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12 February 2010

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Abstract

Economic theory suggests that opening the capital account should allow a country to diversify away economic shocks, increase capital inflows, expand economic growth and efficiency and encourage governments to pursue good policies, the empirical evidence with regard to these theoretical predictions are in some instances debatable. Many studies, for example, have reported mixed results as it relates to the impact of capital account integration on growth, exchange rates, trade and policy discipline. This paper provides a review of this literature as well as some policy for policymakers in relation to managing the process of removing capital controls.

1. Introduction

Most developing countries are characterised by narrow domestic production, i.e. they tend to focus on the production of a few goods and or services. This narrowness of domestic output implies that output tends to very inelastic with respect to relative price changes, as labour and other factors may not be easily redeployed into the production of other goods and services. Furthermore, Helleiner (1982) notes that expenditure switching measures, such as changes in the exchange rate, are unlikely to address any balance of payments difficulties that small nations may encounter. Armstrong and Read (1998) also add that since currency markets in these countries are likely to be relatively thin, exchange rates may be relatively volatile and influenced by structural problems. Given the openness of the economy, such volatility is likely to feed through to the domestic economy and impact on production costs and overall price stability. Exchange rate variations can also result in a redistribution of income, as devaluation tends to benefit exporters and disadvantage the purchasers of imported goods, while an appreciation negatively affects domestic exporters and assists the consumers of imported goods.

One way many developing countries have sought to protect their economies from the potential effects of exchange rate volatility has been to choose some form of a fixed exchange rate system (Khatkhate and Short, 1980). There are four broad possible choices in this regard: (1) dollarisation; (2) a currency board; (3) a peg to a major trading partner, or; (3) a managed float. In the case of dollarisation, the country adopts the currency of another country as its medium of exchange and medium of account. The main advantage of adopting another country's national currency is that the country essentially ties its price level to that of the larger, more credible

country. The common currency guarantees domestic price stability, once foreign prices are stable. Price stability, however, comes at the cost of monetary independence: dollarised economies by definition cannot maintain an independent monetary stance since the country has no control over the volume of money. Exchange rate as well as price stability can also be obtained through the use of a currency board arrangement. Unlike dollarisation, the nation maintains its own currency but each dollar of locally issued notes and coins are backed by foreign reserve investments. In addition to the loss of monetary independence, currency board arrangements tend to have a built-in deflationary bias as the domestic money supply only expands if there is an improvement in the balance of payments. To overcome this deflationary bias, the country could instead fix its currency against that of a major trading partner or some basket of currency. When used in conjunction with controls over capital flows, the country can exert some degree of monetary independence subject, however, to the maintenance of the exchange rate peg. Monetary independence may also be achieved without the use of capital controls if the country intervenes in the foreign exchange market to maintain the peg. Under this system, the level of reserves needed for the central bank of a small state to intervene in the foreign exchange market would have to be prohibitively large.

After subsiding somewhat in the late 1920s, capital controls emerged again in the 1930s as countries sought to deal with the 1931 international financial crisis. In this year, Austria, Germany and Hungary suffered currency crises while Britain reported huge capital outflows. Accordingly, most countries, re-adopted exchange controls in that year. The budding popularity of capital controls also reflected national disenchantment with traditional neoclassical type policies and the emergence of more government intervention and control in the economy.

World War II not only left most countries with large debts, but also significant controls on trade and capital flows. Consequently, a new post-war international financial institution was created, the International Monetary Fund, after a United Nations conference convened in Bretton Woods, New Hampshire, U.S. in July 1944. The governments represented at the conference sought to re-build international economic cooperation and thereby avoid a repetition of the economic policies that had contributed to the Great Depression. Indeed, Article VIII of the IMF Articles of Agreement states, "subject to the provisions of Article VII, Section 3(b) and Article XIV, Section 2, no member shall, without the approval of the Fund, impose restrictions on the making of payments and transfers for current international transactions." Capital controls, rather than diminishing, proliferated between 1950 and 1970 (Obstfeld and Taylor, 1998).

With the collapse of Bretton Woods, most developed countries abandoning fixed exchange rates, capital controls were no longer necessary. Between 1974 and 1975, the USA eliminated its restrictions on capital outflows while Germany liberalised controls on capital inflows. The United Kingdom, under Prime Minister Thatcher, abolished capital controls, while Japan followed in 1980. The decision by the European Community to establish a single market by 1992 implied greater freedom of capital to move freely within the EU.

As the import-substitution policies pursued by most developing countries failed to deliver results and the two oil shocks of the 1970s ravaged some economies, most states were forced to adopt even stiffer controls on the flow of capital. Capital controls were, however, relaxed somewhat in the 1990s, as governments tended to rely more on private markets in pursuit of economic development. Nevertheless, in many developing countries capital movements remained unchanged or were even more restrictive than in the 1960s (Cooper, 1999). Chile, for example,

had a long history of controls on capital account flows and transactions that started in the 1930s and continued through the mid-1970s. These controls were gradually liberalised in the late 1970s and early 1980s, but were tightened because of the Latin American debt crisis of the 1980s (Gallego, Hernández Klaus Schmidt-Hebbel, 1999).

The use of capital controls, however, runs contrary to traditional international macroeconomic thought. For example, Lucas (1982) shows that by opening its capital account, a country can insure effectively insure against country-specific shocks. Further theoretical studies have also showed that removing capital controls should have positive effects on key macroeconomic variables, such as growth and investment.

This survey provides a review of the evidence in order to help countries that are considering removing these capital controls. The study also provides some policy recommendations for managing this process. Following the introduction, Section 2 provides a more detailed look at the type of capital controls used across the world, while Section 3 investigates what the theoretical literature predict are the benefits of the removal of these controls. Section 4 investigates how researchers have gone about quantifying the intensity of these controls and Section 5 detail how researchers have gone about using these indicators to discuss the potential implications for key macroeconomic indicators. Section 6 outlines the main criticisms of the literature on the removal of capital controls, while section 7 provides some recommendations for managing the process of capital control removal. Section 8 concludes with some suggestions for future research.

## 2.	What are Capital Controls?

There are three common restrictions on the capital account: (1) exchange or quantitative limits on capital movements, (2) taxes on financial transactions, and (3) dual or multiple exchange rate regimes. Quantitative controls are usually composed of restrictions on portfolio, real estate, and/or direct investments of both residents wishing to invest abroad as well as non-residents wishing to invest in the country. Ceilings can also be placed on the external asset and liability positions of domestic financial institutions or on the domestic operations of foreign financial entities. In Korea, for example, the government has kept a tight rein on long-term foreign investment (Eichengreen, et. al., 1999) and some governments in other countries have regulated the portfolio choice of investors (see Bakker, 1996 and Park and Song, 1996).

Taxes on international financial transactions, for example, interest equalisation taxes, attempt to eliminate the difference in yields between domestic and foreign investments and restrict either inflows or outflows. A mandatory reserve requirement is one example of a price-based capital control. This type of capital control requires foreign investors to deposit a percentage of their capital investment with the central bank for a minimum period. These measures have been employed in countries such as Brazil, Chile, Colombia, the Czech Republic and Malaysia, and attempt to discourage short-term flows, while not hindering long-term direct investment.

Although a dual exchange rate regime is not strictly speaking a capital control, it can be used to limit capital flows. With dual exchange rates, the authorities usually have differing rates for commercial and financial transactions. In most cases, policymakers attempt to stabilise the

commercial rate but allow the exchange rate for financial transactions to depend on market forces. As a result, it can have a dampening effect on capital flows (Rogoff, et. al., 2003), as foreign investors wanting to move their funds may be subject to greater exchange rate risk.

Capital controls have been used for a number of purposes in countries across the globe. In many small states, these controls have been employed to ensure either the stability of the exchange rate or the peg. In these instances capital controls ensure that uninhibited capital flows either into or out of the country do not place unnecessary pressure on the nation's exchange rate. This is particularly important for small states, as one large capital transaction can have a significant effect on the movement of the country's exchange rate. Policymakers in small states are hence confronted with three typically desirable, but contradictory objectives (known as the monetary policy trilema): (1) stabilise the exchange rate; (2) free movement of capital or; (3) independent monetary policy. Since only two out of these three objectives are mutually consistent, by fixing the exchange rate and utilising capital controls, small states are compelled to surrender control over monetary policy oriented toward domestic objectives.

Capital controls have also been used as a preventative measure against capital outflows during a financial or currency crisis, to obtain tax revenue and to limit foreign ownership in the domestic economy. The intuition behind drawing on capital controls during a crisis is that it should help to slow down the outflow of foreign exchange (because of increased risk perceptions) and allow the government time to implement corrective policies (see Dornbusch and Edwards, 1991; Cuddington, 1986).

