DETERMINANTS OF INTERNATIONAL FINANCIAL INTEGRATION

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Abstract

It is generally accepted that there has been an increase in the degree of international financial integration over the last two decades. Countries are trying to remove the restrictions on cross-border capital movement, deregulate domestic financial markets and offer competitive investment environments to encourage investment. As a result, international financial integration has been a topical area for many financial economists. However, there is a limited amount of research focusing on the determinants of international financial integration theoretically and empirically. To enrich the literature on this topic, the current paper will empirically investigate the potential "drivers" of international financial integration including policy on capital controls and other components of financial structure which are the level of economic and educational development, economic growth, the institutional and legal environment, trade openness, financial development and tax policy.

JEL Classification: *F02, F21, F3, F4*

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DETERMINANTS OF INTERNATIONAL FINANCIAL INTEGRATION

1. Introduction

It is generally agreed by many financial economists and practitioners that there has been an increase in the degree of international financial integration (IFI) over the last two decades (Agenor 2003; Lane & Milesi-Ferretti 2003; Morrison & White 2004). Countries are trying to remove the restrictions on cross-border capital movement, deregulate domestic financial markets and offer competitive investment environments to encourage investment. The use of capital controls in the OECD countries has now reached the lowest point in over fifty years (Epstein & Schor 1992). Not only the OECD but also developing countries' financial linkages with the global economy have risen in recent years (Prasad et al. 2003). In addition, there has been a rapid increase in the size of capital flows when national financial markets are deregulated and international capital flows are liberalized. As a result, international financial integration has been a topical area for financial economists.

Many researchers consider the concept of international financial integration and provide a wide array of indicators to proxy for international financial integration even though none of those definitions can be generally accepted or considered as benchmark (Edison, Levine et al. 2002; Prasad et al. 2003; Von Furstenberg 1998). They clearly differentiate definitions of IFI and different types of indicators: *de jure* indicators to proxy for the prerequisites of international financial integration and *de facto* indicators for the consequences of international financial integration. In addition, Vo & Daly (2005a; 2005b) provide tests of other international financial integration concepts where measures of international financial integration involving testing correlations between different macroeconomic variables. This is effectively

testing the law of one price, of which must hold if the complete international financial integration exists (Vo 2005c).

The main purpose of this paper is to empirically investigate the determinants of international financial integration. Firstly, it is important to identify suitable quantitative variables to proxy for international financial integration[1]. Vo (2005b) constructs many IFI indicators using data from the International Financial Statistics (IFS) of the International Monetary Fund (IMF). We use indicators of international financial integration which are the aggregate stock of assets and liabilities as a share of GDP (IFI01), the stock of liabilities as a share of GDP (IFI02), the aggregate stock of foreign direct investment (FDI) and portfolio investment (PI) as a share of GDP (IFI03), the stock of FDI and PI inflows as a share of GDP (IFI04), the aggregate flows of equity as a share of GDP (IFIEF), the inflows of equity as a share of GDP (IFIEFI), the aggregate stock of equity as a share of GDP (IFIES) and the stock of equity inflows as a share of GDP (IFIESI). The rationale for the inclusion of the equity measures is that equity flows might be driven by a different mechanism (Lane & Milesi-Ferretti 2003). The decision to include both stock measures and flow measures to proxy for IFI is because flow measures are subject to short-term fluctuations while stock measures are not. In addition, it is contended that *de facto* measures of international financial integration which are also considered as volume-based capital account openness measures should cover not only the ability of foreign investors investing domestically but also the ability of residents in the host country to invest abroad. Secondly, a number of control variables need to be identified to serve as candidates to represent determinants of IFI.

[1] See Vo(2005b) for a detailed discussion of the advantages and disadvantages of IFI indicators.

Some previous empirical research examines the determinants of capital controls (Alesina et al. 1994; Epstein & Schor 1992; Lemmen & Eijffinger 1996; Milesi-Ferretti 1995). However, capital controls are considered as prerequisites for international financial integration (Vo 2005b). This paper focus on the *de jure* measures of international financial integration. Hence, for the purpose of this empirical investigation, the *de facto* volume-based capital flow measures are considered as a dependent variable while the *de jure* measures[2] are used as control variables in the regressions. In addition, it is recognized that international financial integration does not arise spontaneously as soon as legal barriers are lifted and it is not self-coordinating from below but as the possible end result of an organized process requiring many formal and practical elements of institutionalization and a system of rules to allow international financial markets to function both competitively and securely (Von Furstenberg 1998). This is consistent with the claim from Kearney and Lucey (2004) that the world's economic and financial system is becoming increasingly integrated due to the rapid expansion of international trade in commodities, services and financial assets. Hence, we will assess many other variables identified in the literature as potential "drivers" of international financial integration. In other words, we relate the link between the variation in the degree of international financial integration to a number of economic and development indicators including capital account liberalization, the level of development, international trade openness and country risk.

Lane (2000) empirically studies gross international investment positions using the gross holding of foreign assets and liabilities in a cross-section sample of 19 countries. He finds that more open countries with larger domestic financial markets

[2] These *de jure* measures are also classified as indicators of international financial liberalization. In this paper, we consider the *de facto* IFI variables as dependent variables. Hence, when we mention IFI it means *de facto* IFI.

tend to hold greater quantities of foreign assets and liabilities. Martin and Rey (2001) present a two-country macroeconomic model with an endogenous number of financial assets. This model can be employed to analyse the impact of IFI on welfare and on the geographical location of financial centre. Lane & Milesi-Ferretti (2003) address the issue of international financial integration and its relationship with equity return. However, this study is restricted to a very limited number of countries (18 OECD countries in the sample) and there are drawbacks in the analysis (Engel 2003). This research will try to address those shortcomings and fill the gap in Lane & Milesi-Ferretti (2003) using Engel (2003) and extending the dataset to a larger number of countries and expand the volume-based measures of IFI.

This work is clearly relevant to the process of policy formation as a thorough understanding of the determinants of international financial integration may provide important insights into the process of financial and monetary integration in the global market. This research advances other previous research by employing the annual frequency dataset covering 79 countries over an extended period of time from 1980 to 2003 and taking advantage of the indicators of international financial integration[3] constructed using data from the IMF's International Financial Statistics and the World Bank's World Development Indicators. Previous research investigating the determinants of international financial integration normally relies on dummy variables or capital control indices to measure the degree of international financial integration (Alesina et al. 1994; Epstein & Schor 1992; Grilli & Milesi-Ferretti 1995; Milesi-Ferretti 1995) and these do not reflect the actual realized volume of capital flows. This work employs *de facto* measures to proxy for IFI of which a subset of these measures has been used previously. Thus, this work is complementary to the literature

[3] *de facto* indicators

in terms of extending to a large number of countries in the dataset over a considerable time period. In addition, we advance other studies by using a number of newly developed techniques in panel data estimation to alleviate the bias caused by data and specification in the model to provide more reliable estimation results.

The remainder of this paper is outlined as follows. Section two reviews the literature. Section three formulates the model. Section four describes the data and methodology. Section five reports the results. Section six concludes the paper.

2. Literature Review

Theoretically, Von Furstenberg (1998) is amongst the very first authors to investigate the prerequisites for IFI in his essay of capital mobility and international financial integration. He forcefully argues that IFI could not be assessed in isolation from a country's financial structure, which is the structure of financial institutions and markets that constitute a country's financial system. Agenor (2003) reviews the literature on the benefits and costs of international financial integration. Lane & Milesi-Ferretti (2003) and Vo (2005b) provide a detailed discussion of international financial integration, characterizing its salient features over the last two decades, and a comparison of the degree of international financial integration across countries and over time.

