THE IMPACT OF FULL REMOVAL OF CAPITAL ACCOUNT CONTROLS ON FOREIGN DIRECT INVESTMENT (FDI) FLOWS FOR BARBADOS USING AN IMPULSE RESPONSE FUNCTION

TREVOR CAMPBELL*

Abstract

This paper seeks to examine the impact of full removal of capital account controls on real FDI flows for Barbados using an impulse response function. The results show that considerable volatility takes place in the first five years but since this activity occurs above the original equilibrium, the outturns are beneficial to Barbados. A new equilibrium is reached during the twelfth year with net real FDI flows expanding by $3 million. Since the new equilibrium is higher than the former equilibrium, the data for this study suggest that Barbados will attract additional net FDI inflows if capital controls are eliminated.

Keywords: FDI, full removal of capital account controls, real domestic income, relative wage costs and foreign exchange reserves.

1. INTRODUCTION

Over the last few years, the issue of capital account controls has attracted the attention of many countries around the globe, especially since the Asian crisis of 1997. It appears that a significant amount of research on capital controls has focused on its effect on private investment, especially portfolio investment and direct investment. However, Asiedu and Lien (2004) advance the view that most developing countries, in particular the countries in dire need of foreign capital, receive very little portfolio investment. Consequently, in the case of developing countries, it seems more realistic to examine the impact of the removal of capital controls on FDI, especially since FDI is known to promote economic activity.

* Trevor Campbell is a former Senior Economist with the Central Bank of Barbados.

Barbados is a small open economy and its foreign reserves are crucial to its survival. It is part of the CARICOM Single Market and Economy (CSME) and is obliged under the CSME agreement to remove exchange control restrictions on capital account transactions within the union. However, given that the other countries within the Area do not have exchange controls on extra-regional capital transactions, any relaxing of such controls by Barbados with CARICOM is tantamount to opening-up to the rest of the world. While the removal of capital controls in Barbados is likely to attract foreign exchange from abroad, any loss of confidence in the country or unfavourable change in policy may be accompanied by a reduction in FDI from foreign countries or an increase in FDI to abroad by locals. These have the potential to place Barbados' fixed exchange rate regime and independent monetary policy at risk.

The country has therefore adopted a gradual approach towards the removal of capital account controls.

It is because of the above-mentioned factors that an attempt is being made to address the impact of the full removal of capital controls on FDI for Barbados. The next section will review the literature on FDI as well as capital controls, while Section 3 will briefly examine the trends in FDI for Barbados during the 1970 to 2004 period. Section 4 seeks to ascertain whether the full removal of capital controls is likely or not to improve FDI flows to Barbados and this will be followed by a conclusion.

2. REVIEW OF SOME OF THE LITERATURE ON FDI AS WELL AS CAPITAL CONTROLS

The literature on FDI and on capital controls has provided some interesting results for readers. Campbell and Gill (2005) sought to identify variables that explained inward FDI to Barbados in the long and short run using an Engle-Granger two-step method for the period 1970-2003. It was discovered that in the long run, FDI was influenced by real income from abroad, real domestic income, foreign and domestic prices, relative wage costs and relative interest rates, while with the exception of real income from abroad, all of the other explanatory variables impacted upon FDI in the short term.

Asiedu and Lien (2004) examined whether FDI was boosted or hindered by the presence of capital controls. They identified three types of capital control policies: namely the existence of multiple exchange rates, controls on the capital account and the stringency of requirements for the repatriation

and/or surrender of export proceeds and on FDI flows. Further, they tried to ascertain how each capital control measure affected FDI across seventy-five developing countries over the 1970-2000 period. Overall, the authors found that capital controls deterred FDI but that the impact had changed over time. Prior to the 1990s, the only restriction that had a significant impact on FDI was the exchange rate structure. However, in the 1990s, all three measures of capital controls were influential, implying that investors had become discriminatory and punitive over time. In addition, the impact on liberalisation varied by region. Capital account control was the only significant policy for East Asian and Pacific countries whereas the exchange rate system and export restrictions were both important determinants of FDI in Latin America and the Caribbean. None of the instruments had any effect on FDI in Sub-Sahara Africa, the Middle East and North Africa.

The paper by Desai, Foley and Hines (2004) attempted to analyse how foreign affiliates of US multinational firms responded to capital controls and their removal. They concluded that these foreign affiliates circumvented capital controls by regularising dividend remittances and relocating profits. However, evading capital controls in this way was costly, given the tax and other business considerations that would otherwise guide dividend repatriations and trade between related prices. Countries imposing capital controls had significantly higher interest rates than similar countries without capital controls did. Together, the costliness of avoidance and higher interest rates raised the cost of capital, significantly reducing the level of FDI. Capital account liberalisations were associated with reversals in these patterns.