Dooley (1996), however, in surveying the previous literature on the effectiveness of capital controls, note that "the power of capital control programmes to affect other important economic variables, such as the volume or composition of capital flows, changes in international reserves, or the level of the exchange rate, is, however, generally not supported by the data." Edwards (1989) and Edwards and Santaella (1993), analysing banking crises in developing countries, show that the private sector was still able to circumvent capital controls on outflows in the months prior to a crisis (similar results are reported by Kaminsky and Reinhart, 1999; Cuddington, 1986, and; Edwards, 1999).

Mathieson and Rojas-Suárez (1993) observe that one of the most frequently exploited methods of evading capital controls has been under- and over-invoicing of exports and imports. With this system, exporters would under-invoice a foreign customer and then make use of the excess funds to invest in foreign assets. Foreign and local agents can also evade capital controls through leads and lags in which trading firms pre-pay or delay payments for imports or exports. For example, an importer may pay early for goods in exchange for a discount thereby permitting the firm to effectively lend money to foreign economic agents. Another channel is through transfer pricing by multinationals (the prices assumed, for the purposes of calculating tax liability, to have been charged by one unit of a multinational company when selling to another (foreign) unit of the same firm). By adjusting its transfer prices, inter-company transfers can enable these entities to shift funds into and out of the country.

Given the inability of controls to prohibit capital outflows during a crisis, some countries have attempted to put in place controls on short-term inflows. For example, a deposit reserve requirement could be used to eliminate any benefits that potential short-term investors see in the

economy by raising the cost of investment. De Gregorio, Edwards and Valdés (1998) as well as Valdés-Prieto and Soto (1998) both report that these type of controls have been effective in the case of Chile in affecting the composition of capital inflows, shifting them away from short-term flows, while still not discouraging long-term capital flows. Edwards (1999) also argued that these controls seemed to have also protected Chile from small external shocks; however, they were less effective in shielding the country against contagion emanating from large external shocks.

Mathieson and Rojas-Suárez (1993) argue that because of the uncertain macroeconomic and political environment in many developing countries, expected returns tend to be lower. As a result, domestic savers may wish to hold a larger proportion of their capital overseas, thereby limiting the amount of funds available for domestic investment. Capital controls can be used in this situation to ensure that domestic funds are available to domestic investors. From the 1950s to 1970s, nationalist movements sprung-up in most developing countries, resulting in many states seeking independence from colonial powers and also a desire to restrict foreign ownership of domestic firms, resources and real estate. Capital controls were in this instance put in place to limit foreign ownership. Although, these controls ensure that most of the rewards from domestic resources accrue to nationals, they also limit the benefits available from foreign direct investment such as attaining new technologies. In addition, restricting capital raises inflation through two channels: (1) by keeping capital in the home economy it allows the government to tax wealth and interest income, and; (2) since it led to higher inflation, it allows government to raise revenue through the inflation tax (the reduction in value to holders of existing money balances due to the issuance of new money is termed the inflation tax).

3.   Theoretical Models of Capital Control Liberalisation

One of the fundamental concepts of economics is that with perfect information, perfect capital markets and perfect competition, the equilibrium achieved with the competitive market system is pareto efficient: there is no other feasible allocation which makes some individual better off and no individual worse off (see Smith, 1776 for a deductive derivation of this concept and Bator, 1957, for a more formal derivation). This theorem, although based on strong assumptions, has influenced economic thinking on issues related to taxation, tariffs, education, health care and, of course, capital controls.

One of the most influential papers to apply this concept to the capital account was Lucas (1982). Lucas showed that it was possible for countries to diversify away output shocks by opening their capital account. The author first notes that no two countries are exactly alike. Some countries, such as those in Latin America, have traditionally specialised in the production of agricultural commodities. In contrast, Middle Eastern countries, because of their resource endowment, usually focus on the production of energy related goods or services. The specialisation of production in commodities implies that domestic consumption can be significantly affected by shocks to either domestic production or price. Lucas shows that one possible solution is for residents in each country to hold a portion of their portfolio in foreign stocks or assets.

The model assumes a two-country pure exchange economy with a single representative agent in each nation (this implies that there are no domestic market imperfections). The "home" country has a stochastic endowment of national output given by X, while the "foreign" country has a stochastic endowment of output illustrated by Y. The "home" country's consumption of domestic

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and foreign output is given by x_h and y_h. The "foreign" country also consumes both local and foreign outputs and these are given by x_f and y_f.

Following Cole and Obstfeld (1991), the specialised case of isoelastic-preferences is examined. The social planner's problem is therefore of the following form:

$$\text{Maximise } \mu \bullet \frac{(x_h^\theta y_h^{1-\theta})^{1-\rho}}{1-\rho} + (1-\mu) \bullet \frac{(x_f^\theta y_f^{1-\theta})^{1-\rho}}{1-\rho} \qquad (1)$$

subject to

$$x_h + x_f = X, \quad y_h + y_f = Y \qquad (2)$$

where $\rho \neq 1$ (a discount factor), θ is the weight that determines the relative consumption of home and foreign output, and μ is the planner's weight that determines relative national wealth in equilibrium; both θ as well as μ are bounded between 0 and 1. The solution to the problem implies that each country consumes:

$$\begin{aligned} x_h &= \lambda X, & x_f &= (1-\lambda)X \\ y_h &= \lambda Y, & y_f &= (1-\lambda)Y \end{aligned} \qquad (3)$$

where $\lambda = \dfrac{1}{1+[(1-\mu)/\mu]^\sigma}$ and $\sigma = 1/\rho$. Using Equation (2.3) one will notice that the ratio of marginal utilities from consuming any good is constant across states of nature. Countries therefore effectively insure each other against country-specific output shocks.

Beginning with Lucas (1987), many authors have attempted to estimate the gains from international risk sharing. Lucas, using a calibrated model of the US economy, estimates that the gains from risk sharing are only one third of one percent. Similar results are reported by Cole

and Obstfeld (1991) and Backus, Kehoe and Kydland (1992). One may argue that the benchmark case of the US economy does not provide a true picture of the gains from international risk sharing, since the level of development of the domestic financial market may provide greater opportunities for self-insurance through intertemporal domestic reallocations. However, Mendoza (1995) and Tesar (1995), both using calibrated world-economy models, find risk-sharing gains similar to the magnitude reported in previous studies. One of the only studies to report large gains from risk sharing is Pallage and Rob (2000) who examined the case of very poor countries. The empirical results above obviously would imply that a country is not significantly better or worse off because of its decision to maintain a closed capital account.

Obstfeld and Rogoff (1996), however, specify the question a bit differently: instead of asking 'what are the gains from international risk sharing?', they ask 'what is the cost of exclusion from world capital markets?' The authors report that with parameters derived from real-world data on developing countries, the penalty from future exclusion from world capital markets range from just 5% GDP for Colombia to 53% for Lesotho.

Economic models suggest that an open capital account can also assist in ensuring an efficient allocation of world savings. Figure 1.1 is the so-called Metzler (1960) diagram, and it presents savings and investment schedules for 'home' and 'foreign' country. 'Home' has an autarky interest rate of r^h while 'foreign' savings are paid an interest rate of r^f, where $r^h < r^f$. Examining, first, the case of perfect capital immobility, equilibrium is given by A and A' for the 'home' and 'foreign' country.

Figure 1: Metzler Diagram, Capital Flows from Low to High Interest Rate Countries
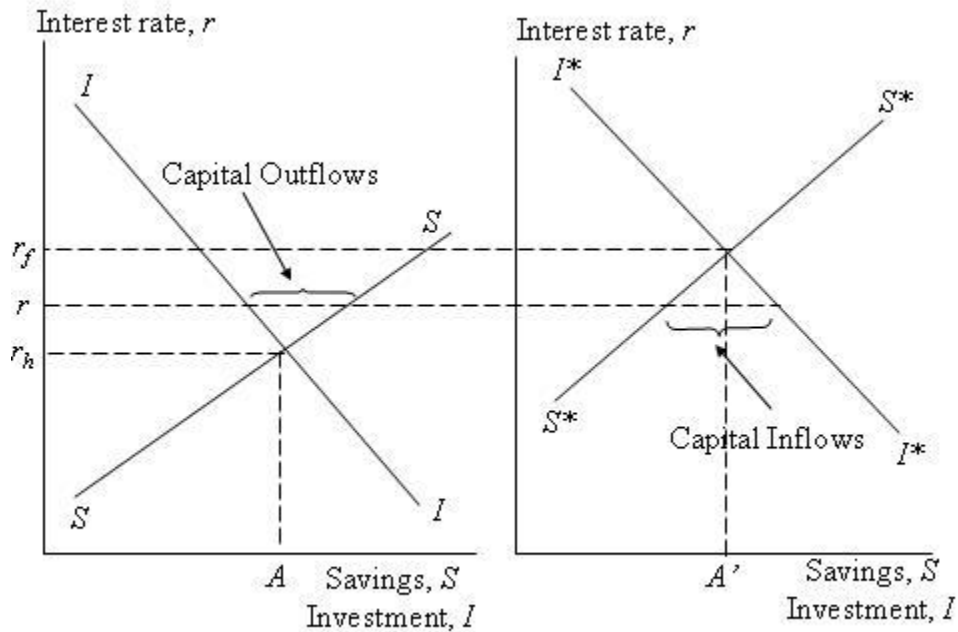
Now consider the case of perfect capital mobility, with citizens of either country allowed to freely move their savings to and from their country. Equilibrium occurs at interest rate r, which is above r_h but below r_f. Capital flows from 'home' to 'foreign' to take advantage of comparatively higher interest rates, resulting in an expansion in aggregate savings at home. As a result, investment in the 'foreign' country rises above that obtained in the equilibrium without capital flows. Agents in both countries are better off, as savers in the 'home' country benefit from higher interest rates, while those in the 'foreign' country are able to expand their investment by employing relatively cheaper funds.