In terms of empirical work on international financial integration, many authors examine different aspects of this concept. Kalemli-Ozcan et al. (1999) empirically assert that capital market integration leads to higher specialization in production through better risk sharing. Bekaert and Harvey (2000) propose a cross-sectional time-series asset price model to assess the impact of market liberalizations in emerging equity markets on the cost of capital, volatility, beta and correlation with world market returns. Henry (2000a) investigates the impact of international financial

integration on domestic investment. In other study, he examines international financial integration in terms of financial liberalization (freedom of foreign investors entry) in emerging markets (Henry 2000b). Beck et al. (2000) report a strong link between financial intermediaries and economic growth and total factor productivity growth. They argue that better financial intermediaries can encourage foreign investment leading to a higher degree of international financial integration and this helps to fuel economic growth. Many other authors investigate the relationship between international financial integration and economic growth (Edison, Klein et al. 2002; Edison, Levine et al. 2002; Vo 2005c). Obstfeld & Taylor (2001) provide a historical review of financial integration and capital markets. Adam et al. (2002) investigate capital market integration in the European Union. Prasad et al. (2003) offer evidence on the effects of financial international integration on developing countries.

A number of authors assess the determinants of *de jure* measures of international financial integration - capital controls. Epstein & Schor (1992) investigate the factors that influence capital controls. Alesina et al. (1994) and Milesi-Ferretti (1995) report a panel investigation of the incidence of capital controls. Epstein & Schor (1992) construct an annual capital control index based on the IMF's annual publication entitled "Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)". Lemmen & Eijffinger (1996) employ a continuous (and time-varying) measure for capital controls and find that inflation rates, government instability and investment are key determinants of capital controls within the European Union. Obstfeld (1998) argues that the international capital market has the potential to yield enormous benefits, but that it also constrains national choices over monetary and fiscal policies, and may facilitate excessive borrowing. Over the medium term,

integration into the global capital market also makes it more difficult to tax internationally footloose capital relative to less mobile factors of production, especially labour. La Porta et al. (1997) suggest that structure of external finance in a country depends on the legal rights of shareholders and creditors, as well as on the degree to which the relevant laws are enforced. The authors give evidence of a strong link between poor investor protection and smaller and narrower capital markets both in equity and debt markets. La Porta et al. (1998) further examine legal rules covering protection of corporate shareholders and creditors, the origin of these rule, and the quality of these rules and the quality of their enforcement in a cross section sample of 49 countries. They report a negative link between concentration of ownership of shares in the largest public companies and investor protection and this is consistent with the hypothesis that small, diversified shareholders are unlikely to be important in countries that fail to protect their rights.

Portes and Rey (1999) study the determinants of bilateral gross cross-border equity flows. They offer substantial empirical evidence on the positive linkage between such flows and various measures of country size (GDP, market capitalization or financial wealth) and sophistication of the market and negative linkage with transaction costs and informational frictions. Martin & Rey (2001) demonstrate the importance of the size of economies and transaction costs for trade flows in assets. Lane & Milesi-Ferretti (2003) examine the trend of international financial integration in a sample of 18 OECD countries. They look at the correlation with various possible explanatory variables including the degree of financial restriction, the depth of financial markets, the openness to international trade etc. They then examine various returns on different classes of assets in an attempt to measure the degree of international diversification offered by international investments. Even though Lane & Milesi-Ferretti (2003) are

amongst the early financial economists to initiate the analysis of international financial integration using a subset of *de facto* measures of IFI, their research is limited to a number of small countries in the OECD.

In lieu of the current literature, this work will clearly enrich the existing empirical literature on assessing the determinants of international financial integration. It also advances other research by providing a large number of indicators to proxy for international financial integration, extending the sample in the dataset to a large number of cross-country (79 countries) and over a long period of time (1980-2003). In addition, we will exploit the advance techniques in panel data estimation to alleviate biases to provide more reliable results.

3. Model Formulation

We follow the suggestion of Von Furstenberg (1998) to assess international financial integration in connection with financial structure of a country. To achieve that, as recommended by Cottarelli & Kourelis (1994) and Hubbard (2004), we examine a wide array of variables constituting the financial structure including policy on capital controls, the degree of economic development, the depth of financial markets, economic growth, the country political and investment environment risk index and the openness of international trade as the potential determinants of international financial integration. In other words, this study considers a set of country characteristics that may influence the level of international financial integration. These include the variables that might have a potential direct causal relationship like policy on capital controls or other variables which might indirectly influence the benefits and costs of international financial integration.

Policy on Capital Controls

The impact of government official controls on cross-border capital movements is considered as an important player in explaining variation in international financial integration. Capital account liberalization is characterized by the relaxation of official policy on cross-border capital controls. A high degree of international financial integration must be associated with free capital mobility without any impediment. If controls are binding, the level of international asset cross-holdings should increase if the capital account is liberalized (Lane & Milesi-Ferretti 2003). It is clear that international financial integration will be affected by the policy on cross-border capital account transactions. In many studies, capital control measures are classified as *de jure* indicators or considered as pre-requisites for international financial integration (Prasad et al. 2003; Von Furstenberg 1998). It is generally accepted that the level of international financial integration would be increased if the capital account is liberalised. However, there is evidence that some developing countries with capital account restrictions have found these restrictions ineffective in controlling actual capital flows with episodes of capital flight from some Latin American countries in the 1970s and 1980s. On the other hand, some countries in Africa have few restrictions but have experienced only a minimal volume of capital flows (Prasad et al. 2003). In this paper, the two measures of official capital restrictions viz the IMF's Restriction dummy variable (CT1) and the Miniane's indicator (CT2)[4] from Miniane (2004) are employed.

Level of Development

Edison et al (2002) and Prasad et al (2003) indicate that countries which are rich and well educated tend to be highly integrated. Hence, to confirm this correlation, we include lagged GDP per capita [GDP(-1)] and the secondary education enrolment rate

[4] See Vo (2005b) for more details.

[EDU] in the model to proxy for level of economic development and education attainment.

Economic growth

Many other studies investigate the relationship between international financial integration and economic growth (Agenor 2003; Edison, Levine et al. 2002). The Institute of International Finance (2001; 2003) reports that economic growth acts as a stimulant for private capital flows into emerging countries. Vo and Daly (2004) state that net private capital flows to emerging economies do not accelerate economic growth and suggest a reversed relationship. In addition, Edison et al. (2002) reports a weak and fragile impact of international financial integration on economic growth and suggests a potential reversal relationship between IFI and economic growth. Therefore, we will examine the impact of economic growth on IFI in this paper by using real per capita GDP (EG) as a control variable.

