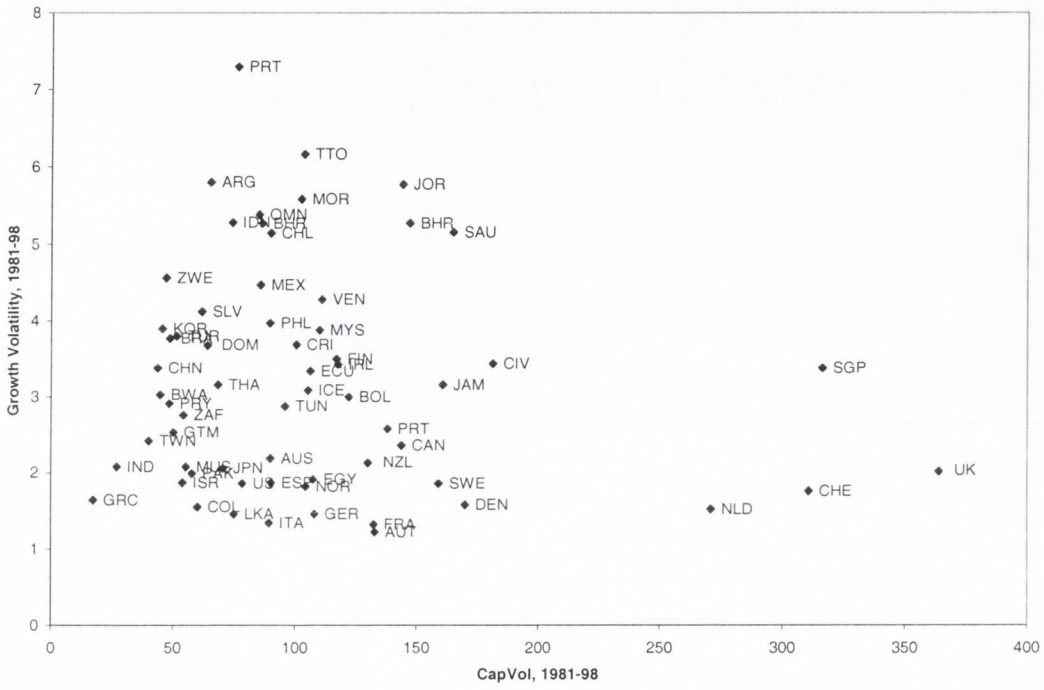

Figure 3.3: Financial openness and the volatility of per capita real GDP growth - 1981-1998

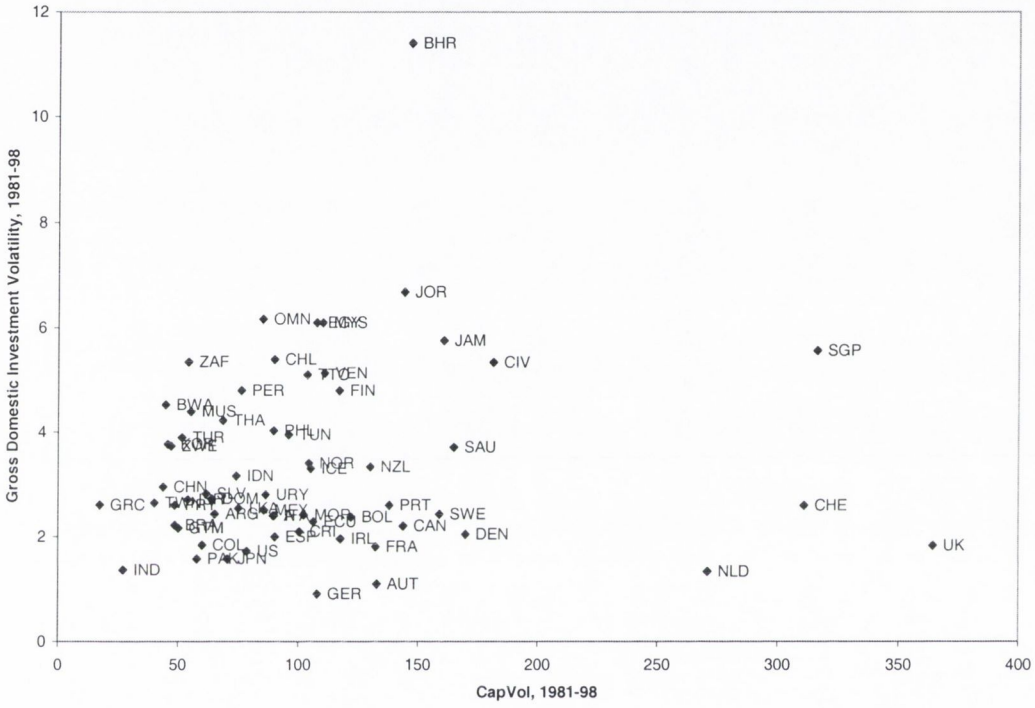

Figure 3.4: Financial openness and the volatility of Gross Domestic Investment (as a percentage of GDP) - 1981-1998

4.1 Introduction[1]

The suddenness and severity of the 1997-98 East Asian crisis highlighted some important questions, particularly in relation to the merits of capital account liberalisation. The increasingly volatile nature of capital flows has prompted some economists to suggest that the capital account is more often the source of economic difficulties and risk rather than benefit. In particular, controls on capital movements have been put forward by some economists as a response to the financial turmoil caused by this excessive volatility of capital flows (Krugman, 1998). On the other hand, many economists continue to argue that the traditional theoretical benefits of free capital mobility outweigh any potential costs. One frequently asserted benefit of greater financial openness is that it may force countries to implement more disciplined economic policies than might be the case if the capital account is relatively closed. As a result, this might have beneficial consequences for the conduct of monetary policy and the degree of effort exerted to keep inflation under control.

This chapter is concerned with empirically analysing the effect of financial openness on the level and volatility of inflation. The theoretical literature in this area provides ambiguous predictions about the impact of increasing financial openness on the rate of inflation. According to the optimal taxation literature, inflation is a tax that is chosen optimally together with other tax instruments. By increasing the scope for portfolio diversification and reducing the ability of governments to impose financial repression measures, the increase in capital outflows that may result from the removal of capital controls may reduce the inflation tax base, implying that any budget deficit would have to be covered by a higher rate of inflation (Grilli and Milesi-Ferretti, 1995).

[1]This Chapter will be published in the Journal of Economic Integration, forthcoming.

On the other hand, greater financial openness may prompt a country to adopt a tighter monetary policy. Many countries with a history of high inflation attempt to solve this by implementing institutional fixes which signal a strong commitment to monetary discipline. Examples include setting up an independent central bank, adopting a currency board, joining a monetary union, and so on. One such signal of commitment to monetary discipline is the removal of any restrictions on the movement of capital. Open capital accounts may force countries to implement prudent monetary policies as a means of preventing costly outflows of capital and attracting capital inflows.[2] In addition to this signaling role, however, the greater level of financial openness that may result from opening the capital account can directly increase the costs associated with loose monetary policy. In countries that frequently resort to generating seigniorage revenue as a means of raising tax revenues, greater capital mobility, by increasing the penalty for excessive money creation, may reduce the inherent inflationary bias of discretionary monetary policy (Gruben and McLeod, 2000). Greater financial openness gives private agents an opportunity to avoid the inflation tax, thus increasing the possibility of large and rapid reserve losses or, in the case of a flexible exchange rate regime, a significant currency depreciation. This should reduce the temptation on the central bank's part to print money, thereby causing the inflation rate to fall.

The empirical evidence examining the impact of capital account openness on inflation levels is mixed. Table 4.1 summarises the main findings of the recent research. Alesina et al (1994) and Grilli and Milesi-Ferretti (1995) find

[2]This is the policy signaling potential of capital account liberalisation emphasised by Bartolini and Drazen (1997) and Laban and Larrain (1997). These papers, however, focus on increases in private investment, as financial liberalisation signals future policy changes which trigger inflows of capital.

that, for a large cross-section of countries, the level of inflation is higher in the presence of capital controls. This finding is not confirmed, however, by Rodrik (1998a) or Kraay (1998). Gruben and McLeod (2000) examine whether capital account liberalisation enables countries to reduce inflation faster. They compare the change in the average inflation rate between the 1980s and 1990s for a large cross-section of countries. They find that, for both OECD and developing countries, capital account openness contributes to the rate of disinflation.

This paper extends the previous research in three main directions. First, all previous studies use restrictiveness indicators of capital account openness.[3] In contrast, I consider the impact of a new volume-based measure of financial openness on inflation levels and volatility over the period 1981-1998. The construction of this measure is described in detail in Chapter Two.

Second, unlike previous studies, the volatility (standard deviation) of the level of inflation is also included as a dependent variable. For some developing countries, the experience of greater capital mobility has brought with it the attendant problem of greater exposure to short-term capital flows. The macroeconomic and financial crises suffered by many developing countries during the 1990s highlighted the difficulties associated with large and swift movements of short-term capital across international borders. Such flows can sometimes be very sensitive to irrational market sentiment in financial markets and can be influenced largely by short-term interest rate differentials on liquid instruments rather than by reference to long-term factors such as the rate of return on investment. This situation partly arises from market failures such as asymmetric

[3]In addition to the rules-based indicator which is computed from information provided by the IMF and a binary indicator constructed by Quinn (1997), Kraay (1998) also uses a volume-based measure of financial openness which he defines as the sum of capital inflows and outflows as a ratio of GDP.

information and bounded rationality which are widespread in financial markets. In addition, many developing countries have not reached a sufficiently advanced level of financial sector development required to efficiently intermediate large and rapid flows of capital. As a result, short-term capital flows can be excessively volatile. This can have serious consequences for inflation stability. In effect, countries with greater levels of capital mobility may experience increased inflation volatility. I am aware of no study that empirically examines the impact of capital account liberalisation and/or financial openness on inflation volatility.

Third, I examine the hypothesis that the relationship between financial openness and inflation levels and volatility may be influenced by the level of financial depth. As mentioned above, countries with weak financial systems are particularly vulnerable to short-term capital flow volatility. In effect, weak financial systems with inadequate prudential supervision cannot efficiently intermediate large flows of short-term capital. As these flows of capital become more volatile, financial fragility increases, potentially culminating in a severe macroeconomic crisis as illustrated by the Mexican crisis of 1994-95 and the 1997-98 East Asian crisis. Thus, the lack of empirical evidence on the benefits of open capital accounts, in terms of low inflation, in some of the previous research may have resulted from a failure to distinguish between countries with varying degrees of financial system strength.[4]

The results are mostly unconvincing. Apart from some weak evidence suggesting that greater financial openness is associated with *higher* inflation volatility in developing countries, there is no evidence of a significant relationship between these variables. The rest of this chapter is organised as follows. Section

[4]Rodrik (1998) and Kraay (1998), however, find no evidence to suggest that the degree of financial depth mediates the relationship between capital account openness and inflation levels.

4.2 examines the empirical link between the volume-based measure of financial openness and the level of inflation while Section 4.3 focuses on the inflation volatility outcomes. Section 4.4 offers some concluding remarks and possible directions for future research in this area.

4.2 Financial Openness and Inflation Levels

In this section, I examine empirically the relationship between the volume-based measure of financial openness ($CapVol_{81-98}$) and inflation levels. Figure 4.1 presents a scatterplot of the natural logarithm of the average annual CPI inflation rate against the degree of financial openness for the full sample over the period 1981 to 1998.[5] There would seem to be a negative relationship between these two variables and, indeed, the simple correlation coefficient is -0.38 which is significant at the 99 percent level. I need to examine, however, whether this relationship is statistically significant in a regression analysis where other variables are taken into account.

For the cross-sectional regression analysis, I regress the natural logarithm of the average annual CPI inflation rate over the period 1981 to 1998 on $CapVol_{81-98}$, using ordinary least squares (OLS), with standard errors corrected for heteroskedasticity by the White procedure. A question that arises when considering the OLS outcomes is whether there is an downward bias on the financial openness coefficient because of reverse causality. One might expect countries to experience greater flows of capital when inflation is reasonably under control. To address this problem, I also carry out two-stage regressions that instrument for $CapVol_{81-98}$. In addition to the basic control variables, the instruments used to predict the average level of financial openness over the period 1981 to 1998

[5]Due to data availability constraints, only 58 countries are included in the full sample

are the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries.[6] The adjusted R^2 for the first stage regression (which is not reported) is 0.65.[7]

The following four basic control variables are included in all regressions: per capita real GDP in 1981 in log form, the average population level over 1981-1998 in log form, average trade openness (exports plus imports divided by GDP) over 1981-1998, and a Latin American regional dummy variable. Several comments about these variables are required.

I include real GDP per capita to capture several possible effects. A higher level of income per capita is likely to be accompanied by a more sophisticated tax system and greater financial system strength, both of which imply a lower optimal inflation tax and thus lower levels of inflation (Campillo and Miron, 1997). On the other hand, high income countries may devote more resources to developing technologies for reducing the costs of inflation, thereby lowering inflation aversion and increasing the level of inflation.

A measure of average trade openness over the period 1981 to 1998 is also included as a regressor. Countries that are more open to international trade have lower incentives to use unexpected inflation to stimulate economic activity, because of the negative effects of real depreciation on the terms of trade

[6] In the developing country subsample, only the initial level of financial openness in 1981 ($CapVol_{81}$) is used as an instrument for the financial openness measure.

[7] Many other variables were considered as potential instruments: a measure of capital account liberalisation over the period 1975 to 1980, the average level of government consumption as a percentage of GDP over 1975-1980, the average government budget balance as a percentage of GDP over 1975-1980, the ratio of liquid liabilities to GDP in 1980, a dummy variable for whether the country is landlocked, a dummy for whether it is an island, distance from the equator, and the share of the population speaking English. None of these, however, increase the adjusted R^2 when included as a regressor in the first stage regression.

(Romer, 1993). Thus one would expect to observe lower inflation levels in more open economies. Lane (1997), however, shows that this relationship between openness and inflation holds independently of the terms of trade mechanism by emphasising the role of nominal price rigidities in the non-traded sector. He points out that because the share of non-tradeable goods in consumption is smaller in open economies, the benefit of a surprise monetary expansion, in terms of increased production of non-tradeables, will be smaller in more open economies. This also implies a negative relationship between trade openness and inflation. For a given level of trade openness, the larger is the economy, the smaller is the benefit of a surprise monetary expansion in terms of increased production of non-tradeables and, therefore, the stronger the inverse relationship between trade openness and inflation. Thus, total average population over the period 1981-98 is also included in the control variables to proxy for a country's economic size and one would expect the sign of the coefficient to be negative.

Throughout the cross-sectional analysis, a number of other variables are introduced, in turn, into the specification. First, in the full sample and in the sample excluding high inflation countries, I interact financial openness with a 0/1 dummy variable representing the industrialised countries to examine whether financial openness has different inflation effects in high- and low-income countries. I then introduce into the specification an institutional variable (GOVREP) that captures the degree to which governments do not repudiate contracts.[8] One would expect inflation levels to be lower in countries with stronger bureaucracies.

To assess the possibility that the relationship between financial openness

[8]This variable is an index scaled from 0 to 10, with lower scores reflecting a higher risk of repudiation. I would like to thank Michael Klein for generously sharing these data with me.

and inflation levels is affected by the quality of the financial system, I introduce into the cross-sectional regressions an interaction term representing financial openness *and* strength of the financial system ($CapVol_{81-98}$*PRIVO), as well as allowing the financial system itself to have a direct impact on outcomes. PRIVO measures the value of credits by financial intermediaries to the private sector divided by GDP.[9] It focuses on credit issued to the private sector, as opposed to credit issued to governments, government agencies, and public enterprises.

Finally, I introduce into the regression specification a measure of central bank independence, taken from Cukierman et al (1992). This variable measures the turnover in central bankers, which is considered to be negatively correlated with the degree of independence of the central bank.[10] One would expect inflation levels to be lower in countries with a more independent central bank, because central bank independence is associated with the choice of central bankers that are more inflation averse than is the government.[11]

4.2.1 Cross-Sectional Results

Three samples are considered: the full sample and two subsamples: the set of developing countries and a subsample excluding seven countries with average inflation rates above 60 percent.[12] The results are presented in Tables 4.2-4.4. In the case of the instrumental variables (IV) regressions, a formal test concerning the possible endogeneity of the financial openness variable is presented in each table in the row labeled "Hausman Test - p value". The p-value is obtained

[9]This variable is only available as an average over five year periods, e.g. 1981-85, 1986-91, etc. Thus, in these regressions, PRIVO is averaged over the period 1981 to 1995.

[10]This variable is only available as an average over the period 1980-1989.

[11]Alesina and Summers (1993) provide comparative evidence to support this view for sixteen OECD countries.

[12]These countries are: Argentina, Bolivia, Brazil, Chile, Israel, Peru, and Uruguay.

using the artificial regression technique discussed in Davidson and MacKinnon (1989).[13] Assuming that the endogeneity of the financial openness measure is what might make the OLS estimates inconsistent, this test can be interpreted as a test of the extent to which this variable is endogenous and/or simultaneous equation bias is a problem.

In the full sample (Table 4.2), GDP per capita, total population and trade openness generally exhibit negative coefficients but they are almost never significant. The Latin American dummy variable is positive and always highly significant. In the basic OLS regression in column (1), $CapVol_{81-98}$ is negative but insignificant. In the IV regression in column (2), $CapVol_{81-98}$ becomes more negative indicating that there is no downward bias when using OLS estimation. The financial openness coefficient, however, remains insignificant. The Hausman test reveals a p-value on the coefficient on the instrumented regressor of 0.13, suggesting that the OLS estimates are consistent. Therefore, for the rest of the full sample, I only report the OLS outcomes.

A formal investigation searching for outliers and influential observations was undertaken using observation-specific dummy variables. This is where a dummy variable is used for country i, effectively excluding it from the dataset for that regression.[14] This is then repeated for each country in turn. In effect, the regressions indicate how the statistical significance of financial openness ($CapVol_{81-98}$) changes when each country's data are excluded in turn. Thus, we can see which countries are influential. The OLS outcome in column (1) of the full sample is robust to the removal of any one country.

When I interact financial openness with a dummy variable representing the

[13]Davidson and MacKinnon (1993) refer to this endogeneity test as the Durbin-Wu-Hausman test.

[14]Kennedy (1998, p226)

industrialised countries, I find no support for the notion that greater capital mobility is associated with lower inflation levels in richer countries. In the OLS regression in column (3), $CapVol_{81-98}$ remains negative while the interaction term exhibits an unanticipated positive coefficient but they are both insignificant.[15] Both variables are also insignificant in the (unreported) IV regression.

When I introduce, in turn, the political stability variable (GOVREP) and an indicator of financial depth (PRIVO) in columns (4) and (5), $CapVol_{81-98}$ remains negative and insignificant. The direct effects of both variables are negative and highly significant, suggesting that countries with stronger bureaucracies and deeper financial systems experience lower inflation levels. The interaction term representing financial openness *and* financial depth is positive but insignificant in column (5), thus providing no evidence to suggest that the combination of increasing financial openness *and* a deeper financial system is associated with lower inflation levels.[16],[17] $CapVol_{81-98}$ remains negative and insignificant when

[15]The (unreported) F-test allows me to reject the null hypothesis of joint insignificance on the part of $CapVol_{81-98}$ and its interaction with the industrialised dummy variable.

[16]The (unreported) F-test allows me to reject the null hypothesis of joint insignificance on the part of $CapVol_{81-98}$ and its interaction with PRIVO. When I replace PRIVO with an alternative measure of financial depth (liquid liabilities as a ratio of GDP), the outcomes are the same.

[17]An important issue is the size and economic significance of the individual coefficients on $CapVol_{81-98}$ and the interaction term. The results in column (5) can be used to evaluate the size of the partial derivative $dINF/dCapVol_{81-98} = b1 + b2X$ where INF is the natural logarithm of the average inflation level, $b1$ is the coefficient on $CapVol_{81-98}$, $b2$ is the coefficient on the interaction term, and X is PRIVO. A one standard deviation increase in financial openness in a country for which PRIVO equals its 25th percentile value (0.3) will lead to a decline in the natural logarithm of average inflation of -0.28. Similarly, at the median level of PRIVO (0.5), a one standard deviation increase in $CapVol_{81-98}$ will lead to a decline of -0.2. At the 75th percentile value of PRIVO (0.7), a one standard deviation increase in financial openness will lead to a decline of -0.14. It must be noted, however, that given that the mean

I include a measure of central bank independence in column (6).[18] This variable exhibits an expected positive coefficient but is insignificant.

The Latin American dummy is the only basic control variable always significant (negative) in the developing country subsample (Table 4.3). Both per capita GDP and total population exhibit positive coefficients in most cases but they are insignificant. Trade openness is negative but never significant. $CapVol_{81-98}$ is negative and insignificant in the basic OLS and IV regression in columns (1) and (2).[19] The Hausman test in column (2) provides no evidence of inconsistent OLS estimates. When I introduce the political stability variable (GOVREP) in column (3), $CapVol_{81-98}$ turns positive but remains insignificant. GOVREP is negative but insignificant. Finally, in column (4), there is no evidence to suggest that the relationship between financial openness and inflation levels in developing countries is contingent on the degree of financial depth. $CapVol_{81-98}$ and the interaction term exhibit negative and positive coefficients,

level of the natural logarithm of average inflation in this full sample of 56 countries is 2.7, the overall economic significance of these partial derivatives is quite small.

[18]The number of countries included in this specification is smaller because of missing central bank independence data for many developing countries.

[19]A formal investigation searching for leverage points using observation-specific dummy variables reveals that the OLS outcome is robust to the removal of any one country.

respectively, but they are insignificant.[20],[21]

Finally, in the sample excluding the high-inflation countries (Table 4.4), per capita GDP, trade openness and total population always exhibit a negative sign but only the former two are regularly significant. In the basic OLS and IV regressions in columns (1) and (2), $CapVol_{81-98}$ is negative but insignificant.[22] The Hausman test in column (2) provides no evidence of inconsistent OLS estimates. The results in column (3) provide no support for the notion that greater financial openness is associated with lower inflation levels in richer countries. $CapVol_{81-98}$ and its interaction with the industrialised dummy variable exhibit negative and positive coefficients, respectively, but they are insignificant.

$CapVol_{81-98}$ remains negative but insignificant when I introduce GOVREP into the specification. This variable exhibits an expected negative coefficient but is insignificant. When I introduce the financial depth variable (PRIVO) and its interaction with financial openness in column (5), both $CapVol_{81-98}$ and the interaction term exhibit negative and positive coefficients, respectively, but they are insignificant.[23] The direct effect of PRIVO is negative and significant at the

[20]The F-test rejects the null hypothesis of joint insignificance for both variables. When I replace PRIVO with the liquid liabilities measure (LLY) of financial depth, $CapVol_{81-98}$ and the interaction term exhibit the same signs but now the latter term is significant at the 95 percent confidence level. This suggests that the combination of increasing financial openness *and* deeper financial systems (as measured by LLY) is associated with *higher* inflation levels in developing countries. In this case, the F-test also rejects the null hypothesis of joint insignificance for both variables. Once again, the economic significance of the partial derivatives is small.

[21]I do not carry out a regression including the measure of central bank independence for the developing country subsample as I do not have enough observations.

[22]Once again, this is robust to the exclusion of any one country in a test for outliers and influential observations.

[23]The same outcome exists when I replace PRIVO with LLY as the measure of financial depth.

99 percent confidence level. Finally, $CapVol_{81-98}$ is negative and insignificant in column (6) when I introduce the central bank independence measure.

4.3 Financial Openness and Inflation Volatility

In this section, I examine empirically the relationship between the volume-based measure of financial openness ($CapVol_{81-98}$) and inflation volatility. One of the possible consequences of increasing financial openness is greater uncertainty. This may come about through a shift in the composition of external obligations towards more short-term and easily-reversible forms of finance. This may make some developing countries more vulnerable to financial and currency crises.[24] As a result, inflation may exhibit greater volatility. The tendency for this to be observed, however, might be expected to decline in countries with deeper financial systems. Figure 4.2 presents a scatterplot of inflation volatility against the degree of financial openness for the full sample over the period 1981 to 1998. Once again, there is a suggestion of a negative relationship although it is not overly apparent. The simple correlation coefficient is -0.25 and this is significant at the 90 percent level.

In this section, I regress the natural logarithm of the standard deviation of the annual CPI inflation rate over the period 1981 to 1998 on $CapVol_{81-98}$, using ordinary least squares (OLS), with standard errors corrected for heteroskedasticity by the White procedure. To address the possibility for reverse causality, I also carry out two-stage regressions that instrument for $CapVol_{81-98}$. In addition to the basic control variables, the instruments used are the same as those used in section 4.3.

[24]There are a number of recent empirical studies which provide evidence to suggest that financial and banking crises are preceded by financial liberalisation. A recent overview of the literature in this area is provided by Aizenman (2002).

Following the procedure of Lane (2002), two basic control variables are included in all regressions: real GDP per capita in log form and trade openness (exports plus imports divided by GDP). These two variables are averaged over the period 1981 to 1998. I also include a dummy variable representing the Latin American countries.[25] Several comments about these variables are required.

I include average GDP per capita to capture several possible effects. A higher level of income per capita is likely to be accompanied by a more sophisticated tax system and greater financial system strength, both of which imply a lower level of inflation volatility (Campillo and Miron, 1997). On the other hand, high income countries may devote more resources to developing technologies for reducing the costs of inflation, thereby lowering inflation aversion and, thus, potentially increasing inflation volatility.

A measure of trade openness is also included as a regressor. Countries that are more open to international trade have lower incentives to use unexpected inflation to stimulate economic activity, because of the negative effects of real depreciation on the terms of trade (Romer, 1993). Thus, one might expect to observe lower inflation volatility in more open economies. On the other hand, more open economies are more vulnerable to external shocks and, therefore, may experience greater inflation volatility.

Like the analysis in Section 4.3, the following variables are introduced, in turn, into the specification. First, in the full sample and in the subsample excluding high inflation countries, I interact financial openness with a 0/1 dummy variable representing the industrialised countries to examine whether capital mobility has different inflation volatility effects in high- and low-income coun-

[25] I exclude total population from the set of regressors as one would not expect the size of a country to be important in explaining inflation volatility.

tries. I then introduce into the specification an institutional variable (GOVREP) that captures the degree to which governments do not repudiate contracts. One would expect inflation volatility to be lower in countries with stronger bureaucracies.

To assess the possibility that the relationship between financial openness and inflation volatility is affected by the quality of the financial system, I introduce into the cross-sectional regressions an interaction term representing financial openness *and* strength of the financial system ($CapVol_{81-98}$*PRIVO), as well as allowing the financial system itself to have a direct impact on outcomes. It might be the case that the extent to which greater financial openness is positively associated with inflation volatility declines in countries with stronger financial systems. Finally, I introduce a measure of central bank independence. One would expect inflation volatility to be lower in countries with a more independent central bank, because central bank independence is associated with the choice of central bankers that are more averse to inflation volatility than is the government.

4.3.1 Cross-Sectional Results

Three samples are considered: the full sample and two subsamples: the set of developing countries and a subsample excluding countries with average inflation rates above 60 percent. The results are presented in Tables 4.5-4.7. In the full sample (Table 4.5), per capita GDP changes sign throughout the regressions but it is almost never significant. Trade openness exhibits a negative sign in all cases but it is never significant. The Latin American dummy variable, however, is positive and always significant. In the basic OLS regression in column (1), $CapVol_{81-98}$ is negative but insignificant. In the IV regression in column

(2), $CapVol_{81-98}$ becomes more negative indicating that there is no downward bias when using OLS estimation. The financial openness coefficient remains insignificant, however. The Hausman test reveals a p-value on the coefficient on the instrumented regressor of 0.75, suggesting that the OLS estimates are consistent.[26] Therefore, for the rest of the full sample, I only report the OLS outcomes.

When I interact financial openness with a dummy variable representing the industrialised countries, I find no support for the notion that greater capital mobility is associated with lower inflation volatility in richer countries. In the OLS regression in column (3), $CapVol_{81-98}$ and the interaction term exhibit anticipated positive and negative coefficients, respectively, but they are insignificant.[27]

When I introduce the political stability variable (GOVREP) in column (4), $CapVol_{81-98}$ is positive but insignificant. The direct effect of GOVREP is negative and highly significant suggesting that inflation volatility is lower in countries with stronger bureaucracies. In column (5), the interaction term representing financial openness and financial depth is negative but insignificant while $CapVol_{81-98}$ is positive and also insignificant.[28],[29] Thus, the strength of the financial system does not appear to impact on the relationship between financial

[26]When I run a test using observation-specific dummy variables to check for outliers and influential observations, I find that the outcome in column (1) is robust to the exclusion of any one country.

[27]The (unreported) F-test allows me to reject the null hypothesis of joint insignificance on the part of $CapVol_{81-98}$ and its interaction with the industrialised dummy variable.

[28]The economic significance of the partial derivatives, calculated at various levels of financial depth (PRIVO), is negligible.

[29]The (unreported) F-test allows me to accept the null hypothesis of joint insignificance on the part of $CapVol_{81-98}$ and its interaction with PRIVO. When I replace PRIVO with LLY, both $CapVol_{81-98}$ and the interaction term change sign but remain insignificant.

openness and inflation volatility. $CapVol_{81-98}$ becomes negative but remains insignificant when I include a measure of central bank independence in column (7). This variable is positive but insignificant.

In the developing country subsample (Table 4.6), trade openness and the Latin American dummy variable exhibit negative and positive coefficients, respectively, and they are almost always significant. GDP per capita is positive but only significant in column (6). In the basic regression in column (1), $CapVol_{81-98}$ exhibits the anticipated positive coefficient but it is insignificant. The outcomes are almost identical in the IV regression and the Hausman test provides no evidence to suggest that the OLS estimates are inconsistent. When I run a test using observation-specific dummy variables to check for influential observations, I find that the outcome in column (1) is not robust to the exclusion of Saudi Arabia, a country with a particularly low level of inflation volatility over the period 1981-98. Thus, I present the outcomes of regressions excluding Saudi Arabia in columns (3)-(6).

In columns (3) and (4), I re-run the basic OLS and IV regressions excluding Saudi Arabia. $CapVol_{81-98}$ exhibits a positive coefficient in the OLS regression and it is now significant at the 90 percent confidence level. This supports the hypothesis that greater financial openness is associated with higher inflation volatility.[30] Significance disappears, however, in the IV regression. $CapVol_{81-98}$ remains positive and insignificant when I introduce, in turn, GOVREP and PRIVO into the regression specification. Both GOVREP and PRIVO are negative and highly significant but there is no evidence in column (6) to suggest that

[30]This new result, however, has two leverage points: Cote d'Ivoire and Singapore. When I exclude the biggest - Singapore - from the sample, $CapVol_{81-98}$ becomes insignificant. This subsequent regression has four leverage points. When I exclude the biggest - Israel - $CapVol_{81-98}$ becomes significant again. This subsequant regression has no leverage points.

the relationship between financial openness and inflation volatility in developing countries is contingent on the degree of financial depth.[31]

Finally, in the sample excluding high-inflation countries (Table 4.7), trade openness exhibits a negative sign in all cases but it is never significant. GDP per capita is also never significant. In the basic OLS and IV regressions in columns (1) and (2), $CapVol_{81-98}$ is negative but insignificant.[32] The Hausman test provides no evidence to suggest that the OLS estimates are inconsistent. The results in column (3) provide no support for the notion that the impact of financial openness on inflation volatility varies between high- and low-income countries. $CapVol_{81-98}$ and the interaction term both exhibit negative coefficients but they are insignificant.[33]

$CapVol_{81-98}$ becomes positive but insignificant when I introduce GOVREP into the specification. This variable exhibits an expected negative coefficient and is significant. When I introduce the financial depth variable (PRIVO) and its interaction with financial openness in column (5), both $CapVol_{81-98}$ and the interaction term are positive and negative, respectively, but they are insignificant.[34] Finally, $CapVol_{81-98}$ becomes negative but remains insignificant in column (6) when I introduce the central bank independence measure.

4.4 Conclusion

In this paper, I have examined empirically the relationship between financial openness, and its interaction with financial depth, and inflation levels and volatility. Apart from some weak evidence suggesting that greater financial

[31] When I replace PRIVO with LLY, the outcomes are the same.