Indeed, the rise in investment should also result in greater growth in the "foreign" country. MacDougall (1960) was the earliest author to emphasise the importance of foreign investment flows, particularly for developing countries, as it can facilitate the transfer of not only finance for potential projects but also lead to the diffusion of technical and managerial knowledge or so-

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called "learning by doing" effects. Numerous authors since then, such as Berthélemy and Démurger (2000), Borensztein, De Gregorio, and Lee (1998), and Grossman and Helpman (1991) have investigated these effects. Since the main results of the models are quite similar, only Borensztein, De Gregorio, and Lee (1998) are examined in detail.

Borensztein, De Gregorio, and Lee (1998) utilises a neoclassical model of firm growth to examine the interaction between foreign capital flows and growth. The authors' model show that foreign capital flows, measured in the study by the proportion of capital goods produced by foreign firms, has a positive impact on the country's long-term growth rate. This effect works through two channels: reducing the cost of introducing new varieties of capital and expanding the existing stock of skilled labour employed in the production of goods and services.

If capital flows tend to result in greater growth in capital receiving countries, this should imply some degree of international income convergence. Building on this notion, Barro, Mankiw and Sala-I-Martin (1995) construct a neoclassical model of growth in which countries that are more open to capital, converge at a faster rate than closed economies. To account for this result, the authors note that while the physical capital to human capital ratio in closed economies is constant, for open economies the ratio initially starts at a high level due to capital flows financing physical capital investment. This, however, results in diminishing returns to human capital setting in much faster, and since convergence is inversely related to the capital share, economies that are more open exhibit a faster rate of convergence.

In addition to growth, Gourinchas and Jeanne (2002) argue that a reduction in restrictions on capital flows can result in higher levels of aggregate efficiency or total factor productivity (TFP).

The authors employ a two-country model, with one homogenous good and three periods. Output is produced with Cobb-Douglas technology and the economy is populated by two agents: capitalists and workers. In the model, the benefits of liberalisation (higher welfare of domestic workers) result not from the flows that the country may receive, but because it leads to the development of the formal, efficient sector. In addition, it reduces the equilibrium level of taxation on capital by making it more mobile.

By making capital more mobile, it also lowers the cost of capital. Eun and Janakiramanan (1986) considers a two country world – 'home' and 'foreign' In the 'home' country there are M_h risky assets available and in 'foreign' there are M_f risky assets. There are no restrictions in the 'home' country on foreign investment; however, 'foreign' restricts foreign investment so that the aggregate proportion of the number of shares outstanding of any foreign firm is no more than δ (an exogenously determined constant). Assuming no capital market imperfections and that each investor allocates his or her investable funds to maximise expected utility of end-of-period wealth, subject to his or her budget constraint, the authors show that the more severe the δ constraint the higher the premium the 'home' investors have to pay. Therefore, liberalisation should reduce the cost of capital.

Alessandria and Qian (2005) also argue that capital account liberalisation can, under certain circumstances, strengthen the role of financial intermediaries, leading to an improvement in the number of investment projects. Building on the endogenous financial intermediation models of Diamond (1984) and Williamson (1986), the authors consider a model with an infinite number of economic agents, with each agent endowed with one unit of a single good that can either be

consumed or invested. A subset of the agents is also endowed with an investment project. To finance the project the agent must borrow. To account for the characteristics of developing countries, the author assumes that the economy's endowment is too small to fund some of the investment projects. With the opening of the capital account, the domestic rate of return on loans will be the same as that on the international market. Alessandria and Qian (2005) report that depending on the level of financial sector development, indexed by the effectiveness and the cost of monitoring technology, opening up the capital account strengthens the incentives of banks to monitor entrepreneurs and results in a larger number of projects with positive net present values. Many authors, such as Qian and Roland (1998) and Obstfeld (1998), also argue that capital account liberalisation punishes wasteful or corrupt governments with capital flight and can therefore induce them to pursue good policies (lower fiscal deficits, introduction of legislation to protect property rights and limit monetisation of the fiscal deficit). However, Cai and Treisman (2005) present a model to show that when regions or countries are significantly different in terms of natural resources, human capital, or infrastructure, better-endowed units may compete away capital from less-endowed counterparts. As a result, there is no significant change in the resource-scarce country and policy may be even less business friendly. Rogowski (2003) reports similar results.

The theoretical literature surveyed above suggests that capital account liberalisation can have positive benefits for small states in terms of international risk sharing, capital inflows, growth, international income convergence, aggregate efficiency, domestic institutions and policy discipline. Many of the assumptions on which these theoretical predictions are based, however, do not always hold in the real world. Consequently, the real world effects of liberalisation may

differ somewhat from the theoretical expectations. The following sections attempt to provide a survey of the literature on the empirical effects of capital account liberalisation.

4. Quantifying Capital Controls

While it is easy to state whether or not a country had capital controls or not, quantifying these controls is somewhat more difficult. The intensity, coverage, and type of controls vary from country to country and over time. Economic researchers have employed numerous types of indicators in an attempt to quantify capital controls. These proxies can be categorised into three groups: ex-post macroeconomic indicators, capital account restrictions indices and regression-based indices.

Assuming that that capital controls restrict capital flows, the integration of capital markets can be evaluated by the quantity of capital that flows across borders (Eken, 1984; Feldman, 1986; Levich, 1987). Therefore, a larger volume of cross-border transactions is reflective of greater capital market openness; to allow for cross-country comparisons, most authors express capital flows as a ratio of gross domestic product. In a similar vein, Lane and Milesi-Ferretti (2001) utilise annual estimates of portfolio and direct investment assets and liabilities as a ratio of gross domestic product. Assuming that uncovered interest parity holds, one alternative to these measures is the difference between onshore and offshore interest rates, as these two rates should equilibrate in the absence of capital controls. These measures of capital account restrictions, however, tend to be correlated with the monetary, fiscal or exchange rate policy stance, the returns offered by domestic markets and even political circumstances.

Given the drawbacks of macroeconomic indicators, researchers have also developed indices of capital controls to track all changes in restrictions within and between countries. One of the simplest of these indices is a dummy variable that takes a value of one if a country has restrictions on capital outflows and zero if it does not. This information is usually derived from various editions of the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER): Building on this approach, Quinn (1997) employs coding rules to capture not only the presence of, but also the intensity of capital controls. The author assesses a nation's financial restrictions on exchange payments and receipts for the import of goods, services and capital. Quinn uses a scale of zero (if import payments are forbidden) to two (if transactions are free). These indices are derived for 64 countries over the period 1958 to 1989. Similar approaches are developed by Montiel and Reinhart (1999) and Haggard and Maxfield (1996). One of the major drawbacks of this index approach is that two independent researchers coding the data may not necessarily arrive at the same measure of financial openness.

Most regression-based indices of capital account restrictions begin with some basic theoretical model from which an empirical prediction is derived. Feldstein and Horioka (1980), building on the fundamental recognition that in a closed economy the return on savings is the national marginal product of capital. This implies that domestic savings or investment can only rise if the return on capital offers a high enough reward to postpone consumption. In a country where capital is perfectly mobile, however, additional savings will leave the country if the foreign rates of return are above those that exist domestically. Therefore, when capital is free to flow between countries net-of-tax rates of returns should be equalised and there should be no strong relation between savings and investment.

Feldstein and Horioka (1980) however find that β was about 0.89 when gross savings were used or 0.94 when net savings were employed. The authors take this result "as evidence against world capital mobility and in favour of a close relation between domestic investment and savings …" This finding has puzzled economists ever since (Obstfeld and Rogoff, 2000), and has prompted significant research into this area (see Coakley, Kulasi and Smith, 1998, for a survey of this literature). Coakley, Kulasi and Smith note that "in the face of a variety of replications, the Feldstein-Horioka result of a high cross-section association between saving and investment rates is remarkably robust."