Institutional, Legal and Investment Environment

Von Furstenberg (1998) argues that IFI requires mutual confidence and the ability to form reputation capital and charter value to provide a firm basis for trust in the suppliers of financial services and in the appropriateness of their incentives. Secure institutional foundations, credibility, internal management controls and ethical infrastructure are very important prerequisites for IFI. To reap the full benefits and minimize associated risks, IFI must be closely coordinated with the development of a sound institutional, legal and investment environment. Moreover, La Porta et al. (1997) suggest that the structure of external finance in a country depends on the legal rights of shareholders and creditors, as well as on the degree to which the relevant laws are enforced. They show that countries with poorer investor protection, measured by both the character of their legal rules and the quality of law enforcement,

have smaller and narrower capital markets. The findings apply to both equity and debt markets. In other research, La Porta et al. (1998) investigate legal rules covering the protection of corporate shareholders and creditors, the origin of these rules, and the quality of their enforcement in 49 countries. The results show that there is close relationship between laws and international financial integration. In our model, we use a country risk index from PRS Group[5] to represent the level of political risk and investment risk which allows comparison across countries and over time. This index ranges from 0 (lowest risk) to 100 (highest risk) and the variable enters the regression in the natural logarithm form [Ln(ICRG)]. The assumption is the higher the degree of international financial integration the higher the value of the index. This is according to the common belief that apart from the priority of a higher rate of return, capital will flow to the countries with stable economic conditions and lower levels or risk.

In addition, Lemmen and Eijffinger (1996) suggest that inflation rates significantly explain international financial integration within the European Union. Hence, we include inflation as a proxy for economic stability (INF). The argument is that countries with high inflation rates will have the domestic currency depreciated and create unfavourable conditions for foreign investors. As a consequence, this will lead to lower capital flow into those countries.

Trade Openness

We also investigate the connection between trade in goods and services and trade in assets. Hummels et al. (2001) and Yi (2003) examine the importance of trade growth and suggest that the striking growth in the trade share of output is one of the most important developments in the world economy. Increased trade openness is also one of major factors influencing globalization. According to Lane & Milesi-Ferretti

[5] This index is calculated based on 22 different types of risk including economic, investment, political and environmental risks by the PRS Group (www.prsgroup.com).

(2003), trade openness may contribute to the increased international financial integration for several reasons. Firstly, trade in goods directly results in corresponding financial transactions such as trade credit, transportation costs and export insurance. Secondly, as stated by Obstfeld and Rogoff (2000), there is a close connection between the gains to international financial diversification and the extent of goods trade: trade costs create an international wedge between marginal rates of substitution and hence limit the gains to asset trade. Thirdly, goods trade and financial positions are jointly determined in some situations, as is often the case with FDI, given the importance of intra-firm intermediate trade. Finally, openness in goods markets may increase the willingness to conduct cross-border financial transactions, reducing financial home bias (a 'familiarity' effect) (Lane & Milesi-Ferretti 2003). Thus it makes sense to include the trade openness (TO) as an explanatory variable in the model.

Financial Market Development, Financial System and Banking System

It is also argued in the literature that the level of international financial integration is also dependent on the level of domestic financial development (Von Furstenberg 1998). We use different variables to proxy for the level of financial development including the size of the stock market (STOCAP), domestic stock market activity or liquidity (STOACT) and stock market efficiency (STOTO) as suggested by (Beck et al. 1999). A well-developed financial market helps to attract foreign investors to diversify their portfolio and increase portfolio investment inflows and hence acts as stimulants to increased international financial integration. Portes and Rey (1999) document that the level of gross cross-border capital flows is influenced by the market size, transaction costs and informational friction. Moreover, Henry (2000a;

2000b) investigates the effects of financial market development on investment and international financial integration and finds that there is a strong link between them.

In addition, we use the ratio of domestic credit to GDP (DCREDIT) and a financial depth indicator which is the ratio of liquid liabilities to GDP (M2) to proxy for the development of the domestic financial system. In integrated financial markets monetary policy cannot control interest rates and exchange rates simultaneously without the use of another instrument – capital controls. Controls on capital inflows are intended to keep a strong currency from becoming stronger whereas controls on capital outflows are intended to support a weak currency. The imposition of capital controls allows the authorities to pursue "inconsistent" monetary policies for a while. Consequently, high (low) levels of domestic credit and M2 may indicate the increased presence of capital export (import) controls (Lemmen & Eijffinger 1996) and hence the obstruction to international financial integration.

Tax Policy

Tax policy is also a factor which may influence the degree of international financial integration (Lane & Milesi-Ferretti 2003) and governments are competing over the tax rate to attract investment (Devereux, Griffith et al. 2002; Devereux, Lockwood et al. 2002). Firstly, corporations will shift their assets to countries with lower corporate income tax rates. Secondly, lower tax rates will attract foreign firms and international financial intermediaries to engage in offshore transactions to take advantage of them. Thirdly, higher income tax rates will force investors to invest rather than keep income to avoid the tax burden and by doing so, they will seek lower tax rates in other countries. Finally, investing overseas may be a good channel for investors to hide income from domestic regulators (Lane & Milesi-Ferretti 2003). In this research, we

use the government tax share of GDP (TAX) as an indicator for tax policy. The assumption is that a greater tax share indicates a higher tax burden for investors.

The Model

In view of the above discussion, we formulate the model as follows:

$$IFI_{it} = \alpha_{it} + \beta X_{it} + \varepsilon_{it}$$

where IFI is the variable to proxy for the degree of international financial integration, X is a vector set of variables identified to be the potential determinants of international financial integration including policy on capital control and other factors constituting financial structure which are lagged GDP per capita, secondary education enrolment rate, economic growth, country risk index, inflation, trade openness, capital market development indicators, financial system indicators and tax policy indicator as defined in the appendix. The subscript i and t indicate the country unit and time period respectively.

4. Data and Methodology

Data is a major issue in empirical work investigating the issue of international financial integration. The paper makes use of the data from the IMF's International Financial Statistics and the World Bank's World Development Indicators. However, the IMF and the World Bank are collecting data from national reporting bureau of statistics. It is very important to note that each country uses different methodology to construct data. In addition, it is noted that some countries report data on foreign assets, liabilities and their components in book value and some report in market value. Generally, book value estimates understate the market value of the underlying assets and liabilities. Similar to other empirical studies employing the data on external holding, we strive to use a dataset as homogeneous as possible, taking into account both structural breaks and methodological differences in the calculation of assets and

liabilities. Nevertheless, as stated by many financial economists, heterogeneities in the data unavoidably remain in empirical studies using cross-country data (Engel 2003; Lane & Milesi-Ferretti 2003).

It is a common belief and recognized by many researchers that there has been an increased degree of international financial integration during the 1980s and 1990s (Edison, Levine et al. 2002; Lane & Milesi-Ferretti 2003; Vo 2005a, 2005b). Hence, our data ranging from 1980 to 2003 clearly exhibit this trend and allowing for short-term fluctuations. In addition, our sample is comprised of developed and developing countries[6] to uncover any difference in the "drivers" of international financial integration.

Table 1 exhibits the summary statistics of the data. There is considerable variation across countries and over time. For example, for the share of the aggregate stock of assets and liabilities in GDP when employed as an indicator for international financial integration, the mean is 216%, the median is 124% but the maximum value is 3597% and the minimum is 19%, while the standard deviation is 377%. There is also a strong variation in the inflation rates amongst countries and over time. Thus, the dataset offers substantial cross-country variation for exploring the link between international financial integration and various economic and investment environment indicators.

INSERT TABLE 1 ABOUT HERE

To obtain an unbiased empirical result, we will employ assorted econometric techniques to estimate the model. We first use the Least Square Panel Estimator to estimate the relationship between the determinants and international financial

[6] This division is based on the World Bank classification.

integration. In addition, we also use other estimators including Two Stage Least Squares and the Generalized Method of Moments (GMM) panel estimator developed for dynamic panel data designed by Holtz-Eakin et al. (1990), Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1997) to extract consistent and efficient estimates of the impact on international financial integration. The advantages of this GMM panel estimation method is to exploit the time-series variation in the data, and it accounts for unobserved country-specific effects, allows for the inclusion of lagged dependent variables as regressors, and controls for the endogeneity of the explanatory variables. This method has been recently employed by Carkovic & Levine (2002) and Edison et al. (2002) to study economic growth. To allow for cross-country differences, we use cross-sectional (country) fixed effects and White standard errors and covariance with no degree of freedom correction.

