



**DOES CAPITAL ACCOUNT LIBERALISATION
LEAD TO INVESTMENT BOOMS IN
CARIBBEAN ECONOMIES?**

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Abstract

It is often argued that capital account liberalisation has provided the main impetus for the significant surge in cross border capital flows over the past two decades. At the same time, the literature attests to the fact that capital account liberalisation entails a great deal of risks to developing countries because opening up the capital account can be destabilising, to the extent that it can increase the vulnerability of these countries to external shocks through sharp changes in foreign exchange reserves. This paper attempts to empirically examine whether capital account liberalisation stimulates higher capital and financial inflows in Caribbean countries, using data for Barbados, Guyana, Jamaica and Trinidad and Tobago. It also seeks to investigate the extent to which these inflows have translated into increased investment. The results from the ARDL co-integration methodology does not give definitive support to the hypothesis that liberalising the capital account leads to increased private capital inflows. However, it provides some evidence that capital flows are significant in explaining the movements in private investment.

Introduction

It is often argued that capital account liberalisation has provided the main impetus for the considerable surge in cross border capital flows over the past two decades. At the same time, the literature attests to the fact that capital account liberalisation entails a great deal of risks to developing countries because opening up the capital account can be destabilising, to the extent that it can increase the vulnerability of these countries to external shocks through sharp changes in foreign exchange reserves.

The case in favour of capital account liberalisation is largely based on efficiency grounds. For instance, it is argued that capital account convertibility reduces domestic financial transaction costs, stimulates innovation and introduces competition in the financial industry both locally and from abroad. Moreover, for countries with limited access to private external finance, it is suggested that an open capital account may facilitate the flow of urgently needed foreign savings, thereby increasing investment and growth. Additionally, liberalisation provides domestic investors with more opportunities to diversify their portfolios and decrease the concentration of exposure to domestic market risks. However, country experiences imply that the perceived benefits work best largely for countries with sound macroeconomic fundamentals, with well-developed financial markets, effective regulatory and prudential structures and with exchange rate policy that allows adequate flexibility.

Macroeconomic management following capital account liberalisation in most developing countries lacks effectiveness because of the limited range and potency of available instruments. Financial institutions are exposed to more risks and hence there is a need for stronger regulations and supervision and most importantly, the private sector needs to develop appropriate instruments to manage the increasing risks in an open economy. The attainment of such sound macroeconomic systems, including strengthening the financial system through adequate prudential regulations, is a process that develops over time. Thus, many developing countries, in various stages of development, often impose controls on capital account transactions in an effort to shield themselves from costs associated with fluctuations in international capital flows.

Mathienson and Rojas-Suarez (1993) cites a number of grounds by which countries justify the use of capital controls. These include, among others, management of balance of payments crises or unstable exchange rates generated by excessively volatile short run capital flows, limiting foreign ownership of domestic factors of production, maintaining the authorities ability to tax domestic financial activities, income and wealth, ensuring that domestic savings are used to finance domestic investment, and preventing capital flows from disrupting stabilization and structural reform programmes. However, in the Caribbean, capital controls have been largely used to: retain domestic savings to finance domestic investment; support a fixed exchange rate system by ensuring the availability of adequate reserves to meet normal balance of payments transactions, and; insulate the domestic economy from external shocks. For instance, cushioning the exchange rate as far as possible from the destabilising effect of sudden capital movements.

The general hypothesis that appears to be emerging from the literature suggests that, on average, not enough savings are generated domestically so foreign savings plays a major role in closing the savings-investment gaps. Many analysts have argued that opening the capital account usually leads to inflows of foreign capital that, in turn, should cause noticeable jumps in the investment-GDP ratios. What is the evidence in the Caribbean?

As is the case with many developing countries in other regions, the countries in the Caribbean have also had to contend with challenges arising from periodic bouts of internal and external imbalances, some of which could be traced to external shocks arising largely from the energy crisis of the 1970s and the effects of the associated measures that were put in place to deal with these shocks. Standard demand management policies along with varying degrees of stabilisation and structural reforms were adopted as countries sought to adjust their economies to deal with these shocks. As small open, mostly fixed exchange rate regimes that depend heavily on international trade, measures to address balance of payment imbalances featured prominently in these adjustment efforts. More often than not restrictions were imposed on external current and capital transactions in the pre-1990 period.

Since the beginning of the 1990s, Guyana, Jamaica and Trinidad and Tobago have liberalised their economies, removing exchange controls and opening up their capital accounts. With the

experience of between 12 to 15 years, there should be enough evidence to support or reject the view that capital account liberalisation facilitates significantly a discernable increase in private capital inflows.