Given the controversy with the Feldstein and Horioka (1980) approach, Aizenman, Pinto and Radziwill (2004) develop a measure of capital mobility that is instead based on the ratio of cumulative discounted gross national saving and gross national investment – the share of domestic capital that was financed by domestic savings. However, the criticisms of the Feldstein and Horioka correlations also apply to Aizenman, Pinto and Radziwill's measure as well.

Based on the theoretical model developed by Edwards and Khan (1985), some studies have sought to estimate the degree of capital mobility by exploiting information from the behaviour of the coefficients of an interest rate determination model. Edwards and Khan note that if the capital account were completely closed, domestic market-clearing interest rate (i) would be given by the weighted sum of the uncovered interest parity interest rate, i^*, and the domestic market clearing rate, $\tilde{i}$:

$$i = \psi i^* + (1-\psi)\tilde{i}, \qquad 0 \le \psi \le 1. \qquad (2.4)$$

The coefficient ψ is an index of capital mobility, and takes a value of zero with perfect capital immobility and one when there are no restrictions on the flow of capital.

Edwards (1985a, 1985b), Edwards and Khan (1985), Edwards (1986), Haque and Montiel (1990), Haque, Lahiri and Montiel (1993) and others use this approach to estimate the degree of capital mobility in developing countries. Most estimates are within the 0 to 1 range, but are unexpectedly high. Maloney (1997), however, criticises the approach for insufficiently explaining how the averaging of closed and open economy interest rates arise from the behaviour of individuals. The author therefore suggest that ψ is not a measure of openness but a gauge of how easy it is to reallocate ones portfolio if the capital account is closed.

Korajczyk (1996) and Levine and Zervos (1998) employ the capital asset pricing model and international asset arbitrage pricing theory to derive measures of integration. The authors assumes that there exists a weighted portfolio of stocks with excess returns denoted by P; firm level observations on stock returns from 24 markets are used to estimate the weighted portfolio. A regression of the following form is then estimated:

$$R_{it} = \alpha_i + b_i P_t + \varepsilon_{it}, \quad i = 1, 2, \ldots, m; \quad t = 1, 2 \ldots, T, \tag{2.5}$$

where m is the number of assets, t time, and R is the excess return on asset i or the return on asset m above the risk-free rate. If markets are perfectly integrated, then the intercept (α_i) should be zero:

$$\alpha_1 = \alpha_2 = \cdots = \alpha_m = 0. \tag{2.6}$$

The estimates of α_i from Equation (2.6) can be employed as measures of financial integration. Eichengreen (2001) argues that the above equation does not adequately capture financial integration, as returns will vary according to the characteristics of the underlying assets.

5. Quantifying Capital Control Restrictions

5.1 Capital Flows, Cost of Capital, and Equity Returns

One of the fundamental arguments in favour of capital account liberalisation is that the removal of controls on financial flows should result in an increase in flows from the low return to the high return country and allow international risk sharing (see Obstfeld, 1994; Bacchetta and van Wincoop, 2000). Alfaro, Kalemli-Ozcan and Volosovych (2005) examine the main determinants of capital inflows into 23 developing countries between 1970 and 1993. The dependent variable, the average of capital inflows during the period, is regressed on institutional quality, distantness, capital controls (measured using an approach similar to Johnston and Tamirisa, 1998), GDP per capita, inflation volatility, human capital and bank credit. The author reports that capital controls have a significant negative impact on capital inflows but have an insignificant effect on capital flow volatility. Johnston and Ryan (1994) and Bartolini and Drazen (1997) obtain similar findings, but note that capital controls do not effectively prevent outflows in developing countries, as mis-invoicing may be used to evade capital controls and that the easing of restrictions on capital outflows, as a part of a broad set of policies aimed at reducing financial repression, is often associated with large capital inflows

Based on the Metzler diagram presented earlier, capital account liberalisation should result in a convergence in the cost or capital across countries, as capital flows from the low interest rate to the high interest rate country. Bakaert and Harvey (2000) employ the Gordon growth model,

which assumes that dividend yields is the ratio of dividends to the cost of capital less the growth rate of dividends, to examine the effects of capital account liberalisation on the cost of capital. In the Gordon growth model the price of a stock (P) is given by:

$$P = \frac{D}{k - g}$$
(2.7)

where D refers to dividends, k is the cost of capital and g is the expected growth rate of dividends. If the expected rate of growth of dividends is constant as liberalisation takes place, then the change in dividend yields following a liberalisation should correspond to the change in the cost of capital. Bakaert and Harvey control for a number of other factors that could possibly affect emerging market returns such as asset concentration, stock market development, microstructure effects, macroeconomic and political effects. The authors report that opening the capital account reduces the cost of capital, but not by much, about 5 to 15 basis points. Stulz (1999) notes that there are two key drawbacks with this approach: expected returns are not constant and since the data are noisy, the valuation model will not hold for every stock price.

As an alternative to the Gordon growth model, the capital asset pricing model can also be employed to test for the effects of liberalisation. In a completely closed market where the assumptions of the CAPM model holds, investors would only care about the expected return of their portfolio and the variance. In a more integrated capital market, it is likely that domestic returns could be correlated with the return on foreign stocks (Chan, Karolyi and Stulz, 1992). Durham (2000) using data on 12 developing countries (Argentina, Brazil, Chile, India, Korea, Mexico, Thailand, Colombia, Malaysia, Philippines, Taiwan, and Venezuela) employ the CAPM approach to investigate the effects of liberalisation. After controlling for value (price to equity ratio and dividend to price ratio), macroeconomic (namely inflation), demographic and country

risk measures, the author reports that liberalisation is not a robust determinant of stock market performance.

However, Bekaert and Harvey (1997) and Kim and Singal (2000) use models that explicitly account for the non-normality of returns, time-varying conditional means (to account for departures from the efficient market hypothesis) and the degree of capital market liberalisation find somewhat different results. The authors report that volatility tends to decline in most countries after liberalisation (by about 6%).

Based on the theoretical findings of Eun and Janakiramanan (1986), Henry (2000a,b) argues that if liberalisation reduces the cost of capital, then holding expected future cash flows constant, equity prices as well as investment in the liberalising country should rise, as the fall in the cost of capital makes some projects, that previously had a negative net present value, viable. Using data on 12 developing countries (Argentina, Brazil, Chile, Colombia, India, Korea, Malaysia, Mexico, the Philippines, Taiwan, Thailand and Venezuela) and a database of stock market liberalisation dates, both official announcement dates and implementation dates, the author estimates the following panel data model:

$$R_{it} = \alpha_i + \gamma.liberalise_{it} + \varepsilon_{it} \qquad (2.9)$$

where R_{it} is the stock market return in country i and time t, α are country-specific dummies, *liberalise* is a dummy variable that is equal to one eight months prior to and preceding liberalisation and zero otherwise and ε is an error term with normal properties. Estimating Equation (2.9) the author observe that liberalisation results in a 26% rise in total stock market

value in US dollar terms, after accounting for changes in macroeconomic fundamentals such as stabilisation policies, trade liberalisation, privatisation and the easing of exchange controls.

By way of a database of 20 developing countries (Argentina, Brazil, Chile, Colombia, Greece, India, Indonesia, Jordan, Korea, Malaysia, Mexico, Nigeria, Pakistan, Philippines, Portugal, Taiwan, Thailand, Turkey, Venezuela and Zimbabwe), Kim and Singal (2000) compare excess dollar returns prior to and post liberalisation, where excess returns are computed as the change in the market index (in US dollars) less the monthly riskless rate obtained on 3-month Treasury bills. Similar to Henry (2000a,b), the authors report that stock market returns tend to rise immediately after liberalisation, due to a growth in demand, but subsequently declines as domestic firms are able to access lower cost funds from international investors.

The empirical evidence on the effects of capital account liberalisation on financial variables seems to be quite positive. Greater financial integration, by increasing the amount of investable funds, seems to reduce the cost of capital and thereby foster greater investment. The rise in investment, by improving the prospects for firms, results in higher stock prices, a reduction in stock market volatility and reduction in the predictability of stock market returns. The main caveat to these studies is that they usually draw inferences from a small sample of countries (less than 20) for which data is available. As a result, it is debatable whether these findings may hold for a set of over 155 developing countries.