Carlson and Hernandez (2002) analysed restrictions both on the capital account and repatriation of export proceeds on the composition of capital flows. Data from sixteen middle income countries were used in this exercise. Unlike the previous writers, they found no significant relationship between FDI and capital controls, a result also obtained by Hernandez, Mellado and Valdes (2001).

Work by Morisset (2000) showed that Africa had not been successful in attracting FDI over the past few decades. When these countries were able to attract multi-national companies, it was principally the result of their natural resources and the size of their domestic market. However a few sub-Saharan African countries had generated the interest of international investors by improving their business environment, suggesting that they could become competitive internationally and attract FDI on a sustainable level.

The study by Montiel and Reinhart (1999) looked at the impact of capital controls on the composition of capital flows for fifteen emerging markets.

They reached the conclusion that capital controls did appear to alter the composition of capital flows, reducing the share of short-term and portfolio flows while increasing that of FDI.

3. TRENDS IN FDI MOVEMENTS IN BARBADOS

Since Barbados is a country which is highly dependent on inward FDI, it is no surprise that FDI inflows to that country have significantly offset outward FDI transactions to abroad. According to the Balance of Payments Publication of Barbados, between 1970 and 2004, outward FDI flows by Barbadians have never exceeded $10 million, the highest being $7.8 million in 2004. Prior to that year, the $5 million figure has been surpassed only once, in 1993, when $5.3 million was invested overseas. On average, FDI flows by Barbadians to abroad accounted for just over one percent of Barbados' total overseas long-term private sector capital outflows.

FDI inflows to Barbados have presented a somewhat different picture when compared to FDI outlays to foreign countries. From 1970 to 1975, FDI inflows averaged some $28 million and were responsible on average for seventy-five (75) percent of total long-term private sector capital inflows into Barbados. With the exception of 1974, the leading component of inward FDI movements was miscellaneous FDI, followed by undistributed earnings and investment in branches and subsidies.

Between 1977 and 1986, FDI inflows to Barbados were not as dominant as in the earlier years but still maintained their importance in Barbados. It was during this period that FDI was dominated by manufacturing and oil companies. Most foreign firms produced electronic components and clothing in the sub-sectors and they accounted for just over 70 percent in manufacturing. In the case of electronic components, firms assembling these items attracted approximately three-fifths of branch investments and parent company loans while the producers of textiles received one-third of reinvested earnings and accounted for nearly all market loans (see Codrington, 1987).

There was some recovery in the following sixteen years, as FDI inflows grew overall by $34.5 million, surpassing that of the expansion of the early 1970s, but its ratio to total long-term private sector capital inflows was lower with a pick-up in the remaining private sector investment categories. However, during this period, the composition of FDI had somewhat changed as investment in branches and subsidiaries replaced miscellaneous FDI as the leading FDI indicator. Barbados benefited from its highest FDI inflow in 2003, when a total of $116.5 million was recorded. This performance was

driven by foreign inflows resulting from the acquisition of a private local company by a foreign enterprise in addition to higher investment in branches by their parent companies based abroad. However, in 2004, there was a reversal of FDI inflow patterns for Barbados, when a decline of $24.2 million was registered.

According to the United Nations Conference on Trade and Development's (UNCTAD) FDI/Transnational Corporation (TNC) World Investment Report (2003), since 1990, Barbados has enjoyed its highest FDI inflows from Canada (approximately $100 million or $8.4 million annually). This has been followed by inward investment from the USA. FDI inflows from the UK were significant but ceased after 1994. Between the latter period of the 1990s and 2004, other FDI inflows have come from China, Columbia, Germany, Malaysia and the Republic of Korea.

4. MODEL SPECIFICATION, METHODOLOGY AND DATA

(a) Model Specification

Our model of FDI is expressed as follows

$$\underset{? \quad + \quad -}{NFDI = f\,(CAP, Y, RW)} \tag{1}$$

where NFDI represents net FDI inflows to Barbados, CAP represents full removal of controls on the capital account, Y is real domestic income and RW is relative wage costs. The relationship between full removal of capital account controls and net FDI is ambiguous, depending on whether FDI inflows exceed FDI outflows to abroad or vice versa. If the former occurs, then the relationship will be a positive one, while an inverse relationship is expected if the latter response occurs. Higher real domestic income should increase net FDI on the strength of additional profitable opportunities for Barbadian firms and more readily available domestic funds for financing. An increase in the domestic wage costs relative to the foreign wage costs is likely to make net FDI inflows unattractive for Barbados, thereby leading to a decline in the dependent variable.