Figure 1 shows the trends in the gross investment, gross domestic and national savings to GDP ratios for Barbados, Trinidad and Tobago, Jamaica and Guyana since 1960. The data seems to suggest that all three (floating exchange rate) countries have experienced increased investment ratios since opening up their capital accounts, although Guyana's investment has tapered-off since 1998. Over the same period, the investment ratios of Barbados, which still maintains some controls on capital and financial transactions, have been sluggish and have indeed fallen from the pre-1990 levels. To what extent can one attribute the increased investment ratios in the three liberalised economies to the liberalisation of the capital account, given that it generally formed part of a menu of reforms in the countries concerned?

The objectives of the paper are two-fold: to examine the macroeconomic impact of opening up the capital account in certain Caribbean countries, and the extent to which such inflows would have translated into increased investment flows. The second objective allows the determination of the possibility of increased foreign savings substituting for domestic savings, as risk-averse domestic savers seek to hold a significant portion of their wealth in foreign assets that may be perceived to yield higher or more certain returns.

After the introduction, the next section looks briefly at the macroeconomic experiences of the countries under analysis with capital account liberalisation. Sections 3 and 4 discuss the theoretical approaches and empirical evidence of capital account liberalisation in private capital inflows. Section 5 outlines the empirical model, econometric methodology and data. The results are presented in section 6 and the final section concludes.

2. Selected Country Experiences Since Capital Account Liberalisation

During the 1970s and 1980s Caribbean economies were characterised by highly restrictive trade and financial regimes: credit was largely directed to priority sectors at preferential interest rates, restrictions on current and capital accounts were extensively used, and market interest rates were administratively set by the authorities. These policies, while well intentioned, insulated the domestic economy, but at the same time were ineffective in a changing global environment. To bring about some measure of efficiency in the allocation and mobilisation of resources, Caribbean economies began the process of liberalising their financial systems as part of an overall package of economic reforms. With trade reforms and a gradual move towards more outward-oriented development strategies in the 1990s many of the countries in the Caribbean removed restrictions on external account and capital accounts. In particular, this aspect has been the most emphasised component of the financial liberalisation process in the Caribbean, as it is critical to the proper functioning of the Single Market and Economy, which envisages, inter alia, the free movement of capital across regional borders.

Guyana, Jamaica and Trinidad removed all capital restrictions on both the current and capital accounts during the early 1990s. Jamaica liberalised its foreign exchange market substantially, opting for the simultaneous liberalisation of the current and the capital and financial accounts. The number of dealers increased in 1994 and there was the establishment of numerous cambios and merchant banks. Guyana opted for a more gradual process, liberalising over a period of five years, starting with current account transactions and then the capital account. The liberalisation process in Trinidad and Tobago occurred over a period of three years. After a period of achieving macroeconomic stabilisation, the sequence of reforms followed were trade and tax reform and afterwards the dismantling of the regime of exchange controls, which was followed by the floating of the exchange rate in 1993. In the immediate period after the floatation, the central bank, in collaboration with the commercial banks, introduced several measures to engender stability in the foreign exchange market. These measures included a *code of conduct* for market participants, a *sharing agreement* and an *agreed minute*. According to Forde (2003), these arrangements contributed to the stability and the reduction in volatility in the foreign exchange market. In addition, the central bank intervenes when necessary in the foreign

exchange market to smooth out swings in liquidity and to keep the exchange rate inline with the macroeconomic environment.

Barbados has adopted a more gradualist approach to financial liberalisation and reform, with the liberalisation agenda focussing primarily on removing restrictions to current account transactions, with delegated authority granted to commercial banks to authenticate numerous transactions, except for cash gifts, (undocumented) merchandise imports, travel and foreign currency accounts. In particular, most current account transactions with the OECS countries are fully liberalised, with the exception of transactions in real estate and government securities¹. Indeed, Barbados' fixed exchange rate regime underscores a more cautious approach with respect to capital account liberalisation, on account of the inextricable link between the maintenance of sufficient foreign reserves and the preservation of the fixed exchange rate. A major concern is that opening up even within CARICOM could be tantamount to opening up to the rest of the world, since countries like Jamaica, Trinidad and Guyana, which have fully liberalised regimes, could act as conduits for capital outflows to the rest of the world. The liberalisation process was boosted during the period 2000-01 with Government borrowings of \$300 million, specifically to buttress the foreign reserves against the adverse effects from the liberalisation of trade and the expected liberalisation of exchange controls. The liberalisation initiatives that followed included increased delegated authority to commercial banks for current account transactions and pension funds were permitted to increase their investments abroad and the regime for foreign currency accounts was also liberalised.