5. Results

Figure 1 to 4 represents the broad trend of the selected measures of international financial integration over the last two decades. Overall, there is an increased trend in the degree of international financial integration over the last two decades. This salient character of the increasing trend of international financial integration is consistent with the current literature.

INSERT FIGURE 1 ABOUT HERE

INSERT FIGURE 2 ABOUT HERE

INSERT FIGURE 3 ABOUT HERE

INSERT FIGURE 4 ABOUT HERE

Table 2 shows the correlation matrix of the variables employed in the panel analysis. It is clear that there is a negative relationship between IFI indicators and capital control measures where the correlation coefficients are in the range from -19% to -55%. This supports the view that countries with strict capital controls will be of a lower degree of international financial integration. In addition, countries which are rich and well educated tend to be of a higher degree of international financial integration. This table also represents a positive relationship between international financial integration and trade openness, the level of financial development, domestic credit and financial deepening. However, there is a clear negative relationship between IFI and inflation. Low correlation coefficients reinforce the supposition of a weak link between economic growth rate and international financial integration as in Vo (2005a). Moreover, there is a very fragile relationship between tax policy and IFI as indicated in the last column of the table 2.

INSERT TABLE 2 ABOUT HERE

The table 3 to table 10 report the estimation results in explaining variation in IFI for a range of specifications from the formulated model. As the least square estimator and two stage least square estimator offer similar results, we do not report those results here to save space. In general, the estimated models are characterized by very high R square (mostly more than 97%). Overall, the Miniane measure (CT2) of capital controls does not do a good job in explaining variation in IFI as its estimated coefficient is not significant throughout. On the other hand, the estimated coefficient

for the IMF dummy variable (CT1) is generally negative and significant (at both the 5% and 10% level) and this indicates that removing barriers on capital controls helps to promote international financial integration.

INSERT TABLE 3 & TABLE 4 ABOUT HERE

In table 3 and table 4, we employ the aggregate stock of assets and liabilities as a share of GDP and the stock of liabilities as a share of GDP respectively as dependent variables. There is a negative relationship between these measures of international financial integration and economic growth where the estimated coefficients are in line 5 (three out of four estimated coefficients are significant at 10%). This is perhaps to support the view suggested by Edison et al. (2002) that less developed and less integrated countries tend to growth faster. In addition, there are other significant estimated coefficients including level of economic development (GDP(-1)), however, this is a negative linkage suggesting the rate of change in the degree of international financial integration is lower in richer countries. The results from the table 3 and 4 also support the view that increased openness in international trade also associated with increased international financial integration.

INSERT TABLE 5 TO TABLE 10 HERE

It is clear from the results that domestic credit as a share of GDP (DCREDIT) is a significant driver of international financial integration (table 3, 4, 5, 6, 9, 10) except the aggregate flow of equity and inflow of equity (table 7 and table 8). There is also a negative link between the government tax share and international financial integration

even though it is insignificant. This confirms the hypothesis that lower income tax is an incentive for higher international investment and international financial integration. Overall, the level of financial market development is positively associated with stronger international financial integration but this relationship is very fragile (mixed evidence of significance). Our results represent a weak linkage between inflation and IFI and this is not like the previous finding of Lemmen & Eijffinger (1996). Moreover, the financial deepening indicator (M2) does not help in explaining variation in stock and flow measures of IFI but it does a good job to serve as determinant of equity measures of IFI. However, it is not robust here because the estimated coefficient for M2 is positive and significant in Table 8 (at both the 5% and 10% level) but it is negative (even though significant) in Table 9.

In summary, the results from the investigation of the determinants of the variation in the degree of international financial integration are provided. Even though there is some insignificant variables, the model are quite successful in explaining variation in the degree of international financial integration. We have concluded that variables such as the IMF capital control policy dummy variable, international trade openness, domestic credit and economic growth are quite successful candidates to act as drivers of international financial integration.

6. Conclusion

This paper investigates the structural determinants of international financial integration. The potential “drivers” of international financial integration are identified from the vast literature including indicators of financial liberalization, level of economic development, education, country risk index, financial development and tax policy. The main objective of this paper is to highlight some empirical features of the growth of the degree of international financial integration. An assorted number of

indicators are employed to proxy for international financial integration. In addition, we use advanced econometric methodology for panel data estimation to estimate the model in order to alleviate potential biases and to produce more reliable results.

Overall, the results provide strong evidence of an increase in the degree of international financial integration in the last decade and this is consistent with previous findings. Even though some variables are unsuccessful in explaining variation in the degree of international financial integration using volume-based *de facto* measures as proxies, the analysis indicates that some variables including the IMF capital control policy dummy variable, trade openness, domestic credit and economic growth are potential candidates to explain variation in the degree of international financial integration. In addition, the results also suggest follow-up research to better establish lines of causality between these variables which is clearly a relevant topic and a challenge for both future theoretical and empirical research.

Appendices

Appendix 1 - Description of variables

Variable	Symbol	Description	Source
Aggregate Stock of Assets and Liabilities	**IFI01**	Ratio of Total Stock of Assets + Liabilities to GDP	Vo (2005b)
Stock of Liabilities	**IFI02**	Ratio of Stock of Liabilities to GDP	Vo (2005b)
Aggregate Stock of FDI and PI	**IFI03**	Ratio of Stock FDI + PI to GDP	Vo (2005b)
Stock of FDI and PI inflows	**IFI04**	Ratio of Stock FDI + PI inflows to GDP	Vo (2005b)
Aggregate Flows of Equity	**IFIEF**	Ratio of Flows of FDI + PI equity to GDP	Vo (2005b)
Inflows of Equity	**IFIEFI**	Ratio of Inflows of FDI + PI equity to GDP	Vo (2005b)
Aggregate Stock of Equity	**IFIES**	Ratio of Stock FDI + PI equity to GDP	Vo (2005b)
Stock of Equity Inflows	**IFIESI**	Ratio of Stock FDI + PI equity inflows to GDP	Vo (2005b)
IMF Dummy	**CT1**	Capital Restriction Measures from AREAER	Vo (2005b)
Miniane's Indicator	**CT2**		Miniane (2004)
Lagged GDP per capita	**GDP(-1)**	Previous year GDP per capita	World Bank's World Development Indicators 2004 CDRom
Secondary Education Enrolment Rate	**EDU**	The proportion of population that enrols in secondary education	World Bank's World Development Indicators 2004 CDRom
Economic Growth	**EG**	Annual growth rate of real per capita GDP	World Bank's World Development Indicators 2004 CDRom
Institutional, Legal and Investment Environment Indicator	**ICRG**	International Country Risk Index ranging from 0 (highest risk) to 100 (lowest risk)	World Bank's World Development Indicators 2004 CDRom
Inflation	**INF**	This is defined as the difference in the natural logarithm of consumer priced index	IMF's International Financial Statistics