[32] These outcomes are robust to the exclusion of any one country from the sample.

[33] The F-test allows me to reject the null hypothesis of joint insignificance on the part of $CapVol_{81-98}$ and the interaction term.

[34] When I replace PRIVO with LLY, the outcomes are the same.

openness is associated with *higher* inflation volatility in developing countries, there is no evidence of a significant relationship between these variables. This finding is in line with most of the previous literature in this area. One possible conclusion is simply that financial openness has no first-order effects on inflation levels and volatility. This is not to say that financial openness may not be important; it may be the case that it has an indirect impact on inflation.

There are some points, however, that are worth noting. First, the non-existence of any empirical relationship in most regressions may lie with the particular measure used in this study. The level of capital flows provides no information about whether the capital account is open or not. It may be the case that the potential disciplinary impact of greater capital mobility on inflation levels only exists when capital controls are fully abolished and the potential threat of large-scale capital outflows in response to high inflation levels becomes explicit.[35] Thus, using measures of financial liberalisation which capture the true extent of capital account openness may be more likely to reveal the existence of any disciplinary effect.[36] Constructing more accurate measures of capital account openness should be part of the future research agenda in this area.

Second, as already mentioned in the introduction, one particular reason for expecting increasing financial openness to lead to greater inflation volatility is the difficulty associated with managing short-term capital flows. One would expect countries who receive a high proportion of short-term capital flows relative to total flows to experience greater inflation volatility. This might be partic-

[35]This is the policy signaling potential of capital account liberalisation emphasised by Bartolini and Drazen (1997) and Laban and Larrain (1997).

[36]Previous studies, of course, all use a restrictions-based indicator which attempts to do this and the outcomes are not conclusive. This indicator, however, has many limitations. See IMF (2001), Eichengreen (2002), and Edison, Klein, et al (2002) for a discussion of these.

ularly evident in countries with weak institutional and financial environments. Thus, constructing measures of short-term capital flows and examining their impact on inflation might be a potentially fruitful extension of the research in this area.

4.A Data sources

- **CapVol$_{81-98}$**: for details about the variables used in the construction of the financial openness measure see chapter two.

- **Inflation Level**: natural logarithm of the annual CPI inflation rate (average 1981-1998). Source: World Bank, World Development Indicators.

- **Inflation Volatility**: natural logarithm of the standard deviation of the annual CPI inflation rate (1981-1998). Source: World Bank, World Development Indicators.

- **GDP per capita:** the logarithm of real per capita GDP in 1981. Source: World Bank, World Development Indicators.

- **Country Size**: the logarithm of total population (average 1981-1998). Source: World Bank, World Development Indicators.

- **Trade Openness:** ratio of exports plus imports to GDP (average 1981-1998). Source: World Bank, World Development Indicators.

- **Financial depth (PRIVO)**: the value of credits by financial intermediaries to the private sector divided by GDP (average 1980-1995). I also use (**LLY**) which refers to liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and nonbank financial intermediaries) divided by GDP. Source: Levine et al. (2000).

- **Political Stability (GOVREP)**: an index of the degree to which governments do not repudiate contracts. Source: through correspondence with Michael Klein.

- **Central Bank Independence**: actual turnover of central bank executives per year (average 1980-1989). Source: Cukierman et. al (1992).

4.B Tables and Figures

Table 4.1: Previous studies on the effects of Capital Account Liberalisation on Inflation

Source	**Number of Countries**	**Years**	**Inflation**
Alesina et al. (1994)	20 (all OECD)	1950-89	negative effect
Grilli and Milesi-Ferretti (1995)	61	1966-89	negative effect
Rodrik (1998)	95	1975-89	no effect
Kraay (1998)	Two groups 117 and 64	1985-97	no effect
Gruben and Mcleod (2000)	112	1981-96	negative effect

Table 4.2: Average Inflation Level (1981-1998) - full sample

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV	OLS	OLS	OLS	OLS
constant	6.6 2.3***	5.9 1.9*	6.7 2.2***	3.8 1.3	1.9 0.5	7.9 2.4***
$CapVol_{81-98}$	-0.002 -0.9	-0.004 -1.3	-0.003 -0.6	-0.001 -0.5	-0.006 -1.1	-0.003 -1.3
log GDP per capita, 1981	-0.9 -2.1**	-0.7 -1.5	-0.9 -1.5	0.4 0.6	0.2 0.2	-0.9 -1.9*
log Population, 81-98	-0.11 -0.4	-0.1 -0.3	-0.1 -0.4	-0.1 -0.3	0.2 0.6	-0.3 -0.9
Trade Openness, 81-98	-0.006 -1.5	-0.004 -1.1	-0.01 -0.9	-0.005 -1.5	-0.004 -1.3	-0.004 -1.5
Latin American Dummy	1.8 4.4***	1.8 4.5***	1.8 3.7***	1.4 3.7***	1.5 3.8***	1.8 2.8***
$CapVol_{81-98}$*Industrialised			0.001 0.2			
GOVREP				-0.3 -2.1**		
PRIVO					-2.3 -3.1***	
$CapVol_{81-98}$*PRIVO					0.006 1.2	
CB Turnover						0.5 0.3
Hausman Test - P-value		0.13				
Adjusted R^2	0.51	0.5	0.5	0.54	0.55	0.51
No. of observations	58	58	58	54	56	40

Note: White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level.

Table 4.3: Average Inflation Level (1981-1998) - developing countries

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	OLS
constant	2.2 0.4	1.7 0.3	-3.3 -0.6	0.8 0.1
$CapVol_{81-98}$	-0.002 -0.3	-0.009 -0.8	0.003 0.4	-0.007 -0.8
log GDP per capita, 1981	-0.4 -0.1	0.1 0.1	1.7 1.4	0.6 0.5
log Population, 81-98	0.1 0.3	0.2 0.5	0.2 0.7	0.2 0.5
Trade Openness, 81-98	-0.007 -1.1	-0.002 -0.2	-0.01 -1.9*	-0.007 -0.7
Latin American Dummy	1.6 3.1***	1.7 3.1***	1.1 2.8***	1.2 2.3**
GOVREP			-0.2 -1.5	
PRIVO				-3.2 -2.4**
$CapVol_{81-98}$*PRIVO				0.01 0.8
Hausman Test - P-value		0.25		
Adjusted R^2	0.4	0.38	0.42	0.42
No. of observations	38	38	34	37

Note: White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$). * (**, ***) indicates statistical significance at the 10% (5%, 1%) level.

Table 4.4: Average Inflation Level (1981-1998) - excluding high inflation countries

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV	OLS	OLS	OLS	OLS
constant	7.7 3.8***	7.2 3.5***	7.9 3.8***	6.5 3.3	4.1 1.4	8.5 3.6***
$CapVol_{81-98}$	-0.001 -0.9	-0.002 -1.3	-0.004 -1.2	-0.001 -0.8	-0.004 -1.3	-0.001 -0.9
log GDP per capita, 1981	-0.9 -3.7***	-0.9 -3.3***	-1.2 -2.9***	-0.6 -1.5	-0.2 -0.5	-0.9 -3.1***
log Population, 81-98	-0.2 -1.2	-0.2 -1.1	-0.2 -0.9	-0.2 -1.3	-0.1 -0.1	-0.3 -1.5
Trade Openness, 81-98	-0.005 -2.1**	-0.004 -1.5	-0.002 -0.6	-0.004 -2.8***	-0.004 -1.7*	-0.005 -2.7***
Latin American Dummy	1.1 4.1***	1.1 4.1***	1.2 3.6***	0.9 4.3***	0.8 3.4***	1.2 2.8***
$CapVol_{81-98}$*Industrialised			0.003 0.8			
GOVREP				-0.1 -0.9		
PRIVO					-1.6 -3.2***	
$CapVol_{81-98}$*PRIVO					0.005 1.2	
CB Turnover						0.6 0.4
Hausman Test - P-value		0.22				
Adjusted R^2	0.54	0.54	0.55	0.63	0.6	0.56
No. of observations	51	51	51	47	49	36

Note: White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level.

Table 4.5: Inflation Volatility (1981-1998) - full sample

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV	OLS	OLS	OLS	OLS
constant	3.4	3.2	2.1	-0.5	0.4	3.3
	1.8*	1.5	0.8	-0.2	0.2	1.4
$CapVol_{81-98}$	-0.001	-0.002	0.003	0.001	0.002	-0.003
	-0.5	-0.5	0.6	0.3	0.3	-1.2
GDP per capita, 81-98	-0.4	-0.4	-0.1	1.8	0.6	-0.4
	-0.8	-0.6	-0.1	1.8*	0.9	-0.6
Trade Openness, 81-98	-0.003	-0.003	-0.01	-0.005	-0.004	-0.001
	-1.3	-0.9	-1.5	-1.5	-1.4	-0.2
Latin American Dummy	2.1	2.1	1.9	1.6	1.7	2.2
	3.9***	3.9***	3.7***	3.3***	3.2***	2.1**
$CapVol_{81-98}$*Industrialised			-0.004			
			-1.1			
GOVREP				-0.6		
				-2.7***		
PRIVO					-1.7	
					-1.9*	
$CapVol_{81-98}$*PRIVO					-0.001	
					-0.2	
CB Turnover						0.3
						0.1
Hausman Test - P-value		0.75				
Adjusted R^2	0.37	0.37	0.36	0.43	0.41	0.3
No. of observations	58	58	58	54	56	40

Note: White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level.

Table 4.6: Inflation Volatility (1981-1998) - developing countries

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV	OLS*	IV*	OLS*	OLS*
constant	-1.3 -0.4	-1.2 -0.3	-2.9 -0.8	-3.5 -0.9	-4.9 -1.2	-4.6 -1.3
$CapVol_{81-98}$	0.007 0.9	0.005 0.5	0.01 1.9*	0.02 1.5	0.01 1.5	0.008 0.8
GDP per capita, 81-98	1.1 0.9	0.9 0.9	1.5 1.3	1.6 1.4	3.1 2.1	2.4 2.1**
Trade Openness, 81-98	-0.01 -2.4**	-0.01 -1.7*	-0.02 -4.1***	-0.02 -2.8***	-0.02 -3.1***	-0.02 -3.4***
Latin American Dummy	1.7 2.9***	1.7 2.8***	1.4 2.8***	1.3 2.1**	1.1 1.9*	0.9 1.5
GOVREP					-0.5 -2.3**	
PRIVO						-4.1 -2.4**
$CapVol_{81-98}$*PRIVO						0.01 0.9
Hausman Test - P-value		0.82		0.6		
Adjusted R^2	0.3	0.3	0.32	0.31	0.35	0.34
No. of observations	38	38	37	37	34	36

Note: An asterisk indicates regressions excluding Saudi Arabia as it was found to be an outlier in a formal test using observation-specific dummy variables. White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level.

Table 4.7: Inflation Volatility (1981-1998) - excluding high inflation countries

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV	OLS	OLS	OLS	OLS
constant	2.9 2.7***	2.9 2.8***	2.7 1.8*	1.6 1.2	0.4 0.3	2.9 1.9*
$CapVol_{81-98}$	-0.001 -0.9	-0.001 -0.3	-0.001 -0.1	0.001 0.1	0.004 1.5	-0.001 -0.9
GDP per capita, 81-98	-0.4 -1.3	-0.4 -1.4	-0.3 -0.8	0.3 0.6	0.4 1.1	-0.4 -0.9
Trade Openness, 81-98	-0.001 -0.6	-0.001 -0.8	-0.001 -0.5	-0.003 -0.9	-0.001 -1.1	-0.001 -0.6
Latin American Dummy	1.1 3.9***	1.1 3.9***	0.9 3.8***	0.9 3.7***	0.8 2.8***	1.2 1.8*
$CapVol_{81-98}$*Industrialised			-0.001 -0.3			
GOVREP				-0.2 -1.7*		
PRIVO					-0.9 -2.2**	
$CapVol_{81-98}$*PRIVO					-0.01 -1.5	
CB Turnover						0.5 0.3
Hausman Test - P-value		0.8				
Adjusted R^2	0.35	0.35	0.34	0.4	0.51	0.28
No. of observations	51	51	51	47	49	36

Note: White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) level.

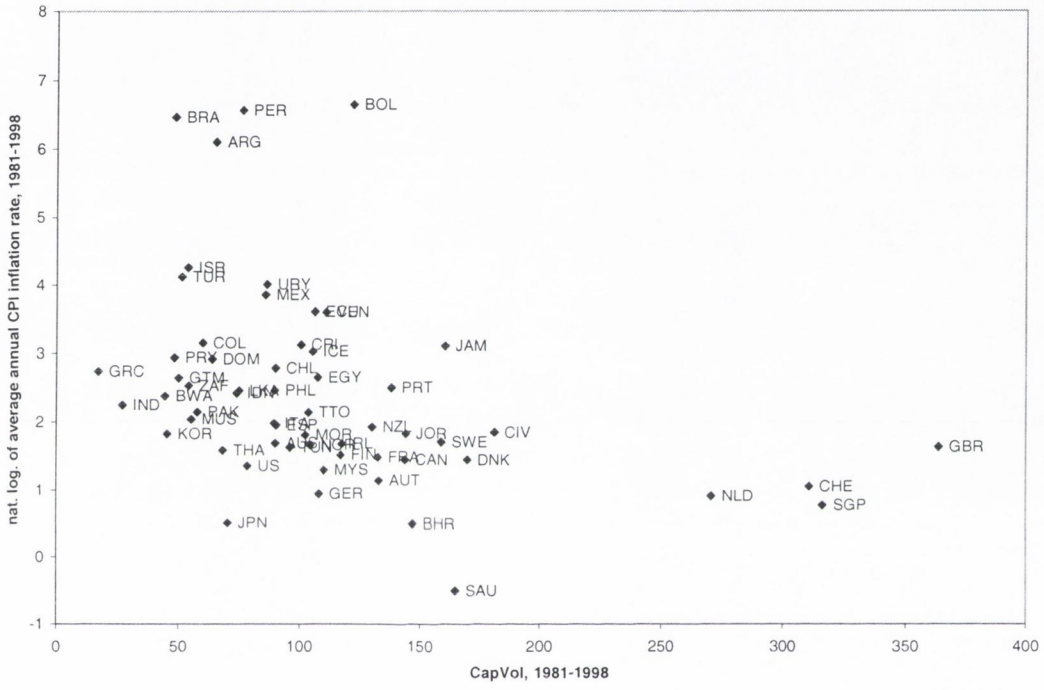

Figure 1: Financial openness and Average inflation levels - 1981-1998

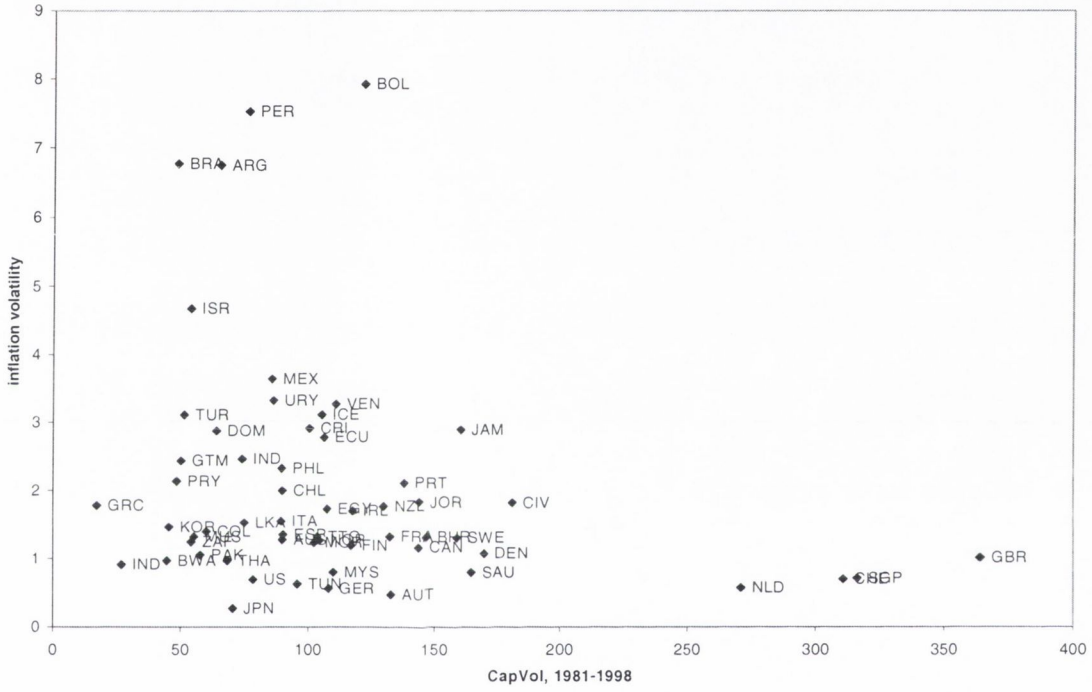

Figure 2: Financial openness and inflation volatility - 1981-1998

Chapter 5

Does Greater Financial Openness Promote Financial Deepening?

5.1 Introduction

The cross-country growth literature highlights a number of factors that potentially intermediate between financial liberalisation and growth. The impact of financial openness on one of these factors, namely gross domestic investment, was empirically examined in Chapter Three. Another important channel through which financial openness may impact on growth is financial system development. In effect, greater financial openness may promote the efficiency and development of the financial sector, thus leading to higher growth.[1]

There are a number of ways through which increasing financial openness may strengthen a country's financial system. Increased foreign ownership of the banking sector may enlarge the absolute size of the domestic banking system, provide services for neglected sectors of the market, reduce financial intermediation costs through greater competition, and introduce financial innovation that broadens the scope of financial services (Klein and Olivei, 2001). Thus, the new financial technologies that accompany the entry of foreign players into the domestic market should improve the entire financial system. These efficiency gains should lead to savings being allocated more efficiently into the most profitable investments. In addition, the vulnerability of the banking sector to financial contagion may decline as a result of a greater foreign presence in the domestic financial system (IMF, 2001). International banks with their large capital base and diversified operations may be less susceptible to financial panic or a domestic bank run and thus may serve as a safe haven for domestic depositors.

In contrast to the vast body of cross-country empirical work examining the link between finance and growth, empirical work investigating the link between

[1]Levine (1997) provides an extensive review of the literature examining the link between financial development and growth.

capital account liberalisation and/or financial openness and financial development is quite small. De Gregorio (1998) examines whether countries exhibiting greater financial integration experience increased financial development. Instead of using the standard, rules-based indicator of capital account openness, he measures financial integration using deviations from two no-arbitrage profits conditions, the international arbitrage pricing model of Levine and Zervos (1995) and the international capital asset pricing model of Levine and Zervos (1998). He finds that the no-arbitrage profits conditions are positively associated with the lending, stock market capitalisation and volatility measures of financial deepening in a cross-section of developing and industrialised countries.

More recently, Klein and Olivei (2001) use the binary indicator of capital account openness to examine the impact of capital account liberalisation on economic growth, via the deepening of a country's financial system for the periods 1986-95 and 1976-95. Previous studies examining the impact of capital account openness on economic growth have viewed financial system depth as exercising an exogenous influence on this relationship.[2] In contrast to this approach, Klein and Olivei (2001) view financial depth as an endogenous variable in the process linking financial liberalisation and economic growth. They find that capital account liberalisation has a substantial impact on growth via the deepening of a country's financial system for both time periods. However, one notable aspect of these results is that the identified correlation is driven entirely by the developed countries in their sample. The authors find no evidence of capital account liberalisation promoting financial depth, and therefore economic growth, outside members of the OECD.

[2]Edison, Klein, et al (2002) and Eichengreen (2002) provide comprehensive overviews of recent research in this area.

Chinn and Ito (2002) examine the impact of a more nuanced index of capital account openness, and its interaction with the legal and institutional environment, on a substantially broader set of proxy measures for financial development that incorporates various measures of the equity markets. They find a positive and significant association between capital account mobility and financial depth, as measured by private credit and stock market activity, that varies with the level of economic development. They also find that the beneficial impact of capital account liberalisation on financial systems is more likely to be found in countries with a higher degree of legal and institutional development.

The aim of this paper is to examine the impact of a volume-based measure of financial openness on financial depth. I specifically focus on the measures of financial depth used in the Klein and Olivei paper. Focusing on the stocks of gross capital flows as a means of developing an alternative indicator of financial openness provides the opportunity to compare outcomes using this measure with Klein and Olivei's findings using the rules-based indicator of capital account liberalisation. For comparison purposes, I also examine the impact of a binary indicator of capital account openness on the financial depth measures.

Significantly, the outcomes using this alternative indicator of international financial integration do not support the findings of Klein and Olivei (2001). Evidence of a relationship between financial openness and financial depth is almost non-existent for any sample of countries. The remainder of the paper is divided into three sections. The next section presents the measures of financial depth used in the empirical analysis and examines properties of these measures. I also describe the rules-based indicator of capital account liberalisation used in the regression analysis.[3] Section 5.3 uses both OLS and instrumental variables esti-

[3]A full description of the volume-based measure of financial openness can be found in

mation to examine the impact of the two alternative measures of international financial integration on financial system strength. Robustness tests are carried out in Section 5.4. Section 5.5 offers some concluding remarks.

5.2 Indicators of Financial Depth and International Financial Integration

Constructing a measure of financial depth for a broad cross-section of countries that adequately reflects the extent to which financial markets carry out their functions is difficult. Similarly, finding a satisfactory measure of the degree of international financial integration within a country also provides many problems. This section discusses the measures of financial depth and international financial integration used in the cross-country regressions and characterises some of their key properties.

5.2.1 Measuring Financial Depth

In this section, I present data on three indicators of financial depth that have been used in the literature on the relationship between financial depth and economic growth (Levine, Loayza, and Beck, 2000).[4] Each of these indicators is constructed such that an increase reflects greater financial depth. The liquid liabilities indicator, LLY, refers to liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and nonbank financial intermediaries) divided by GDP. This measures the overall size of the financial intermediary sector. It does not, however, distinguish between

chapter two.

[4]Precise definitions of the financial depth and international financial integration variables are included in the data appendix. I would like to thank Thorsten Beck for generously sharing this data with me.

the allocation of capital to the private sector and to various governmental and quasi-governmental agencies. To assess the relative amount of credit going to the private sector, Levine, Loayza, and Beck (2000) use the indicator PRIVO, which equals the value of credits by financial intermediaries to the private sector divided by GDP. This indicator isolates credit issued to the private sector, as opposed to credit issued to governments, government agencies, and public enterprises. The third indicator, BANK, represents the ratio of commercial bank assets divided by commercial bank plus central bank assets. This measures the degree to which the banks versus the central banks allocate society's savings. The intuition behind this indicator is that commercial banks are more likely to provide financial services such as risk management and information processing than central banks.

Tables 5.1-5.3 present the evolution of these financial depth variables over the period 1981 to 1995 for the full sample of countries and two subsets: the industrial and developing countries.[5] For the full sample, the average measures of LLY and PRIVO increased by 15.2 percent and 20.9 percent, respectively, while the average measure of BANK increased by only 2.6 percent over this period. Comparing the industrialised and developing countries, we can see that, on average, there was a marginally higher rate of growth for LLY in the developing country subsample while the rate of growth for PRIVO was greater in the industrialised subset. The rate of growth of BANK is slightly bigger among the industrialised countries.

The definitions of LLY and PRIVO suggest that these variables are more

[5]All three financial depth variables are averages over five year periods, e.g. 1981-85, 1986-90, etc. The source for these data is the dataset used in Levine, Loayza, and Beck (2000). Klein and Olivei (2001) use annual observations for each financial depth measure and the source for their data is Beck, Demirguc-Kunt, and Levine (2000).

closely related to each other than either is to BANK. This is illustrated in the bottom half of Tables 5.1-5.3 where there is a much greater correlation between $\triangle$LLY and $\triangle$PRIVO (where $\triangle$ denotes the rate of growth of the variable in question) than between either of these and $\triangle$BANK. As we will see, the closer correspondence between $\triangle$LLY and $\triangle$PRIVO than between either of these indicators and $\triangle$BANK will be highlighted in the patterns of the regression results using these indicators of the change in financial depth.

5.2.2 Measuring International Financial Integration

Most empirical papers examining the economic impact of international financial integration use rules-based indicators of capital account liberalisation to gauge whether a country allows capital to flow freely across its borders. This is the approach followed by Klein and Olivei (2001). I continue to use this indicator in the regression analysis but I also focus on the actual stocks of capital flows as a means of deriving a quantitative indicator of the degree of financial openness. This measure, $CapVol_{81-95}$, is constructed by summing the average levels of the annual stocks of foreign direct investment (FDI), portfolio equity, and portfolio debt assets and liabilities via the accumulation of the corresponding inflows and outflows over the period 1981-1995. This is measured for each country as a percentage of GDP and it covers a sample of 63 industrialised and developing countries. These countries are denoted by an asterisk in the appendix.

The rules-based indicator of capital account openness is constructed from information reported in the data appendix to Cottarelli and Giannini (1997). Using annual data taken from the IMF's publication *Exchange Arrangements and Exchange Restrictions*, I generate a simple 0/1 dummy variable for each country for each year.[6] This dummy variable takes the value 1 if the country

[6]For IMF members, the capital controls index is taken from the IMF's *Exchange Arrange-*

had no capital controls in place. Then, for each country, I calculate the variable $CapIMF_{81-94}$ which represents the proportion of years between 1981 and 1994 in which the country had unrestricted capital mobility.[7] This source covers 94 countries which are listed in appendix. 47 countries had completely closed capital account regimes during the period 1981-1994 (that is, $CapIMF_{81-94} = 0$), all of which are developing countries. There are 23 countries in the full sample which experienced continuously open capital accounts during this period (that is, $CapIMF_{81-94} = 1$).[8] The pairwise correlation between the financial openness measure ($CapVol_{81-95}$) and $CapIMF_{81-94}$ is 0.45 which is reasonably strong and also significant at the 1 percent level.

5.3 International Financial Integration and Financial Depth

This section examines empirically the relationship between the two indicators of international financial integration and financial depth. Initial evidence is presented in Tables 5.4-5.6 by way of simple correlations for the full sample of countries and two subsets: industrial and developing countries.[9] The correlation coefficient is positive in all cases in the full sample, but only significant at 90

ments and Exchange Restrictions under the heading "Restrictions on payments for Capital transactions". For non-IMF members, information is taken from domestic sources.

[7]The reason for focusing on this particular time period is that the data reported in Cottarelli and Giannini (1997) only goes as far as 1994. In addition, a new system was set up by the IMF in 1996 for this report which contains more detail on capital account restrictions but it is not backwardly compatible with the earlier indicator.

[8]These include eight industrial countries (Belgium, Canada, Germany, Japan, Netherlands, Switzerland, United Kingdom, and the United States) and fifteen developing countries (Bahrain, Ghana, Indonesia, Kiribati, Lebanon, Lesotho, Malaysia, Maldives, Oman, Pakistan, Panama, Saudi Arabia, Singapore, Swaziland, and Uruguay).

[9]The distinction between "industrial" and "developing" for both measures of international financial integration countries follows the classification used in Lane and Milesi-Ferretti (2001b).

percent confidence level or better in the case of ΔLLY and ΔPRIVO for the indicator of capital account liberalisation ($CapIMF_{81-94}$). In the subset of industrialised countries (Table 5.5), the correlation coefficients are positive and quite large in the case of ΔLLY and ΔPRIVO for both indicators of international financial integration. The coefficients are significant at the 90 percent confidence level or better, with the exception of ΔLLY for $CapVol_{81-95}$. In the developing country subset, however, the simple correlations are quite small and insignificant at standard confidence levels. This contrast in outcomes between the industrial and developing country subsets will be repeated in the patterns of the regression results below.

Following Klein and Olivei (2001), the analysis of the relationship between international financial integration and financial depth is based on the following cross-sectional regression specification.

$$\triangle FD^i \equiv FD^i_{91-95}/FD^i_{81-85} = \beta_0 + \beta_1 FD^i_{81-85} + \beta_2 FinIntegration^i_{81-95} + \beta_3 \mathbf{X}^i + \epsilon^i \quad (1)$$

Here, FD^i_{91-95} is country i's average measure of financial depth over the period 1991-95 (that is LLY_{91-95}, $PRIVO_{91-95}$, or $BANK_{91-95}$) and FD^i_{81-85} is the respective figure for 1981-85, $FinIntegration^i_{81-95}$ is $CapIMF^i_{81-94}$ or $CapVol^i_{81-95}$, $\mathbf{X}^i$ represents a vector of other explanatory variables, and ϵ^i is an error term.

Following the procedure in Klein and Olivei (2001), the regressions pertaining to the capital account openness indicator ($CapIMF_{81-94}$) include a set of dummy variables representing the regions Africa, Latin America, Asia, and the Middle East, with the omitted regional variable representing the industrialised

countries.[10] These regional dummy variables, however, are not included in the regressions when $CapVol_{81-95}$ is used as a measure of financial integration. This is due to the much smaller sample of countries available for this indicator. The following three variables are included in $\mathbf{X}$ in all regressions: a dummy variable representing the oil exporting nations[11], the average level of trade openness between 1981 and 1985 (exports plus imports as a ratio of GDP), and the ratio of a country's level of government consumption to GDP over the same period. Financial flows finance real trade and, thus, greater trade openness should be positively associated with a more developed financial system while government consumption is included to take account for the possibility that levels of public expenditures are financed by seigniorage revenues.

The inclusion of the initial level of financial depth, FD^{i}_{81-85}, among the regressors enables one to check for evidence of overall financial convergence, whereby countries with initially lower levels of financial depth experience greater financial deepening over the period 1981-95 than countries with more developed financial systems. Evidence of financial convergence would be obtained by finding significant and negative values of β_1. The importance of including FD^{i}_{81-85} in the regressors also lies in the fact that it may improve the accuracy of the estimates of the effect of financial integration on financial depth (β_2) if the three measures of FD^{i}_{81-85} are correlated with the two indicators of financial integration. One might expect a positive correlation since increasing financial integration has been more common in industrialised countries and, as shown in Table 1, these countries had the highest levels of FD^{i}_{81-85}.[12] The simple correlations of 0.33 for $CapIMF_{81-94}$ and LLY_{81-85}, 0.41 for $CapIMF_{81-94}$ and PRIVO_{81-85},

[10] In the developing country subset, the middle east dummy variable is omitted.

[11] This is only included in the full sample and the developing country subsample.

[12] This point is noted by Klein and Olivei (2001).

and 0.14 for $CapIMF_{81-94}$ and BANK_{81-85} are quite large. The simple correlations for $CapVol_{81-95}$ and LLY_{81-85}, PRIVO_{81-85}, and BANK_{81-85} are 0.3, 0.28, and 0.05, respectively.[13] Thus, the exclusion of FD^{i}_{81-85} from equation 1 would cause a downward bias in the estimate of β_2 if financial convergence were present.

One drawback with the intuition behind equation (1) is the possibility for reverse causation, since the degree of international financial integration may depend on the depth of the financial system. In other words, the line of causation may run from financial depth to international financial integration as opposed to that suggested above. As a result, OLS estimates of β_2 would bias the results towards finding a positive relationship between financial integration and financial depth, if countries who experience financial deepening for reasons other than greater capital mobility also experience increased international financial integration. Thus, I also carry out instrumental variables estimation.

As an instrument for $CapIMF_{81-94}$, I use the average of a measure of capital account liberalisation over the period 1975 to 1980 ($CapIMF_{75-80}$). A simple regression of $CapIMF_{81-94}$ on a constant and this indicator produces an R^2 of 0.71 and $CapIMF_{75-80}$ is highly significant.[14] To instrument for the volume-

[13]The simple correlations for both interantional financial integration indicators and LLY_{81-85} and PRIVO_{81-85} are significant at the 99 percent confidence level. They are insignifcant at standard confidence levels for BANK_{81-85}.