Table 1 presents average comparative macroeconomic and balance of payments indicators for the countries under analysis since the mid-1980s. With the exception of Barbados, all the countries were more liberal in the second period and this period was associated with higher capital and financial inflows. Indeed, the impact of higher capital and financial inflows on economic performance was mixed. In the case of Trinidad and Tobago, this period saw an increase in domestic investment, a rebound in economic growth, lower inflation and a significant improvement of the public finances. In addition, there was general improvement in the balance

of payments accounts: the external current account balance improved considerably and there were large inflows of capital, particularly direct investment. In the latter period, this category almost doubled to US\$812.8 million, most likely for investment in the petroleum sector. In Jamaica and Guyana the stories are different. Despite a substantial increase in direct investment during the 1990s, Jamaica appeared to be negatively affected by the liberalisation process, as real output growth declined and inflation almost doubled. However, there was a steady rise in domestic investment. With regard to Guyana, the evidence points to external current account deficits, worsening fiscal balances and a falloff in the average rate of domestic investment and real economic growth. In Barbados, the undertaking of a more liberal trading arrangement resulted in persistent current account deficits, since the late 1990s, which is clearly evident in the latter period. The inflows of private capital during this period were primarily for investment in tourism and utility production, while the Government received inflows from privatisation and borrowings on the international capital market. More recently, cross-border portfolio investment in CARICOM has increased significantly and this has challenged reserve accumulation. In addition the average rate of expansion in domestic investment and economic growth declined.

¹ The thinking here is that these transactions tend to be very large and could lead to volatility in the financial market and hence should be approached with caution.

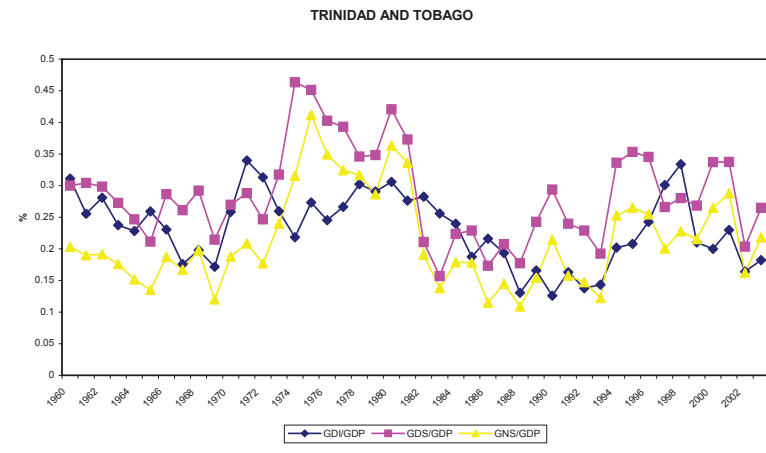
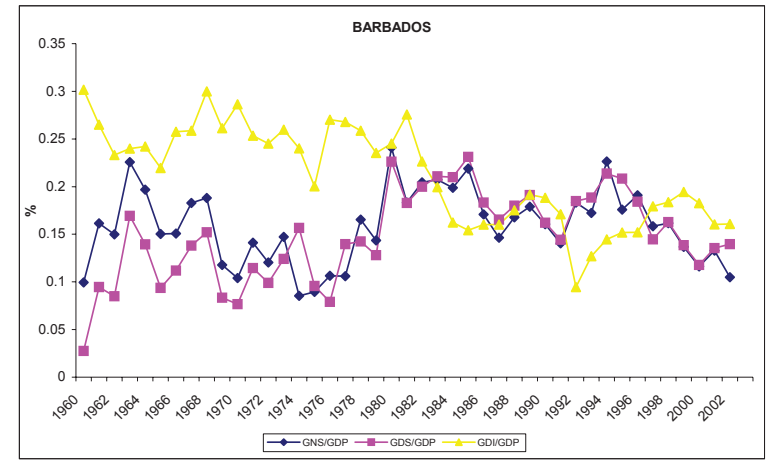
Table 1: Averages of Selected Macroeconomic and Balance of Payments Indicators