5.2 Economic Growth and Instability

Quinn (1997) presents one of the earliest investigations of the relationship between financial integration and growth. The author augments a growth regression (containing initial GDP per capita, investment share, secondary-school enrolment, primary-school enrolment, government share, growth of government share, dummies to distinguish socialist countries and those that had a revolution/coup, region dummies, growth of domestic credit, export share and civil liberalities variables) with a capital account restrictiveness index developed by the author. Quinn reports that international financial integration had a statistically significant and positive impact on average growth between 1960 and 1989, with liberalisation raising annual long run growth by about 1.6% per year. The author, however, only give results using a broad indicator called financial openness, of which capital account integration is a component, and therefore does not allow one to disentangle the effects due to just capital account liberalisation.

Bekaert, Harvey and Lundlad (2001), with a stock market liberalisation dummy as a measure of liberalisation and a sample of both developed and developing countries, obtains similar results to those reported by Quinn (1997). However, the authors also subjected their model to a wide variety of experiments including an alternative set of liberalisation dates, different groupings of countries and four different time-horizons for measuring economic growth. The results did not change appreciably. Henry (2003), on the other hand, employs data on just 18 developing countries and an index of stock market liberalisation to evaluate the effects of capital market liberalisation. The author plots output per worker five years prior and after liberalisation and finds that, on average, output per worker rises by 2.3 percentage points.

Edwards (2001) focuses specifically on the growth experience of emerging economies after capital account liberalisation. Using the Quinn index of liberalisation, the study evaluates the effect of liberalisation on both growth and total factor productivity. The author finds that the coefficient on liberalisation is positive, after controlling for the effects of the standard variables used in cross-country growth regressions, only for those emerging market countries that have achieved a certain level of financial development. Klein and Olivei (1999) report similar results.

Arteta, Eichengreen and Wyplosz (2001) dispute the results reported by Edwards (2001). They note that weighting the observations by initial GDP implies that rich countries have more influence on the overall regression estimates and that the exclusion of current account openness could potentially bias the results, as this is likely to be correlated with capital account liberalisation. Instead, the authors report that the impact of financial liberalisation depends on the degree of macroeconomic stability rather than income.

Klein (2005) also examines the relationship between capital account liberalisation and growth, but the author allows for the effects that institutional quality can have on the success of greater financial integration. The paper argues that countries with poor institutions do not benefit fully from liberalisation, as both domestic and foreign investors face relatively higher risks of expropriation. Klein exploits data on 71 countries between 1976 and 1995. Klein estimates five growth models where average growth is regressed on initial income, an indicator of openness as well as various specifications that allow growth to depend on institutional quality in a linear and quadratic fashion, the rate of convergence which depends on the proportion of years a country had an open capital account and allows the effect of capital account liberalisation on growth to

vary with each quintile of institutional quality. Klein finds that capital account liberalisation does have a positive impact on growth; however, the estimated effect varies with institutional quality. The study also reports that upper-middle-income countries tend to benefit the most from liberalisation.

Although most of the previous studies report gains from liberalisation, a number of other studies – using a wide cross-section of countries – find no significant relationship between liberalisation and growth. The most widely cited of these are Rodrick (1998), Kraay (1998) and Edison, Levine, Ricci and Sløk (2002). Rodrick makes use of a database of 100 countries as well as the *Share* measure of liberalisation between 1975 and 1989. He observes no significant relationship between liberalisation and growth or inflation and investment. Kraay, on the other hand, draws on a variety of liberalisation indicators including the *Share*, Quinn index and a measure based on actual net capital flows (1985-1997), however, all the liberalisation indicators were not significant. Edison, Levine, Ricci and Sløk find no significant relationship between growth and financial integration; however, the authors report a positive relationship with variables such as educational attainment, financial development, and government integrity, which are likely to be positively correlated with growth.

Edison, Klein, Ricci and Sløk (2004) attempt to reconcile these differences found in the literature by estimating regressions that encompass the essential elements of previous studies. The paper observes that integration has an insignificant effect on growth except when interacted with government reputation or GDP. Edison, Klein, Ricci and Sløk suggest that these results could imply that an intermediate level of development may be a precondition for a country to benefit from capital account liberalisation.

Bekaert, Harvey and Lundblad (2004) argue that policymakers are more interested in growth volatility rather than average growth. The early theoretical literature on the topic was outlined in Lucas (1982) who argued that it was possible for a country to diversify away output shocks by opening its capital account. The model, however, assumes the absence of financial market frictions and the independence of savings and investment decisions. The stringency of these assumptions has been the main basis of attack by authors against full capital account liberalisation, most notably, Stiglitz (2000). Stiglitz argues that liberalisation does not lead to greater stability, since capital flows are pro-cyclical – they increase when the economy is expanding and fall during economic downturns. Thus while capital flows do not necessarily cause business cycle fluctuations, they can exacerbate them.

Early, theoretical models of the volatility-liberalisation relationship employed a neokeynesian (or IS-LM) approach, while more recent papers exploit the New Open Economy Macroeconomic framework, which is more grounded in microeconomic theorising. One of the early neoclassical papers was Razin and Rose (1994). These authors evaluated the effects of country-specific and global shocks on the volatility-capital account openness relationship. Razin and Rose assume a small open economy, which is subject to productivity shocks. The results show that capital account liberalisation increases the volatility of investment when the shocks are long-lasting and idiosyncratic. In line with traditional theory, the authors report that opening the capital account allows for better consumption smoothing and therefore reduces consumption volatility.

More recent models use the new open-economy macroeconomic (NOEM) models developed by authors such as Svensson and van Wijnbergen (1989) and popularised by Obstfeld and Rogoff (1995); for a survey of the NOEM approach see Lane (2001). The main features of these models

are optimisation-based dynamic general equilibrium modelling, nominal rigidities and market imperfections and the incorporation of stochastic shocks. Imperfect competition, where agents have market power, permits the explicit analysis of pricing decisions, rationalises demand-determined output in the short-run (since prices are set above marginal cost) and third, provides an explicit role for activist monetary policy intervention, as market power implies that equilibrium production is usually below the social optimum. In addition, the general equilibrium framework assumes that all agents act under perfect foresight, with households deriving their optimal consumption path, asset holdings and labour supply and firms employing labour to produce differentiated goods.

Authors such as Sutherland (1996), Senay (1998) and Buch, Dopke and Pierdzioch (2002), all exploit the NOEM approach to examine the impact of capital account liberalisation on volatility. The authors assume that households incur transaction costs when undertaking positions in international financial markets. This therefore leads to a gap between domestic and foreign interest rates and implies that internationally traded domestic and foreign financial assets are imperfect substitutes. The link between financial integration and volatility is then evaluated by studying the effects of monetary and fiscal shocks on output and consumption. The main predictions of these models is that the impact of financial integration on output volatility depends on the nature of the shocks: when the economy is subject to monetary policy shocks, financial integration increases the volatility of output and decreases the volatility of consumption, while the opposite is the case for fiscal policy shocks. Senay (1998) also combines the assumption of transaction costs in financial markets with the imperfect integration of the goods market. However, the main predictions of the model are similar.

Aghion, Bacchetta and Banerjee (1999) and Kouparitsas (1996) show that the relationship between liberalisation and volatility may be non-linear due to the effects of financial development and overall economic development. Aghion, Bacchetta and Banerjee use a dynamic open economy model with one tradeable good and one non-tradeable good, which is an input in the production process of the tradeable good. They further assume that firms have credit constraints, with less developed firms facing tighter credit constraints. Aghion, Bacchetta and Banerjee's results suggest that liberalisation may actually destabilise the economies of countries at an intermediate stage of development. The authors therefore recommend that countries postpone full capital account liberalisation until they reach a certain level of financial development. Similar findings are obtained by Caballero and Krishnamurthy (2001).

The predictions from the theoretical literature therefore seem to suggest that there should be a non-linear link between capital account liberalisation and economic volatility. However, many of the early empirical studies in the literature ignored the possibility of a non-linear relationship. For example, Razin and Rose (1994) exploiting data on 138 countries between 1950 and 1998 report that there is no significant statistical relationship between various measures of financial openness and the volatility of consumption, investment and/or output. Similarly, Easterly, Islam and Stiglitz (2001) using observations on 60-74 countries for two periods (1960-1978 and 1979-1997) report that the magnitude of the private capital flows variable has no significant influence on growth volatility.

Evidence of non-linearity has, however, been indirectly reported by Buch, Doepke and Pierdzioch (2002). Based on observations on OECD countries for 40 years, the authors find that monetary and fiscal policy shocks have been the main sources of business cycle fluctuations in the 1980s and 1990s, when most countries opened their capital accounts. Similarly, authors such

as Denizer, Iyigun and Owen (2000), O'Donnell (2001), and Calderón, Loayza and Schmidt-Hebbel (2005), using data on a wide cross-section of countries, explicitly take into account the effects of financial development on the volatility-liberalisation relationship. In line with the theoretical models, all the authors report that business cycle volatility depends on the degree of financial development, with those countries with more developed financial sectors being better able to reduce output volatility through financial integration.