Trade Openness	**TO**	Total Import and Export as share of GDP	IMF's Direction of Trade Statistics or World Bank's World Development Indicators 2004 CDRom
The size of stock market	**STOCAP**	the stock market capitalization to GDP ratio which equals the value of listed shares divided by GDP. Both numerator and denominator are deflated appropriately, with the numerator equalling the average of the end-of-year value for year t and year t-1, both deflated by the respective end-of-year CPI, and the GDP deflated by the annual value of the CPI.	Standard & Poor's, Emerging Stock Markets Factbook and supplemental S&P data, and World Bank and OECD GDP estimates.
The domestic stock market activity or liquidity	**STOACT**	the total value of trades of stock on domestic exchanges as a share of GDP. Since both numerator and denominator are flow variables measured over the same time period, deflating is not necessary in this case.	Standard & Poor's, Emerging Stock Markets Factbook and supplemental S&P data, and World Bank and OECD GDP estimates.
The stock market efficiency	**STOTO**	the stock market turnover ratio as efficiency indicator of stock markets. It is defined as the ratio of the value of total shares traded and market capitalization. It measures the activity or liquidity of a stock market relative to its size. A small but active stock market will have a high turnover ratio whereas a large, while a less liquid stock market will have a low turnover ratio. Since this indicator is the ratio of a stock and a flow variable, we apply a similar deflating procedure as for the market capitalization indicator.	Standard & Poor's, Emerging Stock Markets Factbook and supplemental S&P data, and World Bank and OECD GDP estimates.
Domestic Credit	**DCREDIT**	Domestic Credit Provided By banks and financial institution	World Bank's World Development Indicators

Financial Depth	**M2**	Ratio of liquid liabilities to GDP	2004 CDRom World Bank's World Development Indicators
Tax Share	**TAX**	Government Tax share in GDP	2004 CDRom World Bank's World Development Indicators 2004 CDRom

Appendix 2 - List of Countries in the sample

Developed Countries

Australia, Austria, Bahamas, Bahrain, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Korea, Kuwait, Luxembourg, Malta, Netherlands, Netherlands Antilles, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, United Kingdom, United States.

Developing Countries

Argentina, Barbados, Bolivia, Botswana, Brazil, Cape Verde, Chile, China, Colombia, Congo, Costa Rica, Czech Republic, Egypt, El Salvador, Fiji, Gabon, Haiti, Hungary, India, Indonesia, Jamaica, Jordan, Kenya, Libya, Malaysia, Mali, Mauritius, Mexico, Morocco, Namibia, Nigeria, Pakistan, Paraguay, Peru, Philippines, Senegal, Seychelles, South Africa, Sri Lanka, Swaziland, Thailand, Togo, Tunisia, Turkey, Uruguay, Vanuatu, Venezuela.

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Table 1 Data Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev.
IFI01	2.16	1.24	35.97	0.19	3.77
IFI02	1.14	0.76	17.44	0.08	1.80
IFI03	0.82	0.51	10.02	0.03	0.96
IFI04	0.46	0.36	5.08	0.02	0.46
IFIEF	0.07	0.04	1.36	0.00	0.13
IFIEFI	0.04	0.02	1.00	0.00	0.08
IFIES	0.59	0.38	5.91	0.02	0.68
IFIESI	0.33	0.23	4.39	0.01	0.40
CT1	0.50	1.00	1.00	0.00	0.50
CT2	0.53	0.50	1.00	0.08	0.32
LGDPCAL	8.36	8.37	10.99	5.05	1.45
EDU	0.75	0.76	1.61	0.06	0.32
EG	0.02	0.02	0.35	-0.25	0.04
LN(ICRG)	4.22	4.26	4.56	3.24	0.22
INFLATION	0.37	0.06	117.50	-1.00	3.72
TRADE	0.78	0.67	2.96	0.12	0.46
STOCAP	0.49	0.31	3.30	0.00	0.50
STOACT	0.27	0.09	3.26	0.00	0.45
STOTO	0.49	0.33	4.75	0.00	0.57
DCREDIT	0.55	0.45	2.03	0.03	0.39
M2	0.47	0.40	1.73	0.04	0.29
TAX	0.22	0.20	0.49	0.00	0.09

Table 2 Correlation Matrix

	IFI01	IFI02	IFI03	IFI04	IFIEF	IFIEFI	IFIES	IFIESI	CT1	CT2	GDP(-1)	EDU	EG	LN(ICRG)	INFLATION	TRADE OPENNESS	STOCAP	STOACT	STOTO	DCREDIT	M2	TAX
IFI01	1.00	0.99	0.71	0.58	0.65	0.56	0.73	0.69	-0.41	-0.55	0.11	0.14	0.00	0.05	-0.02	0.45	0.33	0.22	0.02	0.08	0.19	-0.21
IFI02		1.00	0.70	0.60	0.69	0.60	0.71	0.70	-0.42	-0.54	0.07	0.14	-0.01	0.01	-0.01	0.45	0.32	0.19	0.01	0.04	0.18	-0.22
IFI03			1.00	0.95	0.84	0.74	0.97	0.92	-0.42	-0.52	0.34	0.45	0.00	0.34	-0.18	0.23	0.51	0.48	0.17	0.37	0.33	0.09
IFI04				1.00	0.86	0.78	0.93	0.94	-0.46	-0.52	0.28	0.48	-0.01	0.31	-0.19	0.25	0.46	0.45	0.16	0.26	0.24	0.16
IFIEF					1.00	0.97	0.83	0.88	-0.30	-0.33	0.18	0.40	0.21	0.22	-0.05	0.43	0.32	0.24	0.02	0.18	0.28	0.11
IFIEFI						1.00	0.72	0.82	-0.19	-0.19	0.08	0.26	0.17	0.14	-0.04	0.41	0.19	0.13	-0.01	0.10	0.23	-0.08
IFIES							1.00	0.95	-0.30	-0.38	0.31	0.38	0.03	0.34	-0.15	0.27	0.57	0.55	0.17	0.41	0.34	0.08
IFIESI								1.00	-0.28	-0.33	0.14	0.25	-0.01	0.22	-0.11	0.37	0.46	0.42	0.06	0.21	0.19	0.08
CT1									1.00	0.76	-0.58	-0.52	-0.04	-0.58	0.15	-0.32	-0.33	-0.35	-0.15	-0.53	-0.66	-0.27
CT2										1.00	-0.75	-0.66	-0.03	-0.65	0.17	-0.09	-0.13	-0.26	-0.29	-0.39	-0.53	-0.46
GDP(-1)											1.00	0.84	0.05	0.75	-0.04	0.15	0.39	0.37	0.19	0.62	0.37	0.47
EDU												1.00	0.10	0.66	-0.07	0.00	0.33	0.30	0.33	0.53	0.36	0.50
EG													1.00	0.28	-0.10	0.09	0.12	0.12	0.19	0.11	0.08	0.08
LOG(ICRG)														1.00	-0.19	0.15	0.40	0.34	0.19	0.60	0.42	0.46
INFLATION															1.00	-0.08	-0.09	-0.06	-0.03	-0.06	-0.11	-0.08
TO																1.00	0.17	0.15	-0.14	0.14	0.38	0.24
STOCAP																	1.00	0.71	0.20	0.58	0.41	0.04
STOACT																		1.00	0.58	0.51	0.26	-0.02
STOTO																			1.00	0.27	0.09	-0.06
DCREDIT																				1.00	0.66	0.24
M2																					1.00	0.18
TAX																						1.00

Table 3 Panel Estimation of the Aggregate Stock of Assets and Liabilities as share of GDP