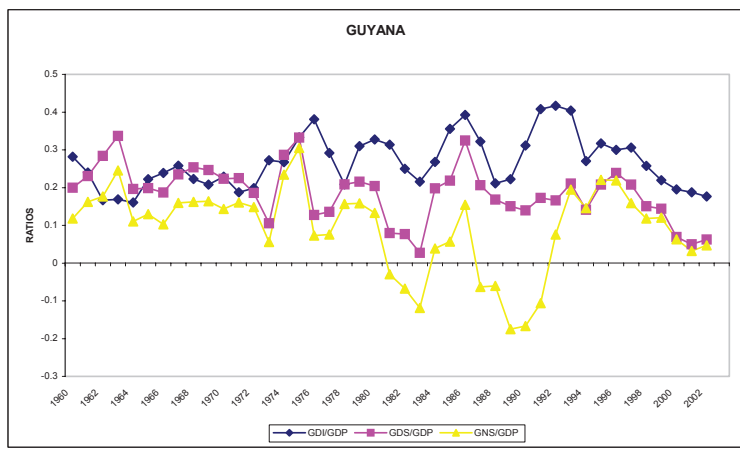
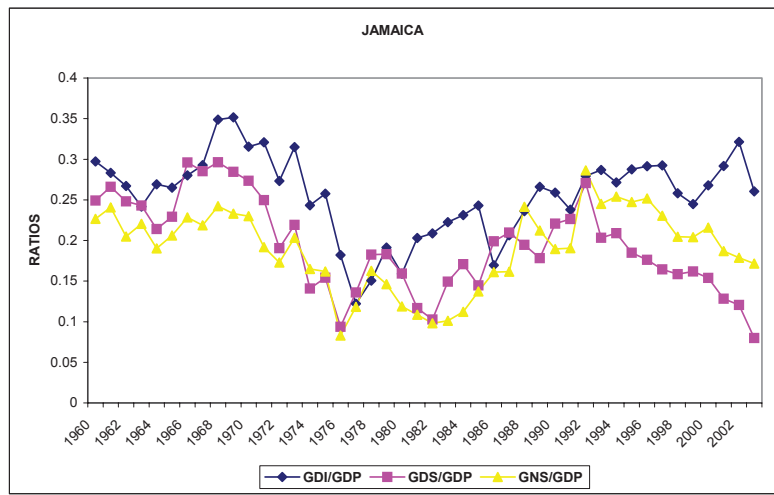
	Barbados			Trinidad and Tobago			Jamaica		
	1985-90	1991-00	2001-04	1985-90	1991-00	2001-02	1985-90	1991-00	2001-03
Selected Macroeconomic Indicators									
Real GDP Growth	2.1	1.3	1.2	-2.2	4.6	7.7	3.4	1.4	1.6
Inflation	3.8	2.8	1.4	9.4	6.0	4.3	15.3	26.0	9.5 ¹
Investment to GDP	0.17	0.16	0.16	0.17	0.21	0.19	0.23	0.27	0.29
Domestic Savings to GDP	0.19	0.17	0.14	0.22	0.30	0.27	0.19	0.19	0.11
Fiscal Balance to GDP	-5.8	-1.6	-3.7	-4.6	-0.1	0.2	-0.9	1.6	-5.7
Balance of Payments (US Millions)									
Current Account	16.3	2.2	-196.2	-59.0	18.2	246.2	-160.84	-192.5	-864.8
Capital and Financial Account	41.1	47.3	239.9	-173.3	83.2	359.4	162.8	307.9	946.6
Of which:									
Direct Investment	5.2	13.6	20.5	56.8	495.0	812.8	37.1	228.8	605.2
Portfolio Investment	3.5	0.3	0.4	0.0	-27.3	-138.2	0.0	2.8	348.4
Other Investment	13.8	51.9	89.9	-230.2	-411.9	-467.2	145.2	188.2	827.5

Sources: The international Financial Statistics CD Rom, International Monetary Fund
Various issues of the Annual Statistical Digest, central Bank of Barbados

Notes: ¹ data for the period 2001-04.
² data for the period 1995-2000.
³ data for the period 2001-02.
⁴ data for the period 1992-2000.
⁵ data for the period 2001-03.
n.a means not available

Figure 1: Trends in Investment and Savings To GDP Ratios





3. Theoretical Approaches to the Determination of Private Capital Flows

According to Johnston and Ryan (1994), there are two main theoretical approaches to explaining private capital flows: the portfolio balance approach, based on Branson's (1968) extension of the Markowitz-Tobin portfolio selection model, and the monetary approach to the balance of payments, following Johnson (1971) and Kouri and Porter (1974). The former focuses on the role of risk-adjusted returns, that is, the relative real returns on domestic and foreign assets, as well as the change in wealth. The latter relies on the role of monetary disequilibrium in explaining capital movements, that is, the difference between the demand for money and the money supply in the domestic market. As a result, variables that determine the demand for money and the supply of money become relevant to influencing capital flows.

Fernandez-Arias and Montiel (1994) develop a useful analytical framework that brings together aspects of these two types of approaches. They decompose the influence on private capital flows into domestic and external factors. Suppose capital flows occur in the form of transactions in various types of assets, indexed by s , where $s = 1(s)n$. The domestic returns on asset s is decomposed into a "project" expected returns D , and a "country creditworthiness" adjustment factor, C , which lies between zero and one. D depends inversely on the vector F of net flows to projects of all types, while C is a negative function of the end-of-period stocks of liabilities of all types, denoted $S(= S_{-1} + F)$. Voluntary capital flows (components of the vector F) are determined by the arbitrage condition:

$$D_s [d.F] C_s [c, S_{-1} + F] = W_s [w, S_{-1w} + F] \quad (1)$$

where W_s is the opportunity cost of funds of type s in the world economy, taken to depend on S to reflect portfolio considerations for external creditors. The shift factors d , c and w are associated with the domestic economic climate, country creditworthiness, and any creditor country financial conditions relevant for developing country investment (for example, financial returns and capital-market regulations). Specifically, d would include, among other things, any variable that increase the expected rate of return and/or reduce the perceived risk as in the portfolio balance approach mentioned above. In addition, it would capture the removal of capital

controls and liberalisation of restrictions on foreign direct investment. c would depend on some current measure of available resources like wealth in the portfolio balance approach as well on foreign returns. Finally, w would include factors like foreign interest rates and/or recession abroad.