[14]Following Klein and Olivei (2001), I also considered a number of other variables as potential instruments for $CapIMF_{81-94}$. These are: (a) an average of a measure of capital account liberalisation and a measure of current account liberalisation over the period 1975-80; (b) an index of whether a country had multiple currency practices and an index of whether a country required the surrender of export proceeds. Both were averaged over the period 1975-80; and (c) an average of a measure of capital account liberalisation, current account liberalisation, multiple currency practices, and the surrender of export proceeds over the period 1975-80. All data is taken from the IMF's *Exchange Arrangments and Exchange Restrictions*. None

based measure of financial openness ($CapVol_{81-95}$), I use the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. In this case, a simple regression of $CapVol_{81-95}$ on a constant and these two variables produces an R^2 of 0.64 and the two variables are highly significant.[15]

Estimation results for equation (1) regarding $CapIMF_{81-94}$ for the full sample and the industrial and developing country subsets are shown in Tables 5.7-5.9. Tables 5.10-5.12 present the results for the financial openness indicator ($CapVol_{81-95}$). The estimation technique is ordinary least squares (OLS), with standard errors corrected for heteroskedasticity by the White procedure. I also carry out instrumental variables (IV) estimation to check for simultaneity bias.

A formal test concerning the possible endogeneity of each indicator of international financial integration is presented in each table of results in the row labeled "Hausman Test - p-value". The p-value is obtained using the artificial regression technique discussed in Davidson and MacKinnon (1989).[16] Assuming that the endogeneity of each capital mobility measure is what makes the OLS estimates inconsistent, this test can be interpreted as a test of the extent

of these variables, however, were statistically significant or increased the adjusted R^2 when included as a regressor in the first stage regression.

[15]Many other variables were considered as potential instruments for $CapVol_{81-95}$: a measure of capital account liberalisation over the period 1975-80, the average level of government consumption as a percentage of GDP over 1975-80, the average government budget balance as a percentage of GDP over 1975-80, the ratio of liquid liabilities to GDP (LLY) in 1980, a dummy variable for whether the country is landlocked, a dummy for whether it is an island, distance from the equator, and the share of the population speaking English. None of these variables, however, were statistically significant or increased the adjusted R^2 when included as a regressor in the first stage regression.

[16]Davidson and MacKinnon (1993) refer to this endogeneity test as the Durbin-Wu-Hausman test.

to which each variable is endogenous and/or simultaneous equation bias is a problem.

5.3.1 Outcomes for Capital Account Openness Indicator ($CapIMF_{81-94}$)

There is reasonably strong support for conditional financial convergence in the regressions using the rules-based indicator of capital account openness. The estimated coefficient on the initial level of financial depth (FD_{81-85}) is negative and regularly significant at the 90 percent confidence level or better in all samples. Trade openness exhibits an expected positive coefficient in most regressions but, with the exception of $\triangle$LLY in the industrialised subsample, it is never significant. The initial level of government consumption is also insignificant in all regressions. The dummy variable representing the oil exporting nations, however, is negative and regularly significant.

Full Sample In the full sample (Table 5.7), the coefficient on $CapIMF_{81-94}$ is positive but insignificant in the case of $\triangle$LLY in column (1). I test the robustness of this result by looking for leverage points in the regression. Leverage points are observations which are influential in determining the statistical significance of key results. I determine the leverage points of the regression by using observation specific dummy variables. This is where a dummy variable is used for country i, effectively excluding its data from the data set for that regression.[17] This is then repeated for each country in turn. In effect, the regressions indicate how the statistical significance of financial openness ($CapIMF_{81-94}$) changes when each country's data are excluded, in turn, from the regression. Thus, we can see which countries are influential. The outcome for $CapIMF_{81-94}$ in the OLS regression for $\triangle$LLY is robust to the removal of any one country.

[17] Kennedy (1998, p226)

The results of a two-stage regression that instruments for the measure of financial openness are presented in column (2). $CapIMF_{81-94}$ remains positive and insignificant and the fact that the size of the coefficient is smaller suggests that there may be an upward bias when using OLS estimation. The p-value of the coefficient on the instrumented regressors is 0.13 in the Hausman test, suggesting that the OLS estimates are not plagued by inconsistency.

A similar pattern of coefficients can be seen in the outcomes for the private credit measure of financial depth ($\triangle$PRIVO). $CapIMF_{81-94}$ exhibits a positive coefficient in column (3) and is significant at the 90 percent confidence level. A formal test for influential observations, however, reveals that this outcome is not robust to the exclusion of Indonesia - a country with a value of one for $CapIMF_{81-94}$ and a very high value of $\triangle$PRIVO. When I re-run the OLS regression omitting Indonesia in column (2), $CapIMF_{81-94}$ remains positive but it becomes insignificant.[18] There is also a considerable decline in the overall explanatory power of the regression. In the IV regression, however, $CapIMF_{81-94}$ is positive and significant at the 90 percent confidence level. The Hausman test provides no evidence to suggest that the OLS estimates in column (4) are inconsistent.

Finally, $CapIMF_{81-94}$ is negative and insignificant in the OLS regression for $\triangle$BANK in column (7). This outcome is robust to the exclusion of any one country. In the IV regression, the sign on $CapIMF_{81-94}$ becomes positive but it remains insignificant and there is no evidence from the Hausman test to suggest

[18]This new result, however, has seven leverage points. When I omit the biggest - Pakistan - $CapIMF_{81-94}$ becomes significant again at the 90 percent confidence level. This subsequent regression for the sample size of seventy seven countries, however, has five leverage points: Belgium, Bolivia, Ghana, New Zealand, and the United Kingdom. Bolivia is the biggest leverage point. When it is omitted from the sample, $CapIMF_{81-94}$ becomes insignificant.

inconsistent OLS estimates.

Thus, these full sample outcomes are not as convincing as the findings of Klein and Olivei (2001) who present evidence of a strong positive and significant association between capital account liberalisation and the same three measures of financial depth. It must be noted, however, that they examine different time periods (1976-95 and 1986-95), use a different sample of countries, and they use annual observations for each of the financial depth measures.[19]

Industrial countries In the industrial country subsample (Table 5.8), $CapIMF_{81-94}$ is positive and significant at the 90 percent confidence level or better for $\triangle$LLY and $\triangle$PRIVO in the OLS regressions in columns (1) and (4). These estimates suggest that capital account liberalisation boosts financial development in richer countries. Both these outcomes, however, are not robust to the exclusion of influential observations. In the case of $\triangle$LLY, the omission of New Zealand leads to insignificance on the part of $CapIMF_{81-94}$ in column (2).[20] The capital account openness indicator remains insignificant in the IV regression and the Hausman test provides no evidence of inconsistent OLS estimates. In the case of $\triangle$PRIVO in column (5), the exclusion of the United Kingdom leads to $CapIMF_{81-94}$ becoming insignificant and there is a sharp decline in the overall explanatory power of the regression.[21] $CapIMF_{81-94}$ remains positive and in-

[19]The source of the financial depth indicators used in Klein and Olivei (2001) is Beck, Demirguc-Kunt, and Levine (2000). In contrast, the three financial depth variables used in this chapter are averages over five year periods, e.g. 1981-85, 1986-90, etc. The source for these data is the dataset used in Levine, Loayza, and Beck (2000).

[20]This new result is itself robust to the exclusion of any one country.

[21]This new sample of twenty one countries has five leverage points. So the exclusion of any one of these five leverage points will result in a regression where $CapIMF_{81-94}$ is positive and significant. Sweden is the biggest leverage point. When I exclude Sweden, $CapIMF_{81-94}$ remains positive and significant. This subsequent regression has only one leverage point:

significant in the IV regression in column (6) and, once again, the Hausman test provides no evidence of inconsistent OLS estimates. The size of the coefficient on $CapIMF_{81-94}$ is much smaller in the IV outcomes suggesting that there may be an upward bias when using OLS estimation.

In the case of $\triangle$BANK, $CapIMF_{81-94}$ is positive but insignificant in the OLS regression in column (7). This outcome, however, is not robust to the exclusion of Spain in a formal test for influential observations. $CapIMF_{81-94}$ is positive and significant at the 93 percent confidence level in column (8) and there is an increase in the overall explanatory power.[22] Significance disappears, however, in the IV regression in column (9) but there is no evidence from the Hausman test to suggest that the OLS estimates in column (8) are inconsistent.

Once again, these outcome are not as convincing as those found in Klein and Olivei (2001). They find a strong positive and significant association between capital account openness and their liquid liabilities (LLY) and private credit (PRIVO) measures of financial deepening.

Developing countries The outcomes in the developing country subsample (Table 5.9) provide no evidence of a positive and significant association between capital account openness and financial depth. $CapIMF_{81-94}$ is positive but insignificant in the OLS and IV regressions pertaining to $\triangle$LLY.[23] When I measure financial depth using private credit (PRIVO), $CapIMF_{81-94}$ is positive in both the OLS and IV regressions and actually significant in the latter at

Belgium.

[22]This new result has three leverage points: Denmark, Greece, and Iceland. Greece is the biggest of these leverage points. When it is excluded from the sample, $CapIMF_{81-94}$ is positive but insignificant. This subsequent regression has no leverage points.

[23]This outcome is robust to the exclusion of any one country in a formal test for influential observations.

the 90 percent confidence level. Interestingly, the sign of the coefficient on $CapIMF_{81-94}$ is quite bigger in the IV regression suggesting that the potential for upward bias in the OLS regressions is non-existent in this sample.

When I measure financial depth using $\triangle$BANK, $CapIMF_{81-94}$ is negative and insignificant in the OLS regression in column (5). Interestingly, however, this outcome is not robust to the exclusion of Bolivia and $CapIMF_{81-94}$ becomes significant (negative) at the 91 percent confidence level when this country is omitted from the regression sample in column (6).[24] Thus, there is some evidence to suggest that capital account liberalisation actually *hinders* financial development (as measured by $\triangle$BANK) in developing countries. In the IV regression, however, $CapIMF_{81-94}$ remains negative but it becomes insignificant. The Hausman tests in this developing country subsample provide no evidence that capital account openness has an endogenous component and warrants IV estimation. These results for the developing countries are quite similar to the findings of Klein and Olivei in their sample of 66 non-OECD countries for the period 1986-95.

5.3.2 Outcomes for Financial Openness Indicator($CapVol_{81-95}$)

Support for conditional financial convergence in the regressions using the volume-based indicator of financial integration is not as strong as that found using the rules-based indicator of capital account openness. The estimated coefficient on

[24]This new result for the smaller sample size has eleven leverage points. So the exclusion of any one of these countries, out of the fifty nine in the sample, will result in a regression where $CapIMF_{81-94}$ is insignificant. Ghana is the biggest leverage point. When it is excluded from the sample, $CapIMF_{81-94}$ is insignificant. This subsequent regression has only two leverage points: Guatemala and Zambia. When I exclude the biggest, Guateamla, $CapIMF_{81-94}$ becomes significant at the 90 percent confidence level.

the initial level of financial depth (FD_{81-85}) is negative in all regressions but not regularly significant. Trade openness is negative and insignificant in the full sample and the industrial country subsample but it becomes positive in the developing country subsample and is actually significant in the case of $\triangle$LLY when Bolivia is omitted (Table 5.12). Once again, government consumption is almost never significant. The oil dummy continues to be negative and regularly significant.

Full sample In the full sample (Table 5.10), the coefficient on $CapVol_{81-95}$ is positive and significant at the 90 percent confidence level in the case of $\triangle$LLY. A formal investigation searching for influential observations, however, reveals that this outcome is not robust to the exclusion of the United Kingdom. $CapVol_{81-95}$ remains positive but becomes insignificant in column (2) and there is a sharp decline in the overall explanatory power.[25] This is also the outcome in the IV regression and the bigger coefficient on $CapVol_{81-95}$ indicates that there is no upward bias when using OLS estimation. The Hausman test provides no evidence to suggest that the OLS estimates in column (2) are inconsistent.

A very similar pattern of coefficients can be seen in the outcomes for the private credit measure of financial depth ($\triangle$PRIVO) in columns (4)-(6). $CapVol_{81-95}$ exhibits a positive and significant coefficient in column (4) but this is not robust to the exclusion of the United Kingdom. When I re-run the OLS regression omitting this country in column (5), $CapVol_{81-95}$ remains positive but becomes insignificant.[26] In the IV regression, $CapVol_{81-95}$ remains positive and insignificant and the Hausman test provides no evidence to suggest that the OLS esti-

[25]This new result is itself robust to the omission of any one country from the dataset.

[26]Once again, this new result is itself robust to the omission of any one country from the dataset.

nates in column (5) are inconsistent.

Finally, $CapVol_{81-95}$ is positive and insignificant in the OLS regression for ∠BANK in column (7). This outcome, however, is not robust to the exclusion of Mauritius. In the OLS and IV regressions in columns (8) and (9), $CapVol_{81-95}$ is insignificant at the 90 percent confidence level or better and there is no evidence from the Hausman test to suggest inconsistent OLS estimates in column (8).[27] Thus, in general, these full-sample outcomes are reasonably similar to the results obtained using $CapIMF_{81-94}$.[28]

Industrial Countries In the industrial country subsample (Table 5.11), $CapVol_{81-95}$ is positive and significant at the 90 percent confidence level or better for △LLY and △PRIVO in the OLS regressions in columns (1) and (4). Thus, like the initial outcomes obtained using $CapIMF_{81-94}$ in the same sample[29], these estimates suggest that financial openness boosts financial development in richer countries. Both these outcomes, however, are not robust to the exclusion of the United Kingdom. In the case of both △LLY and △PRIVO, the omission of this country leads to insignificance on the part of $CapVol_{81-95}$ in columns

[27]This new result, however, has four leverage points. Bolivia is the biggest leverage point and when I exclude this country from the sample, $CapVol_{81-95}$ becomes insignificant. This subsequent regression has no leverage points.

[28]For completeness, I re-run the regressions involving $CapIMF_{81-94}$ including only the countries for which financial openness data ($CapVol_{81-95}$) is available. For these 55 countries (56 in the case of △BANK), $CapIMF_{81-94}$ is positive for all three financial depth measures but only significant in the case of △PRIVO. Significance in this case, however, disappears when Indonesia is omitted.

[29]There are only 21 countries in the industrial country subsample when $CapVol_{81-95}$ is used as a measure of international financial integration because Belgium-Luxembourg is excluded. A measure of $CapVol_{81-95}$ was not calculated for Belgium-Luxembourg following a warning by Lane and Milesi-Ferretti (2001b) about the reliability of the estimated stocks of equity liabilities.

(2) and (5), respectively and there is a huge decline in the overall explanatory power of the regressions.[30] $CapVol_{81-95}$ remains positive and insignificant in the IV regressions and the Hausman tests provide no evidence of inconsistent OLS estimates.

In the case of △BANK, $CapVol_{81-95}$ is positive but insignificant in the OLS regression in column (7).[31] The sign of the coefficient changes in the IV regression but it remains insignificant. From the Hausman test, the p-value of the coefficient on the instrumented regressors is 0.07, suggesting that the OLS estimates in column (7) may be inconsistent.

Developing countries The outcomes for the developing country subsample are presented in Table 5.12. $CapVol_{81-95}$ is positive but insignificant in the OLS regressions pertaining to △LLY and △PRIVO in columns (1) and (4). A formal test for outliers, however, reveals that these outcomes are not robust to the exclusion of Bolivia - a country with an extremely high level of financial deepening over the period 1981 to 1995. When I re-run the OLS regressions omitting Bolivia, $CapVol_{81-95}$ turns negative and becomes significant at the 91 and 97 percent confidence levels for △LLY and △PRIVO, respectively.[32] $CapVol_{81-95}$ remains negative in the IV regressions but it is only significant in the case of △PRIVO. Thus, there is quite strong evidence to suggest that greater financial openness *hinders* financial development in poorer countries.

[30] In the case of △LLY, however, the new regression has one leverage point: Japan. When it is excluded from the sample, $CapVol_{81-95}$ becomes highly significant again and the adjusted R^2 of this regression is 0.46. This subsequent regression has no leverage points. In the case of △PRIVO, the new regression has no leverage points.

[31] This is robust to the exclusion of any one country from the sample.

[32] In the case of △LLY, this new result has nine leverage points. Korea is the biggest leverage point. When it is excluded from the sample, $CapVol_{81-95}$ becomes insignificant. In the case of △PRIVO, this new result is robust to the exclusion of any one country.

The adjusted R^2 of these regressions is very small and there is no evidence from the Hausman tests to suggest that the OLS estimates in columns (2) and (5) are inconsistent. When I measure financial depth using $\triangle$BANK, $CapVol_{81-95}$ is positive and insignificant in both the OLS and IV regressions. The overall explanatory power of these regressions is quite high.[33]

Thus, these outcomes provide little evidence to suggest that increasing financial openness is beneficial for financial system development. Indeed, the results for the developing countries suggest that greater openness to international flows of capital may actually retard financial deepening. One possible explanation for this is that certain economic and/or institutional conditions need to be in place before a country can reap the financial deepening rewards of greater financial openness. This hypothesis will be examined in the next section.

Unlike Klein and Olivei (2001), I do not carry out two-stage least squares regression analysis to examine the impact of international financial integration on economic growth, via financial deepening. This is because both measures of international financial integration are not regularly significant and the overall explanatory power of the regressions reported in Tables 5.7-5.12 is quite small. Thus, using the regressors from equation (1) to instrument for $\triangle FD^i$ will not provide an accurate estimate of the impact of financial openness on economic growth.

[33]For completeness, I re-run the regressions involving $CapIMF_{81-94}$ including only the countries for which financial openness data ($CapVol_{81-95}$) is available. For these 34 developing countries (33 in the case of $\triangle$BANK), $CapIMF_{81-94}$ is positive but insignificant for all three financial depth measures.

5.4 Robustness Test - Role of Legal Arrangements

As noted by Klein and Olivei (2001) and Chinn and Ito (2002), it may be the case that the indicators of international financial integration are serving as proxies for a country's overall efforts to reform an economy if greater capital mobility is a just a small part of a wider policy undertaking. In particular, policies to strengthen the quality of the political and institutional environment may also be implemented as part of a wide-ranging reform package. In countries where the legal system does not clearly define property rights or guarantee the enforcement of contracts, the incentives on the part of financial institutions to create loans may be limited (Chinn and Ito, 2002). In addition, the financial decisions made by individuals is likely to be influenced by the degree of legal protection for creditors and the credibility of the accounting system.

La Porta et al (1997, 1998) and Levine et al (2000) provide evidence to suggest that the degree of legal protection investors receive has a significant influence on a country's financial sector development. Therefore, to ensure that both indicators of international financial integration are not simply proxing for good government, I augment the basic regression specification with a measure of the degree to which governments do not repudiate contracts (GOVREP). This variable highlights the quality of enforcement of legal rules within a country.[34]

It may also be the case that the beneficial impact of greater financial openness on financial development is contingent on the presence of a government that is trusted to honor contracts. To examine this possibility, I introduce into the OLS regressions an interaction term between each measure of international

[34]This variable is an index scaled from 0 to 10, with lower scores reflecting a higher risk of repudiation. Because of data availability, the number of countries is smaller than in the original cross-section. I would like to thank Michael Klein for generously sharing this data with me.

financial integration and GOVREP, as well as allowing GOVREP to have a direct impact on outcomes. Tables 5.13 and 5.14 present the robustness outcomes for the capital account openness indicator ($CapIMF_{81-94}$), while Tables 5.15 and 5.16 present the results for $CapVol_{81-95}$. I focus on only the OLS outcomes for the full sample and the developing country subsample.

Columns (1), (4), and (6) of Table 5.13 show the effect of adding GOVREP as a control variable to the basic regression specification for the capital account liberalisation indicator. The direct effect of GOVREP exhibits a predicted positive coefficient in all regressions but it is only significant in the case of $\triangle$PRIVO in column (4). The basic results are robust to the inclusion of this additional variable. In column (1), $CapIMF_{81-94}$ exhibits a positive and significant coefficient but this is not robust to the exclusion of Indonesia as illustrated in column (2). With respect to the outcomes pertaining to $\triangle$PRIVO, $CapIMF_{81-94}$ is positive and highly significant in column (4) and this outcome is robust to the exclusion of any country.[35] $CapIMF_{81-94}$ is positive but insignificant in column (6).

Columns (3), (5), and (7) in Table 5.13 introduce into the regressions an interaction term between $CapIMF_{81-94}$ and GOVREP. The interaction term exhibits an unexpected negative coefficient in columns (5) and (7) but it is never

[35]Thus, unlike the full sample outcomes in Table 5.7, $CapIMF_{81-94}$ remains positive and significant even when I omit Indonesia from the sample. It becomes insignificant, however, when the interaction term is introduced in column (5).

significant.[36] These are similar to the findings of Klein and Olivei (2001).[37] I also report the outcomes of the robustness test for the developing country subsample in Table 5.14. The direct effect of GOVREP is positive but only significant for △PRIVO. $CapIMF_{81-94}$ is never significant in any regression. The interaction term is negative but insignificant.

Columns (1), (3) and (5) of Table 5.15 show the effect of adding GOVREP as a control variable to the basic regression specification for the financial openness indicator. I exclude the United Kingdom from these regressions as it was found to be outlier in a formal test using observation-specific dummy variables. The direct effect of GOVREP is positive and significant in most regressions. $CapVol_{81-95}$ is positive but never significant. Columns (2), (4), and (6) in Table 5.15 introduce into the regressions an interaction term between $CapVol_{81-95}$ and GOVREP. Once again, the interaction term exhibits an unanticipated negative coefficient but it is never significant at standard confidence levels.[38]

In the developing country subsample, however, in Table 5.16, the interaction term is negative and significant in columns (2) and (4) while the direct effects of both $CapVol_{81-95}$ and GOVREP are positive and also significant. These outcomes are robust to the exclusion of any one country in a formal test for

[36] An important issue is the size and economic significance of the individual coefficients on $CapIMF_{81-94}$ and the interaction term. This can be evaluated by examining the size of the partial derivative $dFD/dCapIMF_{81-94} = b1 + b2X$ where FD is the degree of financial deepening, $b1$ is the coefficient on $CapIMF_{81-94}$, $b2$ is the coefficient on the interaction term, and X is GOVREP. The partial derivatives reveal that an increase in capital account openness will have a positive impact on financial deepening at any level of GOVREP. The size and economic significance of the partial derivatives, however, is very small.

[37] When I replace GOVREP with a measure of government anti-diversionary policies - in effect, a proxy for the quality of governmental institutions - I obtain very similar results.

[38] Replacing GOVREP with a measure of government anti-diversionary policies makes no difference to the outcomes.

outliers. Thus, contrary to the hypothesis underlying these robustness tests, it would seem that developing countries with greater levels of financial openness *and* stronger levels of contract enforcement experience *less* financial deepening.[39]

In general, however, there is almost no evidence to suggest that the relationship between international financial integration and financial development is contingent on the quality of legal arrangements.[40]

5.5 Conclusion

The objective of this chapter is to extend Klein and Olivei's (2001) analysis of the relationship between capital account mobility and financial depth by examining the impact of an alternative volume-based indicator of financial openness. Klein and Olivei (2001) provide evidence to suggest that the beneficial impact of capital account openness on financial depth is limited to industrialised countries over the periods 1986-1995 and 1976-1995. Using a similar indicator of capital account openness for the period 1981-95, I find evidence of a positive association between capital account openness and financial depth for the full sample and the subset of industrial countries. This relationship, however, is generally statistically insignificant when outliers are excluded from the sample. There is some evidence in the developing country subsample that greater capital account openness actually retards financial deepening.[41]

When I omit the United Kingdom from all samples, I find almost no evi-

[39]This is also illustrated by the size of the partial derivative which becomes more negative as the value of GOVREP rises. The economic significance of these changes, however, is negligible.

[40]This is in contrast to the findings of Chinn and Ito (2002) who present evidence suggesting that only in an environment with higher levels of legal and institutional development will the link between international financial integration and financial development be detectable.

[41]This is only the case when financial depth is measured using $\triangle$BANK.

dence of a positive and significant relationship between financial openness and financial depth in the full sample or industrial country subsample. Moreover, greater openness to international flows of capital appears to *hinder* financial deepening in developing countries. One possible explanation for these outcomes is that financial openness may only lead to financial deepening when an efficient legal and institutional environment is already in place. This viewpoint, however, is not supported by robustness tests where interactions between both international financial integration measures and the quality of the bureaucracy are insignificant.[42]

There are a number of limitations, however, with both indicators of international financial integration and, thus, these results should be interpreted cautiously. For example, while the binary measure ($CapIMF_{81-94}$) provides a good indication of the presence or absence of capital controls in general, it is limited by a lack of information on the intensity of such controls. In addition, as the measure does not distinguish between different types of capital controls, it is not possible to investigate whether some restrictions may be beneficial in terms of their ability to strengthen the financial system. Moreover, the data ignores the fact that capital controls are frequently circumvented, thus potentially rendering this measure obsolete in some countries.

With respect to the volume-based indicator ($CapVol_{81-95}$), inflows and outflows of capital are endogenous and they are influenced by a wide range of economic and policy outcomes. These include monetary, fiscal, and exchange rate policies; the national and international economic and financial climate; and political circumstances (Eichengreen, 2002). Focusing on the stock measures

[42] As noted by Klein and Olivei (2001), however, quality of the bureaucracy is only one of many factors which may help to create a more stable macroeconomic and political environment.

of capital flows, however, allows me to overcome some of these drawbacks - as they accumulate flows over the period 1981-95, these stock measures avoid to a large extent the problem of temporary capital flow fluctuations resulting from the political and policy environment.

5.A Data sources

- **Capital Account Openness ($\mathbf{CapIMF}_{81-94}$)**: I use information reported in the data appendix to Cottarelli and Giannini (1997) to generate a simple 0/1 dummy variable for each country for each year. $CapIMF_{81-94}$ is the proportion of years over the period 1981-94 with no restrictions on the capital account. For IMF members, the capital controls index is taken from the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* under the heading "Restrictions on payments for Capital transactions". For non-IMF members, information is taken from domestic sources.

- **Financial Openness ($\mathbf{CapVol}_{81-95}$)**: for details about the variables used in the construction of the financial openness measure, see chapter two.

- **LLY:** ratio of liquid liabilities to GDP. Source: Levine et al. (2000).

- **PRIVO**: ratio of claims on the nonfinancial private sector to GDP. Source: Levine et al. (2000).

- **BANK:** ratio of commercial bank assets to commercial bank plus central bank assets. Source: Levine et al. (2000).

- **Government Consumption**: ratio of government consumption to GDP (average1981-85). Source: Levine et al. (2000).

- **Trade Openness:** ratio of exports plus imports to GDP (average 1981-85). Source: Levine et al. (2000).

- **Oil Dummy:** dummy variable taking the value of 1 if a country exports oil. Source: World Bank, World Development Indicators.

- **GOVREP**: the degree to which governments do not repudiate contracts. Source: personal correspondence with Michael Klein.

- **GADP**: an index of the absence of corruption and the quality of the bureaucracy. Source: International Country Risk Guide. Since this index starts only in 1984, I use the average value over 1984-1994.

- **Distance to the equator**: Source: Cross-National Time-Series Data Archive.

- **Landlocked nation dummy**: Source: Cross-National Time-Series Data Archive

- **Island nation dummy**: Source: Cross-National Time-Series Data Archive

- **Language variable**, corresponding to the fraction of the population speaking English. Source: Cross-National Time-Series Data Archive

5.B List of countries for $CapIMF_{81-94}$ and $CapVol_{81-95}$

Argentina*	Ecuador*	Korea, Rep. of*	Saudi Arabia*
Australia*	Egypt*	Lebanon	Senegal
Austria*	Fiji	Lesotho	Singapore*
Bahamas	Finland*	Malawi	South Africa*
Bahrain*	France*	Malaysia*	Spain*
Barbados	Gabon	Maldives	Sri Lanka*
Belgium	Gambia	Mali	Swaziland
Benin	Germany*	Malta	Sweden*
Bhutan	Ghana	Mauritius*	Switzerland*
Bolivia*	Greece*	Mexico*	Thailand*
Botswana*	Guatemala*	Morocco*	Togo
Brazil*	Guinea	Nepal	Trinidad and Tobago*
Burkina Faso	Honduras	Netherlands*	Tunisia*
Cameroon	Iceland*	New Zealand*	Turkey*
Canada*	India*	Niger	Uganda
Chad	Indonesia*	Nigeria	United Kingdom*
Chile*	Ireland*	Norway*	United States*
Colombia*	Israel*	Oman*	Uruguay*
Congo, Dem. Rep.	Italy*	Pakistan*	Venezuela*
Costa Rica*	Jamaica*	Panama	West Samao
Cote d'Ivoire*	Japan*	Paraguay*	Zaire
Cyprus	Jordan*	Peru*	Zambia
Denmark*	Kenya	Philippines*	
Dominican Republic*	Kiribati	Portugal*	

Note: An asterisk indicates countries for which $CapVol_{81-95}$ is available.