Some empirical studies have also attempted to test whether the non-linear relationship between financial integration and macroeconomic volatility also depends on whether the country has a diversified trading regime and the size of the economy. Kose, Prasad, and Terrones (2003), Kose (2002) and Senhadji (1998), which all draw on cross-country databases, show that countries with an undiversified trade structure are more susceptible to terms of trade shocks and foreign demand shocks after financial integration. Kose, Prasad and Terrones (2003) also find that after gross capital flows pass a particular threshold, it has a negative impact on volatility. Kose and Prasad (2002) note that small states that exhibit higher degrees of trade and financial openness tend to be more prone to terms of trade shocks.

The link between capital account liberalisation on growth, as shown in this section, is somewhat fragile. What seems to emerge from many studies examined in this section is that liberalisation in of itself does not guarantee greater growth. Certain institutional factors, such as investor protection legislation and good supervisory standards, are important if a country is to fully exploit the potential benefits from opening its capital account. If these institutional factors are absent, then liberalisation may have little or no impact on growth and may actually increase income volatility.

5.3   Exchange Rates

Since the literature usually finds a positive relationship between greater financial integration and capital flows, some writers have attempted to examine what impact these flows have on a country's exchange rate. However, there does not seem to be a robust relationship between the two variables. Calvo, Leidermand and Reinhart (1996) investigate the effects of large capital inflows on the real exchange rate in Asia and Latin America during the 1990s. They note that in Asia, the capital flows resulted in a rise in the share of investment in GDP, while in Latin America consumption expenditure increased. In Latin America, therefore, these flows resulted in inflation and an appreciation of the real exchange rate. Consequently, many countries in the region were forced to tighten fiscal policy and capital control measures in order to curb shot-term capital inflows and lengthen the maturity period of capital inflows.

Similarly, Edwards (2000), using a vector autoregression approach, empirically examines the dynamic effects of capital inflows on the real exchange rate of Latin American countries. The study reports that, prior to liberalisation, there is an inverse relationship between the two variables. After liberalisation, however, this relationship was reversed. Although the magnitude and degree of persistence differed between countries, all countries reported that the large capital inflows of the 1990s led to an appreciation of the real exchange rate. Edwards attributes his findings to a shift in the intertemporal elasticity of aggregate demand that led to a change in the

extent of consumption smoothing and distribution of expenditure over time as well as the supply of elasticity of nontradables, leading to a rise in inflation.

In a more explicit test of the effects of capital controls on exchange rates, Edwards (1999), employing monthly data from June 1991 to September 1998, estimate a vector autoregression to examine the relationship between changes in the Chilean reserve requirement on capital inflows and the real exchange rate. The variables included were, the tax equivalent of the controls, the Chile-US bilateral real exchange rate, the rate of devaluation of the nominal exchange rate, and domestic interest rates. The paper observes that the tax on capital flows did not have a significant effect on Chile's bilateral real exchange rate.

Kim and Singal (2000), making use of monthly data on inflation for 17 emerging market countries, also assess the effects that stock market liberalisation has on nominal exchange rates. Exchange rates are expressed in US dollars per unit. For most countries, the change in the exchange rate after liberalisation is not significantly different from zero or that the rate of depreciation is significantly lower post-liberalisation compared to after liberalisation. Kim and Singal then go on to assess the effects that stock market liberalisation has on nominal as well as real exchange rate volatility. Volatility of exchange rates is important since it increases the risk premium attached to cross-border transactions. The authors use autoregressive conditional heteroskedasticity (ARCH) and generalised autoregressive conditional heteroskedasticity (GARCH) models to fit the volatilities of exchange rates in developing countries. These volatilities are then examined prior to and post liberalisation to identify whether there is a significant decline. Kim and Singal estimate that the volatility of nominal and real exchange rates tends to fall after liberalisation.

Rather than explicitly examining the link between capital controls and exchange rates, Glick and Hutchison (2005) considers whether restrictions on capital flows is associated with a lower or higher probability of an exchange rate crisis. The authors employ observations on 69 developing countries between 1975 and 1997. Restrictions on international payments are proxied by indices developed from the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions.* Glick and Hutchison report that restrictions on capital flows are associated with a higher probability of an exchange rate crisis, even after controlling for various macroeconomic restrictions and institutional factors.

5.4   Trade

If capital account liberalisation significantly affects a country's exchange rate, this should imply that a country's level and composition of trade could change as well. Tamirisa (1999) make use of data on 40 developed, developing and transition countries, along with a gravity equation to examine the relation between trade and the removal of capital controls.   Capital account liberalisation is measured using the approach outlined by Johnston and Tamirisa (1998) and the study reports that exchange and capital controls tend to be barriers to trade in both developing and transition countries but not in industrial states.

Aizenman and Noy (2004) exploits a larger database that contains annual series for 84 countries between 1982 to 1998 to investigate the Granger causal relationship between financial and trade openness. Financial openness is measured as the sum of total capital inflows and outflows as a percent of gross domestic product, while trade openness is the average sum of exports and imports as a percentage of GDP over the previous five years to smooth out any fluctuations due to temporary changes in the terms of trade. To control for the effects that missing variables might have on their results, the study includes a dummy variable to indicate a functioning democracy, as well as measures of corruption, inflation, per capita gross domestic product, the government's budget surplus and the world interest rate. Aizenman and Noy report that there tends to be a two-way feedback relationship between the two variables: financial openness (Granger) causes trade openness while trade openness (Granger) causes financial openness. In addition, most of feedback between the two variables can be attributed to Granger causality rather than simple correlation between the two variables.

In contrast, Goldberg and Klein (2000) proxy capital mobility by the amount of foreign direct investment flows a country receives. They provide a simple partial equilibrium model to show that foreign direct investment into an industry increases output by providing more capital and by raising the marginal product of labour. If the industry was a net exporter, FDI increases exports, while if it was net importer, FDI increases imports as these firms draw labour away from net exporters. To test this hypothesis empirically, the authors employ detailed sectoral trade and FDI inflow data between the United States and eight Latin American countries (Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru and Venezuela) over the period 1972 to 1994. Using a cross-section equation, Goldberg and Klein regress net exports on US real GDP, domestic real GDP, the real exchange rate, and FDI inflows to a particular sector as well as FDI inflows to all other sectors. The authors obtain mixed results with FDI increasing exports in some countries but reducing it in others.

5.5   Policy Discipline

One of the conventional arguments for opening up the capital account is that it has a disciplinary effect on the conduct of national macroeconomic policies (see Fischer, 1998 and Stiglitz, 2000). This assertion is based on the assumption that international capital flows tend to be highly sensitive to macroeconomic policies (responding negatively to bad monetary and fiscal policies). As a result, governments should be induced to conduct better macroeconomic policies. One should therefore find that capital account liberalisation is inversely related to governments' fiscal deficit and inflation.

Kim (2003) tests this hypothesis using data on 54 industrial and developing countries between 1950 to 1989. Capital account liberalisation is measured via a 0/1 IMF liberalisation dummy, which is allowed to take intermediate values if the country has only liberalised its current account but not its capital account. Using three-stage least squares to control for endogeneity in some of the explanatory variables, the budget deficit is expressed as a function of capital account liberalisation, the yearly average number of executive changes, the average number of months a government lasts, the yearly average number of coalition governments, the external current account balance as a percentage of GDP, the exchange rate regime, the degree of central bank independence, the yearly average number of leftist governments and trade openness (the sum of exports and imports as a percentage of GDP). The author's results suggest that there exist a strong negative correlation between capital account liberalisation and the fiscal deficit, with full liberalisation leading to a 2.3% improvement in government's fiscal balance, holding all other factors constant. The analysis also showed that the disciplinary effect is stronger in countries with a fixed exchange rate regime and, surprisingly, weak central bank independence.

Building on the results reported in Kim (2003), Tytell and Wei (2004) present a simple theoretical model, backed up by empirical results to support the hypothesis about the disciplinary effect of capital account liberalisation. The model considers a small open economy with one domestic firm and n foreign firms. Production depends only on productivity and the capital stock. The domestic capital stock is fixed, but the capital stock of foreign firms depends on the government's policy rule (the probability of choosing either good or bad policies). Using backward induction, the authors show that the probability of government pursuing good policies is positively related to financial integration, and the number of foreign firms. Tytell and Wei

then draw on data on 62 countries (22 industrial and 40 developing) for the period 1975 to 1999 (the data is averaged over five-year non-overlapping sub-periods to smooth out business cycle fluctuations). Financial integration is measured as the ratio of total foreign assets and liabilities as a share of GDP. The budget deficit is then regressed on inflation, financial integration, government changes, government coalitions and trade openness. The authors, however, could not find evidence in support of the hypothesis that financial integration leads to smaller fiscal deficits.