Equation 1 defines F implicitly, hence capital flows will be determined by d , c , w and S_{-1} , that is, by domestic factors operating both at the project and country levels, as well as factors pertaining to the external environment. The component vector F , capital flows, are assumed to be increasing in d and c , but decreasing in w and S_{-1} .

4. A Review of the Empirical Evidence of Capital Account Liberalisation (Controls) on Private Capital Flows

The macroeconometric literature on the impact of capital account liberalisation has focused on economic growth with mixed results (for excellent surveys of this literature, see Eichengreen (2001), Edison, Klein, Ricci and Sloek (2002), or Prasad, Rogoff, Wei and Ayhan Kose (2003)). Also, a number of studies have drawn conclusions about capital mobility from examining economic variables, like domestic interest rates or saving and investment (see Frankel, 1989). However, the literature on the direct impact of capital controls on private capital flows has been scant.

The first study that has empirically examined directly the effect of capital controls on private capital flows is Johnston and Ryan (1994). Using panel data from 52 developed and developing countries for the period 1985-1992, they found that exchange controls significantly alter the structure of industrial countries' capital accounts, especially by restricting outflows of recorded direct and portfolio investment. However, for developing countries capital controls do not effectively prevent the outflows, and misinvoicing may be used to circumvent the exchange control.

Since this panel data study, time series investigations have been done on countries in Latin America, Asia as well as Europe. Soto (1997) and De Gregorio, Edwards and Valdes (2000), using the Vector Autoregression (VAR) approach on monthly data to analyse Chile's

unremunerated revenue requirement on capital flows, found that the composition of private capital flows tilted towards long-term maturities, with the tax on capital movements discouraging short-term flows.

Valdes-Prieto and Soto (1998), employing a different methodology, a non-linear specification, reached a similar conclusion that capital controls discouraged short-term flows in Chile. Overall, these studies on Chile suggested that the reduction in short-term flows were fully compensated by increases in long-term capital flows, resulting in aggregate capital moving into Chile being unaltered by the controls.

In the case of Colombia, Cardenas and Berrera (1997) also found a relative inability of controls to reduce the level of capital, and non-remunerated deposits success in inducing a recomposition of foreign liabilities in favour of long-term maturities. Reinhart and Smith (1996) results for a group of Asia, Eastern European and Latin America countries are consistent with the preceding findings. On the other hand, Buch and Hanschel (1999) assessed the unremunerated reserve requirement in Slovenia for the period 1992 to 1998 and found that the unremunerated reserve requirement was ineffective in reducing overall inflow of foreign capital.

Cardoso and Goldfajn (1998) study the case of Brazil, by accounting for the endogeneity of capital controls (both on outflows and inflows) by considering a government that set controls in response to capital inflows. They found that the government reacts strongly to capital flows by increasing controls on inflows during booms and relaxing them during times of distress. Using a VAR framework, they also showed that controls temporarily alter the level and composition of capital flows within a six-month period, but have no sustained effects in the long run.

Using a similar VAR approach to Cardoso and Goldfajn (1998), Goh (2005) found similar results for Malaysia, that is, control policies that had temporary effects on capital flows and controls that have reduced short term flows but to some extent may have decreased private long term flows, namely, foreign direct investment.

4. Empirical Model, Methodology and Data

The model used in this study is very similar to that developed by Johnston and Ryan (1994) as is defined as follows:

$$NC = \alpha_0 + \alpha_1 Y + \alpha_2 i + \alpha_3 GB + \alpha_4 (i - \phi) + \alpha_5 (i^* - \phi^*) + \alpha_6 c + \varepsilon \quad (2)$$

The dependent variable NC is a measure of capital and c is an explanatory variable representing the controls on capital movements. The remaining variables: Y, i, GB, (i-φ) and (i*-φ*) are other factors influencing the movement in capital flows. The relative returns on domestic (1-φ) and foreign assets (1*-φ*), and the change in wealth-measured by national income Y-are thought to be largely related to portfolio investment decisions. In addition, the nominal interest rate, i, and the government balance, GB, which are functions of the demand and supply of money, act as a measure of confidence to investors and thus they too play a role in determining capital inflows. A priori, it is anticipated that $\alpha_1, \alpha_4 > 0$; $\alpha_2, \alpha_3, \alpha_5 < 0$. The error ε satisfies the classical least squares regression properties.