5.C Tables

Table 5.1: Financial Depth Statistics, 1981-1995 - Full Sample

	LLY	PRIVO	BANK
Mean, 1981-85	0.46	0.43	0.78
% change 81-95	15.2	20.9	2.6
No. of observations	76	77	83
Simple Correlations	△LLY	△PRIVO	△BANK
△LLY	1		
△PRIVO	0.78	1	
△BANK	0.51	0.47	1

Table 5.2: Financial Depth Statistics, 1981-1995 - Industrialised Countries

	LLY	PRIVO	BANK
Mean, 1981-85	0.68	0.74	0.91
% change 81-95	13.2	29.7	4.4
No. of observations	21	21	21
Simple Correlations	△LLY	△PRIVO	△BANK
△LLY	1		
△PRIVO	0.86	1	
△BANK	0.12	0.07	1

Table 5.3: Financial Depth Statistics, 1981-1995 - Developing countries

	LLY	PRIVO	BANK
Mean, 1981-85	0.37	0.31	0.73
% change 81-95	16.2	16.1	2.7
No. of observations	55	56	62
Simple Correlations	△LLY	△PRIVO	△BANK
△LLY	1		
△PRIVO	0.77	1	
△BANK	0.57	0.53	1

Table 5.4: Simple Correlations - Full Sample

	△LLY	△PRIVO	△BANK
$CapIMF_{81-94}$	0.19 (0.1)	0.25 (0.02)	0.06 (0.8)
$CapVol_{81-95}$	0.15 (0.5)	0.08 (0.8)	0.03 (0.9)

Note: p-values in parentheses

Table 5.5: Simple Correlations - Industrialised countries

	△LLY	△PRIVO	△BANK
$CapIMF_{81-94}$	0.43 (0.05)	0.44 (0.05)	-0.05 (0.9)
$CapVol_{81-95}$	0.32 (0.2)	0.37 (0.1)	-0.16 (0.5)

Note: p-values in parentheses

Table 5.6: Simple Correlations - Developing Countries

	△LLY	△PRIVO	△BANK
$CapIMF_{81-94}$	0.14 (0.3)	0.17 (0.2)	0.1 (0.5)
$CapVol_{81-95}$	0.04 (0.9)	-0.09 (0.6)	0.09 (0.6)

Note: p-values in parentheses

Table 5.7: Capital Account Openness and Financial Depth - Full Sample

	△LLY	
	(1)	(2)
	OLS	IV
constant	1.3 (7.3)***	1.4 (5.4)***
FD_{81-85}	-0.6 (-2.3)**	-0.6 (-2.7)***
$CapIMF_{81-94}$	0.2 (1.4)	0.12 (0.9)
Trade Openness, 1981-85	0.001 (0.4)	0.001 (0.5)
Gov. Con., 1981-85	0.006 (0.9)	0.01 (0.7)
Oil	-0.2 (-2.2)**	-0.2 (-1.2)
Hausman Test - p-value		0.13
Adjusted R^2	0.18	0.18
No. of observations	79	79

Note: White heteroskedasticity-consistent t-statistics in parentheses. The regressions include dummy variables for the regions Africa, Latin America, Asia, and the Middle East. IV denotes instrumental variable estimation when $CapIMF_{81-94}$ is instrumented by an indicator of a country's stance toward capital account liberalisation between 1975 and 1980 ($CapIMF_{75-80}$). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 5.7 continued

	ΔPRIVO			ΔBANK	
	(3)	(4)	(5)	(6)	(7)
	OLS	OLS	IV	OLS	IV
constant	1.5	1.4	1.4	1.9	1.8
	(4.3)***	(3.9)***	(3.6)***	(5.3)**	(8.1)***
FD_{81-85}	-0.7	-0.6	-0.6	-0.9	-0.9
	(-2.1)**	(-1.7)*	(-1.9)*	(-1.9)*	(-4.2)***
$CapIMF_{81-94}$	0.5	0.4	0.4	-0.02	0.03
	(1.9)*	(1.4)	(1.7)*	(-0.3)	(0.3)
Trade Openness, 1981-85	-0.001	-0.001	-0.001	0.001	0.001
	(-0.6)	(-0.3)	(-0.3)	(1.2)	(0.6)
Gov. Con., 1981-85	0.01	0.01	0.01	-0.002	-0.002
	(0.9)	(1.1)	(0.9)	(-0.2)	(-0.2)
Oil	-0.4	-0.5	-0.5	-0.2	-0.2
	(-2.4)**	(-2.9)***	(-1.5)	(-1.5)	(-1.3)
Hausman Test - p-value			0.85		0.17
Adjusted R^2	0.19	0.12	0.12	0.28	0.28
No. of observations	79	78	78	82	82

Note: Indonesia was found to be an outlier in the regression in column (1) and therefore excluded from the regressions in columns (2) and (3). White heteroskedasticity-consistent t-statistics in parentheses. The regressions include dummy variables for the regions Africa, Latin America, Asia, and the Middle East. IV denotes instrumental variable estimation when $CapIMF_{81-94}$ is instrumented by an indicator of a country's stance toward capital account liberalisation between 1975 and 1980 ($CapIMF_{75-80}$). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 5.8: Capital Account Openness and Financial Depth - Industrial countries

	ΔLLY			ΔPRIVO		
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	IV	OLS	OLS	IV
constant	1.5	1.4	1.3	1.2	1.2	1.2
	(3.9)***	(3.3)***	(1.9)*	(1.8)*	(1.6)	(2.1)**
FD_{81-85}	-0.7	-0.7	-0.5	-0.8	-0.5	-0.3
	(-1.9)*	(-1.5)	(-1.2)	(-1.9)*	(-1.1)	(-0.7)
$CapIMF_{81-94}$	0.5	0.4	0.2	0.9	0.5	0.2
	(1.7)*	(1.5)	(0.6)	(2.4)**	(1.6)	(0.5)
Trade Openness, 1981-85	-0.001	-0.001	0.001	0.001	0.004	0.005
	(-0.1)	(-0.1)	(0.1)	(0.3)	(1.1)	(1.1)
Gov. Con., 1981-85	-0.004	-0.001	0.001	0.01	-0.01	-0.01
	(-0.3)	(-0.2)	(0.1)	(0.4)	(-0.1)	(-0.2)
Hausman Test - p-value			0.18			0.28
Adjusted R^2	0.19	0.16	0.06	0.28	0.14	0.05
No. of observations	22	21	21	22	21	21

Note: New Zealand was found to be an outlier in the regression in column (1) and therefore excluded from the regressions in columns (2) and (3). The United Kingdom was found to be an outlier in the regression in column (4) and therefore excluded from the regressions in columns (5) and (6). White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapIMF_{81-94}$ is instrumented by an indicator of a country's stance toward capital account liberalisation between 1975 and 1980 ($CapIMF_{75-80}$). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 5.8 - continued

	ΔBANK		
	(7)	(8)	(9)
	OLS	OLS	IV
constant	1.4	1.4	1.4
	(3.5)***	(3.4)***	(6.6)***
FD_{81-85}	-0.5	-0.5	-0.5
	(-1.3)	(-1.4)	(-1.9)*
$CapIMF_{81-94}$	0.04	0.06	0.02
	(1.5)	(1.9)*	(0.4)
Trade Openness, 1981-85	0.001	0.001	0.001
	(2.4)**	(2.7)***	(1.3)
Gov. Con., 1981-85	0.002	0.003	0.003
	(0.4)	(0.7)	(0.7)
Hausman Test - p-value			0.32
Adjusted R^2	0.11	0.16	0.13
No. of observations	22	21	21

Note: Spain was found to be an outlier in column (1) and, therefore, excluded from the regressions in columns (2) and (3). White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapIMF_{81-94}$ is instrumented by an indicator of a country's stance toward capital account liberalisation between 1975 and 1980 ($CapIMF_{75-80}$). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 5.9: Capital Account Openness and Financial Depth - Developing countries

	ΔLLY		ΔPRIVO			ΔBANK	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	IV	OLS	IV	OLS	OLS	IV
constant	1.5	1.5	1.4	1.5	1.8	1.5	1.5
	(6.1)***	(4.5)***	(3.3)***	(2.9)***	(5.2)***	(7.6)***	(7.7)***
FD_{81-85}	-0.8	-0.8	-0.9	-0.8	-0.9	-0.4	-0.4
	(-2.3)**	(-2.2)**	(-1.3)	(-1.3)	(-1.9)*	(-2.1)**	(-2.1)**
$CapIMF_{81-94}$	0.08	0.1	0.3	0.5	-0.07	-0.1	-0.03
	(0.5)	(0.6)	(0.9)	(1.8)*	(-0.6)	(-1.7)*	(-0.3)
Trade Openness, 1981-85	0.001	0.001	-0.001	-0.001	0.001	0.002	0.001
	(1.4)	(0.8)	(-0.3)	(-0.5)	(0.9)	(1.4)	(1.2)
Gov. Con., 1981-85	0.01	0.01	0.01	0.01	-0.002	-0.01	-0.01
	(1.1)	(0.8)	(0.9)	(0.6)	(-0.2)	(-1.1)	(-1.4)
Oil	-0.2	-0.2	-0.4	-0.4	-0.2	-0.3	-0.2
	(-2.4)**	(-1.2)	(-2.5)**	(-1.3)	(-1.4)	(-2.2)**	(-1.9)*
Hausman Test - p-value		0.76		0.15			0.15
Adjusted R^2	0.18	0.18	0.14	0.13	0.26	0.26	0.25
No. of observations	57	57	57	57	60	59	59

Note: Bolivia was found to be an outlier in the regression in column (5) and, therefore, excluded from the regressions in columns (6) and (7). White heteroskedasticity-consistent t-statistics in parentheses. The regressions include dummy variables for the regions Africa, Latin America, and Asia. IV denotes instrumental variable estimation when $CapIMF_{81-94}$ is instrumented by an indicator of a country's stance toward capital account liberalisation between 1975 and 1980 ($CapIMF_{75-80}$). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 5.10: Financial Openness and Financial Depth - Full sample

	ΔLLY			ΔPRIVO		
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	IV	OLS	OLS	IV
constant	1.2 (6.4)***	1.3 (7.3)***	1.3 (6.9)***	1.3 (3.9)***	1.3 (4.3)***	1.3 (4.5)***
FD_{81-85}	-0.5 (-1.7)*	-0.4 (-1.2)	-0.5 (-2.3)**	-0.5 (-1.4)	-0.3 (-0.9)	-0.4 (-1.1)
$CapVol_{81-95}$	0.002 (1.7)*	0.001 (0.6)	0.003 (1.5)	0.004 (1.9)*	0.002 (0.8)	0.002 (0.7)
Trade Openness, 1981-85	-0.001 (-0.3)	0.001 (0.4)	-0.001 (-0.1)	-0.002 (-1.5)	-0.001 (-0.8)	-0.001 (-0.5)
Gov. Con., 1981-85	0.001 (0.1)	-0.002 (-0.3)	-0.004 (-0.4)	0.003 (0.2)	-0.001 (-0.1)	-0.001 (-0.1)
Oil	-0.3 (-1.9)*	-0.3 (-1.7)*	-0.3 (-1.3)	-0.6 (-3.2)***	-0.6 (-2.9)***	-0.6 (-1.5)
Hausman Test - p-value			0.49			0.9
Adjusted R^2	0.11	0.01	-0.02	0.06	-0.02	-0.02
No. of observations	55	54	54	55	54	54

Note: The United Kingdom was found to be an outlier in columns (1) and (4) and, therefore, is excluded from the regressions in columns (2), (3), (5), and (6). White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 5.10 - continued

	ΔBANK		
	(7)	(8)	(9)
	OLS	OLS	IV
constant	2.4 (5.9)***	2.4 (5.6)***	2.4 (6.9)***
FD_{81-85}	-1.8 (-3.1)***	-1.7 (-2.9)***	-1.7 (-7.3)***
$CapVol_{81-95}$	0.001 (1.5)	0.001 (1.7)*	0.001 (2.1)**
Trade Openness, 1981-85	-0.001 (-0.2)	-0.001 (-0.5)	-0.001 (-0.8)
Gov. Con., 1981-85	0.01 (0.7)	0.01 (0.7)	0.003 (0.3)
Oil	-0.1 (-0.9)	-0.1 (-0.9)	-0.1 (-0.5)
Hausman Test - p-value			0.66
Adjusted R^2	0.56	0.55	0.54
No. of observations	54	53	53

Note: Mauritius was found to be an outlier in column (1) and, therefore, is excluded from the regressions in columns (2) and (3). White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 5.11: Financial Openness and Financial Depth - Industrialised countries

	ΔLLY		
	(1)	(2)	(3)
	OLS	OLS	IV
constant	2.4	1.6	1.4
	(13.4)***	(3.2)***	(2.7)***
FD_{81-85}	-0.9	-0.4	-0.2
	(-1.8)*	(-0.9)	(-0.7)
$CapVol_{81-95}$	0.004	0.001	0.001
	(2.4)**	(0.7)	(0.1)
Trade Openness, 1981-85	-0.006	-0.001	-0.001
	(-1.4)	(-0.5)	(-0.1)
Gov. Con., 1981-85	-0.03	-0.01	-0.01
	(-1.7)*	(-0.7)	(-0.3)
Hausman Test - p-value			0.6
Adjusted R^2	0.42	-0.12	-0.16
No. of observations	21	20	20

Note: The United Kingdom was found to be an outlier in column (1) and, therefore, is excluded from the regressions in columns (2) and (3). White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 5.11 - continued

	ΔPRIVO			ΔBANK	
	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	IV	OLS	IV
constant	1.7	1.5	1.2	1.4	1.3
	(2.7)***	(1.6)	(1.7)*	(3.2)***	(6.2)***
FD_{81-85}	-0.7	-0.4	-0.1	-0.5	-0.4
	(-1.8)*	(-0.6)	(-0.2)	(-1.1)	(-1.5)
$CapVol_{81-95}$	0.005	0.003	0.001	0.001	-0.001
	(3.7)***	(1.1)	(0.2)	(0.8)	(-0.6)
Trade Openness, 1981-85	-0.007	-0.004	0.01	0.001	0.001
	(-1.8)*	(-0.5)	(0.1)	(1.1)	(0.9)
Gov. Con., 1981-85	-0.007	-0.005	0.003	0.001	0.001
	(-0.3)	(-0.2)	(0.1)	(0.3)	(0.2)
Hausman Test - p-value			0.35		0.07
Adjusted R^2	0.41	-0.07	-0.2	0.04	0.01
No. of observations	21	20	20	21	21

Note: The United Kingdom was found to be an outlier in column (1) and, therefore, is excluded from the regressions in columns (2) and (3). White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 5.12: Financial Openness and Financial Depths - Developing countries

	ΔLLY		
	(1)	(2)	(3)
	OLS	OLS	IV
constant	1.2	1.3	1.3
	(5.9)***	(6.9)***	(6.7)***
FD_{81-85}	-0.8	-0.1	-0.1
	(-1.2)	(-0.3)	(-0.1)
$CapVol_{81-95}$	0.002	-0.003	-0.003
	(0.5)	(-1.7)*	(-1.4)
Trade Openness, 1981-85	0.001	0.002	0.003
	(0.5)	(1.8)*	(1.7)*
Gov. Con., 1981-85	0.01	0.002	0.002
	(0.8)	(0.2)	(0.1)
Oil	-0.3	-0.2	-0.2
	(-2.1)**	(-1.4)	(-0.9)
Hausman Test - p-value			0.6
Adjusted R^2	-0.03	-0.02	-0.03
No. of observations	34	33	33

Note: Bolivia was found to be an outlier in column (1) and therefore, is excluded from the regressions in columns (2) and (3). White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 5.12 - continued

	ΔPRIVO			ΔBANK	
	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	IV	OLS	IV
constant	1.5	1.5	1.6	2.7	2.6
	(3.5)***	(3.5)***	(4.1)***	(6.4)***	(8.5)***
FD_{81-85}	-0.7	-0.1	-0.1	-2.2	-2.1
	(-0.8)	(-0.2)	(-0.1)	(-3.5)***	(-5.4)***
$CapVol_{81-95}$	0.001	-0.005	-0.008	0.001	0.002
	(0.1)	(-2.2)**	(-1.7)*	(0.5)	(0.7)
Trade Openness, 1981-85	0.001	0.003	0.004	0.001	-0.001
	(0.1)	(1.3)	(1.2)	(0.2)	(-0.1)
Gov. Con., 1981-85	0.004	0.003	0.005	0.004	0.001
	(0.3)	(0.2)	(0.2)	(0.4)	(0.1)
Oil	-0.5	-0.2	-0.4	0.1	0.1
	(-2.4)**	(-1.4)	(-0.8)	(0.7)	(0.3)
Hausman Test - p-value			0.17		0.58
Adjusted R^2	-0.09	-0.04	-0.06	0.59	0.58
No. of observations	34	33	33	33	33

Note: Bolivia was found to be an outlier in in column (1) and, therefore, is excluded from the regressions in columns (2) and (3). White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 5.13: Robustness Test for CapIMF Outcomes - Role of Legal Arrangements - Ful sample

	ΔLLY		
	(1)	(2)	(3)
	OLS	OLS	OLS
constant	1.1 (2.8)***	1.1 (2.7)***	1.2 (3.3)***
FD_{81-85}	-0.8 (-2.7)***	-0.7 (-2.4)**	-0.8 (-2.8)***
$CapIMF_{81-94}$	0.3 (1.9)*	0.26 (1.5)	0.02 (0.1)
Trade Openness, 1981-85	-0.001 (-0.1)	0.001 (0.1)	-0.001 (-0.2)
Gov. Con., 1981-85	0.003 (0.3)	0.005 (0.5)	0.004 (0.5)
Oil	-0.2 (-1.4)	-0.2 (-1.7)*	-0.2 (-1.5)
GOVREP	0.04 (0.8)	0.04 (0.7)	0.03 (0.6)
$CapIMF_{81-94}$*GOVREP			0.04 (0.5)
Adjusted R^2	0.2	0.12	0.19
No. of observations	68	67	68

Note: Indonesia was found to be an outlier in column (1) and, therefore, is excluded from the regression in column (2). White heteroskedasticity-consistent t-statistics in parentheses. The regressions include dummy variables for the regions Africa, Latin America, Asia, and the Middle East. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 5.13 - continued

	ΔPRIVO		ΔBANK	
	(4)	(5)	(6)	(7)
	OLS	OLS	OLS	OLS
constant	-0.1 (-0.2)	-0.2 (-0.3)	1.8 (3.7)***	1.8 (3.7)***
FD_{81-85}	-1.1 (-3.5)***	-1.1 (-3.3)***	-1.3 (-2.1)**	-1.3 (-2.1)**
$CapIMF_{81-94}$	0.7 (2.4)**	0.8 (0.8)	0.01 (0.1)	0.2 (0.4)
Trade Openness, 1981-85	-0.003 (-2.2)**	-0.003 (-2.2)**	0.001 (0.4)	0.001 (0.5)
Gov. Con., 1981-85	0.001 (0.1)	-0.001 (-0.1)	-0.003 (-0.2)	-0.01 (-0.3)
Oil	-0.3 (-1.4)	-0.3 (-1.4)	-0.1 (-0.8)	-0.1 (-0.8)
GOVREP	0.23 (2.7)***	0.2 (3.1)***	0.01 (1.3)	0.05 (1.2)
$CapIMF_{81-94}$*GOVREP		-0.02 (-0.1)		-0.03 (-0.5)
Adjusted R^2	0.27	0.26	0.36	0.35
No. of observations	68	68	68	68

Note: White heteroskedasticity-consistent t-statistics in parentheses. The regressions include dummy variables for the regions Africa, Latin America, Asia, and the Middle East. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 5.14: Robustness Test for CapIMF Outcomes - Role of Legal Arrangements - Developing countries

	ΔLLY		ΔPRIVO		ΔBANK	
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	OLS	OLS
constant	1.6	1.5	0.5	0.2	1.9	1.7
	(4.4)***	(4.6)***	(0.9)	(0.5)	(4.2)***	(4.6)***
FD_{81-85}	-1.5	-1.4	-1.5	-1.3	-1.3	-1.3
	(-3.1)***	(-2.8)***	(-1.8)*	(-1.5)	(1.9)*	(-1.9)*
$CapIMF_{81-94}$	0.2	0.9	0.6	2.5	-0.04	1.3
	(1.2)	(0.9)	(1.5)	(1.2)	(-0.3)	(1.2)
Trade Openness, 1981-85	0.001	0.002	-0.003	-0.001	0.001	0.001
	(1.5)	(1.8)*	(-1.2)	(-0.2)	(0.2)	(0.6)
Gov. Con., 1981-85	0.01	0.01	0.01	-0.004	-0.003	-0.004
	(1.1)	(0.8)	(0.4)	(-0.2)	(-0.2)	(-0.3)
Oil	-0.1	-0.1	-0.3	-0.3	-0.1	-0.1
	(-1.1)	(-1.1)	(-1.4)	(-1.2)	(-0.7)	(-0.8)
GOVREP	0.04	0.06	0.2	0.3	0.03	0.07
	(0.9)	(1.7)*	(2.4)**	(3.8)***	(0.9)	(1.5)
$CapIMF_{81-94}$*GOVREP		-0.1		-0.3		-0.2
		(-0.8)		(-0.9)		(-1.3)
Adjusted R^2	0.22	0.22	0.16	0.17	0.32	0.34
No. of observations	46	46	46	46	46	46

Note: White heteroskedasticity-consistent t-statistics in parentheses. The regressions include dummy variables for the regions Africa, Latin America, and Asia. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 5.15: Robustness Test for CapVol Outcomes - Role of Legal Arrangements - Full sample

	ΔLLY		ΔPRIVO		ΔBANK	
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	OLS	OLS
constant	1.3 (4.8)***	0.1 (0.1)	0.8 (1.9)*	-0.3 (-0.3)	2.4 (5.7)***	1.7 (4.7)***
FD_{81-85}	-0.4 (-1.4)	-0.4 (-1.7)*	-0.8 (-1.7)*	-0.7 (-1.5)	-2.1 (-3.1)***	-1.9 (-3.6)***
$CapVol_{81-95}$	0.001 (0.8)	0.01 (1.4)	0.003 (1.2)	0.01 (1.1)	0.001 (1.4)	0.01 (1.4)
Trade Openness, 1981-85	-0.001 (-0.2)	-0.001 (-0.3)	-0.002 (-1.1)	-0.002 (-1.3)	-0.001 (-0.1)	-0.001 (-0.6)
Gov. Con., 1981-85	-0.003 (-0.4)	-0.01 (-1.3)	-0.01 (-0.8)	-0.02 (-1.2)	0.001 (0.1)	-0.004 (-0.8)
Oil	-0.4 (-1.8)*	-0.5 (-1.9)*	-0.6 (-2.1)**	-0.7 (-1.9)*	0.002 (0.2)	-0.1 (-0.8)
GOVREP	0.004 (0.1)	0.2 (1.7)*	0.1 (1.7)*	0.3 (1.9)*	0.05 (2.2)*	0.1 (1.9)*
$CapVOL_{81-95}$*GOVREP		-0.001 (-1.5)		-0.001 (-0.9)		-0.001 (-1.3)
Adjusted R^2	-0.01	0.1	-0.01	0.01	0.57	0.6
No. of observations	52	52	52	52	52	52

Note: The United Kingdom is excluded from all regressions as it was found to be an outlier. White heteroskedasticity-consistent t-statistics in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 5.16: Robustness Test for CapVol Outcomes - Role of Legal Arrangements - Developing Countries

	ΔLLY		ΔPRIVO		ΔBANK	
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	OLS	OLS
constant	1.1	-1.1	0.3	-2.6	2.6	1.1
	(2.7)***	(-1.1)	(0.6)	(-1.7)*	(5.2)***	(1.2)
FD_{81-85}	-0.8	-0.8	-1.2	-1.2	-2.2	-2.1
	(-1.2)	(-1.2)	(-1.1)	(-0.9)	(-3.1)***	(-4.1)***
$CapVol_{81-95}$	0.003	0.03	0.003	0.04	0.001	0.02
	(0.7)	(2.1)**	(0.5)	(1.8)*	(0.5)	(1.5)
Trade Openness, 1981-85	-0.001	0.004	-0.002	0.01	-0.001	-0.001
	(-0.2)	(1.5)	(-0.4)	(0.9)	(-0.1)	(-0.2)
Gov. Con., 1981-85	0.001	-0.01	0.001	-0.02	0.003	0.003
	(0.5)	(-0.8)	(0.1)	(-0.9)	(0.3)	(0.2)
Oil	-0.4	-0.3	-0.6	-0.4	0.07	0.1
	(-1.9)*	(-1.2)	(-1.5)	(-1.1)	(0.4)	(0.8)
GOVREP	0.03	0.4	0.2	0.7	0.02	0.3
	(0.5)	(2.4)**	(1.8)*	(2.7)***	(0.4)	(1.7)*
$CapVOL_{81-95}$*GOVREP		-0.004		-0.01		-0.003
		(-2.2)**		(-1.9)*		(-1.5)
Adjusted R^2	-0.06	0.1	-0.1	0.01	0.56	0.62
No. of observations	32	32	32	32	31	31

Note: White heteroskedasticity-consistent t-statistics in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Chapter 6

Does Financial Openness Influence Fiscal Size and Discipline Fiscal policy?

6.1 Introduction

Despite the macroeconomic crises experienced by many emerging markets throughout the 1990s, many economists continue to advocate greater openness to international flows of capital as a means of boosting economic performance. One frequently asserted benefit of financial openness is the disciplinary effect that cross-border capital flows are expected to have on national economic policies. Unrestricted movements of capital, it is argued, may prevent governments from pursuing harmful policies.[1] One particular policy area which may be influenced by increasing financial openness is the degree of fiscal activism within a country. In effect, greater openness to international flows of capital may force countries to adopt a smaller and more disciplined fiscal stance.

Theoretical predictions about the impact of increasing financial openness on fiscal policy are ambiguous. From the perspective of fiscal size, efficiency gains from increased risk diversification opportunities and a better allocation of international savings may enhance economic growth and the potential tax base which suggests the possibility of a larger fiscal presence, in terms of possibly larger absolute levels of tax revenue and/or public expenditure. This assumes that the perfect-markets paradigm is reasonably applicable to capital markets. Many economists, however, argue that financial markets suffer from numerous market failures and distortions which ultimately lead to the inefficient intermediation of large amounts of capital inflows in developing countries. As a consequence of these problems, severe macroeconomic and financial crises can sometimes follow. Thus, the fiscal presence may actually contract in the face of increasing financial openness.

Countries with closed capital accounts tend to rely quite heavily on financial

[1] See Fischer (1998).

repression and high inflation taxes as sources of fiscal revenue. In addition, capital controls may enforce lower domestic interest rates, thereby reducing the cost of domestic borrowing and possibly triggering an increase in debt-financed public expenditures (Kraay, 1998). Thus, the opening of the capital account could remove a significant proportion of these revenues and increase the costs of domestic borrowing, potentially leading to a tightening of the fiscal stance.[2] In terms of capital income taxation, whether greater capital mobility will increase or decrease fiscal revenue will depend largely on the feasibility of foreign capital income taxation and the extent to which domestic investors are able to avoid the capital income tax.[3]

Garrett (1998) and Garrett and Nickerson (2001) present two contrasting perspectives on the relationship between international financial integration and government size (as measured by total government expenditure and general government consumption). These are referred to as the "efficiency" hypothesis and the "compensation" hypothesis. The former argues that international capital markets will punish countries with large capital outflows if they excessively expand government size. A greater fiscal presence through increased government expenditure implies potentially greater short-term borrowing and, ultimately, higher taxes. Borrowing results in higher real interest rates which will depress investment while taxes on income and wealth affect asset holders and therefore distort investment decisions (Garrett and Nickerson, 2001). These are viewed with disapproval by financial markets and, therefore, countries who wish to attract and maintain inflows of capital have little choice but to reduce government

[2]This may have beneficial consequences, however, as it might prompt a government to adopt a more disciplined fiscal stance.

[3]Garcia Pascual (1999) provides a comprehensive theoretical review of the optimal fiscal policy under free capital mobility.

size.[4]

In contrast, the "compensation" hypothesis argues that the increasing inequality and economic insecurity that is an inevitable consequence of greater international financial integration, particularly in poorer countries, will lead governments to expand expenditure as a means of compensating those who lose out from this process. This might also have the additional political benefit of maintaining and, possibly increasing, citizen support for the process of international financial integration. This hypothesis is the same as that used with respect to trade liberalisation which argues that as countries engage more in open trade with the rest of the world, there may be increased numbers of people disadvantaged by it, necessitating a more active fiscal stance. Unrelated to the "compensation" hypothesis is the view that greater financial openness may lead to a larger fiscal presence as countries find it easier to raise funds on international capital markets. Thus, from a political economy perspective, it is not obvious what effect increasing financial openness will have on government size.[5]

Another line of theory is that countries may run tighter fiscal stances in response to the introduction of external risks associated with herding behaviour in international capital markets. These risks are generally caused by financial or political distortions and/or domestic imbalances. A fragile domestic banking system and/or unsustainable budget deficits caused by political inefficiencies are factors which may lead to costly currency or financial crises. These problems can

[4]This hypothesis is very much linked up with the policy discipline argument mentioned above. For example, an increasing budget deficit might cause concern in international financial markets and, if not reduced, may prompt an outflow of capital.

[5]In the empirical analysis below, I also use current and tax revenue levels as measures of fiscal size.

be intensified, however, by the particular characteristics of international capital markets. Market failures arising from asymmetric information, incompleteness of contingent markets, and bounded rationality are widespread in financial markets and can lead to problems of moral hazard or herding behaviour (Rodrik, 1998a). The moral hazard problem can take a number of different forms. If the government becomes involved as a financial intermediary by acting as a safety net for borrowers or lenders it can increase the risk of financial distress. For example, investors may undertake higher risks in the presence of limited liability (Garcia Pascual, 1999). Another example of moral hazard is where investors perceive that the domestic authorities will bail out big financial institutions in the event of any crisis, thereby tempting investors into taking on more risky activities.

With respect to the problem of herding behaviour, asymmetric and incomplete information in international capital markets can sometimes lead to excessive short-term capital flow volatility. In response to these problems, countries may adopt more prudent and simpler fiscal policies (e.g. limiting the size of the budget deficit) as a means of lowering the probability of costly currency or financial crises (Garcia Pascual, 1999). For example, implementing a fiscal rule that states the budget should be balanced may make it easier for international financial markets to evaluate the degree of solvency within a country. The most optimal course of action would be to try to eliminate the existing distortions within the domestic financial system. This, however, can be very difficult and, as a result, a tighter fiscal stance may be adopted as long as financial fragility is still an issue. This is the type of predicted disciplinary impact of greater financial openness emphasised by Fischer (1998).

Empirical research on the impact of financial openness on the degree of fis-

cal activism is relatively scarce. Quinn (1997), using a rules-based measure of capital controls, presents evidence of a positive and sometimes significant relationship between financial liberalisation and government expenditure over the period 1974-89 for a sample of 38 countries.[6] Kim (2000) finds a negative association between capital account openness and budget deficits over the period 1950-1990 using three-stage least squares analysis for a sample of 54 OECD and developing countries. He also shows that this disciplinary impact is stronger for countries under a fixed exchange rate regime and for countries with weak central bank independence. In contrast, Garrett (2000), using panel data estimation, finds scant evidence that the liberalisation of capital accounts has been associated with a reduction in fiscal activism (including budget deficits) in 21 OECD countries over the period 1973-1993. Both authors use Quinn's (1997) index of international financial openness as an indicator of capital account openness.

This chapter extends the previous research by examining the impact of an alternative, volume-based indicator of financial openness on the average level of six measures of fiscal activism. One of the main reasons why empirical studies examining the impact of capital mobility have provided inconclusive outcomes is due to the difficulty of measuring the degree of capital account openness. Focusing on the volume of gross capital stocks as a means of developing an alternative indicator of international financial integration provides the opportunity to compare outcomes using this measure with previous research using different indicators. I also examine the impact of a country's net external asset position on the relationship between financial openness and fiscal activism. It may be the case that the potential disciplinary impact of greater financial

[6]Quinn's measure draws on information contained in the country-by-country descriptions of foreign exchange restrictions in the International Monetary Fund's *Annual Report on Exchange Arrangements and Exchange Restrictions.*

openness on fiscal policy only exists in countries with high levels of net external liabilities.

To anticipate my findings, I find no evidence to suggest that financial openness is related to the size of the fiscal presence. With respect to fiscal discipline, however, there is some mixed evidence to suggest that greater financial openness lowers budget deficits, particularly in developing countries. In contrast, however, greater financial openness appears to increase levels of government debt in developing countries. The rest of this chapter is structured as follows. Section 6.2 describes the data. Section 6.3 presents the results. Section 6.4 concludes.

6.2 Data

6.2.1 Measuring Financial Openness

As an alternative to the restrictions-based measure constructed by the IMF and refined by Quinn (1997), I construct an indicator based on the estimated stocks of foreign assets and liabilities. This indicator, $CapVol_{81-98}$, is constructed by summing the average gross levels of the annual stocks of foreign direct investment (FDI), portfolio equity, and debt assets and liabilities via the accumulation of the corresponding inflows and outflows for the period 1981-1998.[7] This is measured for each country as a percentage of GDP and it covers a sample of 63 industrialised and developing countries. The list of countries is presented in the appendix in Chapter two.

In the empirical analysis, I also include as additional regressors an interaction term representing financial openness *and* the net foreign asset position ($CapVol_{81-98}$*NFA) for each country as well as allowing NFA to have a direct

[7]For a full description of the variables used in the construction of this measure of financial openness, see Chapter Two.

effect on outcomes. The net foreign asset position indicates the extent of a country's debtor or creditor status. The intuition behind examining the impact of this measure is that the potential disciplinary impact of cross-border capital flows on fiscal policy is more likely to apply to debtor countries. Thus, one might expect to observe a more disciplined fiscal stance in countries with a larger proportion of net external liabilities relative to GDP.[8] In addition, the interaction term representing financial openness *and* the net foreign asset position ($CapVol_{81-98}$*NFA) is included to examine the possibility that the potential disciplinary impact of greater financial openness on fiscal policy may only exist in countries with large negative net external positions.[9] Following Lane and Milesi-Ferretti (2001b), I use a measure of the net foreign asset position (NFA) which is the cumulated current account, adjusted to reflect the impact of capital transfers, valuation changes, and net capital gains on equity and FDI holdings. This is also measured for each country as a percentage of GDP. It is available for the same 63 industrial and developing countries as above and is averaged over the period 1981-1998.

6.2.2 Fiscal Policy Measures

Six facets of fiscal policy are examined in the regression analysis: (a) total expenditure; (b) government consumption; (c) current revenue; (d) tax revenue;

[8]There may, however, be reverse causality here in the sense that countries may have high levels of net external debt because of fiscal indiscipline.

[9]Although there is no obvious theoretical link from the net foreign asset position (NFA) to fiscal size, I include this variable and its interaction with $CapVol_{81-98}$ in the regressions for each fiscal size measure because I want to have a consistent specification across all six dependent variables. In addition, as NFA and its interaction with financial openness may influence the budget deficit, it is interesting to examine if such a relationship is coming through the expenditure or revenue side.

(e) the overall budget balance[10]; and (f) government debt. All these variables are expressed as percentages of GDP and averaged over the period 1981-98. The first four measures give some indication of the size of the fiscal presence. As described above, it is not clear what effect greater financial openness will have on the degree of fiscal activism within a country. The latter two variables give some idea of the degree of fiscal discipline within a country. One would expect more financially open economies to exhibit greater fiscal discipline by way of smaller budget deficits and lower levels of government debt.

6.3 Specification and Results

To start, I compute simple correlations between the financial openness measure ($CapVol_{81-98}$) and the average level of the six fiscal policy measures over the period 1981 to 1998 for the full sample.[11] The outcomes are presented in Table 6.1. There is a strong positive correlation between financial openness and each fiscal indicator and the correlation coefficients are significant at the 90 percent confidence level or better in all cases. This positive relationship is also evident in Figures 6.1-6.6 which present a scatterplot of each fiscal indicator against the degree of financial openness for the full sample of countries.