Similarly, Kaminsky, Reinhart and Végh (2004) attempt to investigate whether the business cycle correlation of capital flows, fiscal or monetary policy has changed because of capital market integration. The authors exploit a database of 104 countries between 1960 to 2003. The sample is then split into two periods: 1960-1979, which they assume as the pre-liberalisation period, and 1980 to 2003, the post-liberalisation period. However, no significant change in either the correlation of the business cycle with capital flows or fiscal policy is observed (they were procyclical in both periods). There are two main drawbacks with Kaminsky, Reinhart and Végh's (2004) approach: not all countries liberalised during the 1980s and the results reported may be due to other factors unrelated to capital account liberalisation.

Grunberg (1998), in a primarily descriptive article, provide two explanations as to why greater financial integration might actually lead to a deterioration in government's fiscal balance. The author notes that capital controls might actually be a source of revenue for many developing states (for example a tax on capital outflows). In addition, since liberalisation implies that a larger proportion of economic activity is conducted either abroad or by non-national companies tax revenues usually fall, as foreign income is untaxed. The reduction in revenue is also met with

a concomitant increase in the demand for public funds for retraining, social insurance, education, security, public transport and telecommunications. A government with inadequate preparation for capital account liberalisation also incurs increased expenditure as a result of bailing out banking crises. These two factors could possible account for the negative relationship reported by Tytell and Wei (2004).

Turning to inflation, Grilli and Milesi-Ferretti (1995) provide one of the earliest attempts to examine the relationship between capital account openness and inflation. The authors use a panel of 61 countries over the period 1973 to 1989 and find that greater restrictions on capital account transactions and convertibility is associated with higher inflation. Gruben and McLeod (2001 and 2002) examine the effects of liberalisation using a financial integration indicator similar to that developed by Johnston and Tamirisa (1998) and data on 112 countries (20 Organisation for Economic Cooperation and Development or OECD and 82 developing countries). The authors regress inflation on liberalisation as well as a number of macroeconomic control variables (initial per capita GDP, trade share, political stability, government surplus and central bank openness). Gruben and McLeod report that liberalisation can reduce annual inflation by about 3% per annum. These results were robust to changes in the econometric model and methodology such as the inclusion of trade openness, and allowing for outliers, heteroskedasticity, institutional variables as well as the potential endogeneity of capital controls.

Kim and Singal (2000), using monthly data on inflation for 17 emerging market countries, calculate what the authors refer to as excess inflation (actual inflation less average inflation prior to liberalisation all divided by the standard deviation of inflation). Via parametric and non-parametric tests, Kim and Singal report a significant decrease in inflation after liberalisation. The

authors also assess the effects that stock market liberalisation has on inflation volatility using autoregressive conditional heteroskedasticity (ARCH) and generalised autoregressive conditional heteroskedasticity (GARCH) models to fit the volatilities of the developing countries. These volatilities are then examined prior to and post liberalisation to identify whether there is a significant decline. Kim and Singal estimate that volatility fell in nine out of the 17 countries after liberalisation.

Tytell and Wei (2004) employ data on 62 countries (22 industrial and 40 developing) for the period 1975 to 1999 (the data is averaged over five-year non-overlapping sub-periods to smooth out business cycle fluctuations). Financial integration is measured as the ratio of total foreign assets and liabilities as a share of GDP. Inflation is regressed on the budget deficit, financial openness, exchange rate flexibility, annual number of central bank governors, trade openness and a dummy variable that takes a value of one if the country is an industrial country. The authors find that capital account liberalisation has a negative and statistically significant impact on inflation, and increases the probability of a transition from a low to moderate inflation environment.

While the literature seems to yield ambiguous results as it relates to the fiscal deficit and greater financial integration, there appears to be a robust inverse relationship between inflation and higher financial integration. These results may imply that liberalisation does not cause governments to pursue conservative spending policies, but rather changes the way it finances the fiscal deficit, i.e. less borrowing from the central bank and maybe more foreign borrowing or domestic paper issues. Unfortunately there are no studies that explicitly examine the impact that liberalisation has on the pattern of financing of government's deficit as well as debt.

6.   Criticisms of Models of Capital Account Liberalisation

In recent years, capital market liberalisation has drawn harsh criticism by some economists, especially Joseph Stiglitz. This author has written numerous articles arguing the case against financial integration (see Stiglitz, 2000, 2004a and 2004b). Stiglitz's main contention is that "financial and capital market liberalisation – done hurriedly, without first putting into place an effective regulatory framework" can do more harm than good. In most articles, Stiglitz focuses on short-term speculative flows rather than foreign direct investment, which is not as volatile and therefore should not be as disruptive.

Stiglitz notes that the case for capital account liberalisation is based on theoretical models that have strong assumptions: perfect information, perfect capital markets and perfect competition. These assumptions are unlikely to be applicable to any country, especially developing states. Moreover, empirical evidence suggests that capital market liberalisation is more likely to lead to instability, as capital flows tend to be pro-cyclical. Therefore as the economy enters a downturn in the business cycle, capital is likely to flow out of the country, (or the rate of growth will slow) accentuating the decline in economic activity.

Khan and Zahler (1985) note that "developing countries were being continually appraised of the benefits of outward-looking policies … [however], sharp declines in growth rates … and the increases in current account deficits to levels that were no longer sustainable, exerted considerable pressures on the authorities [in developing countries] to retreat from the policies they had earlier announced." The authors develop a dynamic general equilibrium model to

examine the transitional macroeconomic effects of changes in barriers to trade and capital flows and the simultaneous liberalisation of trade and capital flows. Khan and Zahler report that the removal of capital controls leads to large capital inflows, augments liquidity, resulting in an increase in aggregate demand and a deterioration in the external current account deficit. Since the capital inflows generated by the interest rate differential are not adequate to cover the current account deficit the country loses international reserves. The negative effects of opening up the capital account can also be magnified by inconsistent domestic policies and an adverse international climate.

The link between liberalisation and financial crises has recently been reported in many studies (see Breuer, 2004 for a survey on the literature on currency crises). Glick and Hutchison (1999), using a sample of 90 countries covering the period 1975 to 1997 and the 0/1 IMF dummy variable to indicate the absence or presence of capital controls, report that banking and twin (banking and currency) crises have primarily occurred in developing countries, especially in the 1990s, and were also more likely in financially liberalised emerging-market economies. Similarly, Kaminsky and Reinhart (1999), observe that financial liberalisation also preceded most banking sector crises. Demirgüç-Kunt and Detragiache (1998) explicitly considers the link between banking crises and financial liberalisation in 53 countries between 1980 and 1995. The authors report that while banking crises are more likely to occur in liberalised financial markets, the link between liberalisation and the fragility of banks weakens when the country has a strong institutional environment.

In contrast, Glick, Guo and Hutchison (2006) argue that one of the reasons capital account liberalisation may be associated with greater vulnerability to currency crises is because of the

special characteristics of countries that choose to liberalise. These countries are more likely to have macroeconomic imbalances, financial weaknesses, political instability, and institutional problems. To obtain unbiased estimates the authors explicitly model the sample selection problem in their econometric model. Nevertheless, the authors state, "all of our results suggest that, even after controlling for sample selection bias (and obtaining unbiased estimates), capital restrictions are associated with a greater likelihood of currency crises". These results are in stark contrast to previous studies that usually link the removal of capital controls to currency crises. The authors further calculated that countries without controls are between 5-28% less likely to experience a currency crisis.

7.   Policy Options for Dealing with Capital Account Liberalisation

Khan and Zahler (1985) note that since opening the capital account in some circumstances can result in a deterioration in the nation's external position, it is important that liberalisation be supported by active domestic macroeconomic management, external financing and international reserves. However, given the limits to the amount of international reserves a country can accumulate and the amount of borrowing that can be undertaken, some tightening in fiscal and monetary policies might be necessary to constrain public and private sector spending.

Aizenman, Lee and Rhee (2004) note that many developing countries, especially those in Asia, are being more pro-active in the management of their international reserves and debt positions. These reserves have been seen as a tool to buffer the economy from sudden stops in capital flows.

The authors provide a theoretical model to account for the possibility that sudden stops could lead to significant output losses due to increased banking cost and/or crises. In this situation, international reserves reduce the probability of a liquidity crisis and as a result increases welfare. Aizenman, Lee and Rhee also estimate a model of the demand for international reserves and find empirical evidence supporting their hypotheses using data on South Korea.

Breuer (2004) summaries many of the options that countries have employed to deal with the effects of capital account liberalisation. These can be disaggregated into four categories: (1) controls on short-term financial flows; (2) functions of a lender of last resort; (3) governance, and; (4) surveillance.