Co-integration analysis is applied to derive estimates for the long run and short run. Considering the small sample size of 25 observations and 6 explanatory variables the Engle and Granger (1987) two step-procedure and the Vector Autoregressive (VEC) method developed by Johansen (1988) and Johansen and Juselius (1990) are contemplated but not pursued. Instead, the Autoregressive Distributed Lag (ADRL) approach popularised by Pesaran and Pesaran (1997) and later by Pesaran *et al.* (2000) is employed to conduct the empirical investigation. This methodology has several advantages: (a) unlike the Engle and Granger two-step procedure and the Johansen and Juselius VEC approach, the ARDL method does not require a priori knowledge of the integration properties of the variables in order to examine the presence of cointegration; (b) the ARDL-based estimates of the long-run coefficients are super consistent in small sample sizes and the model takes sufficient lags to capture the data generating process in a general-to-specific modeling framework; (c) a dynamic error correction (ECM) can be derived from the

ARDL model through a simple linear transformation, and; (d) the ARDL approach avoids the problems encountered when using non-stationary time series data.

After transformation of Equation 1, the ARDL error correction model takes the form:

$$\nabla y_t = \alpha_0 + \sum_{i=1}^k \beta_i \nabla x_{kt-i} + \sum_{i=1}^k \delta_i z_{kt-1} + u_t \quad (3)$$

where y_t is a nx1 vector of endogenous variables, x_{kt-i} is a nxn vector containing the exogenous variables, and z_{kt-1} is a nx1 vector comprising both endogenous and exogenous variables. α_0 is a nx1 vector of constant terms, while β_i and δ_i are nxk vectors of parameters containing information about the short and long-run, respectively. u_t is a kx1 vector of error terms. The first step of the ARDL model testing procedure is to conduct a bound test for the presence of a long-run relationship among the variables. This is done by carrying out a joint significance test on Equation 2, with the null hypothesis of no cointegration ($H_0: \delta_i = 0$). The procedure is based on the F or Wald-statistic, but in this case, since the F statistic has a non-standard distribution the calculated F-statistic is compared to two sets of critical values computed by Pesaran *et al.* (2001) for various significance levels and sample sizes. One set of critical values posits that all variables are I(0) and the other assumes that all are I(1). If it is known that all variables are I(0) acceptance or rejection of the null hypothesis depends on the lower bound. Similarly, if all variables are I(1) the decision is made based on the upper bound. However, if the calculated F-statistic lies between the lower and upper critical values, the result is said to be inconclusive. The ARDL method estimates (m+1)^k regressions in order to obtain the optimal lag length for each variable, where m is the maximum number of lags chosen by the user and k is the number of variables in the original equation including the constant term. The most appropriate ARDL model is selected using a model selection criterion like, Schwartz Bayesian (SBC). This completes stage one of the ARDL procedure.

In stage two, if cointegration is detected the long-run coefficient estimates are derived from the chosen ARDL model from stage 1, and transformed into an ECM of the form:

$$\nabla y_t = \alpha_0 + \sum_{i=1}^k \beta_i \nabla x_{kt-i} + \varphi_t \varepsilon_{t-1} + u_t \quad (4)$$

ε_t provides information about the speed of adjustment to long-run equilibrium. Finally, various diagnostic tests are used to check the adequacy of the ARDL model.

The model is estimated using annual data for Barbados, Guyana, Jamaica and Trinidad and Tobago for the period 1979 to 2003. The capital flow variable (NC) is represented by net private capital inflows and it is estimated by summing portfolio investment liabilities, direct investments and other commercial bank investment liabilities. Capital controls (c) are captured by a capital account liberalization index developed by Quinn (1997) and extended by Greenidge (2005). The index is based on a coding system, which is applied to information taken from the IMF's annual publication on Exchange Arrangements and Exchange Restrictions (AREAER). This publication contains detailed reports on each member country's exchange arrangement, administration of controls, prescription of currency, regulations on import and import payments etc. To code the extent of a country's restrictions on capital flows, Quinn adopted a graduating scale (0, 0.5, 1, 1.5 and 2) for each dimension of each restriction to create an additive measure of a country's overall financial openness. In each case receipts and payments are scored separately, while a country's ability to restrict exchange and capital flows under its international agreements are also coded. The analysis results in an indicator for capital account openness that ranges from 0 to 4. Thus, it provides information on the intensity of controls and also covers controls on nonresidents as well as residents. Greenidge uses the same procedure but his index is supplemented by additional information from the respective central banks. His argument is that the IMF's AREREA is updated annually with information provided by the individual country's central banks and in many cases such information is sent in summary, but there is usually more detail and explanations housed at the central banks. In addition, Greenidge modifies Quinn's coding rules to better reflect practices within the Caribbean region. The real domestic interest rate ($i - \phi$) and the real foreign interest rate ($i^* - \phi^*$) for each country is derived by subtracting the annual inflation rate (ϕ) from the average discount rate on treasury bills. The U.S. treasury bill and inflation rates are used to represent the foreign domestic interest rate (i^*) and the foreign inflation rate (ϕ^*). The REER for Barbados and Jamaica is sourced from Moore and Skeete (2003) and is defined as a consumer price index of a country's main trading partners relative to that of the domestic currency.