For the cross-sectional regression analysis, I, in turn, regress the average level of each of the six fiscal policy indicators on $CapVol_{81-98}$, using ordinary least squares (OLS), with standard errors corrected for heteroskedasticity by the White procedure. The following control variables are introduced to isolate their impact on the level of these fiscal indicators: real GDP per capita in log

[10]For this variable, a positive sign indicates a budget surplus while a negative sign denotes a budget deficit.

[11]The total number of countries included in the full sample varies for each fiscal measure due to data availability constraints.

form, trade openness (measured as the ratio of the sum of a country's exports and imports to its national income), total population in log form as a proxy for country size, and the dependency ratio in the population.[12] All four control variables are averaged over the period 1981 to 1998. Some comments about these control variables are required.

According to Wagner's Law, the demand for government services is income elastic, so that GDP per capita should be positively associated with government size (measured by either spending or taxes). One would also expect GDP per capita to be associated with larger budget deficits due to stickiness in budgets (Garrett, 2000). The degree of trade openness is included in the regressions to take account of the fact that as countries engage more in open trade with the rest of the world, there may be increased numbers of people disadvantaged by it, necessitating a more active fiscal stance. Rodrik (1998b) argues that open countries are more subject to external shocks, and therefore need a larger public sector to provide a stabilising role. Thus, trade openness is expected to be positively associated with government size and negatively associated with the budget balance and government debt.

Alesina and Wacziarg (1998), however, provide a different but not mutually exclusive explanation for the positive empirical relationship between trade openness and government size by arguing that this link is mediated by country size (as proxied by total population). They show that country size is negatively related to government size, and that it is also negatively related to trade openness. Such empirical observations, they argue, are consistent with recent economic models of country formation (Alesina and Spolaore, 1995; Alesina et al, 1997) which suggest that country size, government size, and trade openness

[12]The choice of regressors follows the procedure of Fatas and Rose (2001).

are interconnected. In particular, the determination of country size arises from a trade-off: large countries can afford to have smaller governments and they already benefit from a sizable market which reduces their need to be open to trade. However, they must bear the cost of cultural heterogeneity. Thus, countries with larger populations are expected to have smaller governments. The final control variable is the dependency ratio. Countries with a higher proportion of young and old people relative to the potentially active age group are likely to exhibit a larger fiscal presence, bigger budget deficits, and higher levels of government debt.

Two samples are considered in the regression analysis: the full sample and the set of developing countries. For the full sample, four sets of regressions are carried out. First, I regress each dependent variable of interest on a constant, financial openness ($CapVol_{81-98}$), and two key control variables: real GDP per capita and trade openness. Two additional control variables are included in the second specification: the dependency ratio and total population. I then interact financial openness with a 0/1 dummy variable representing the industrialised countries to examine whether financial openness has different effects on the fiscal indicators in high- and low-income countries. Finally, in the fourth specification, I include the net foreign asset measure (NFA) and its interaction with $CapVol_{81-98}$. Apart from the second specification, the same set of regressions are carried out for the developing country subsample. The results are presented in Tables 6.2-6.13.

6.3.1 Total Expenditure

Tables 6.2 and 6.3 present the full sample and developing country outcomes for total expenditure. In the full sample, the control variables all have their

expected sign but only GDP per capita is always significant. In the basic OLS regression specification in column (1) of Table 6.2, the coefficient on the financial openness indicator ($CapVol_{81-98}$) is positive but insignificant at standard confidence levels. I test the robustness of this result by looking for leverage points in the regression. Leverage points are observations which are influential in determining the statistical significance of key results. I determine the leverage points of the regression by using observation-specific dummy variables. This is where a dummy variable is used for country i, effectively excluding it from the dataset for that regression. This is then repeated for each country in turn. In effect, the regressions indicate how the statistical significance of financial openness ($CapVol_{81-98}$) changes when each country's data are excluded in turn. Thus, we can see which countries are influential. The outcome for $CapVol_{81-98}$ in the OLS regression is robust to the removal of any one country.

$CapVol_{81-98}$ remains positive and insignificant when I include the additional two regressors in column (2). There is evidence from column (3), however, to suggest that the impact of financial openness on total expenditure varies between the industrialised and developing countries. $CapVol_{81-98}$ and its interaction with the industrialised dummy variable exhibit negative and positive coefficients, respectively, and they are highly significant. When I replace the industrialised dummy variable with real per capita GDP in 1981 (not reported here), however, $CapVol_{81-98}$ and the new interaction term change signs and are no longer significant.

When I introduce the net foreign asset measure and its interaction with financial openness in column (4), $CapVol_{81-98}$ is positive and insignificant. Both *NFA* and the interaction term, however, are significant (positive and negative, respectively). A formal test for leverage points, however, reveals that this out-

come is not robust to the exclusion of Singapore - a country with a very positive net foreign asset position and a high level of financial openness. Both *NFA* and the interaction term continue to exhibit positive and negative coefficients, respectively, but they are no longer significant in column (5). Thus, there is little evidence of a significant relationship between financial openness, or its interaction with the net external asset position, and total expenditure levels.

In the developing country subsample, the control variables all have the expected sign but only the dependency ratio is always significant. In the basic OLS regression specification in column (1) of Table 6.3, the coefficient on the financial openness indicator ($CapVol_{81-98}$) is negative but insignificant at standard confidence levels. This outcome is robust to the exclusion of any one country from the sample. $CapVol_{81-98}$ remains negative and insignificant when I include the additional two regressors in column (2). When I introduce the net foreign asset measure and its interaction with financial openness in column (3), $CapVol_{81-98}$ is negative and insignificant. Both *NFA* and the interaction term exhibit positive and negative coefficients, respectively, but they are insignificant.[13]

6.3.2 Government Consumption

Tables 6.4 and 6.5 present the full sample and developing country outcomes for government consumption. In the full sample, the control variables all have the expected sign but only GDP per capita and the dependency ratio are significant. In the basic OLS regression specification in column (1) of Table 6.4, the coefficient on the financial openness indicator ($CapVol_{81-98}$) is positive but insignificant at standard confidence levels. This outcome is robust to the removal of any one country from the sample.. $CapVol_{81-98}$ remains positive and

[13]This outcome is robust to the exclusion of any one country.

insignificant when I include the additional two regressors in column (2). There is no evidence from column (3) to suggest that the impact of financial openness on government consumption varies between industrialised and developing countries.

When I introduce the net foreign asset measure and its interaction with financial openness in column (4), $CapVol_{81-98}$ remains positive and insignificant. Both *NFA* and the interaction term, however, are significant (positive and negative, respectively). This outcome is robust to the exclusion of any one country. Thus, countries with more negative net external asset positions seem to have lower levels of government consumption.[14] In addition, the impact of the net foreign asset position on government consumption levels appears to be affected by the degree of financial openness - the extent to which countries with more negative values for *NFA* have lower levels of government consumption is weaker in more financially open economies.

The outcomes for the developing country subsample are quite similar to those for the full sample. With the exception of the dependency ratio which is positive and significant, none of the control variables are significant. In the basic OLS regression specification in column (1) of Table 6.5, the coefficient on the financial openness indicator ($CapVol_{81-98}$) is positive but insignificant at standard confidence levels. This outcome is robust to the exclusion of any one country. $CapVol_{81-98}$ turns negative but remains insignificant when I include the additional two regressors in column (2).

$CapVol_{81-98}$ is negative and insignificant in column (3). Once again, both *NFA* and the interaction term are significant (positive and negative, respec-

[14] One possible explanation for this outcome is that countries with large negative net external positions may find it harder to borrow funds on international capital markets, thus reducing government consumption levels.

tively). When I omit Singapore from the regression sample in column (4), however, the interaction term remains negative but it is no longer significant. The direct effect of the net foreign asset position remains positive and significant at the 95 percent confidence level. Thus, developing countries with more negative net foreign asset positions appear to have lower levels of government consumption.[15]

6.3.3 Current Revenue

Tables 6.6 and 6.7 present the full sample and developing country outcomes for current revenue. In the full sample, the control variables all have the expected positive sign, with the exception of country size, but they are not regularly significant. In the basic OLS regression specification in column (1) of Table 6.6, $CapVol_{81-98}$ is positive but insignificant at standard confidence levels. This outcome is robust to the removal of any one country. $CapVol_{81-98}$ remains positive and insignificant when I include the additional two regressors in column (2). There is evidence from column (3) to suggest that the impact of financial openness on current revenue varies between industrialised and developing countries. $CapVol_{81-98}$ and its interaction with the industrialised dummy variable exhibit negative and positive coefficients, respectively and they are significant at the 95 percent confidence level or better. When I replace the industrialised dummy variable with real per capita GDP in 1981, however, $CapVol_{81-98}$ and the new interaction term change signs and are no longer significant.

When I introduce the net foreign asset measure and its interaction with financial openness in column (4), $CapVol_{81-98}$ is positive and insignificant. Both *NFA* and the interaction term, however, are significant (positive and negative,

[15]This outcome also provides no support for the view that countries may have large negative net external positions partly because of high government consumption levels.

respectively). This outcome, however, is once again not robust to the exclusion Singapore. In column (5), the omission of Singapore leads to insignificance on the part of the interaction term but the direct effect of *NFA* remains positive and significant.[16] Thus, countries with a greater proportion of net external liabilities to GDP have lower levels of current revenue.

In the developing country subsample in Table 6.7, $CapVol_{81-98}$ is negative and insignificant in columns (1) and (2)[17] and it remains insignificant when *NFA* and the interaction term are introduced in column (3), both of which are significant (positive and negative, respectively). Once again, however, the exclusion of Singapore leads to insignificance on the part of the interaction term but *NFA* remains positive and significant.[18]

6.3.4 Tax Revenue

Tables 6.8 and 6.9 present the full sample and developing country outcomes for tax revenue. In the full sample, GDP per capita exhibits an expected positive coefficient and it is sometimes significant. The other three control variables generally have negative coefficients but they are almost never significant. In the basic OLS regression specification in column (1) of Table 6.8, $CapVol_{81-98}$ is positive but insignificant at standard confidence levels. This outcome is robust to the removal of any one country. $CapVol_{81-98}$ remains positive and insignificant when I include the additional two regressors in column (2). There is evidence from column (3) to suggest that the impact of financial openness on tax revenue varies between industrialised and developing countries. $CapVol_{81-98}$ and its interaction with the industrialised dummy variable exhibit negative and

[16]This new result is itself robust to the exlcusion of any one country.

[17]These results are robust to the exclusion of any one country.

[18]This new result is itself robust to the omission of any one country.

positive coefficients, respectively and they are significant at the 95 percent confidence level or better. Once again, however, when I replace the industrialised dummy variable with real per capita GDP in 1981, $CapVol_{81-98}$ and the new interaction term change signs and are no longer significant.

When I introduce the net foreign asset measure and its interaction with financial openness in column (4), $CapVol_{81-98}$ is positive and significant at the 90 percent confidence level. Both *NFA* and the interaction term are also significant (positive and negative, respectively). This outcome, however, is not robust to the exclusion Singapore. In column (5), the omission of Singapore leads to insignificance on the part of all three variables.[19]

None of the control variables are significant in the developing country subsample, with the exception of country size in column (2). The coefficient on the financial openness indicator ($CapVol_{81-98}$) is negative but insignificant in all regressions. This outcome is robust to the exclusion of any one country in a formal test for influential observations. Both the net foreign asset position and its interaction with financial openness are insignificant in column (3).

6.3.5 Budget Balance

Tables 6.10 and 6.11 present the full sample and developing country outcomes for the budget balance. In the full sample, GDP per capita exhibits an expected negative coefficient in all cases but it is never significant. Trade openness is positive and significant in most cases which is surprising as one would expect countries with a high degree of trade openness to exhibit more negative budget balances. Both total population and the dependency ratio are negative but almost never significant. In the basic OLS regression specification in column

[19]This new result is itself robust to the exclusion of any one country.

(1) of Table 6.10, $CapVol_{81-98}$ is positive but insignificant. This outcome, however, is not robust to the exclusion of Botswana. When I omit Botswana from the sample in column (2), $CapVol_{81-98}$ remains positive but it becomes significant at the 90 percent confidence level.[20]

A question that arises when considering the OLS outcomes is whether there is an upward bias on the financial openness coefficient because of reverse causality. One might expect countries to experience greater flows of capital when the budget balance is reasonably under control. In effect, the line of causation may run from smaller budget deficits to increasing financial openness.[21] To address this problem, I re-run the regressions using a two-stage regression technique that instruments for $CapVol_{81-98}$. In addition to the basic control variables, the instruments used are the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. The IV outcome for the basic regression specification is presented in column (3).[22] $CapVol_{81}$ remains positive but it is insignificant. A Hausman test reveals a p-value on the coefficient of the instrumented regressor of 0.3, suggesting that the OLS estimates in column (2) are consistent. $CapVol_{81-98}$ remains positive and it is now significant at the 92 percent confidence level when I include the additional two regressors in the OLS regression in column (4).[23]

There is strong evidence from column (5) to suggest that the impact of finan-

[20]This new result, however, has eleven leverage points. Israel is the biggest leverage point. When it is excluded from the sample, $CapVol_{81-98}$ becomes insignificant.

[21]With respect to the four fiscal indiactors examined above, I think it is reasonable not to expect any of these to influence the degree of financial openness. These measures do not provide any information on the degree of fiscal discipline within a country. Thus, I do not carry out any two-stage regressions for these indicators.

[22]Botswana is excluded from the sample.

[23]When Israel is excluded from the sample, however, $CapVol_{81-98}$ becomes insignificant. In the unreported IV regression, $CapVol_{81-98}$ is positive but insignificant.

cial openness on the budget balance varies between industrialised and developing countries. $CapVol_{81-98}$ and its interaction with the industrialised dummy variable exhibit positive and negative coefficients, respectively, and they are highly significant. In addition, there is a large increase in the overall explanatory power of the regressions. When I replace the industrialised dummy variable with real per capita GDP in 1981, however, $CapVol_{81-98}$ and the new interaction term exhibit the same signs but they are no longer significant.

When I introduce the net foreign asset measure and its interaction with financial openness in column (6), $CapVol_{81-98}$ is positive but insignificant. Both *NFA* and the interaction term exhibit positive and negative coefficients, respectively, but they are also insignificant.[24]

In the developing country subsample, $CapVol_{81-98}$ is negative and insignificant in column (1) but, once again, the omission of Botswana leads to the financial openness indicator becoming positive and significant at the 90 percent confidence level.[25] $CapVol_{81-98}$ becomes insignificant in the IV regression in

[24]This outcome is robust to the exclusion of any one country. The sign of the coefficients on $CapVol_{81-98}$ and the interaction term suggest that the extent to which greater financial openness leads to a more a positive budget balance increases the more negative is the net external asset position. This is illustrated further when I evaluate the size of the partial derivative $dBB/dCapVol_{81-98} = b1 + b2X$ where BB represents the budget balance, $b1$ is the coefficient on $CapVol_{81-98}$, $b2$ is the coefficient on the interaction term, and X is the net foreign asset position. A one standard deviation increase in financial openness in a country for which NFA equals its 75th percentile value (-10) will lead to an increase in the budget balance of 1.4 percent of GDP. At the median level of NFA (-27), a one standard deviation increase in $CapVol_{81-98}$ will lead to an increase in the budget balance of 2.8 percent of GDP. At the 25th percentile value of NFA (-40), a one standard deviation increase in financial openness leads to an increase in the budget balance of 3.5 percent of GDP. Given that the mean level of the budget balance in the full sample is -3.4 percent of GDP, the economic significance of these partial derivatives is very substantial.

[25]This new result, however, has eight leverage points. Israel is the biggest leverage point.

column (3) and the Hausman test provides no evidence of inconsistent OLS estimates. $CapVol_{81-98}$ remains positive and it is now significant at the 97 percent confidence level when I include the additional two regressors in column (4).[26] When I introduce the net foreign asset measure and its interaction with financial openness in column (5), both of which are insignificant, $CapVol_{81-98}$ is positive and highly significant.[27] Thus, there is some evidence to suggest that increasing financial openness disciplines the budget balance in developing countries.

6.3.6 Government Debt

Tables 6.12 and 6.13 present the full sample and developing country outcomes for government debt. In the full sample, GDP per capita, trade openness and the dependency ratio generally exhibit positive coefficients but they are rarely significant. Country size exhibits an unexpected positive coefficient in most regressions but, with the exception of column (5), it is never significant. In the basic OLS regression specification in column (1) of Table 12, $CapVol_{81-98}$ is positive but insignificant. This outcome is robust to the exclusion of any one country from the sample. Reverse causation may be a problem, however, in the sense that countries may experience greater flows of capital when government debt levels are reasonably under control. To address this issue of causality, I re-run the regression using a two-stage regression technique that instruments for $CapVol_{81-98}$. The instruments used are the same as those above. $CapVol_{81}$ remains positive and insignificant and the coefficient on $CapVol_{81-98}$ becomes much larger indicating that there may be an downward bias when using OLS. A Hausman test reveals a p-value on the coefficient on the instrumented re-

When it is excluded from the sample, $CapVol_{81-98}$ becomes insignificant.

[26]This outcome is robust to the exclusion of any one country, including Israel, from the data. In the unreported IV regression, however, $CapVol_{81-98}$ is positive but insignificant.

[27]This outcome is also robust to the exclusion of any one country.

gressor of 0.2, suggesting that the OLS estimates in column (1) are consistent. $CapVol_{81-98}$ remains positive and insignificant when I include the additional two regressors in column (3).[28]

There is no evidence from column (4) to suggest that the impact of financial openness on the government debt varies between industrialised and developing countries. When I introduce the net foreign asset measure and its interaction with financial openness in column (5), $CapVol_{81-98}$ remains positive and insignificant. Both *NFA* and the interaction term exhibit positive and negative coefficients, respectively, but only the latter is significant. This outcome, however, is not robust to the exclusion of Israel, as can be seen from column (6). In this case, the financial openness coefficient becomes significant (positive) at the 95 percent confidence level while the interaction term remains negative and highly significant.[29] This outcome is somewhat surprising as it suggests that the extent to which increasing financial openness is associated with higher government debt levels declines the more positive is the net external asset position.[30]

In the developing country subsample, $CapVol_{81-98}$ is positive and highly

[28] $CapVol_{81-98}$ is also insignificant in the unreported IV regression.

[29] This new result is robust to the exclusion of any one country in the new sample. This result is also found in the unreported IV regression.

[30] The results in column (6) can be used to evaluate the size of the partial derivative $dGD/dCapVol_{81-98} = b1 + b2X$ where GD represents government debt, $b1$ is the coefficient on $CapVol_{81-98}$, $b2$ is the coefficient on the interaction term, and X is the net foreign asset position. A one standard deviation increase in financial openness in a country for which NFA equals its 75th percentile value (-10) will lead to an increase in government debt of 14 percent. At the median level of NFA (-27), a one standard deviation increase in $CapVol_{81-98}$ will lead to an increase in government debt of 21 percent. At the 25th percentile value of NFA (-40), a one standard deviation increase in financial openness leads to an increase in government debt of 28 percent. Given that the mean level of government debt in the full sample is 56.6 percent of GDP, the economic significance of these partial derivatives is substantial.

significant in column (1). This outcome is robust to the exclusion of any one country. $CapVol_{81-98}$ remains positive and highly significant in the IV regression in column (2) and also in column (3) when the additional control variables are included. The Hausman test provides no evidence of inconsistent OLS estimates. Thus, greater financial openness appears to *increase* government debt levels in developing countries.

When I introduce the net foreign asset measure and its interaction with financial openness in column (4), $CapVol_{81-98}$ becomes insignificant. The interaction term, however, is negative and significant at the 90 percent confidence level. A search for leverage points, however, reveals that this outcome is not robust to the exclusion of Israel. Thus, as can be seen in column (5), $CapVol_{81-98}$ becomes highly significant again and the interaction term remains negative and significant at the 95 percent confidence level.[31] Thus, like the full sample outcomes, the extent to which increasing financial openness is associated with higher government debt levels in poorer countries declines the more positive is the net external asset position.[32]

These outcomes for government debt would seem to contradict the predicted disciplinary impact of greater financial openness on the fiscal stance.[33] On the

[31]This new result is robust to the exclusion of any one country in the new sample. This result is also found in the unreported IV regression.

[32]Once again, the size of the partial derivatives is substantial.

[33]They also contradict the findings in the previous subsection which suggest that greater financial openness is associated with lower budget deficits. One possible explanation for these inconsistent outcomes may be differences in country coverage. To examine this possibility, I re-run the developing country regressions, including only those countries for which both the budget balance and government debt data are available. This leaves a smaller sample of 32 developing countries. In these new regressions, $CapVol_{81-98}$ continues to exhibit a positive coefficient for both variables in all specifications but, interestingly, it is never significant at standard confidence levels. This finding lends support to the view that differences in country

other hand, more financially open countries may find it easier to raise funds on international capital markets and, thus, may take on higher levels of government debt.

6.3.7 Summary of Results

There is almost no evidence of a direct relationship between financial openness and any of the four measures of fiscal size. The net foreign asset position, however, does seem to have an influence on the size of the fiscal presence. Countries who have a large proportion of net external liabilities (relative to GDP) exhibit lower levels of government consumption and current revenue. This outcome also holds in developing countries.

With respect to the issue of fiscal discipline, there is evidence of a positive relationship between financial openness and the budget balance but it is not regularly significant in both the full sample and developing country subsample. This outcome does not appear to be contingent on the net foreign asset position. In contrast, greater financial openness appears to increase levels of government debt in developing countries.

6.4 Conclusion

This paper investigates whether greater openness to international flows of capital leads governments to adopt a more disciplined fiscal stance for fear of being penalised by the international capital markets. It also examines the impact of financial openness on the size of the fiscal presence. I find no evidence to suggest that financial openness is related to the degree of fiscal activism. The evidence regarding fiscal discipline, however, is somewhat contradictory. There is some

coverage may be driving the inconsistent outcomes discussed above.

mixed evidence to suggest that greater financial openness lowers budget deficits, particularly in developing countries. In contrast, however, greater financial openness appears to increase levels of government debt in developing countries.

I conclude by highlighting a possible extension to this paper. It would be useful to construct openness measures for each form of capital transaction. This would allow one to examine whether different forms of capital transaction have different effects on both fiscal size and fiscal discipline. This would be particularly interesting for comparing the impact of short-term versus long-term capital transactions. It may be the case that countries who experience a large proportion of short-term capital flows may be forced to adopt an overly-disciplined fiscal stance in response to the volatile nature of these flows which tend to be highly sensitive to market sentiment (Kim, 2000).[34]

[34]Of course, it could also be the case that capital flows may become more volatile in response to indisciplined fiscal policy.

6.A Data sources

- **CapVol$_{81-98}$**: for details about the variables used in the construction of the financial openness measure, see Chapter Two.
- **Net foreign assets (NFA)**: estimate of the net external asset position based on adjusted cumulative current account, as a percentage of GDP, averaged over 1981-1998 (see Lane and Milesi-Ferretti (2001b) for methodology). Source: Lane and Milesi-Ferretti (2001a).
- **Total expenditure**: total government expenditure, as a percentage of GDP, averaged over 1981-1998. Source: World Bank, World Development Indicators.
- **Government consumption**: total government consumption, as a percentage of GDP, averaged over 1981-1998. Source: World Bank, World Development Indicators.
- **Current revenue**: current revenue, excluding grants, as a percentage of GDP, averaged over 1981-1998. Source: World Bank, World Development Indicators.
- **Tax revenue**: total tax revenue, as a percentage of GDP, averaged over 1981-1998. Source: World Bank, World Development Indicators.
- **Budget balance**: the overall budget balance, including grants, as a percentage of GDP, averaged over 1981-1998. Source: World Bank, World Development Indicators.
- **Government debt**: stock of public debt, as a percentage of GDP, averaged over 1981-1998. Public debt is defined as the sum of public debt, net of foreign exchange reserves, and gross domestic public debt. For a full description of this variable and the sources for this data, see Lane and Milesi-Ferretti (2001c). Source: correspondence with Philip Lane.
- **GDP per capita**: logarithm of real GDP per capita in current US dollars, averaged over 1981-1998. Source: World Bank, World Development Indicators.
- **Trade openness**: ratio of exports plus imports to GDP, averaged over 1981-1998. Source: World Bank, World Development Indicators.
- **Dependency ratio**: ratio of dependents - the population under 15 and above the age of 65 - to the working-age population - those aged 15-64, averaged over 1981-1998. Source: World Bank, World Development Indicators.
- **Country size**: logarithm of total population, averaged over 1981-1998. Source: World Bank, World Development Indicators.

6.B Tables and Figures

Table 6.1: Correlation between Financial Openness and Fiscal Policy Indicators

	Correlation	P-value	No. of Countries
Total Expenditure (1981-98)	0.3	0.05	55
Government Consumption (1981-98)	0.24	0.1	61
Current Revenue (1981-98)	0.36	0.02	55
Tax Revenue (1981-98)	0.39	0.01	55
Budget Balance (1981-98)	0.24	0.08	55
Government Debt (1981-98)	0.25	0.06	58

Table 6.2: Level of Total Expenditure - Full sample

	(1)	(2)	(3)	(4)	(5)
constant	-27.4 (-1.7)*	-41.1 (-1.1)	-37.2 (-0.9)	-13.1 (-0.3)	-38.2 (-0.8)
GDP per capita	14.6 (3.1)***	19.3 (3.1)***	12.7 (1.9)*	14.1 (1.9)*	15.1 (2.1)**
Trade openness	0.01 (0.3)	-0.003 (-0.1)	0.1 (2.7)***	0.01 (0.3)	0.1 (1.7)*
Size		-2.4 (-1.1)	-0.7 (-0.3)	-2.9 (-1.4)	-0.6 (-0.2)
Dependency ratio		24.1 (1.9)*	35.7 (2.9)***	14.6 (1.1)	13.1 (0.9)
$CapVol_{81-98}$	0.01 (0.3)	0.01 (0.4)	-0.1 (2.7)***	0.02 (0.8)	0.02 (0.6)
$CapVol_{81-98}$*Industrial			0.12 (3.7)***		
NFA				0.2 (1.7)*	0.1 (1.1)
$CapVol_{81-98}$*NFA				-0.001 (-1.7)*	-0.001 (-0.8)
Adjusted R^2	0.2	0.25	0.36	0.27	0.33
No. of observations	55	55	55	55	54

Note: White heteroskedasticity-consistent t-statistics in parentheses. Singapore was found to be an outlier in the regression in column (4) and, therefore, it is excluded from the regression in columns (5). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 6.3: Level of Total Expenditure - Developing countries

	(1)	(2)	(3)
constant	-13.1 (-0.4)	-48.5 (-0.9)	-58.2 (-0.9)
GDP per capita	11.1 (1.1)	16.5 (1.5)	16.9 (1.4)
Trade openness	0.05 (0.9)	0.06 (1.3)	0.1 (1.7)*
Size		-1.3 (-0.6)	0.04 (0.1)
Dependency ratio		38.4 (3.4)***	33.5 (2.1)**
$CapVol_{81-98}$	-0.06 (-0.8)	-0.06 (-0.9)	-0.08 (-0.9)
NFA			0.1 (1.1)
$CapVol_{81-98}$*NFA			-0.002 (-1.5)
Adjusted R^2	0.03	0.22	0.22
No. of observations	34	34	34

Note: White heteroskedasticity-consistent t-statistics in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 6.4: Level of Government consumption - Full sample

	(1)	(2)	(3)	(4)
constant	-10.4 (-1.5)	-47.5 (-2.4)**	-46.9 (-2.2)**	-22.2 (-1.1)
GDP per capita	6.8 (3.4)***	13.5 (4.2)***	12.1 (3.1)***	9.6 (2.9)***
Trade openness	0.005 (0.2)	0.003 (0.2)	0.03 (1.1)	0.01 (0.4)
Size		-0.4 (-0.4)	-0.06 (-0.1)	-1.1 (-1.3)
Dependency ratio		24.9 (2.9)***	28.3 (3.2)***	18.1 (2.2)**
$CapVol_{81-98}$	0.005 (0.3)	0.002 (0.2)	-0.02 (-0.9)	0.004 (0.4)
$CapVol_{81-98}$*Industrial			0.03 (1.1)	
NFA				0.15 (2.9)***
$CapVol_{81-98}$*NFA				-0.001 (-2.9)***
Adjusted R^2	0.14	0.32	0.33	0.39
No. of observations	61	61	61	61

Note: White heteroskedasticity-consistent t-statistics in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 6.5: Level of Government Consumption - Developing countries

	(1)	(2)	(3)	(4)
constant	-8.4 (-0.4)	-46.1 (-1.4)	-21.6 (-0.6)	-18.1 (-0.4)
GDP per capita	6.2 (1.1)	11.3 (1.9)*	7.8 (1.1)	4.7 (0.6)
Trade openness	0.01 (0.1)	0.03 (0.9)	0.1 (0.9)	0.09 (1.5)
Size		0.1 (0.1)	-0.5 (-0.4)	0.1 (0.1)
Dependency ratio		28.6 (2.9)***	21.4 (2.2)**	16.7 (1.7)*
$CapVol_{81-98}$	0.002 (0.1)	-0.02 (-0.6)	-0.03 (-0.6)	0.01 (0.2)
NFA			0.16 (2.8)***	0.12 (2.3)**
$CapVol_{81-98}$*NFA			-0.001 (-2.4)**	-0.001 (-1.2)
Adjusted R^2	0.01	0.24	0.32	0.4
No. of observations	40	40	40	39

Note: White heteroskedasticity-consistent t-statistics in parentheses. Singapore was found to be an outlier in the regression in column (3) and, therefore, it is excluded from the regression in column (4). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 6.6: Level of Current Revenue - Full sample

	(1)	(2)	(3)	(4)	(5)
constant	-27.2 (-1.9)*	-31.6 (-0.9)	-28.1 (-0.9)	25.9 (0.7)	8.8 (0.2)
GDP per capita	13.3 (3.4)***	16.8 (3.4)***	10.9 (2.2)**	7.5 (1.2)	8.2 (1.3)
Trade openness	0.03 (0.8)	0.01 (0.3)	0.1 (2.7)***	0.02 (0.6)	0.1 (1.7)*
Size		-2.8 (-1.4)	-1.2 (-0.6)	-4.4 (-2.2)**	-2.9 (-1.3)
Dependency ratio		20.1 (1.9)*	30.5 (2.8)***	5.6 (0.5)	4.6 (0.4)
$CapVol_{81-98}$	0.01 (0.4)	0.02 (0.6)	-0.1 (-2.2)**	0.03 (1.2)	0.02 (1.1)
$CapVol_{81-98}$*Industrial			0.1 (3.2)***		
NFA				0.3 (2.8)***	0.2 (2.3)**
$CapVol_{81-98}$*NFA				-0.002 (-2.4)**	-0.001 (-1.5)
Adjusted R^2	0.25	0.32	0.43	0.41	0.44
No. of observations	55	55	55	55	54

Note: White heteroskedasticity-consistent t-statistics in parentheses. Singapore was found to be an outlier in the regression in column (3) and, therefore, it is excluded from the regression in column (4). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 6.7: Level of Current Revenue - Developing countries

	(1)	(2)	(3)	(4)
constant	-10.4 (-0.4)	-24.6 (-0.7)	15.5 (0.3)	14.1 (0.3)
GDP per capita	9.3 (1.2)	12.4 (1.8)*	6.1 (0.6)	6.6 (0.6)
Trade openness	0.08 (1.4)	0.08 (1.8)*	0.09 (1.9)*	0.08 (1.8)*
Size		-2.2 (-1.1)	-3.2 (-1.3)	-3.2 (-1.4)
Dependency ratio		28.6 (2.7)***	15.8 (1.2)	16.6 (1.2)
$CapVol_{81-98}$	-0.08 (-0.9)	-0.08 (-1.2)	-0.06 (-0.9)	-0.07 (-0.7)
NFA			0.2 (1.9)*	0.3 (1.8)*
$CapVol_{81-98}$*NFA			-0.002 (-1.7)*	-0.002 (-1.2)
Adjusted R^2	0.12	0.29	0.35	0.34
No. of observations	34	34	34	33