	Coefficient	t-statistics	Probability	Coefficient	t-statistics	Probability
CT1	-0.65*	-(3.13)	0.00			
CT2				0.74**	(1.77)	0.09
GDP(-1)	-1.62*	-(3.16)	0.00	-1.35*	-(2.23)	0.03
EDU	0.28	(0.95)	0.35	-0.23	-(1.02)	0.32
EG	-2.44*	-(2.90)	0.01	-1.56	-(1.50)	0.14
LN(ICRG)	0.28	(0.61)	0.55	0.88	(1.50)	0.15
INFLATION	0.07**	(1.73)	0.09	-0.08	-(0.60)	0.55
TO	1.63*	(3.26)	0.00	0.67	(1.35)	0.19
STOCAP	0.27*	(3.91)	0.00	0.11	(1.45)	0.16
STOACT	-0.38*	-(3.40)	0.00	-0.24*	-(2.73)	0.01
STOTO	0.66*	(3.79)	0.00	0.33*	(2.47)	0.02
DCREDIT	1.44*	(6.05)	0.00	1.35*	(6.36)	0.00
M2	-0.37	-(0.48)	0.64	0.91	(1.65)	0.11
TAX	-2.41	-(1.05)	0.30	-2.06	-(0.79)	0.43
R^2	0.9712			0.9708		

Note: Dependent variable is Aggregate Stock of Assets and Liabilities as share of GDP, GMM Estimator
* Significant at both 5% and 10% level
** Significant at 10% level

Table 4 Panel Estimation of the Stock of Liabilities as share of GDP

	Coefficient	t-statistics	Probability	Coefficient	t-statistics	Probability
CT1	-0.49*	-(3.35)	0.00			
CT2				0.24	(1.11)	0.28
GDP(-1)	-0.76*	-(2.48)	0.02	-0.50	-(1.41)	0.17
EDU	0.27**	(1.86)	0.07	-0.02	-(0.14)	0.89
EG	-1.42*	-(3.42)	0.00	-0.98**	-(1.89)	0.07
LN(ICRG)	-0.14	-(0.45)	0.65	0.40	(1.10)	0.28
INFLATION	0.03	(1.66)	0.11	-0.06	-(0.72)	0.48
TO	0.68*	(2.60)	0.01	0.12	(0.43)	0.67
STOCAP	0.20*	(5.25)	0.00	0.09**	(1.93)	0.06
STOACT	-0.24*	-(4.54)	0.00	-0.14*	-(2.89)	0.01
STOTO	0.43*	(4.36)	0.00	0.20*	(2.46)	0.02
DCREDIT	0.97*	(8.32)	0.00	0.89*	(7.49)	0.00
M2	0.06	(0.14)	0.89	0.75*	(2.57)	0.02
TAX	-1.85	-(1.61)	0.12	-1.15	-(0.83)	0.42
R^2	0.9767			0.9709		

Note: Dependent variable is Stock of Liabilities as share of GDP, GMM Estimator
* Significant at both 5% and 10% level
** Significant at 10% level

Table 5 Panel Estimation of the Aggregate Stock of FDI and Portfolio Investment Assets and Liabilities as share of GDP

	Coefficient	t-statistics	Probability	Coefficient	t-statistics	Probability
CT1	-0.29	-(1.33)	0.20			
CT2				0.47	(1.64)	0.11
GDP(-1)	-1.44*	-(5.72)	0.00	-1.44*	-(4.58)	0.00
EDU	-0.13	-(0.58)	0.57	-0.52*	-(2.59)	0.02
EG	-0.99**	-(1.91)	0.07	-0.16	-(0.31)	0.76
LN(ICRG)	0.16	(0.82)	0.42	0.39	(1.58)	0.13
INFLATION	0.01	(0.39)	0.70	-0.06	-(0.95)	0.35
TO	0.17	(0.75)	0.46	-0.50*	-(2.67)	0.01
STOCAP	0.08	(0.96)	0.35	-0.04	-(0.64)	0.53
STOACT	-0.15	-(1.59)	0.13	-0.08	-(1.38)	0.18
STOTO	0.20	(1.16)	0.26	0.02	(0.25)	0.80
DCREDIT	0.96*	(5.99)	0.00	0.99*	(9.07)	0.00
M2	0.10	(0.41)	0.68	0.79**	(1.87)	0.07
TAX	-0.43	-(0.22)	0.83	-2.45	-(1.34)	0.19
R^2	0.9748			0.9785		

Note: Dependent variable is Aggregate Stock of FDI and Portfolio Investment Assets and Liabilities as share of GDP, GMM Estimator
* Significant at both 5% and 10% level
** Significant at 10% level

Table 6 Panel Estimation of the Stock of FDI and PI inflows as share of GDP

	Coefficient	t-statistics	Probability	Coefficient	t-statistics	Probability
CT1	-0.35*	-(5.74)	0.00			
CT2				0.08	(0.51)	0.62
GDP(-1)	-0.82*	-(4.33)	0.00	-0.63*	-(2.65)	0.01
EDU	0.02	(0.18)	0.86	-0.16	-(1.53)	0.14
EG	-0.53*	-(2.03)	0.05	-0.30	-(1.04)	0.31
LN(ICRG)	-0.05	-(0.38)	0.70	0.35	(1.63)	0.12
INFLATION	0.00	(0.00)	1.00	-0.06	-(1.14)	0.26
TO	-0.17	-(1.39)	0.18	-0.54*	-(3.98)	0.00
STOCAP	0.10*	(2.94)	0.01	0.03	(0.88)	0.39
STOACT	-0.10*	-(2.79)	0.01	-0.04	-(1.10)	0.28
STOTO	0.19*	(4.40)	0.00	0.04	(0.68)	0.50
DCREDIT	0.63*	(6.67)	0.00	0.56*	(6.35)	0.00
M2	0.68*	(2.53)	0.02	1.09*	(3.78)	0.00
TAX	-0.64	-(0.75)	0.46	-0.05	-(0.05)	0.96
R^2	0.9846			0.9803		

Note: Dependent variable is Stock of FDI and PI inflows as share of GDP, GMM Estimator
* Significant at both 5% and 10% level
** Significant at 10% level

Table 7 Panel Estimation of the Aggregate Flows of Equity as share of GDP

	Coefficient	t-statistics	Probability	Coefficient	t-statistics	Probability
CT1	-0.01	-(0.49)	0.62			
CT2				-0.04	-(0.55)	0.59
GDP(-1)	0.08	(0.86)	0.40	0.15	(1.61)	0.12
EDU	-0.03	-(0.68)	0.50	-0.04	-(0.85)	0.40
EG	-0.04	-(0.42)	0.68	-0.08	-(0.73)	0.47
LN(ICRG)	0.00	-(0.04)	0.97	-0.01	-(0.39)	0.70
INFLATION	0.01	(1.52)	0.14	0.01*	(2.28)	0.03
TO	0.31	(1.55)	0.13	0.22	(1.22)	0.23
STOCAP	-0.04**	-(1.69)	0.10	0.02	(0.67)	0.51
STOACT	0.03**	(1.91)	0.06	0.03	(1.45)	0.16
STOTO	-0.01	-(0.66)	0.51	0.00	-(0.21)	0.84
DCREDIT	-0.04	-(0.32)	0.75	-0.13	-(1.09)	0.28
M2	-0.19	-(0.74)	0.46	-0.12	-(0.48)	0.64
TAX	-0.65*	-(2.33)	0.03	-0.67*	-(2.03)	0.05
R^2	0.7524			0.7655		