Most financial crises result from large capital inflows accordingly many countries attempt to limit this potential source of instability through limits on financial flows. These controls may be placed on the volume of inflows or outflows to limit capital flight. One of most cited examples is that of Chile. Chile has a special policy called an unremunerated reserve requirement where foreign investors have to deposit 30% of their funds at the central bank at zero interest rate. This measure was implemented to increase the cost on short-term capital inflows as the longer the maturity of the investment the lower the relative cost of the deposit requirement. This policy has enabled the country to maintain a manageable level of capital inflows and restrain the appreciation of the real exchange rate. Colombia also introduced a similar system in September of 1993, but with the reserve requirement varying by the maturity period. Although these measures can have some short-term value, financial derivatives can be used to circumvent controls on short-term capital flows.

Johnston (1998) explains that capital account liberalisation should be viewed as only one aspect of financial sector liberalisation. As a result, the role of authorities should be to establish an appropriate regulatory framework. The author therefore recommends that developing countries, especially, should first develop financial institutions, markets and instruments, adopt international standards of account and time disclosure of information and expand its supervisory capacity. In countries where banks are the main intermediaries of capital flows, banks' interest rates and credit policies could encourage firms to borrow abroad and under pricing of credit could distort the domestic yield curve. Johnston (1999) also observes that with greater freedom of capital movements, the covered interest rate parity condition is more likely to hold. As a result, inconsistent interest or exchange rate policies could lead to significant outflows. The author therefore notes that if the country's exchange rate is fixed, monetary policy will not have enough autonomy to serve as both a tool for achieving domestic macroeconomic objectives as well as stabilising short-term capital inflows. Similarly, if the country has an inflation target, the exchange rate can no longer be used to achieve external current account objectives.

Based principally on the McKinnon's (1973) insights, the notion of sequencing of the capital account liberalisation process has been viewed as a useful tool to allow countries to obtain the maximum benefits and minimise risks from liberalisation. The conventional sequence is that a country should first achieve macroeconomic stability, develop domestic financial institutions, markets and instruments and then liberalise the capital account. Johnston (1998) note that while, "certain rules about sequencing capital account liberalisation – for example, countries should liberalise long-term flows before short-term flows, and foreign direct investment before portfolio investment – have the appeal of simplicity, the fungibility of capital, [however], makes their practical application difficult."

Good governance – rules, policies, guidelines, practices and the institutions and institutional framework that reduce uncertainty in transactions – has also been put forward as another policy option to assist countries that are opening up their capital account. Breuer (2004) notes that governance covers a range of issues: data dissemination at the country level and transparency in the transactions of financial and non-financial entities.

Mathieson and Rojas-Suárez (1993) recommends that based on experiences of countries that have had difficulty sustaining an open capital account, it is important that they implement certain policies before liberalising capital flows. They suggest that countries introduce policies that help decrease the differences between domestic and external financial market conditions, such as reducing the financing of the fiscal deficit through money creation, as well as lowering or eliminating restrictions that inhibit labour and goods market flexibility. Mathieson and Rojas-Suárez also recommend the elimination of taxes on financial income that could result in abrupt capital outflows as well as strengthen the safety and soundness of the domestic financial system.

More recently, Prasad and Rajan (2005) propose to offset the sometimes-negative effects of too much capital inflows after the process of liberalisation by securitising these capital inflows through the issue of shares in a closed-end mutual fund(s) to domestic residents in domestic currency. The proceeds obtained could then be used to purchase foreign exchange from the central bank and then invested abroad. The proposal places the burden of sterilisation on the private sector rather than government and allows domestic residents to diversify their portfolio. The Central Bank of Barbados employed a similar type of policy known as a 'second tier reserve' programme. Under this scheme commercial banks, pension funds and insurance companies are

allowed to invest, up to a specific limit, in foreign markets each year with the understanding that they could be required to repatriate the investments at the request of the Central Bank. Allowing these financial entities to invest overseas in a carefully monitored environment has the additional benefit of removing from the system funds that could further spur consumer lending and imports. The main limitation of the approach proposed by Prasad and Rajan (2005) is that it assumes that the country in question has a large amount of reserves, over and above what is essential for prudential purposes. Indeed, the Central Bank of Barbados had to discontinue it 'second-tier reserve' scheme in 2005, as commercial banks continued to expand credit despite being allowed to invest part of their portfolio overseas. The assumption of unlimited foreign exchange reserves is unlikely to hold in most developing countries.

8.   Conclusions

While theory suggests that opening the capital account should allow a country to diversify away economic shocks, increase capital inflows, expand economic growth and efficiency and encourage governments to pursue good policies, the empirical evidence with regard to these theoretical predictions are in some instances debatable. Many studies, for example, have reported mixed results as it relates to impact of capital account integration on growth, exchange rates, trade and policy discipline. In the case of economic growth, most recent studies only find a link between greater financial integration and growth after controlling for the level of development of the country as well as institutional quality.

Despite the uncertainty of the relationship between capital account liberalisation and some macroeconomic variables, the impact of liberalisation on financial variables seems to be quite robust. Greater financial integration, by increasing the available stock of investment funds, reduces the cost of capital and can lead to an expansion in investment. Moreover, the rise in investment, by improving the prospects for firms, can result in higher stock prices, a reduction in stock market volatility and lead to more efficient market returns. In addition, the popular belief of the positive link between financial integration and volatility (growth and stock market) is not validated by the empirical literature. The majority of studies report that capital account liberalisation has a negative or no effect on economic volatility. The study also reports an inverse relationship between inflation and integration; however, the nature of this relationship is not yet well understood in the literature.

One of the key drawbacks of the capital account liberalisation literature is the variety of indicators used to quantify restrictions. Indicators of financial integration range from ex-post macroeconomic indicators such as private capital flows and interest rate differentials, to capital account restriction indices derived from the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions and regression-based indices derived from aggregate macroeconomic relationships. The wide variety of indicators used makes it difficult for researchers in the field to compare and replicate results. In addition, many of the indicators used in the literature are not calculated for most small states and are therefore excluded from many research databases.

Research on capital account liberalisation although advancing rapidly is still a relatively new area of study. As a result, a number of issues have not yet been examined in the literature. These include such topics as the impact of capital account liberalisation on the monetary transmission

process, deficit financing and government debt. Capital account liberalisation could influence the monetary transmission process since domestic firms no longer have to source financing solely from local commercial banks or other domestic financial institutions. As a result, a rise in domestic interest rates by the local authorities might not have the intended effect as economic agents may simply substitute high cost domestic funds for low cost foreign funds. Similarly, since governments can easily access capital markets with an open capital account, it might chose to use more foreign funds to finance its deficit. This could have positive effects on inflation (by reducing the monetisation of the fiscal deficit), but by pushing up the country's external debt it also increases the vulnerability of the nation. In addition, some of the topics examined in this study, such as interest rates, fiscal deficit and trade are in need of further theoretical and empirical investigation.

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Table 1: Summary of the Capital Account Liberalisation Literature

Variable	Positive	Negative	No Effect
Capital Flows	Alfaro, Kalemli-Ozcan and Volosovych (2005)		
Cost of Capital	Johnston and Ryan (1994)	Henry (2003)	
Equity Returns	Henry (2000a)	Bakaert and Harvey (2000)	Durham (2000)
Investment	Kim and Singal (2000) Henry (2000b)		
	Levine and Zervos (1998)		
	De Melo and Tybout (1986)		
Investment Volatility		Kim and Singal (2000)	De Santis and İmrohoroğlu (1997)
		Bakaert and Harvey (1997)	
Economic Growth	Klein (2005)		Edison, Levine, Ricci and Sløk (2002)
	Henry (2003)		Edwards (2001)
	Bekaert, Harvey and Lundlad (2001)		Arteta, Eichengreen and Wyplosz (2001)
	Quinn (1997)		Klein and Olivei (1999)
			Levine and Zervos (1998)
			Rodrick (1998)
			Kraay (1998)
Economic Volatility		Bakaert, Harvey and Lundblad (2004)	Razin and Rose (1994)
			Easterly, Islam and Stiglitz (2001)
			Kose, Prasad and Terrones (2003a and 2003b)
Exchange Rates	Edwards (2000)		Edwards (1999)
	Calvo, Leidermand and Reinhart (1996)		Kim and Singal (2000)
Trade	Aizenman and Noy (2004)	Tamirisa (1999)	Goldberg and Klein (2000)
Fiscal Deficit		Kim (2003)	Tytell and Wei (2004) Kaminsky, Reinhart and Végh (2004)

Variable	Positive	Negative	No Effect
Inflation		Grilli and Milesi-Ferretti (1995)	
		Gruben and McLeod (2001 and 2002)	
		Kim and Singal (2000)	
		Tytell and Wei (2004)	