Note: White heteroskedasticity-consistent t-statistics in parentheses. Singapore was found to be an outlier in the regression in column (3) and, therefore, it is excluded from the regression in column (4). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 6.8: Level of Tax Revenue - Full sample

	(1)	(2)	(3)	(4)	(5)
constant	-30.1 (-2.7)***	11.5 (0.3)	14.7 (0.4)	31.6 (0.9)	13.3 (0.4)
GDP per capita	13.4 (4.1)***	9.9 (1.8)*	4.5 (0.8)	5.9 (0.9)	6.7 (1.1)
Trade openness	-0.01 (-0.2)	-0.03 (-0.9)	0.06 (2.1)**	-0.02 (-0.6)	0.06 (1.4)
Size		-3.2 (-1.9)*	-1.7 (-1.1)	-3.3 (-2.1)**	-1.7 (-0.9)
Dependency ratio		-8.1 (-0.6)	1.4 (0.1)	-15.6 (-1.1)	-16.8 (-1.1)
$CapVol_{81-98}$	0.02 (0.9)	0.02 (0.9)	-0.07 (-2.7)***	0.03 (1.7)*	0.03 (1.5)
$CapVol_{81-98}$*Industrial			0.1 (4.3)***		
NFA				0.1 (1.9)*	0.1 (1.2)
$CapVol_{81-98}$*NFA				-0.001 (-1.9)*	-0.001 (-0.9)
Adjusted R^2	0.33	0.34	0.45	0.36	0.42
No. of observations	55	55	55	55	54

Note: White heteroskedasticity-consistent t-statistics in parentheses. Singapore was found to be an outlier in the regression in column (4) and, therefore, it is excluded from the regression in column (5). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 6.9: Level of Tax Revenue - Developing countries

	(1)	(2)	(3)
constant	-5.1 (-0.2)	26.7 (0.7)	23.1 (0.5)
GDP per capita	6.6 (1.1)	3.9 (0.5)	4.3 (0.5)
Trade openness	0.04 (1.3)	0.02 (0.6)	0.05 (1.2)
Size		-3.1 (-1.9)*	-2.3 (-1.3)
Dependency ratio		-2.7 (-0.2)	-5.3 (-0.4)
$CapVol_{81-98}$	-0.05 (-1.1)	-0.04 (-0.8)	-0.05 (-0.9)
NFA			0.08 (0.8)
$CapVol_{81-98}$*NFA			-0.001 (-1.2)
Adjusted R^2	0.04	0.06	0.05
No. of observations	34	34	34

Note: White heteroskedasticity-consistent t-statistics in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 6.10: Level of Budget Balance - Full sample

	(1)	(2)	(3) - IV	(4)	(5)	(6)
constant	-1.3 (-0.2)	-3.3 (-0.7)	-5.5 (-1.2)	10.9 (0.8)	9.4 (0.8)	11.9 (0.9)
GDP per capita	-1.2 (-0.8)	-0.7 (-0.6)	0.05 (0.1)	-2.7 (-1.4)	-0.5 (-0.3)	-2.9 (-1.3)
Trade openness	0.02 (2.4)**	0.02 (1.9)*	0.02 (2.2)**	0.02 (1.8)*	-0.02 (-2.1)**	0.02 (1.7)*
Size				-0.3 (-0.4)	-0.8 (-1.5)	-0.3 (-0.5)
Dependency ratio				-7.7 (-1.5)	-12.3 (-2.4)**	-7.9 (-1.5)
$CapVol_{81-98}$	0.01 (0.9)	0.01 (1.7)*	0.002 (0.2)	0.01 (1.8)*	0.05 (4.1)***	0.01 (1.5)
$CapVol_{81-98}$*Industrial					-0.04 (-4.1)***	
NFA						0.1 (0.1)
$CapVol_{81-98}$*NFA						-0.001 (-0.1)
Hausman Test - p value			0.3			
Adjusted R^2	0.1	0.14	0.11	0.15	0.29	0.11
No. of observations	55	54	54	54	54	54

Note: White heteroskedasticity-consistent t-statistics in parentheses. Botswana was found to be an outlier in column (1) and, therefore, it is excluded in the regressions presented in columns (2)-(6). IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 6.11: Level of Budget Balance - Developing countries

	(1)	(2)	(3) - IV	(4)	(5)
constant	-0.7 (-0.1)	-7.5 (-0.8)	-6.6 (-0.7)	20.9 (1.3)	29.3 (1.9)*
GDP per capita	-1.3 (-0.4)	0.3 (0.1)	0.3 (0.1)	-2.7 (-0.9)	-3.8 (-1.5)
Trade openness	0.03 (1.2)	0.01 (0.4)	0.02 (0.8)	-0.01 (-0.9)	-0.02 (-1.7)*
Size				-1.1 (-1.3)	-1.5 (-1.8)*
Dependency ratio				-15.6 (-3.2)***	-15.8 (-3.1)***
$CapVol_{81-98}$	-0.001 (-0.1)	0.03 (1.8)*	0.02 (0.5)	0.04 (2.4)**	0.05 (2.9)***
NFA					-0.003 (-0.1)
$CapVol_{81-98}$*NFA					0.001 (0.6)
Hausman Test - p-value			0.5		
Adjusted R^2	0.13	0.23	0.21	0.4	0.38
No. of observations	34	33	33	33	33

Note: White heteroskedasticity-consistent t-statistics in parentheses. Botswana was found to be an outlier in column (1) and, therefore, it is excluded in the regressions presented in columns (2)-(5). IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 6.12: Level of Government Debt - Full sample

	(1)	(2) - IV	(3)	(4)	(5)	(6)
constant	99.6 (1.7)*	128.6 (2.4)**	41.3 (0.3)	16.5 (0.1)	-148.6 (-1.2)	-80.5 (-0.8)
GDP per capita	-16.7 (-0.9)	-27.1 (-1.7)*	-7.4 (-0.3)	5.9 (0.3)	18.3 (0.8)	4.3 (0.3)
Trade openness	0.1 (1.1)	0.02 (0.2)	0.1 (1.1)	-0.05 (-0.3)	0.3 (3.9)***	0.2 (3.9)***
Size			0.6 (0.1)	-1.4 (-0.3)	11.6 (2.4)**	10.9 (2.4)**
Dependency ratio			31.2 (0.5)	16.1 (0.3)	28.8 (0.6)	7.5 (0.2)
$CapVol_{81-98}$	0.11 (1.1)	0.26 (1.3)	0.11 (1.1)	0.3 (1.5)	0.09 (1.4)	0.14 (2.2)**
$CapVol_{81-98}$*Industrial				-0.2 (-1.4)		
NFA					0.08 (0.3)	0.2 (0.6)
$CapVol_{81-98}$*NFA					-0.005 (-2.4)**	-0.005 (-2.9)***
Hausman Test - p-value		0.2				
Adjusted R^2	0.07	0.01	0.04	0.07	0.39	0.48
No. of observations	58	58	58	58	58	57

Note: White heteroskedasticity-consistent t-statistics in parentheses. Israel was found to be an outlier in column (5) and, therefore, it is excluded in the regression in column (6). IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrial countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 6.13: Level of Government Debt - Developing countries

	(1)	(2) - IV	(3)	(4)	(5)
constant	100.5 (1.2)	66.4 (0.6)	140.8 (0.8)	-189.8 (-0.8)	0.9 0.1
GDP per capita	-23.1 (-0.9)	-17.4 (-0.5)	-21.6 (-0.6)	27.5 (0.7)	-12.5 (-0.6)
Trade openness	-0.2 (-1.2)	-0.5 (-1.4)	-0.2 (-1.4)	0.2 (0.9)	0.03 (0.2)
Size			-7.9 (-1.2)	8.9 (1.1)	4.5 (0.6)
Dependency ratio			19.8 (0.4)	55.6 (0.9)	22.6 (0.5)
$CapVol_{81-98}$	0.6 (2.8)***	0.9 (2.5)**	0.6 (2.8)***	0.2 (0.9)	0.4 (2.9)***
NFA				-0.1 (-0.4)	0.005 (0.1)
$CapVol_{81-98}$*NFA				-0.004 (-1.9)*	-0.003 (-2.1)**
Hausman Test - p-value		0.28			
Adjusted R^2	0.31	0.19	0.3	0.51	0.69
No. of observations	37	37	37	37	36

Note: White heteroskedasticity-consistent t-statistics in parentheses. Israel was found to be an outlier in column (4) and, therefore, it is excluded in the regression in column (5). IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

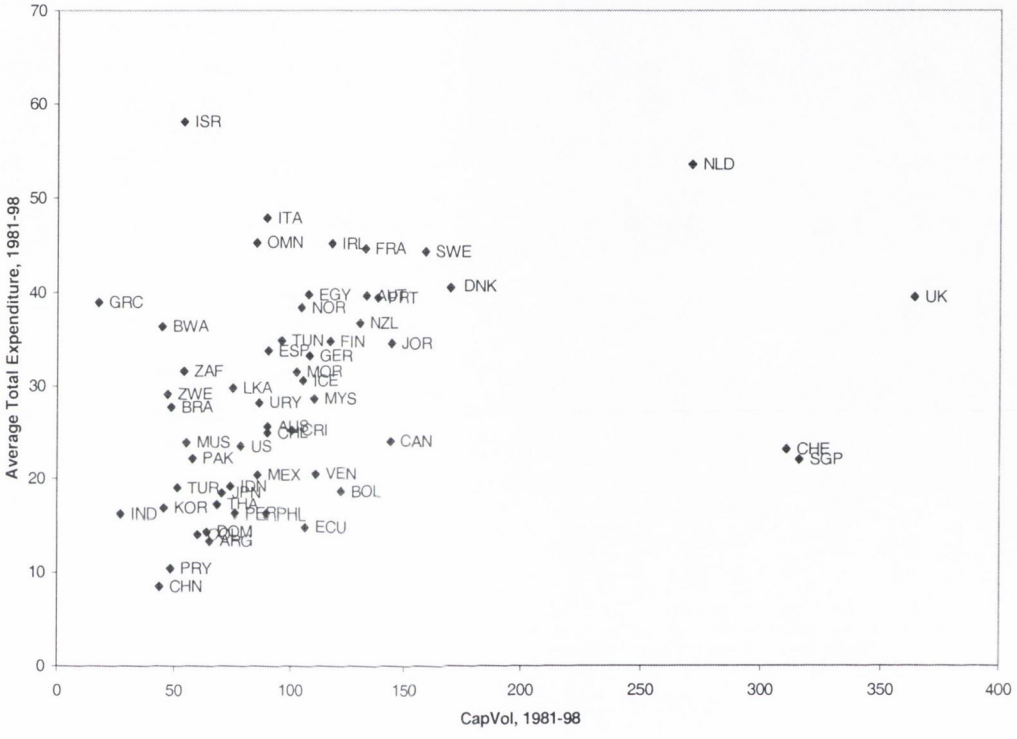

Figure 6.1: Financial openness and Average Total Expenditure levels (as a percentage of GDP) - 1981-1998

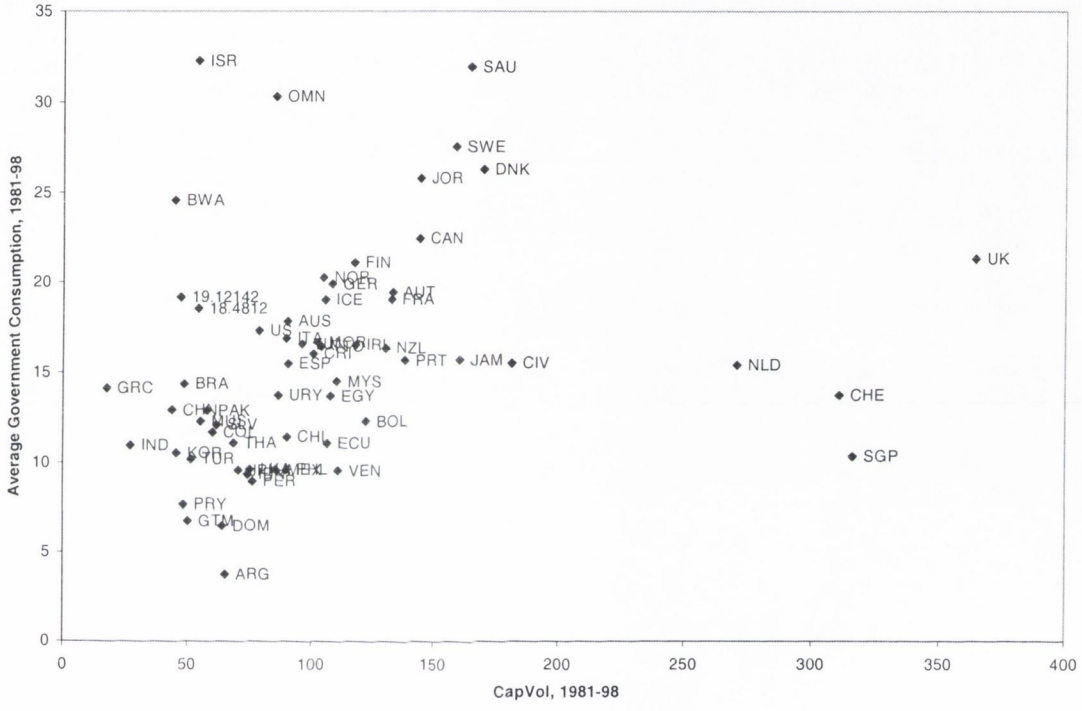

Figure 6.2: Financial openness and Average Government Consumption levels (as a percentage of GDP) - 1981-1998

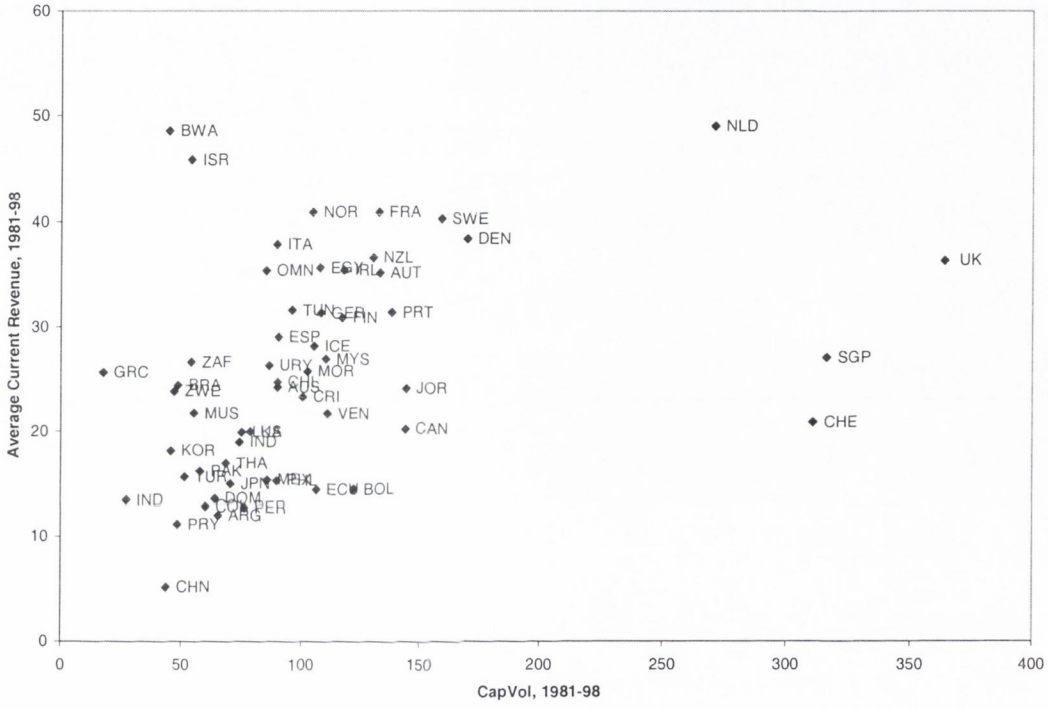

Figure 6.3: Financial openness and Average Current Revenue levels (as a percentage of GDP) - 1981-1998

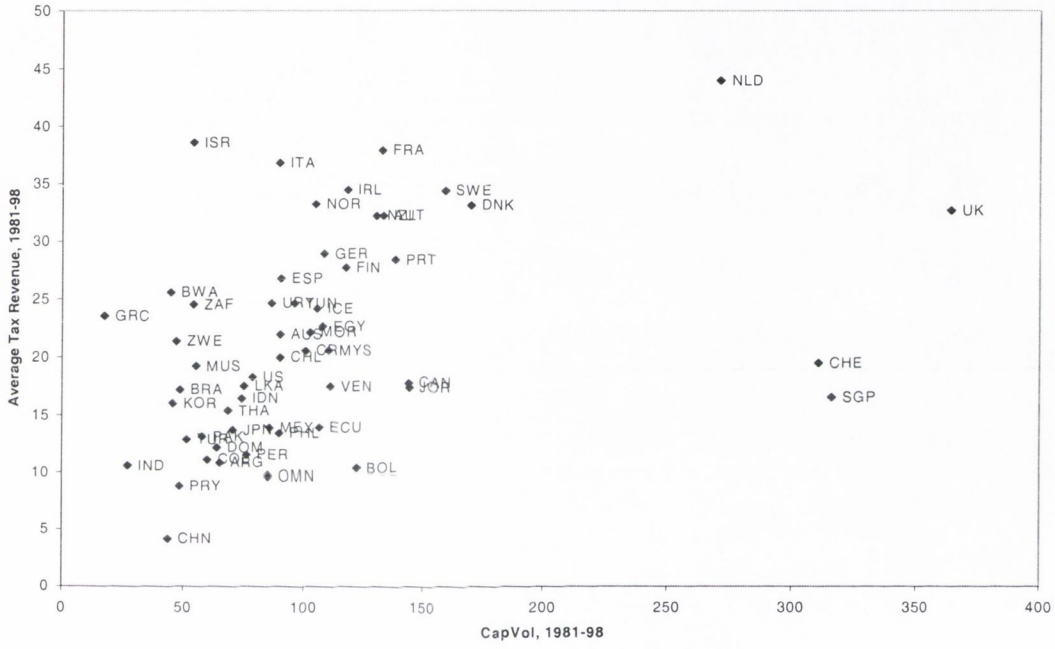

Figure 6.4: Financial openness and Average Tax Revenue levels (as a percentage of GDP) - 1981-1998

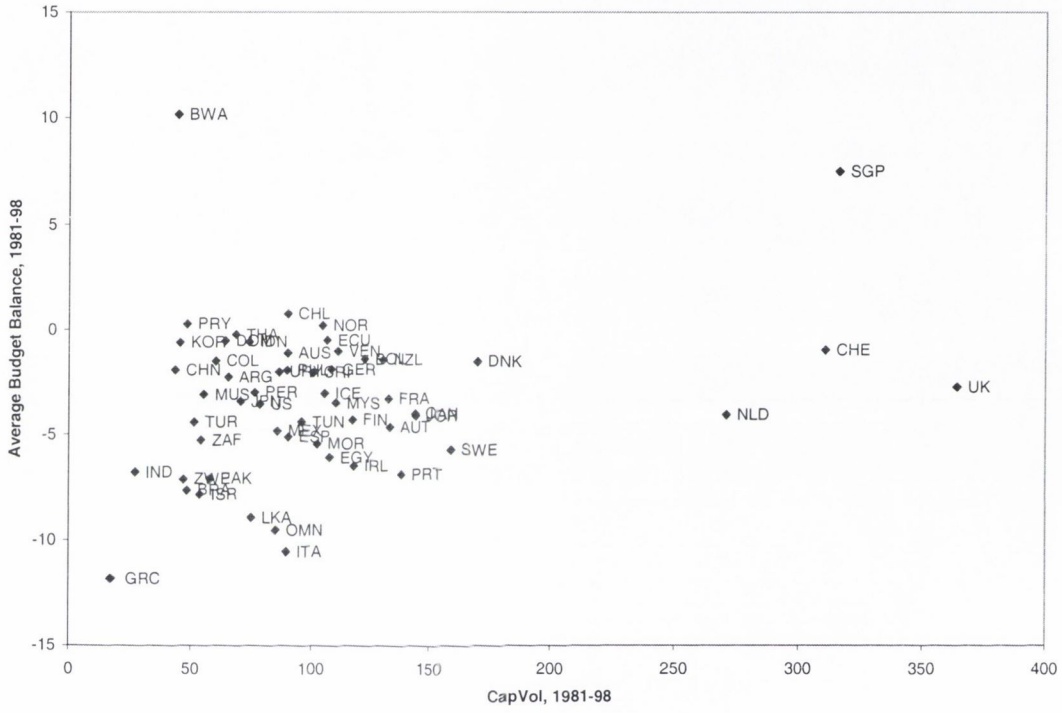

Figure 6.5: Financial openness and the Average Budget Balance (as a percentage of GDP) - 1981-1998

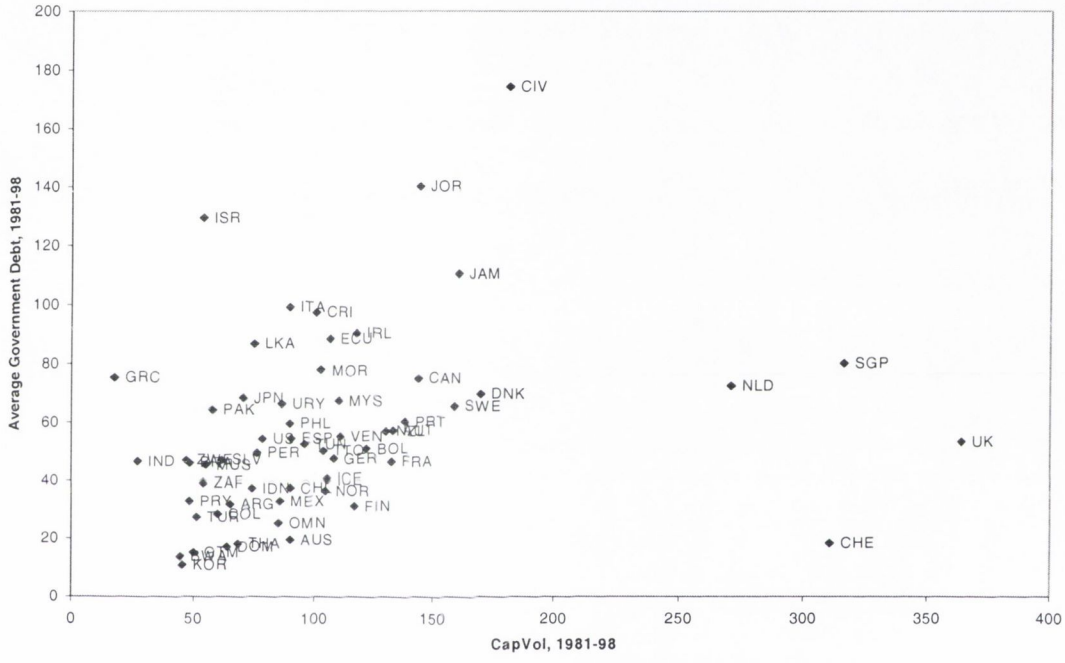

Figure 6.6: Financial openness and Average Government Debt levels (as a percentage of GDP) - 1981-1998

Chapter 7

Financial Openness and Exchange Rate Volatility

7.1 Introduction

The last two decades has seen a dramatic increase in capital flows, particularly inflows to developing countries. Theory suggests that free capital mobility should boost economic performance by offering increased risk diversification opportunities and allowing greater access to foreign savings to finance domestic investment projects. Empirical evidence to support this viewpoint, however, is relatively scarce.[1] In addition, many developing countries experienced macroeconomic crises during the 1990s, partly as a result of volatile inflows and outflows of capital. This has prompted some economists to suggest that capital controls may be required in some situations to deal with the problems associated with free capital mobility (Rodrik, 1998a).

One particular area that may be affected by increasing levels of financial openness is exchange rate volatility. For many developing countries, the experience of greater capital mobility has brought with it the attendant problem of greater exposure to short-term capital flows.[2] Such flows tend to be driven largely by short-term factors such as interest rate differentials on liquid instruments and they can be sometimes sensitive to irrational market sentiment in financial markets. The latter situation arises from market failures such as asymmetric information and bounded rationality which are widespread in financial markets. As a result, short-term capital flows tend to be excessively volatile.

[1] Edison, Klein, et al (2002) and Eichengreen (2002) provide comprehensive overviews of recent research in this area.

[2] This is not, however, confirmed by Kraay (1998) who examines the relationship between financial openness and the volatility of capital flows. He finds modest evidence suggesting that financially open economies owe more short-term bank debt relative to FDI inflows of capital and that these short-term flows are somewhat more volatile than long-term flows. Despite this shift in the composition of external obligations, he finds that the overall volatility of net flows of capital is not significantly higher in financially open economies.

There are a number of recent empirical studies which provide evidence to suggest that currency and banking crises are preceded by financial liberalisation.[3] Glick and Hutchison (1999) investigated a sample of 90 countries during 1975-1997 and found that currency and twin crises tend to arise mostly in financially liberalised emerging-market economies. These crises can have very serious consequences for macroeconomic performance. Thus, this paper is concerned with examining the impact of financial openness on exchange rate stability. Is greater financial openness associated with more instability in the nominal and/or real exchange rate?[4]

Although there are a number of studies that examine the determinants of bilateral exchange rate volatility (Martin, 1998; Engel, 1999; Devereux and Lane 2002) and real effective exchange rate volatility (Hau, 2001), I am aware of no empirical study that has specifically examined the relationship between international financial integration and exchange rate volatility. This may be partly explained by the difficulty of accurately measuring the degree of international financial integration within a country. Most empirical studies have relied upon a binary indicator of capital account openness based on the restrictions on capital flows as reported annually to the IMF by national authorities. In this paper, however, I use a new, volume-based measure of financial openness, constructed from information contained in a new dataset compiled by Philip

[3] Aizenman (2002) provides an overview of the research in this area.

[4] There may be reverse causation here in the sense that countries may experience greater flows of capital when exchange rate movements are less volatile. Thus, in addition to ordinary least squares estimation, I also employ instrumental variables estimation to account for this possible problem. It is also worth noting that the potential disciplining effect of greater international financial integration may lead to more stable exchange rate movements.

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To anticipate my findings, there is little evidence of a relationship between financial openness and bilateral nominal or real dollar exchange rate volatility. Some evidence does exist, however, to suggest that increasing financial openness is associated with greater real effective exchange rate volatility. In particular, there is reasonably strong support for the notion that greater financial openness *decreases* real effective exchange rate volatility in richer countries and *increases* it in poorer countries. The rest of this chapter is organised as follows. Section 7.2 examines the cross-sectional dimensions of the data while Section 7.3 focuses on a panel data approach. Section 7.4 concludes.

7.2 Cross-Sectional Evidence on the Volatility-Financial Openness Linkage

The empirical relationship between financial openness and exchange rate volatility is analysed from two different dimensions. I first study the cross-sectional evidence where the specification is

$$Vol_i = \beta_0 + \beta_1 CapVol_i + \beta_2 X_i + \epsilon_i \quad (1)$$

where Vol_i represents various measures of exchange rate volatility, CapVol_i is the measure of financial openness, and X_i represents different control variables. I focus on the volatility of three types of exchange rates: (a) bilateral nominal US dollar exchange rates, (b) bilateral real US dollar exchange rates, and (c) multilateral real effective exchange rates. The data for bilateral nominal US dollar exchange rates are taken from the International Financial Statistics (IFS). I use monthly and annual data. To calculate monthly and annual bilat-

eral real US dollar exchange rates, I use bilateral nominal US dollar exchange rates and consumer price indices.[5] The multilateral real effective exchange rate data are constructed as the ratio between the domestic consumer price index, converted in dollar terms at the period average nominal exchange rate, and a trade-weighted average of trade partners' consumer price indices also expressed in US dollars. This is available as annual data.[6] The time period under consideration for all three exchange rates is 1981 to 1998. A full description of the data is available in the appendix.

I now need to define my measures of exchange rate volatility. In the case of monthly data for bilateral nominal and real US dollar exchange rates, volatility is measured as the standard deviation of the monthly change of the logarithm of the bilateral US dollar nominal or real exchange rate. I also use annual data and, in this case, volatility is measured as the standard deviation of the annual change of the logarithm of the bilateral US dollar nominal or real exchange rate.[7] With respect to multilateral real effective exchange rate data, I follow the procedure used by Hau (2001) who measures real exchange rate volatility as the standard deviation for the percentage changes of the real effective exchange rate over intervals of one year. I also measure real effective exchange rate changes over three year periods but I do not report the outcomes as they are very similar. Exchange rate volatility is multiplied by 100 in all cases.[8]

[5]Monthly CPI data is not available for the following countries: Australia, Iceland, Ireland, Israel, and New Zealand. Thus, to calculate monthly bilateral real US dollar exchange rates for these countries, I interpolate the monthly CPI data using annual CPI observations. The formula used to calculate the monthly CPI values is: $[x(t+12)/x(t)]^{1/12} = 1 + g_m$

where x is the annual CPI value.

[6]This data was obtained through correspondence with Philip Lane.

[7]I do not report the results for the annual data as they are very similar to the outcomes using monthly data.

[8]Hau (2001) examines the relationship between trade openness and real effective exchange

Following Hau (2001), the set of control variables included in X_i comprise of trade openness (measured as the ratio of the sum of a country's exports and imports to its national income, averaged over the relevant sample period), per capita income in 1981 measured in US dollars in log form, the average number of revolutions and coups over the relevant time period as an indicator of political stability, a dummy variable representing oil exporting countries, a measure of central bank independence, and a measure of the degree to which countries have exchange rate commitments. Several comments about these control variables are required.

Hau (2001) provides empirical support for the theoretical prediction emphasised by Hau (2000) and Obstfeld and Rogoff (2000) that more open economies should exhibit less volatile real exchange rates. Countries with more tradeable goods are likely to experience greater aggregate price flexibility than more closed economies. As a result, asymmetric monetary and/or real shocks will induce greater real exchange rate changes to achieve the required relative price adjustment in more closed economies. Thus, more open economies should behave more like flexible price economies and experience less real exchange rate volatility. For a sample of 48 countries, Hau (2001) provides empirical evidence of a negative relationship between trade openness and real exchange rate volatility that is robust to the inclusion of various control variables.[9]

The level of per capita income in 1981 is included as a proxy for the level of development - poorer countries are likely to experience larger real and monetary

rates and such a relationship is likely to be more evident at low frequencies where law-of-one-price deviations are less pronounced.

[9]Hau's (2001) empirical approach focuses on real effective exchange rates which aggregate bilateral real exchange rates rather than bilateral US dollar exchange rates. This, he argues, is because any specific bilateral real exchange rate might not be representative of the trade flows of some countries.

shocks and, therefore, more volatile nominal and real exchange rate movements. This may be due to such factors as their greater dependence on world commodity prices and/or more unstable political environments which may lead to larger monetary shocks (Hau, 2001). To take account of this latter possibility, I also include in the regressions the average number of revolutions and coups as an indicator of political stability. Politically unstable countries are likely to experience more volatile exchange rate movements. A dummy variable representing oil exporting countries is also included to take account of the fact that, given the volatility of the world oil price, these countries should experience greater real exchange rate fluctuations.

An indicator of central bank independence, taken from Cukierman et al (1992), measures the legal independence of the central bank.[10] This is included to take account of the possibility that more independent central banks may be particularly averse to excessive exchange rate volatility and, thus, may take significant steps to ensure that this does not materialise. It may also be the case that a more independent central bank sends a positive signal to financial markets about the future conduct of monetary policy, thus potentially stabilising exchange rate movements.

Finally, the indicator of exchange rate commitments is taken from Reinhart and Rogoff (2002) who develop a novel system of re-classifying historical exchange rate regimes. Using their classification, I calculate the fraction of years during the relevant time period for which each country exhibits an exchange rate commitment. I define an exchange rate commitment for any given year as a situation where a country's exchange rate regime is assigned a number between 1 and 9 in Reinhart and Rogoff's fine grid natural classification in Table

[10]This variable is only available for the period 1976-89.