Note: Dependent variable is Aggregate Flows of Equity as share of GDP, GMM Estimator
* Significant at both 5% and 10% level
** Significant at 10% level

Table 8 Panel Estimation of the Inflows of Equity as share of GDP

	Coefficient	t-statistics	Probability	Coefficient	t-statistics	Probability
CT1	0.02*	(2.33)	0.02			
CT2				0.00	-(0.08)	0.94
GDP(-1)	0.06	(1.01)	0.32	0.08	(1.23)	0.22
EDU	-0.07*	-(2.81)	0.01	-0.06*	-(2.36)	0.02
EG	-0.02	-(0.33)	0.74	-0.05	-(0.84)	0.40
LN(ICRG)	0.02	(0.90)	0.37	-0.01	-(0.35)	0.73
INFLATION	0.00	(1.23)	0.22	0.00	(1.24)	0.22
TO	-0.01	-(0.17)	0.87	-0.01	-(0.10)	0.92
STOCAP	-0.01	-(0.35)	0.73	0.02	(1.63)	0.11
STOACT	0.02**	(1.86)	0.07	0.01	(0.97)	0.33
STOTO	-0.01	-(0.86)	0.39	0.00	-(0.02)	0.99
DCREDIT	-0.01	-(0.47)	0.64	-0.03	-(0.97)	0.34
M2	0.13*	(2.19)	0.03	0.13*	(2.35)	0.02
TAX	-0.09	-(0.75)	0.45	-0.12	-(0.99)	0.33
R^2	0.6814			0.7079		

Note: Dependent variable is Inflows of Equity as share of GDP, GMM Estimator
* Significant at both 5% and 10% level
** Significant at 10% level

Table 9 Panel Estimation of the Stock of Equity as share of GDP

	Coefficient	t-statistics	Probability	Coefficient	t-statistics	Probability
CT1	0.07	(0.39)	0.70			
CT2				0.44	(1.33)	0.20
GDP(-1)	-2.61*	-(3.46)	0.00	-2.73*	-(4.53)	0.00
EDU	0.44	(1.53)	0.14	0.04	(0.17)	0.87
EG	-2.15*	-(2.36)	0.03	-0.67	-(0.71)	0.49
LN(ICRG)	-0.03	-(0.05)	0.96	0.31	(0.73)	0.48
INFLATION	-1.57	-(1.09)	0.29	-0.08	-(0.11)	0.91
TO	1.34**	(1.99)	0.06	0.35	(0.83)	0.42
STOCAP	0.05	(0.72)	0.48	-0.10	-(1.58)	0.13
STOACT	-0.12	-(1.28)	0.22	-0.09	-(0.78)	0.45
STOTO	0.24	(1.61)	0.12	0.18	(0.98)	0.34
DCREDIT	0.84*	(6.85)	0.00	0.89*	(4.92)	0.00
M2	-1.89*	-(2.78)	0.01	-0.94*	-(2.65)	0.02
TAX	1.72	(0.81)	0.43	-1.03	-(0.57)	0.58
R^2	0.9643			0.9691		

Note: Dependent variable is Stock of Equity as share of GDP, GMM Estimator.
* Significant at both 5% and 10% level
** Significant at 10% level

Table 10 Panel Estimation of the Stock of Equity Inflows as share of GDP

	Coefficient	t-statistics	Probability	Coefficient	t-statistics	Probability
CT1	-0.10	-(1.20)	0.24			
CT2				0.11	(0.88)	0.39
GDP(-1)	-0.41*	-(2.88)	0.01	-0.41*	-(2.35)	0.03
EDU	-0.01	-(0.10)	0.92	-0.13	-(1.19)	0.25
EG	-0.22	-(1.26)	0.22	0.03	(0.12)	0.90
LN(ICRG)	-0.03	-(0.30)	0.76	0.09	(0.65)	0.52
INFLATION	0.01	(0.39)	0.70	-0.02	-(0.69)	0.50
TO	-0.10	-(1.11)	0.28	-0.30*	-(2.36)	0.03
STOCAP	0.07	(1.47)	0.15	0.03	(0.78)	0.45
STOACT	-0.07	-(1.40)	0.17	-0.05	-(1.25)	0.22
STOTO	0.10	(1.27)	0.22	0.04	(0.96)	0.35
DCREDIT	0.51*	(6.41)	0.00	0.52*	(7.65)	0.00
M2	0.24	(1.31)	0.20	0.44	(1.56)	0.13
TAX	0.51	(0.64)	0.53	0.00	(0.01)	1.00
R^2	0.9651			0.9666		

Note: Dependent variable is Stock of Equity Inflows as share of GDP, GMM Estimator
* Significant at both 5% and 10% level
** Significant at 10% level