Data for the Government or fiscal balance (GB) and real GDP (Y) were taken from the IMF's International Financial Statistics September 2005 CD ROM. The treasury-bill discount rates, the consumer price indices and the REER for Guyana and Trinidad and Tobago are extracted from this same database. In some cases data for Y, i and GB were also gathered from the Barbados Annual Statistical Digest, the Central Bank of Guyana Statistical Bulletin as well as the Central Bank of Guyana annual report. Most of the data for the GB of Trinidad and Tobago was obtained from their central bank's website.

5. Preliminary Results

The empirical results are computed using the Microfit version 4.0 econometric software developed by Pesaran and Pesaran (1997). The ARDL estimation procedure discussed previously is performed on Equation 1 using data for the four Caribbean countries. To determine the optimal lag structure for each model the SBC is chosen and a maximum lag length of 1 is assumed due to the small sample size. According to the statistic, the selected ARDL models for Barbados, Guyana, Jamaica and Trinidad and Tobago are ARDL1.(0,0,0,0,0,0), ARDL2.(1,0,0,1,0,0,0) ARDL3.(1,1,0,0,0,0,0,0) and ARDL4.(0,0,0,0,0,0,0). However these models appear to be misspecified judging by the rejection of the Pesaran co-integration F-statistics and the exploding error correcting terms (results available from authors). Attempts to correct this misspecification by changing regressors, lag structures, sample periods, model selection criteria and even using the alternative Engle – Granger two step co-integration methodology proved futile. The only consolation is that most of the estimated long run coefficients have the a priori signs (see Tables A1-A4 in the Appendix). For all countries, except Jamaica, the coefficient on the variable of interest, that is, the capital liberalisation index, c, is positive, suggesting that liberalisation in these three countries would lead (in the case of Barbados) and have led (in the case of Trinidad and Tobago and Guyana) to an increase in total private capital flows. For the case of Jamaica, the model implies that the movement towards liberalisation has reduced that country's private capital inflows. These results are in harmony with the stylised facts given in Section 2 above.

In summary, from a statistical point a view the capital liberalisation index is not significant to private capital inflows and this may be due, among other things, to the lack of variability in the capital liberalisation index and the possibility that capital liberalisation may be working indirectly through the real exchange rate and/or the real interest rate differential. From an economic point of view, the sign indicate that for all countries, except Jamaica, private capital flows were associated with capital account liberalisation.

The next hypothesis to be tested is whether private capital flows complement or substitute for private investment, that is, does private capital flows lead to investment booms? To examine this issue a modification of the investment model derived by Acosta and Loza (2004) is used. The same ARDL cointegration approach described in the Section 4 and applied in Section 5 is utilized to estimate this model for Barbados and Guyana only, mainly due to the unavailability of data for the other two countries. The model is defined as follows:

$$privinv_t = c + \alpha_1 extdebt_t + \alpha_2 credit_t + \alpha_3 gdp_t + \alpha_4 privcap_t + \mu_t$$

where *privinv* is private investment, *extdebt* is external debt, *credit* is private sector credit, *gdp* is gross domestic product at market prices and *privcap* is private capital inflows. The a priori expectations are $\alpha_2, \alpha_3, \alpha_4 > 0; \alpha_1 < 0$ and the data is sourced from the IMF's International Financial Statistics September 2005 CD ROM, the Barbados Annual Statistical Digest 2004 and the Central Bank of Guyana Annual Report 2004.

To maximise degrees of freedom a maximum lag length of one is set. The SBC selects the ARDL model (1,0,0,0) for Barbados and (1,0,1,1,1) for Guyana. These investment models appear to be better specified than the capital flows equations above with co-integration being accepted by the Pesaran co-integration F- statistics and the negative and non-exploding error correcting terms. Also the diagnostic tests reveals that there is no evidence of significant serial correlation, heteroscedasticity, non-normality or parameter instability. The long run coefficients are presented in Table A5 in the Appendix. For Guyana, most of the variables are significant and of reasonable sign. The variable of interest, *privcap*, implies a complementary relationship

with private domestic investment, that is, an increase in capital inflows generates higher levels of private investment.

In the case of Barbados, despite acceptable diagnostics and reasonable signs on most of the right hand side variables, all of the regressors are statistically insignificant (Table A6 in the Appendix). However, like Guyana, private capital inflows complement private investment.