4 of their paper.[11] Thus, for example, the US is classified as "freely floating" since 1978 and thus is assigned a value of 13 in the fine grid natural classification. Therefore, the fraction of years for which the US had an exchange rate commitment over the years 1981 to 1998 is zero. I include this variable as a regressor to take account of the likelihood that countries with an exchange rate commitment throughout most or all of the relevant time period are more likely to have exhibited less volatile exchange rate movements.[12]

Figures 7.1 to 7.5 present scatterplots of the volatility measures for different exchange rates against the degree of financial openness for the full sample over the period 1981 to 1998.[13] Figures 1 to 4 focus on the monthly and annual volatility of bilateral nominal and real US dollar exchange rates while figure 5 focuses on the one year volatility of real effective exchange rates. There would seem to be a negative relationship between financial openness and exchange rate volatility in all five scatterplots and the simple bivariate correlations are -0.2, -0.18, -0.23, -0.1, and -0.25, respectively.[14]

[11]This implies that a country's exchange rate can be summarised under one of the following headings: (1) no seperate legal tender, (2) pre announced peg or currency board, (3) pre announced horizontal band that is narrower than or equal to +/- 2%, (4) de facto peg, (5) pre announced crawling peg, (6) pre announced crawling band that is narrower than or equal to +/- 2%, (7) de facto crawling peg, (8) de facto crawling band that is narrower than or equal to +/-2%, and (9) pre announced crawling band that is wider than or equal to +/- 2%.

[12]In their study, Reinhart and Rogoff (2002) create a separate category for countries whose twelve-month rate of inflation is above 40 percent. These episodes are classified as "freely falling". Due to the consequences these periods of high inflation have for real exchange rate movements, I also report regressions that exclude all countries that are classified as "freely falling" at some stage over the period 1981 to 1998.

[13]The number of countries varies in each scatterplot as a result of data availability.

[14]Only the simple correlations between financial openness and the monthly volatility of the bilateral real exchange rate (-0.23) and the one-year volatility of the real effective exchange rate (-0.25) are significant at the 90 percent confidence level or better.

Tables 7.1 to 7.6 present the cross-sectional regression results for the different exchange rate volatility measures. For each exchange rate volatility measure, I report outcomes for two samples: the full sample and a sample excluding those countries that are classified by Reinhart and Rogoff (2002) as "freely falling" at some stage over the period 1981 to 1998. The regression technique used is ordinary least squares (OLS), with standard errors corrected for heteroskedasticity by the White procedure. A potential problem with the OLS estimates, however, is the possible existence of a downward bias on the financial openness coefficient ($CapVol_{81-98}$) due to reverse causality. One might expect countries to experience greater flows of capital when the exchange rate is reasonably stable. To address this problem, I also carry out two-stage regressions that instrument for $CapVol_{81-98}$. In addition to the basic control variables, the instruments used to predict the average level of financial openness over the period 1981 to 1998 are the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries.

For each sample, five alternative regression specifications are carried out. In the first specification, I regress the relevant exchange rate volatility measure on financial openness ($CapVol_{81-98}$) and two basic control variables: the logarithm of per capita GDP in 1981 and trade openness. In the second specification, I interact financial openness with a 0/1 dummy variable representing the industrialised countries to examine whether financial openness has different effects on exchange rate volatility in high- and low-income countries. A measure of political stability and a dummy variable representing the oil exporting countries are introduced in the third specification. A measure of exchange rate commitments is then added in the fourth specification. Finally, an index of central bank independence is introduced in the fifth specification.

7.2.1 Monthly Bilateral Nominal Dollar Exchange Rate Volatility

Tables 7.1 and 7.2 present the outcomes for the full sample and the sample excluding "freely falling" countries for monthly bilateral nominal dollar exchange rate data. Volatility is measured at a frequency of one month. In the full sample, both trade openness and per capita GDP exhibit predicted negative signs but only the former is occasionally significant at standard confidence levels. In the basic OLS regression in column (1), $CapVol_{81-98}$ exhibits a negative coefficient but it is insignificant. In the IV regression in column (2), $CapVol_{81-98}$ remains negative and insignificant and the Hausman test provides no evidence to suggest that the OLS estimates are inconsistent. Thus, I only report OLS outcomes for the rest of this sample.

A formal investigation searching for leverage points was undertaken using observation-specific dummy variables. This is where a dummy variable is used for country i, effectively excluding it from the dataset for that regression. This is then repeated for each country in turn. In effect, the regressions indicate how the statistical significance of financial openness ($CapVol_{81-98}$) changes when each country's data are excluded in turn. Thus, we can see which countries are influential. The OLS outcome in column (1) is robust to the removal of any one country.

When I interact financial openness with a dummy variable representing the industrialised countries, I find no support for the notion that greater financial openness is associated with lower nominal dollar exchange rate volatility in richer countries. In column (3), $CapVol_{81-98}$ and the interaction term exhibit positive and negative coefficients, respectively, but they are insignificant.[15] Both

[15]The F-test allows me to reject the null hypothesis of joint insignificance on the part of $CapVol_{81-98}$ and its interaction with the industrial country dummy variable.

variables are also insignificant in the (unreported) IV regression.

In column (4), both the political stability variable and the oil export dummy variable are negative but only the latter is significant.[16] $CapVol_{81-98}$ is negative but insignificant in this specification. The exchange rate commitment measure is insignificant when introduced in column (5) while the central bank independence indicator is positive but insignificant in column (6). In both specifications, $CapVol_{81-98}$ is negative and insignificant.

Table 7.2 reports the outcomes of the same regressions when countries classified as "freely falling" are excluded from the sample. Trade openness exhibits a negative coefficient and is always significant. GDP per capita is negative but never significant. In the basic regression in column (1), $CapVol_{81-98}$ is positive and significant at the 90 percent confidence level suggesting that greater financial openness is associated with a more volatile nominal dollar exchange rate. When I test for leverage points, however, I find that $CapVol_{81-98}$ becomes insignificant when I exclude Egypt from the sample. Thus, regressions presented in columns (2)-(7) exclude Egypt. $CapVol_{81-98}$ remains positive in all cases but it is never significant.[17] There is no evidence from column (3) that greater financial openness is associated with lower nominal exchange rate volatility in richer countries. Both $CapVol_{81-98}$ and the interaction term exhibit positive coefficients but they are insignificant. Thus, in general, there is almost no evidence of a relationship between financial openness and bilateral nominal dollar exchange rate volatility.

[16]There are three oil-exporting countries in the full sample (Oman, Saudi Arabia, and Trinidad and Tobago) and all have very low volatility measures. According to Reinhart and Rogoff (2002), Saudi Arabia has had a de facto peg to the US dollar since 1975. Reinhart and Rogoff do not examine the exchange rate history of either Oman and Trinidad and Tobago.

[17]These results are themselves robust to the exclusion of any one country from the sample.

7.2.2 Monthly Bilateral Real Dollar Exchange Rate Volatility

Tables 7.3 and 7.4 present the results for the full sample and the sample excluding "freely falling" countries for monthly bilateral real dollar exchange rate data.[18] Volatility is measured at a frequency of one month. In the full sample, $CapVol_{81-98}$ exhibits a negative coefficient in the basic regression but it is insignificant. This outcome, however, is once again not robust to the omission of Israel. Thus, the results presented in columns (2)-(7) focus on the full sample outcomes excluding Israel. Trade openness is negative and highly significant in most cases while per capita GDP is negative but not regularly significant. The sign on $CapVol_{81-98}$ now becomes positive in the basic OLS regression in column (2) but it remains insignificant.[19] In the IV regression, $CapVol_{81-98}$ becomes negative indicating that there is no downward bias when using OLS estimation. It remains insignificant, however. The Hausman test provides no evidence of inconsistent OLS estimates. There is no evidence from column (4) that the impact of financial openness on nominal exchange rate volatility varies between high- and low-income countries.[20] $CapVol_{81-98}$ is positive and insignificant in the remaining regressions.

Table 7.4 reports the outcomes of the same regressions when countries classified as "freely falling" are excluded from the sample. In the basic regression in column (1), $CapVol_{81-98}$ is positive and significant at the 90 percent confidence level. This outcome, however, is not robust to the exclusion of Cote d'Ivoire. Thus, the results presented in columns (2)-(7) focus on the outcomes excluding

[18]This variable is constructed using monthly CPI and bilteral US dollar nominal exchange rate data.

[19]This new result is itself robust to the exclusion of any one country form the sample.

[20]The F-test allows me to reject the null hypothesis of joint insignificance on the part of $CapVol_{81-98}$ and the interaction term.

Cote d'Ivoire. Trade openness is negative and highly significant in most cases while per capita GDP is negative but never significant. $CapVol_{81-98}$ is positive but insignificant in the basic OLS and IV regressions in columns (2) and (3).[21] There is no evidence from column (4) that greater financial openness is associated with lower bilateral real dollar exchange rate volatility in richer countries. $CapVol_{81-98}$ remains positive and insignificant in columns (5)-(7).

7.2.3 Real Effective Exchange Rate Volatility

Tables 7.5 and 7.6 focus on the outcomes for real effective exchange rate volatility. The time period under consideration is 1981 to 1998 and, following Hau (2001), volatility is measured at a frequency of one year. Both trade openness and the initial level of per capita GDP are negative and regularly significant. This is the same as the outcomes in Hau (2001). In the basic OLS regression in column (1), $CapVol_{81-98}$ exhibits a negative coefficient but it is insignificant. This outcome is robust to the exclusion of any one country in a test using observation-specific dummy variables. In the IV regression in column (2), $CapVol_{81-98}$ remains negative and insignificant and the Hausman test provides no evidence to suggest that the OLS estimates are inconsistent. Thus, I only report the OLS outcomes for the rest of this sample.

When I interact financial openness with a dummy variable representing the industrialised countries, however, I find strong support for the notion that greater financial openness is associated with higher real effective exchange rate volatility in developing countries. In the OLS regression in column (3), $CapVol_{81-98}$ and the interaction term exhibit positive and negative coefficients, respectively, and they are highly significant. Both variables are also highly significant in the

[21] These new results are robust to the exclusion of any one country form the sample.

(unreported) IV regression.[22] When I use the initial level of per capita GDP (in log form) instead of the dummy variable representing the industrialised countries to construct the interaction term, $CapVol_{81-98}$ and the new interaction term continue to exhibit positive and negative coefficients, respectively, and they are highly significant.[23] Simple calculations reveal that in this regression the 'turning point' occurs at a level of log per capita real GDP equal to 3.65 - any country with a value of log per capita real GDP in 1981 greater than 3.65 experiences a decline in effective real exchange rate volatility when financial openness ($CapVol_{81-98}$) rises. 30 countries out of the full sample of 61 have a value of log per capita real GDP in 1981 greater than 3.65.[24],[25]

In column (4), both the political stability and oil export dummy variables

[22]When I measure real effective exchange volatility at a frequency of three years, $CapVol_{81-98}$ and the interaction term are again positive and negative, respectively, and highly significant in both the OLS and IV regressions. These outcomes are robust to the exclusion of any one country.

[23]This is also the case when I measure real effective exchange volatility at a frequency of three years. Due to space considerations, I do not report these results.

[24]These include all the industrial countries and the following developing countries: Argentina, Israel, Mexico, Oman, Saudi Arabia, Singapore, Trinidad and Tobago, Uruguay, and Venezuela.

[25]The same outcome is found when I evaluate the size of the partial derivative $dVOL/dCapVol_{81-98} = b1 + b2X$ where VOL is real effective exchange rate volatility, $b1$ is the coefficient on $CapVol_{81-98}$, $b2$ is the coefficient on the interaction term, and X is log per capita real GDP in 1981. A one standard deviation increase in financial openness in a country for which log per capita real GDP in 1981 equals its 25th percentile value (3.3) will lead to an increase in real effective exchange rate volatility of 1.4. At the median level of log per capita real GDP in 1981 (3.7), however, a one standard deviation increase in $CapVol_{81-98}$ will have no impact on volatility. At the 75th percentile value of log per capita real GDP in 1981 (4), a one standard deviation increase in financial openness leads to a decline in volatility of -1.4. Given that the mean level of real effective exchange rate volatility in this full sample of 61 countries is 8.9, the economic significance of these partial derivatives is quite substantial.

exhibit predicted positive coefficients but they are insignificant. $CapVol_{81-98}$ is negative but insignificant in this specification. The exchange rate commitment measure is negative and highly significant when introduced in column (5) while the central bank independence indicator is positive but insignificant in column (6). In both specifications, $CapVol_{81-98}$ is negative and insignificant.[26]

Table 7.6 reports the outcomes of the same regressions when countries classified as "freely falling" are excluded from the sample. Once again, both trade openness and per capita GDP are negative and regularly significant. In the basic OLS and IV regressions in columns (1) and (2), $CapVol_{81-98}$, in contrast to the full sample outcomes, exhibits a positive coefficient but it is insignificant.[27] The outcomes in column (3) again provide strong evidence that greater financial openness is associated with higher real effective exchange rate volatility in poorer countries. $CapVol_{81-98}$ and the interaction term are positive and negative, respectively, and highly significant.[28] When I use the initial level of per capita GDP (in log form) instead of the dummy variable to construct the interaction term, $CapVol_{81-98}$ and the new interaction term continue to exhibit positive and negative coefficients, respectively, and they are highly significant.[29] Simple calculations reveal that in this case the 'turning point' occurs at a level of log per capita real GDP equal to 3.8 - any country with a value of log per capita real GDP in 1981 greater than 3.8 experiences a decline in effective real exchange rate volatility when financial openness ($CapVol_{81-98}$) rises. 28 countries out of this sample of 43 have a value of log per capita real GDP in 1981

[26]These outcomes are robust to the exclusion of any one country in the sample.

[27]These outcomes are robust to the exclusion of any one country in the sample.

[28]This is also the case in the IV regression and when I measure real effective exchange rate volatility at a frequency of three years.

[29]This is also the case when I measure real effective exchange volatility at a frequency of three years.

greater than 3.8.[30]

In column (4), the oil export dummy variable is positive and highly significant. $CapVol_{81-98}$ is positive but insignificant in this specification. The exchange rate commitment measure is again negative and highly significant when introduced in column (5) while the central bank independence indicator is positive but insignificant in column (6). In both specifications, $CapVol_{81-98}$ is positive and insignificant.

7.3 Panel Evidence on the Volatility-Financial Openness Linkage

I now present a panel data analysis of the relationship between financial openness and exchange rate volatility. I divide the years 1981 to 1998 into three 6-year periods: 1981-1986 ($T1$), 1987-1992 ($T2$), and 1993-1998 ($T3$). The general specification is

$$Vol_{it} = \alpha_i + \beta^{CapVol} * CapVol_{it} + \beta^{X} * X_{it} + \phi T1 + \delta T2 + \epsilon_{it} \qquad (2)$$

where Vol_{it} represents various measures of exchange rate volatility, CapVol_{it} is the measure of financial openness, X_{it} represents the set of control variables, and $T1$ and $T2$ are time dummies. Once again, I focus on the volatility of the same three types of exchange rates: (a) bilateral nominal US dollar exchange rates, (b) bilateral real US dollar exchange rates, and (c) multilateral real effective exchange rates. A full description of the data is available in the appendix. Volatility is measured in the same way for each exchange rate type

[30]These include all the industrial countries and the following developing countries: Israel, Mexico, Oman, Saudi Arabia, Singapore, Trinidad and Tobago, and Uruguay. Once again, the size of the partial derivative is quite substantial.

as in the cross-sectional regressions. For the multilateral real effective exchange rate data, however, I only measure exchange rate changes over one year periods. This is because 6-year time periods are too small to measure the volatility of real effective exchange rate changes over intervals of three years.

The set of control variables included in X_{it} are the same as those included in the cross-sectional regressions. With the exception of per capita GDP which is measured at the beginning of each period, each variable is averaged over each of the three 6-year intervals. The measure of central bank independence, however, is not included in the panel data regressions as it is not available for the 1990s.

Tables 7.7 to 7.12 present the panel data analysis for the various exchange rate volatility measures. I report regression outcomes for the same two samples as in the cross-section: the full sample and a sample excluding those countries that are classified by Reinhart and Rogoff (2002) as "freely falling". For each sample, four alternative regression specifications are carried out. The regression technique used is pooled ordinary least squares (OLS), with standard errors corrected for heteroskedasticity by the White procedure.

In the first specification, I regress the relevant exchange rate volatility measure on financial openness ($CapVol_{81-98}$) and two control variables: the logarithm of per capita GDP and trade openness. In the second specification, I interact financial openness with a 0/1 dummy variable representing the industrialised countries to examine whether financial openness has different effects on exchange rate volatility in high- and low-income countries. I then add a measure of political stability and a dummy variable for oil exporting countries. Finally, a measure of exchange rate commitments is introduced in the fourth specification. For each specification, I also include fixed time effects in columns (2), (4), (6) and (8).

7.3.1 Monthly Bilateral Nominal Dollar Exchange Rate Volatility

Tables 7.7 and 7.8 present the results for monthly bilateral nominal dollar exchange rate data. Volatility is measured at a frequency of 1 month. In the full sample, trade openness is negative and always significant at the 95 percent confidence level or better. GDP per capita is negative in most specifications except columns (3) and (4) but it is only occasionally significant.

In the basic pooled OLS regression, $CapVol_{81-98}$ exhibits a positive coefficient but it is only significant when the (unreported) time dummies are introduced in column (2). This outcome is robust to the exclusion on any one country in a formal test for leverage points using observation-specific dummy variables. Both of the time dummies are positive but only $T1$ is significant. In contrast to the cross-sectional outcomes, there is evidence from columns (3) and (4) to support the notion that greater financial openness is associated with higher bilateral nominal dollar volatility in poorer countries. $CapVol_{81-98}$ and the interaction term are positive and negative, respectively, and significant at the 95 percent confidence level or better.[31]

When I introduce the political stability and oil export dummy variables, $CapVol_{81-98}$ remains positive but it is only significant when the time dummies are included in the sample. The exchange rate commitment indicator is negative and highly significant in columns (7) and (8). $CapVol_{81-98}$ is positive but insignificant in this case.

When I focus on the sample excluding "freely falling" countries in Table 7.8, however, evidence of a positive association between financial openness and

[31] When I replace the dummy variable representing the industrialised countries with the initial level of per capita GDP in 1981 (in log form), $CapVol_{81-98}$ and the new interaction term are also positive and negative, respectively, and highly significant, with and without time dummies.

bilateral nominal dollar volatility is non-existent. Trade openness continues to be negative and significant in all specifications. GDP per capita is negative but never significant. $CapVol_{81-98}$ is positive in all specifications but it is never significant at standard confidence levels. There is no evidence from columns (3) and (4) to suggest that the effect of increasing financial openness on bilateral nominal dollar volatility varies with the level of economic development. The unreported time dummies are positive but never significant.[32] These outcomes are robust to the exclusion of any one country. Thus, as suggested in the cross-sectional results in Table 7.2, there would appear to be a positive but insignificant relationship between financial openness and bilateral nominal dollar volatility among low-inflation countries.

7.3.2 Monthly Bilateral Real Dollar Exchange Rate Volatility

The outcomes for monthly bilateral real dollar exchange rate data, presented in Tables 7.9 and 7.10, are very similar to those for monthly bilateral nominal dollar volatility. In the full sample, trade openness exhibits an expected negative coefficient and it is highly significant in all specifications. GDP per capita is also negative and significant in most specifications except columns (3) and (4). In the basic regression, $CapVol_{81-98}$ is positive but only significant when the time dummies are introduced in column (2). This outcome is robust to the exclusion on any one country in a formal test for influential observations using observation-specific dummy variables. Both time dummies are positive but only $T1$ is significant.

In contrast to the cross-sectional outcomes, there is evidence from columns (3) and (4) to support the notion that greater financial openness is associated

[32]The F-test, however, rejects the null hypothesis that the time dummies are jointly insignificant.

with higher bilateral real dollar volatility in poorer countries. $CapVol_{81-98}$ and its interaction with the industrial country dummy variable exhibit positive and negative coefficients, respectively, and they are significant at the 95 percent confidence level.[33] When I introduce the political stability and oil export dummy variables, $CapVol_{81-98}$ remains positive but it is only significant when the time dummies are included in the sample. The exchange rate commitment indicator is negative and highly significant in columns (7) and (8). $CapVol_{81-98}$ is positive but insignificant in this case.

When I focus on the sample excluding "freely falling" countries in Table 7.10, however, evidence of a positive association between financial openness and bilateral real dollar volatility is non-existent. Trade openness continues to be negative and significant in all specifications. GDP per capita is negative but never significant. $CapVol_{81-98}$ is positive in all specifications but it is never significant at standard confidence levels.[34] There is no evidence from columns (3) and (4) to suggest that the effect of increasing financial openness on bilateral nominal dollar volatility varies with the level of economic development.[35] The unreported time dummies are positive but never significant.[36] These outcomes are robust to the exclusion of any one country. Thus, like the monthly nominal dollar volatility outcomes, there would appear to be a positive but insignificant relationship between financial openness and bilateral real dollar volatility among low-inflation countries.

[33] I find the same outcome when I use the initial level of per capita GDP in 1981 instead of the dummy variable when constructing the interaction term.

[34] These outcomes are robust to the exclusion of any one country from the sample.

[35] When I replace the dummy variable with the initial level of per capita GDP in 1981 (in log form), however, $CapVol_{81-98}$ and the new interaction term are positive and negative, respectively, and both are highly significant, with and without time dummies.

[36] The F-test rejects the null hypothesis of joint insignificance for both time dummies.

7.3.3 Real Effective Exchange Rate Volatility

Table 7.11 focuses on the full sample outcomes for real effective exchange rate volatility. Volatility is measured at a frequency of one year. Trade openness and per capita GDP are both negative but only the former is significant in all specifications. In the basic regression specification in column (1) and (2), $CapVol_{81-98}$ is positive and significant. These outcomes are robust to the exclusion of any one country. Both of the time dummies are negative and highly significant in column (2) and there is a large increase in the overall explanatory power of the regressions when they are included.

Like the cross-sectional outcomes in Table 7.9, there is strong evidence from columns (3) and (4) to suggest that the impact of greater financial openness on real exchange rate volatility is contingent on the level of economic development. $CapVol_{81-98}$ and the interaction term are positive and negative, respectively, and highly significant.[37] The financial openness indicator remains positive and significant when I introduce, in turn, the other control variables. Both the political stability and oil export dummy variables exhibit predicted positive coefficients but they are insignificant. The foreign exchange commitments indicator is negative but only significant when I include the time dummies.

When I exclude the "freely falling" countries, $CapVol_{81-98}$ remains positive and significant in the basic regression specification in columns (1) and (2) of Table 7.12. Once again, both time dummies are negative and highly significant. $CapVol_{81-98}$ and the interaction term exhibit positive and negative coefficients, respectively, in columns (3) and (4) but, with the exception of the direct effect

[37] When I replace the dummy variable with the initial level of per capita GDP in 1981 (in log form), however, $CapVol_{81-98}$ and the new interaction term are positive and negative, respectively, but only significant when the time dummies are included.

of financial openness in column (3), they are insignificant. When I introduce the remaining control variables in columns (5)-(8), $CapVol_{81-98}$ is positive but only significant when the time dummies are excluded.

7.4 Conclusion

This paper empirically examines the relationship between financial openness and exchange rate volatility. Countries who experience a high degree of capital flows may be exposed to more volatile exchange rate movements. Evidence to suggest that financial openness has a direct impact on any of the exchange rate volatility measures is almost non-existent. The results do suggest, however, that the relationship between financial openness and real effective exchange rate volatility depends on the level of economic development - both the cross-sectional and panel data outcomes suggest that greater financial openness is associated with higher volatility in poorer countries.

As already mentioned in the introduction, one of the reasons why increasing financial openness might lead to greater exchange rate volatility is the potentially destabilising effect of rapid short-term capital flow movements. In effect, the level of financial openness itself may not be that big an influence on exchange rate volatility. Rather, it may be the case that countries with a high proportion of short-term capital flows relative to total flows are more likely to experience volatile exchange rate movements. This might particularly be evident in countries with poorly developed financial systems. Thus, constructing measures of short-term capital flows and examining their impact on exchange rate volatility should be part of the future research agenda in this area.

7.A Data sources

- **Nominal Dollar Exchange Rate Volatility (monthly data):** Standard deviation of the monthly change of the logarithm of the bilateral US dollar nominal exchange rate (period average) over 1981.1-1998.12. Source: IMF's *International Financial Statistics* CD-ROM.

- **Nominal Dollar Exchange Rate Volatility (annual data):** Standard deviation of the annual change of the logarithm of the bilateral US dollar nominal exchange rate (period average) over 1981-1998. Source: IMF's *International Financial Statistics* CD-ROM.

- **Real Dollar Exchange Rate Volatility (monthly data):** Standard deviation of the monthly change of the logarithm of the bilateral US dollar real exchange rate over 1981.1-1998.12. Source: author's calculations based on monthly CPI and bilateral US dollar nominal exchange rate (period average) data from IMF's *International Financial Statistics* CD-ROM.

- **Real Dollar Exchange Rate Volatility (annual data):** Standard deviation of the annual change of the logarithm of the bilateral US dollar real exchange rate over 1981-1998. Source: author's calculations based on annual CPI and bilateral US dollar nominal exchange rate (period average) data from IMF's *International Financial Statistics* CD-ROM.

- **Real Effective Exchange Rate Volatility (annual data):** Standard deviation for the percentage changes of the real effective exchange rate over intervals of 1 and 3 years for the period 1981-1998. Source: correspondence with Philip Lane.

- **Trade Openness:** ratio of exports plus imports to GDP. Source: World Bank, World Development Indicators.

- **GDP per capita:** the logarithm of per capita GDP in 1981. Source: World Bank, World Development Indicators.

- **Political Stability:** average number of revolutions and coups over the period 1981 to 1998. Source: Cross-National Time-Series Data Archive.

- **Foreign Exchange Rate Commitments:** the fraction of years for which a country exhibits an exchange rate commitment. I define an exchange rate commitment as a situation where, for any given year, a country's exchange rate regime is assigned a number between 1 and 9 in Reinhart and Rogoff's fine grid classification in Table 4 of their paper. Source: Reinhart and Rogoff (2002).

- **Oil Dummy:** dummy variable taking the value of 1 if a country exports oil. Source: World Bank, World Development Indicators.

- **Central Bank Independence:** an index of legal central bank independence (average 1976-1989). Source: Cukierman et al (1992)

7.B Tables and Figures

Table 7.1: Bilateral Nominal Dollar Volatility (monthly) - Full Sample

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV	OLS	OLS	OLS	OLS
constant	3.3 2.7***	2.7 1.9*	2.1 1.1	2.9 1.8*	3.6 3.1***	1.9 1.2
$CapVol_{81-98}$	-0.001 -0.4	-0.003 -1.1	0.003 0.9	-0.001 -0.6	-0.001 -0.7	-0.001 -0.9
Trade Openness	-0.003 -1.8*	-0.001 -0.7	-0.006 -1.9*	-0.002 -1.5	-0.003 -1.7*	-0.002 -1.2
log per capita GDP, 1981	-0.4 -1.2	-0.2 -0.5	-0.08 -0.1	-0.3 -0.7	-0.4 -1.2	-0.1 -0.2
$CapVol_{81-98}$*Industrialised			-0.004 -1.3			
Political stability				-0.2 -0.2		
Oil export dummy				-0.9 -2.4**		
FX commitment					-0.4 -1.5	
CB turnover						0.5 0.7
Hausman test - P-value		0.22				
Adjusted R^2	0.02	-0.01	0.05	0.04	0.02	-0.06
No of Observations	56	56	56	56	54	39

Note: White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.2: Bilateral Nominal Dollar Volatility (monthly) - excluding freely falling countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	OLS	IV	OLS	OLS	OLS	OLS
constant	2.5 2.4**	1.9 2.1**	1.9 1.8*	2.2 2.1**	2.3 1.8*	1.9 1.9*	0.6 0.8
$CapVol_{81-98}$	0.002 1.7*	0.001 1.4	0.001 0.6	0.0005 0.2	0.001 1.3	0.001 1.2	0.001 0.6
Trade Openness	-0.003 -3.3***	-0.002 -3.1***	-0.002 -2.1**	-0.002 -0.7	-0.003 -2.7***	-0.002 -2.9***	-0.001 -1.8*
log per capita GDP, 1981	-0.4 -1.3	-0.2 -0.9	-0.2 -0.7	-0.3 -1.1	-0.3 -0.9	-0.2 -0.8	0.1 0.7
$CapVol_{81-98}$*Industrialised				0.001 0.4			
Political stability					-1.2 -1.1		
Oil export dummy					-0.5 -1.5		
FX commitment						0.1 0.3	
CB turnover							0.2 0.9
Hausman test - P-value			0.7				
Adjusted R^2	0.06	0.03	0.02	0.01	0.17	-0.01	0.01
No of Observations	42	41	41	41	41	39	30

Note: White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. Egypt was found to be an outlier in column (1) and, therefore, is excluded in the regressions presented in columns (2)-(7). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.3: Bilateral Real Dollar Volatility (monthly) - Full Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	OLS	IV	OLS	OLS	OLS	OLS
constant	3.7 2.9***	4.1 3.4***	3.4 2.7***	2.9 1.7*	4.4 2.8***	4.4 3.8***	2.6 1.8*
$CapVol_{81-98}$	-0.001 -0.5	0.0002 0.3	-0.002 -0.9	0.004 1.4	0.0003 0.3	0.0001 0.1	0.0001 0.3
Trade Openness	-0.003 -1.9*	-0.003 -2.7***	-0.002 -1.1	-0.006 -2.4**	-0.004 -2.7***	-0.003 -2.8***	-0.003 -3.3***
log per capita GDP, 1981	-0.5 -1.5	-0.6 -2.1**	-0.4 -1.1	-0.3 -0.6	-0.7 -1.7*	-0.7 -2.2**	-0.3 -0.8
$CapVol_{81-98}$*Industrialised				-0.004 -1.3			
Political stability					-0.7 -0.9		
Oil export dummy					-0.4 -1.1		
FX commitment						-0.3 -1.3	
CB turnover							0.4 0.6
Hausman test - P-value			0.18				
Adjusted R^2	0.05	0.07	0.04	0.11	0.06	0.07	-0.04
No of Observations	53	52	52	52	52	51	38

Note: White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. Israel was found to be an outlier in column (1) and, therefore, is excluded in the regressions presented in columns (2)-(7). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.4: Bilateral Real Dollar Volatility (monthly) - excluding "freely falling" countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	OLS	IV	OLS	OLS	OLS	OLS
constant	2.6 2.3**	2.1 1.9*	2.1 1.5	2.3 1.9*	2.3 1.4	2.2 1.9*	1.8 1.5
$CapVol_{81-98}$	0.001 1.7*	0.001 1.2	0.001 0.5	-0.0001 -0.1	0.001 0.9	0.001 1.1	0.001 1.4
Trade Openness	-0.002 -3.1***	-0.002 -2.9***	-0.002 -1.7*	-0.001 -0.7	-0.002 -2.1**	-0.002 -3.1***	-0.002 -2.8***
log per capita GDP, 1981	-0.4 -1.3	-0.2 -0.8	-0.2 -0.6	-0.3 -0.9	-0.3 -0.6	-0.3 -0.9	-0.2 -0.7
$CapVol_{81-98}$*Industrialised				0.001 0.5			
Political stability					-0.5 -0.5		
Oil export dummy					-0.3 -0.7		
FX commitment						-0.08 -0.5	
CB turnover							0.6 1.3
Hausman test - P-value			0.9				
Adjusted R^2	0.07	0.02	0.01	-0.01	0.01	-0.01	0.02
No of Observations	39	38	38	38	38	37	31

Note: White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. Cote d'Ivoire was found to be an outlier in column (1) and, therefore, is excluded in the regressions presented in columns (2)-(7). * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.5: Effective Real Volatility (annual data) - Full Sample