Figure 1 Broad trend of Stock Assets and Liabilities and Stock of Liabilities

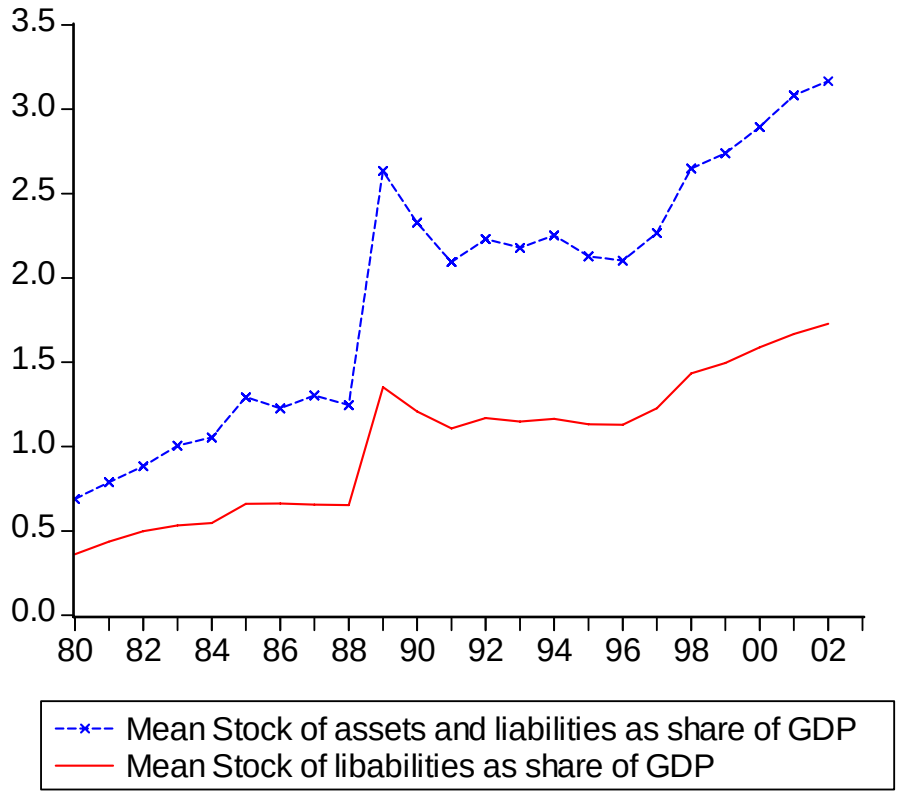


Figure 2 Broad trend of Gross Stock FDI + PI and Stock of FDI and PI inflows

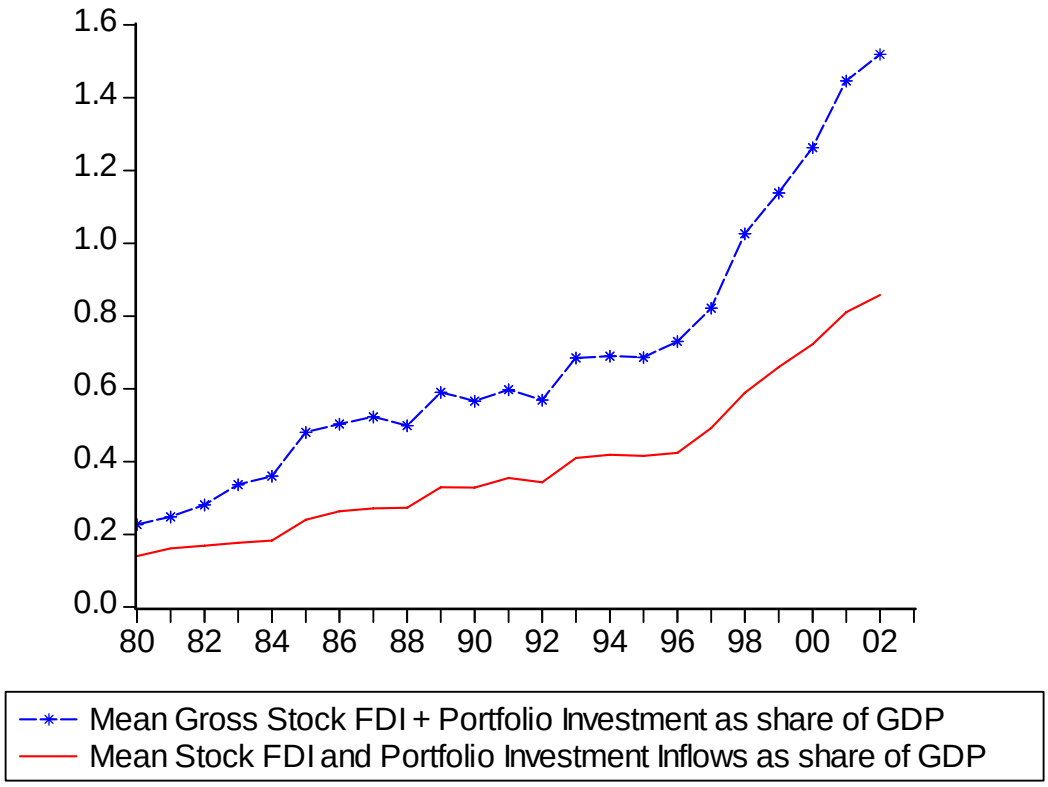


Figure 3 Broad trend of Aggregate Flows of Equity and Inflows of Equity

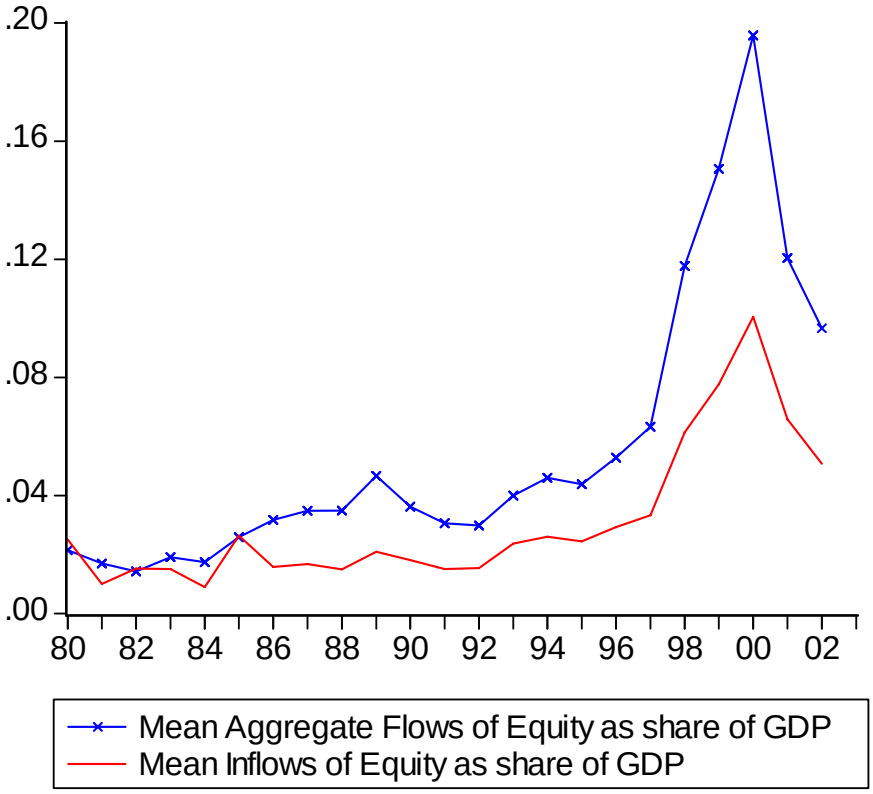
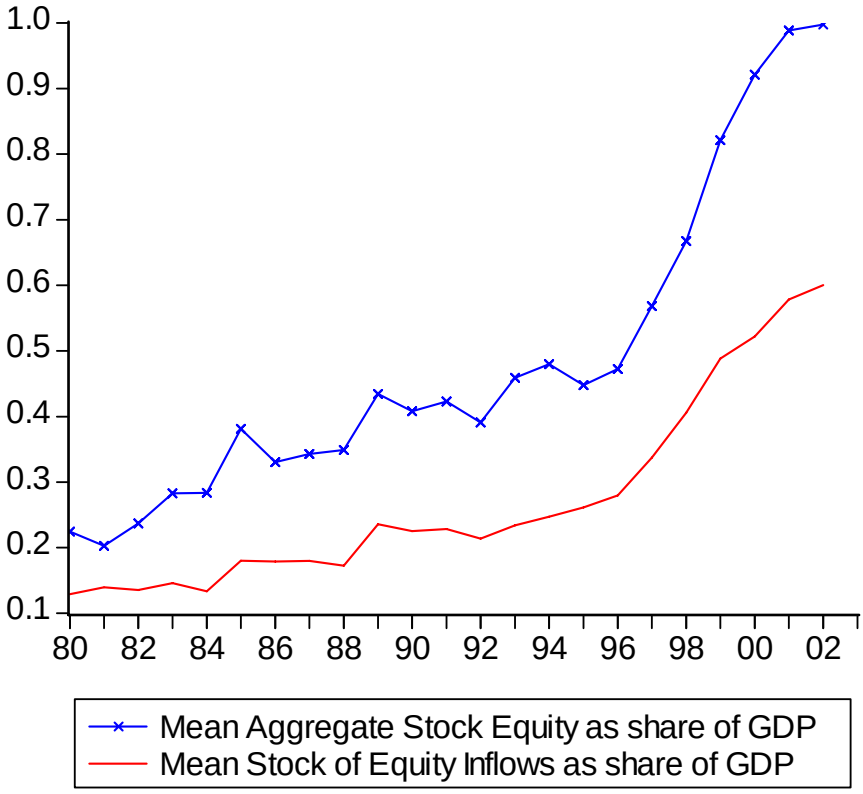


Figure 4 Broad trend of Aggregate Stock Equity and Stock of Equity Inflows



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