6. Conclusion

This paper examines the impact of capital account liberalisation on private capital inflows in the Caribbean, using data for Barbados, Guyana, Jamaica and Trinidad and Tobago. It also investigates the extent to which these inflows have translated into increased private sector investment.

Looking at the stylised facts on these Caribbean countries there is a clear upward shift in capital flows after capital liberalisation and a consequent rise in investment levels. However, the empirical model does not support a significant statistical relationship between private capital flows and capital liberalization, although it gives credence to the general positive direction of these two variables. It appears that the model suffers from misspecification errors, probably due to the sample size and the construction of the data, notably the capital liberalisation index, which may have too little variation to be useful for regression analysis.

However, on the second hypothesis there seems to be some evidence to support the facts observed in the data that private capital flows complements private investment. Guyana gives a telling example in this situation.

In summary, it could be argued that private capital flows in the Caribbean are on the rise but it is not certain whether this is due to capital liberalisation forces. However, it seems that the expansion in private capital inflows could be a significant catalyst for investment booms in the region.

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Appendix.

Variables	Description
NC	Private Capital Inflows
GB	The Respective Country's Fiscal Deficit
REER	The Real Effective Exchange Rate
$(1-\phi)$	The Real Domestic Interest Rate
$(I^*-\phi^*)$	The Real Foreign Interest Rate
Y	Real Gross Domestic Product
CC	Capital Controls
<i>privinv</i>	Private Investment
<i>Credit</i>	Credit to the Private Sector
<i>Extdebt</i>	External Debt
<i>Gdp</i>	Nominal Gross Domestic Product
<i>Privcap</i>	Private Capital Inflows
C	Constant

Long Run Estimates For Selected ARDL Models
Dependent Variable-NC

Table A1.

ARDL Model (0,0,0,0,0,0)

Barbados			
Regressors	Coefficient	Standard Error	T-Statistic
GB	0.44146	0.16671	2.6480
REER	-1.2054	0.53645	-2.2470
$(1-\phi)$	1.4859	5.9295	0.25059
$(I^*-\phi^*)$	1.7061	6.2318	0.27377
Y	4.7184	3.0275	1.5585
CC	0.60709	2.3744	0.25568
C	-370.4912	258.6429	-1.4324

Table A2.

ARDL Model (1,0,0,1,0,0)

Guyana			
Regressors	Coefficient	Standard Error	T-Statistic
GB	-0.7824000	0.4017000	-1.9475
REER	0.0085377	0.0081608	1.0462
$(1-\phi)$	0.22725	0.32660	0.69579
$(I^*-\phi^*)$	1.1651	0.69618	1.6736
Y	0.0017599	0.0037855	0.46490
CC	0.04636	0.079091	0.58712
C	-25.4765	17.1486	-1.4856

Table A3.

ARDL Model (1,1,0,0,0,0,0)

Jamaica			
Regressors	Coefficient	Standard Error	T-Statistic
GB	-0.041094	0.034545	-1.1896
REER	-19.6451	17.7507	-1.1067
(1- ϕ)	32.5850	21.6575	1.5046
(1* - ϕ *)	-40.1434	51.8278	-0.77455
Y	9.2975	19.7089	0.47174
CC	-3.0297	4.5188	-0.67045
C	580.3164	1260.0	0.46056

Table A4.

ARDL Model (0,0,0,0,0,0,0)

Trinidad and Tobago			
Regressors	Coefficient	Standard Error	T-Statistic
GB	0.027005	0.091385	0.29551
REER	2.2067	4.6327	0.47632
(1- ϕ)	64.8460	40.4982	1.6012
(1* - ϕ *)	25.8590	31.0388	0.83312
Y	4.8575	6.3984	0.75918
CC	0.34574	5.5336	0.062480
C	-1127.4	777.7155	-1.4496

Long Run Estimates of Selected ARDL Models
Dependent Variable- *prinv*

Table A5.

ARDL Model (1,1,1,1,0)

Guyana			
Regressors	Coefficient	Standard Error	T-Statistic
<i>Credit</i>	0.0024449	0.016501	0.14817
<i>Extdebt</i>	0.070607	0.0056808	12.4292
<i>Gdp</i>	0.12429	0.015258	8.1462
<i>Privcap</i>	31.5767	6.3803	4.9491
C	-420.6294	97.1158	-4.3312

Table A6.

ARDL Model (1,0,0,0,0)

Barbados			
Regressors	Coefficient	Standard Error	T-Statistic
<i>Credit</i>	-0.0090099	0.0085667	-1.0517
<i>Extdebt</i>	0.016153	0.077086	0.20954
<i>Gdp</i>	0.023119	0.020423	1.1320
<i>Privcap</i>	0.016366	0.21009	0.077900
C	8.0560	38.1183	0.21134