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV	OLS	OLS	OLS	OLS
constant	27.2 4.6***	25.6 3.6***	9.5 1.3	25.4 3.4***	34.2 5.9***	25.4 2.9***
$CapVol_{81-98}$	-0.0005 -0.1	-0.008 -0.6	0.05 3.1***	-0.001 -0.1	-0.0002 -0.1	-0.007 -0.4
Trade Openness	-0.03 -1.8*	-0.02 -1.4	-0.07 -3.8***	-0.03 -1.7*	-0.03 -2.2**	-0.02 -1.2
log per capita GDP, 1981	-4.5 -2.7***	-3.9 -1.8*	0.3 0.1	-4.1 -1.9*	-5.8 -3.5***	-4.2 -1.7*
$CapVol_{81-98}$*Industrialised			-0.06 -3.9***			
Political stability				4.1 0.7		
Oil export dummy				1.9 1.1		
FX commitment					-4.3 -3.6***	
CB turnover						2.9 0.5
Hausman test - P-value		0.5				
Adjusted R^2	0.12	0.12	0.36	0.1	0.22	0.08
No of Observations	61	61	61	61	59	44

Note: White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.6: Effective Real Volatility (annual data) - excluding "freely falling" countries

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV	OLS	OLS	OLS	OLS
constant	21.8 3.5***	22.1 2.9***	12.2 2.1**	21.9 2.9***	28.7 4.9***	21.1 2.5**
$CapVol_{81-98}$	0.0005 0.9	0.006 0.5	0.05 3.4***	0.006 0.9	0.005 0.8	0.003 0.6
Trade Openness	-0.01 -1.9*	-0.01 -1.4	-0.04 -4.1***	-0.01 -1.7*	-0.02 -2.4**	-0.01 -1.7*
log per capita GDP, 1981	-3.9 -2.4**	-4.1 -1.9*	-1.2 -0.8	-4.1 -2.1**	-5.3 -3.5***	-3.9 -1.5
$CapVol_{81-98}$*Industrialised			-0.03 -3.7***			
Political stability				3.1 0.4		
Oil export dummy				3.6 2.2**		
FX commitment					-3.1 -3.4***	
CB turnover						0.2 0.1
Hausman test - P-value		0.9				
Adjusted R^2	0.15	0.15	0.35	0.2	0.36	0.09
No of Observations	43	43	43	43	41	32

Note: White heteroskedasticity-consistent t-statistics in parentheses. IV denotes instrumental variable estimation when $CapVol_{81-98}$ is instrumented by the level of financial openness in 1981 ($CapVol_{81}$) and a dummy variable representing the industrialised countries. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.7: Bilateral Nominal Dollar Volatility (monthly) - Full Sample

	(1)	(2)	(3)	(4)
		Time Dum.		Time Dum
constant	2.8 3.3***	2.4 2.8***	0.8 0.7	0.4 0.3
$CapVol_{81-98}$	0.001 1.1	0.002 1.8*	0.005 2.2**	0.006 2.5**
Trade Openness	-0.01 -2.8***	-0.005 -2.5**	-0.008 -3.2***	-0.008 -3.2***
log per capita GDP, 1981	-0.4 -1.7*	-0.4 -1.5	0.1 0.4	0.2 0.5
$CapVol_{81-98}$*Industrialised			-0.005 -2.1**	-0.005 -2.2**
Adjusted R^2	0.01	0.06	0.03	0.09
No of Observations	167	167	167	167

Note: White heteroskedasticity-consistent t-statistics in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.7 - continued

	(5)	(6)	(7)	(8)
		Time Dum		Time Dum
constant	2.9 3.1***	2.4 2.5**	3.4 3.9***	3.1 3.4***
$CapVol_{81-98}$	0.001 1.1	0.002 1.8*	0.001 0.7	0.001 1.2
Trade Openness	-0.005 -2.8***	-0.005 -2.4**	-0.005 -2.9***	-0.005 -2.7***
log per capita GDP, 1981	-0.4 -1.7*	-0.4 -1.4	-0.4 -1.9*	-0.4 -1.7*
Political stability	-0.2 -0.3	0.02 0.1		
Oil export dummy	0.1 0.2	0.1 0.1		
FX commitment			-0.6 -3.6***	-0.6 -3.4***
Adjusted R^2	0.01	0.05	0.06	0.1
No of Observations	167	167	161	161

Note: White heteroskedasticity-consistent t-statistics in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.8: Bilateral Nominal Dollar Volatility (monthly) - excluding "freely falling" countries

	(1)	(2)	(3)	(4)
		Time Dum.		Time Dum
constant	1.5 1.7*	1.5 1.6	1.4 1.7*	1.3 1.5
$CapVol_{81-98}$	0.001 1.4	0.002 1.6	0.002 0.7	0.002 0.8
Trade Openness	-0.002 -2.3**	-0.002 -2.2**	-0.003 -1.9*	-0.003 -1.9*
log per capita GDP, 1981	-0.2 -0.6	-0.1 -0.6	-0.1 -0.5	-0.1 -0.5
$CapVol_{81-98}$*Industrialised			-0.0003 -0.2	-0.0003 -0.2
Adjusted R^2	0.01	-0.01	0.002	-0.01
No of Observations	118	118	118	118

Note: White heteroskedasticity-consistent t-statistics in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.8 - continued

	(5)	(6) Time Dum	(7)	(8) Time Dum
constant	1.4 1.4	1.4 1.2	1.6 1.6	1.5 1.5
$CapVol_{81-98}$	0.001 1.3	0.001 1.4	0.001 1.3	0.001 1.4
Trade Openness	-0.002 -2.3**	-0.002 -2.1**	-0.002 -2.2**	-0.002 -2.1**
log per capita GDP, 1981	-0.1 -0.4	-0.1 -0.3	-0.1 -0.5	-0.1 -0.5
Political stability	-0.1 -0.1	-0.07 -0.1		
Oil export dummy	-0.6 -2.9***	-0.6 -2.9***		
FX commitment			-0.05 -0.4	-0.04 -0.3
Adjusted R^2	0.05	0.04	-0.01	-0.02
No of Observations	118	118	112	112

Note: White heteroskedasticity-consistent t-statistics in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.9: Bilateral Real Dollar Volatility (monthly) - Full sample

	(1)	(2)	(3)	(4)
		Time Dum.		Time Dum
constant	3.3 4.1***	2.9 3.5***	1.4 1.1	0.8 0.6
$CapVol_{81-98}$	0.001 0.9	0.001 1.8*	0.005 2.2**	0.005 2.5**
Trade Openness	-0.01 -2.8***	-0.004 -2.4**	-0.01 -3.3***	-0.01 -3.2***
log per capita GDP, 1981	-0.5 -2.2**	-0.5 -2.1**	0.01 0.1	0.1 0.2
$CapVol_{81-98}$*Industrialised			-0.005 -2.1**	-0.005 -2.2**
Adjusted R^2	0.03	0.09	0.05	0.12
No of Observations	158	158	158	158

Note: White heteroskedasticity-consistent t-statistics in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.9 - continued

	(5)	(6)	(7)	(8)
		Time Dum		Time Dum
constant	3.6 3.8***	3.1 3.3***	4.1 4.9***	3.6 4.3***
$CapVol_{81-98}$	0.001 0.9	0.001 1.7*	0.001 0.5	0.001 1.2
Trade Openness	-0.01 -2.8***	-0.004 -2.4**	-0.005 -3.2***	-0.01 -2.7***
log per capita GDP, 1981	-0.6 -2.4**	-0.5 -2.1**	-0.6 -2.8***	-0.6 -2.4**
Political stability	-0.3 -0.6	-0.1 -0.2		
Oil export dummy	0.4 0.8	0.4 0.8		
FX commitment			-0.6 -3.9***	-0.5 -3.8***
Adjusted R^2	0.02	0.09	0.09	0.14
No of Observations	158	158	155	155

Note: White heteroskedasticity-consistent t-statistics in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.10: Bilateral Real Dollar Volatility (monthly) - excluding "freely falling" countries

	(1)	(2)	(3)	(4)
		Time Dum.		Time Dum
constant	2.1 2.3**	1.9 2.1**	1.3 1.5	1.2 1.3
$CapVol_{81-98}$	0.001 1.4	0.001 1.5	0.003 1.2	0.003 1.3
Trade Openness	-0.002 -2.5**	-0.002 -2.3**	-0.003 -2.7***	-0.003 -2.7***
log per capita GDP, 1981	-0.2 -1.1	-0.2 -0.9	-0.07 -0.3	-0.1 -0.3
$CapVol_{81-98}$*Industrialised			-0.002 -0.8	-0.002 -0.8
Adjusted R^2	0.02	0.02	0.02	0.02
No of Observations	109	109	109	109

Note: White heteroskedasticity-consistent t-statistics in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.10 - continued

	(5)	(6)	(7)	(8)
		Time Dum		Time Dum
constant	1.9 1.8*	1.8 1.6	2.2 2.3**	2.1 2.1**
$CapVol_{81-98}$	0.001 1.3	0.001 1.6	0.001 1.4	0.001 1.5
Trade Openness	-0.002 -2.4**	-0.002 -2.2**	-0.003 -2.4**	-0.002 -2.3**
log per capita GDP, 1981	-0.2 -0.8	-0.2 -0.7	-0.3 -1.1	-0.3 -1.1
Political stability	0.01 0.1	0.03 0.1		
Oil export dummy	-0.3 -1.4	-0.3 -1.4		
FX commitment			-0.1 -0.7	-0.1 -0.7
Adjusted R^2	0.02	0.02	0.02	0.01
No of Observations	109	109	106	106

Note: White heteroskedasticity-consistent t-statistics in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.11: Effective Real Volatility (annual data) - Full Sample

	(1)	(2)	(3)	(4)
		Time Dum.		Time Dum
constant	6.3 2.2**	9.9 4.1***	-0.8 -0.2	2.6 0.9
$CapVol_{81-98}$	0.01 2.4**	0.007 1.8*	0.03 2.7***	0.02 2.9***
Trade Openness	-0.02 -2.5**	-0.02 -2.5**	-0.03 -2.7***	-0.03 -2.7***
log per capita GDP, 1981	-1.1 -1.2	-1.1 -1.5	0.7 0.7	0.8 0.9
$CapVol_{81-98}$*Industrialised			-0.02 -2.1**	-0.02 -2.7***
Adjusted R^2	0.04	0.38	0.08	0.42
No of Observations	178	178	178	178

Note: White heteroskedasticity-consistent standard errors are calculated. t-statisitics are in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.11 - continued

	(5)	(6)	(7)	(8)
		Time Dum		Time Dum
constant	5.1 1.4	8.7 2.8***	7.3 2.7***	12.1 4.9***
$CapVol_{81-98}$	0.01 2.2**	0.007 1.7*	0.01 2.4**	0.007 1.8*
Trade Openness	-0.01 -2.4**	-0.02 -2.3**	-0.02 -2.8***	-0.02 -2.8***
log per capita GDP, 1981	-0.8 -0.8	-0.9 -1.1	-1.2 -1.4	-1.5 -2.2**
Political stability	2.6 1.1	2.5 1.3		
Oil export dummy	1.7 1.1	1.8 1.5		
FX commitment			-0.7 -1.5	-1.4 -3.6***
Adjusted R^2	0.06	0.4	0.05	0.41
No of Observations	178	178	172	172

Note: White heteroskedasticity-consistent standard errors are calculated. t-statisitics are in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.12: Effective Real Volatility (annual data) - excluding "freely falling" countries

	(1)	(2)	(3)	(4)
		Time Dum.		Time Dum
constant	6.4 1.5	9.7 2.7***	3.3 0.9	6.5 2.8***
$CapVol_{81-98}$	0.01 2.2**	0.007 1.7*	0.02 1.7*	0.01 1.5
Trade Openness	-0.01 -1.4	-0.01 -1.7*	-0.01 -1.8*	-0.02 -1.9*
log per capita GDP, 1981	-1.3 -1.1	-1.3 -1.2	-0.5 -0.5	-0.5 -0.7
$CapVol_{81-98}$*Industrialised			-0.008 -0.9	-0.01 -1.1
Adjusted R^2	0.08	0.48	0.08	0.49
No of Observations	118	118	118	118

Note: White heteroskedasticity-consistent standard errors are calculated. t-statisitics are in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

Table 7.12 - continued

	(5)	(6)	(7)	(8)
		Time Dum		Time Dum
constant	6.4 1.2	9.6 2.1**	7.2 1.7*	11.3 3.2***
$CapVol_{81-98}$	0.01 2.1**	0.008 1.5	0.01 2.2**	0.007 1.5
Trade Openness	-0.01 -1.4	-0.01 -1.5	-0.01 -1.5	-0.01 -1.8*
log per capita GDP, 1981	-1.3 -0.9	-1.3 -1.1	-1.5 -1.2	-1.6 -1.5
Political stability	0.3 0.1	0.4 0.2		
Oil export dummy	0.5 0.6	0.5 1.4		
FX commitment			-0.4 -0.6	-0.8 -2.1**
Adjusted R^2	0.06	0.48	0.08	0.49
No of Observations	118	118	112	112

Note: White heteroskedasticity-consistent standard errors are calculated. t-statisitics are in parentheses. * (**, ***) indicates statistical significance at the 10% (5%, 1%) confidence level.

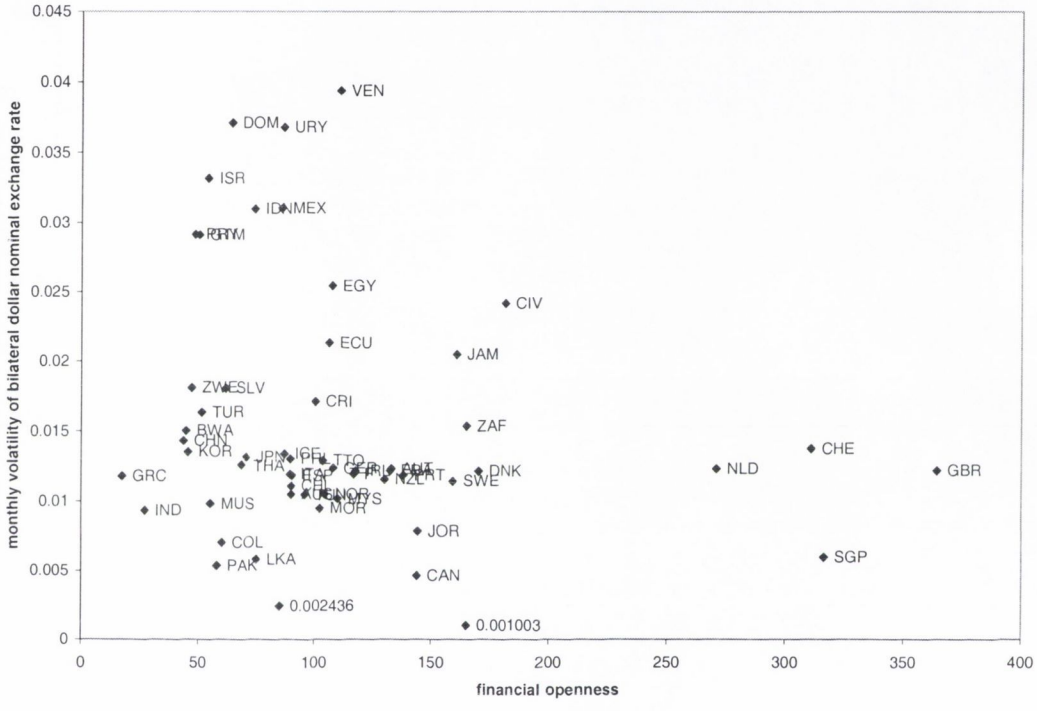

Figure 7.1: Monthly volatility of the bilateral dollar nominal exchange rate for a sample of 56 countries over the period January 1981 to December 1998 as a function of their financial openness.

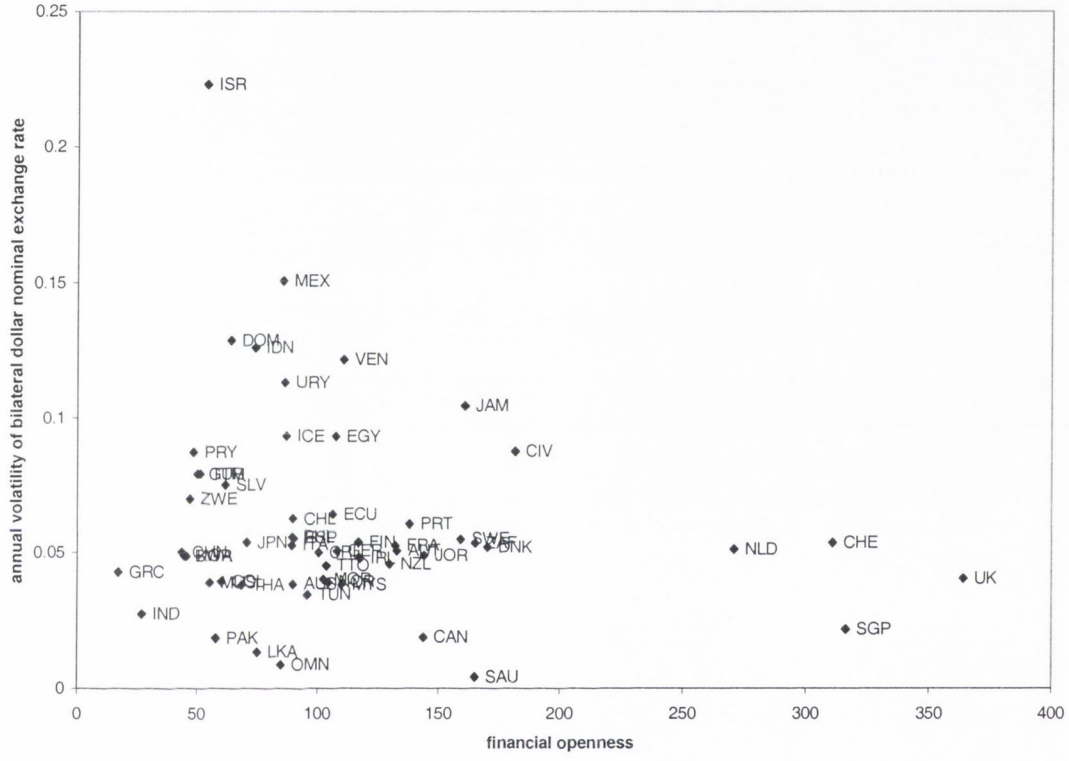

Figure 7.2: Annual volatility of the bilateral dollar nominal exchange rate for a sample 56 countries over the period 1981 to 1998 as a function of their financial openness.

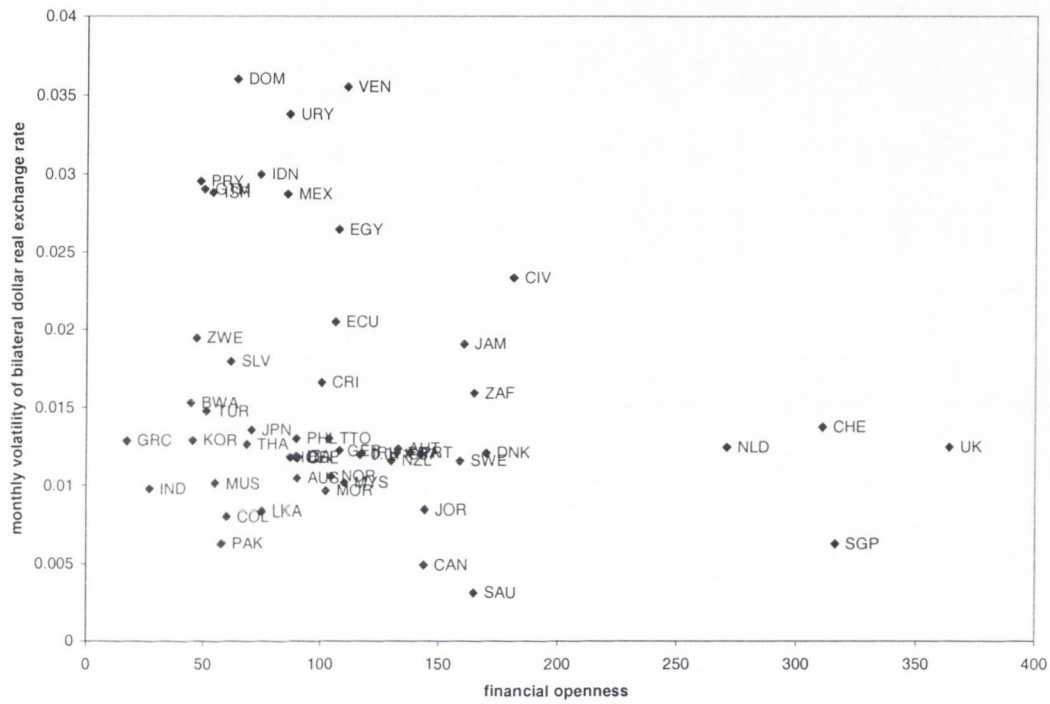

Figure 7.3: Monthly volatility of the bilateral dollar real exchange rate for a sample 53 countries over the period January 1981 to December 1998 as a function of their financial openness.

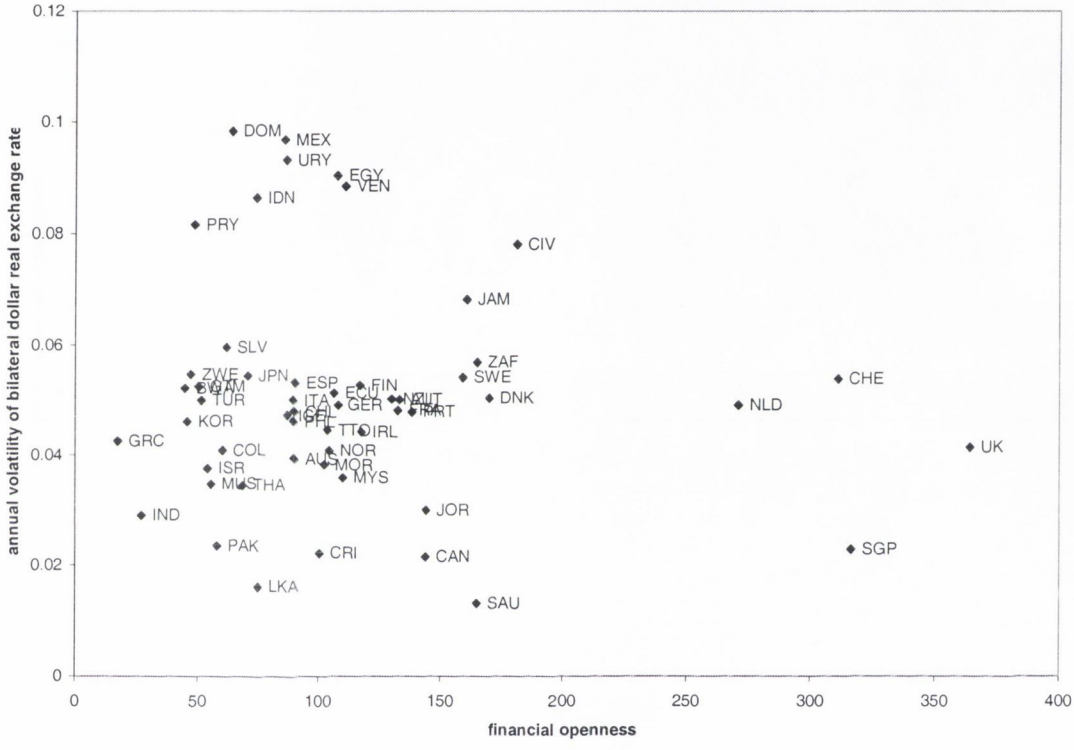

Figure 7.4: Annual volatility of the bilateral dollar real exchange rate for a sample 53 countries over the period 1981 to 1998 as a function of their financial openness.

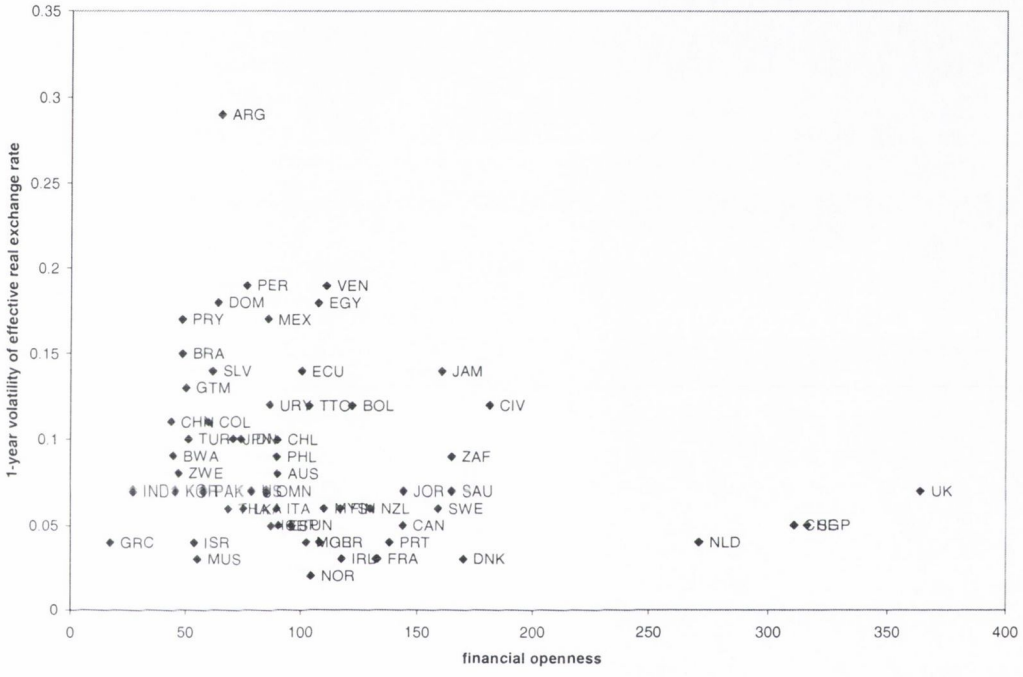

Figure 7.5: 1-year volatility of the real effective exchange rate for a sample of 61 countries over the period 1981 to 1998 as a function of their financial openness

Chapter 8

Conclusion

8.1 Summary of Results

The consequences and desirability of increasing international financial integration is likely to remain a topic of heated debate for the foreseeable future. This will particularly be the case in developing countries where restrictions on capital movements continue to be widespread. Proponents of greater openness to financial flows maintain that more rapid economic development is an inevitable consequence of such an experience. In contrast, skeptics argue that any potential benefits of increasing financial openness are outweighed by the costs associated with greater economic instability and vulnerability caused by volatile capital flows. This viewpoint is further emphasised by the severe macroeconomic crises experienced by many developing countries in the 1990s. As Bhagwati (1998) points out in an influential article expressing skepticism about the merits of unfettered international trade in assets, "*The claims of enormous benefits from free capital mobility are not persuasive. Substantial gains have been asserted, not demonstrated*".

This thesis attempts to widen the empirical side of the debate by using new data to examine the impact of a quantitative measure of international financial integration on various indicators of macroeconomic performance. In general, the results presented in this thesis suggest that greater financial openness hinders macroeconomic performance in developing countries but it may benefit developed countries. This is particularly evident in Chapter Three where greater financial openness was found to be significantly associated with lower per capita GDP growth and higher output volatility in developing countries. In addition, it does not appear to be the case that developing countries which have stronger economic, financial, and institutional characteristics are more likely to reap the predicted benefits of greater financial openness.

One frequently asserted benefit of greater financial openness is that it may force countries to implement more disciplined economic policies than might be the case if the capital account is relatively closed. As a result, this might have beneficial consequences for the conduct of both monetary and fiscal policy. There is no evidence in Chapter Four of a significant relationship between financial openness and inflation levels or volatility. Moreover, the degree of financial system strength does not appear to influence the relationship between these variables. In terms of fiscal discipline, however, there is evidence to suggest that greater financial openness lowers budget deficits, particularly in developing countries. In contrast, however, greater financial openness appears to increase levels of government debt in developing countries.[1]

Chapter Five assesses the hypothesis that international financial integration should lead to the more rapid development of the financial system. This extends the work of Klein and Olivei (2001). I find little evidence of a positive and statistically significant relationship between financial openness and financial depth in the full sample or industrial country subsample. Moreover, greater openness to international flows of capital appears to *hinder* financial deepening in developing countries. One possible explanation for this absence of a relationship is that increasing financial openness may only lead to financial deepening when an efficient legal and institutional environment is already in place. This viewpoint, however, is not supported by robustness tests where the interaction between the financial openness measure and the quality of the bureaucracy is insignificant.

Finally, Chapter Seven investigated the view that greater openness to international flows of capital may expose countries to more instability in the nominal

[1] As pointed out in Chapter Six, however, one possible explanation for this apparent inconsistency may be differences in country coverage.

and/or real exchange rate. Evidence to suggest that financial openness has a direct impact on exchange rate volatility is almost non-existent. The results do suggest, however, that the relationship between financial openness and real effective exchange rate volatility depends on the level of economic development - both the cross-sectional and panel data outcomes suggest that greater financial openness is associated with higher volatility in poorer countries.

8.2 Policy Implications

Economic theory suggests that the free flow of capital across international borders will offer increased risk diversification opportunities through international risk-sharing arrangements, the potential for a more efficient global allocation of resources, and greater discipline on domestic policymakers. This has prompted industrial countries to undertake widespread capital account liberalisation over the past quarter-century. Many attribute efficiency gains and increased diversification opportunities in these countries to the removal of controls on capital movements. A natural policy prescription, therefore, is to extend this process of international financial integration to less developed countries and, indeed, greater capital mobility has become a more noticeable feature of some of these countries over the last decade. The empirical evidence presented in this thesis, however, suggests that the experience of greater financial openness has had negative macroeconomic consequences for developing countries. This finding, allied to the frequent occurrence of financial and currency crises in the 1990s, leads one to question the validity of the view that the ideal world is one of free capital flows. Skepticism over the merits of free capital mobility is further increased by the fact that I find no evidence to support the belief that the benefits of financial openness will materialise in developing countries once stronger

financial and institutional environments are put in place. These outcomes point to the need to consider the possibility that no level of financial or institutional strength will render a country immune to the crises repeatedly generated by capital movements.

There is a small but growing number of economists who believe that the efficiency and predictability associated with the market for goods and services does not apply to the market for financial assets. This view was first highlighted in an influential paper by Rodrik (1998a) who argues that "*financial markets are fundamentally different*". Rodrik emphasised that market failures arising from moral hazard, asymmetric information, incompleteness of contingent markets, and bounded rationality are a widespread feature of financial markets, particularly in developing countries. The impact of these problems is dramatically exposed with severe macroeconomic consequences when large amounts of capital flow out of a country in a very short space of time, sometimes even when the domestic economy appears to be in good shape. In another influential paper emphasising the unstable nature of capital markets, Bhagwati (1998) cites the work of the economic historian Charles Kindleberger who emphasised that capital flows are characterised by panics and manias. According to Kindleberger (1984), financial crises have appeared at roughly ten-year intervals for the last 400 years or so, illustrating that boom-and-bust cycles have always been a pervasive feature of international capital markets. Thus, given the fact that countries who embrace free capital mobility must be prepared to deal with greater instability and the probability that a financial or currency crisis is inevitable, it only seems logical to ask if this process is worth all the risks involved. As Bhagwati (1998) notes, "*the gains from economic efficiency that would flow from free capital mobility must be set against the potential losses*".

The results presented in this thesis suggest that greater financial openness is failing to deliver improved macroeconomic performance in developing countries. Why then does capital account convertibility continue to be such a common policy prescription for these countries? Bhagwati (1998) argues that this reflects both ideology and the activities of interest groups. The former is the belief that market forces can be relied upon to deliver the most efficient outcome. The market failures mentioned above illustrate why this will not always be the case for capital flows. The issue of interest groups arises from the view that large financial institutions such as those found on Wall Street have a lot to gain from a world where free capital mobility is pervasive. According to Bhagwati (1998), the lobbying of these institutions has prompted organisations like the IMF to fully embrace and advocate the goal of capital account convertibility, despite the increasingly obvious risks involved. In response to the recent crises experienced by many developing countries, the IMF has recently begun to espouse the importance of correctly sequencing the opening of the capital account - i.e. that strong domestic institutions need to be in place before the capital account is fully opened. The idea that full capital account convertibility might in itself be harmful and that controls on certain types of capital movements may be beneficial has yet to be fully considered by the IMF. The evidence presented in this thesis suggests that these ideas need to be given more consideration by policymakers. As Bhagwati (1998) suggests, "*It is time to shift the burden of proof from those who oppose to those who favour liberated capital*".

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