(b) Methodology and Data

A cointegration approach is being used for the estimation of the model. This involves (a) testing for cointegration, (b) testing over and exact identifying restrictions, and (c) using generalized impulse response analysis. This

procedure is based on the maximum likelihood estimation of a vector autoregressive (VAR) system.

Consider the following VAR of order p in the (n+1)- vector of variables z_t:

$$z_t = a + c_t + \sum_{i=1}^{p} \phi_i z_{t-1} + \xi_t, \qquad t = 1,2,3,\ldots. \tag{2}$$

where a and c are (n+1) vectors of intercepts and trend coefficients and ϕ_i, i = 1,……p, are (n–1) × (n+1) matrices of coefficients. Z_t is partition as $z_t = [E_t X'_t]$ where E_t represents the dependent variable, net FDI inflows and X_t is an n-vector of forcing variables, t = 1, 2, ……. . Note that ξ_t is a vector of Gaussian errors. The assumption made here is that:

the roots of $| I_{n+1} - \sum_{i=1}^{p} + \Phi_i z^i | = 0$ either lie outside the circle unit $|z| = 1$ or satisfy the condition z = 1. Such an assumption allows the elements of z_t to be of order zero, one or cointegrated. By the process of re-parameterizing, the unrestricted vector error correction (VEC) form of (2) is given by:

$$\Delta z_t = a + c_t + \Pi z_{t-1} + \sum_{i=1}^{p-1} \acute{\Gamma}_i \Delta z_{t-1} + \xi_t, \; t = 1, 2,\ldots.., \tag{3}$$

where $\Pi = - (I_{N+1} - \sum_{i=1}^{p} \Phi i)$ and $\acute{\Gamma} = \sum_{j=_{t+i}}^{p} \Phi j$, i = 1, …, p-1, are the (n+1)x (n+1) matrices of long-run multipliers and short-run dynamics coefficients respectively.

Since the matrix Π controls the cointegration properties, the rank (r) of Π determines the number of cointegrating vectors in the system. There are three cases:

Case 1: Π has full rank and any linear combination of z_{t-1} is stationary. This allows us to estimate our normal VAR in levels.

Case 2: Π has reduced rank, which implies that there are some linear combinations of z_t that are stationary, so that z_t is cointegrated. VAR in levels is consistent but inefficient (Koop *et al.*, 1996) and a VEC must be estimated.

Case 3: Π has zero rank, so that no linear combinations of z_{t-1} are stationary. Δz_t is stationary with no integration. In this case, a normal VAR in first differences can be estimated.

In case 2, the matrix Π can be expressed as $\Pi = \alpha\beta'$ where α and β are both (k+1) x (r) matrices of full column rank; β is the matrix of cointegrating vectors and α is the matrix of "weighting elements".

The test statistics for determining the cointegrating rank, based on the hypothesis that the rank is at most (k-r) against the alternative that the rank is (k-r-1), are the trace statistics given by:

$$Q_t = -T \sum_{i = T-1}^{k} \log (1- \lambda_i)$$

and the maximum eigenvalue statistic given by $Q_{max} = -T \log (1- \lambda_{T-1}) = Q_t - Q_{t-1}$ where λ_i is the largest eigenvalue. The critical values in both cases can be found in Osterwald-Lenum (1992).

Once the model has been estimated, its dynamism is investigated with the use of the impulse response (IR) function to measure the time profile of the effect of shocks on future states of the system. An IR Function traces the effect of a one standard deviation shock to one of the innovations on current and future values of the endogenous variables. The responses that occur in the initial periods after the shock will explain the behavior of the system in the short run, whereas the responses that occur in later periods will provide insights about the long run effects.

Two different IR functions can be computed, namely the standard Orthoganalised IR function popularized by Sims (1980) and the Generalized IR function by Koop et al (1996) and Pesaran and Shin (1996). The Orthogonalised IR functions are not unique and depend on the particular ordering of the VAR. This is so because the orthogonalised IR functions are obtained by employing a Cholesky decomposition of the covariance matrix of the shocks ξ_t in equation 2 above, which creates a problem because the Cholesky decomposition is non-unique. Generalized IR functions, by construction, circumvent the problem of dependence of the orthogonalised IR functions on the ordering of the VAR. In this study, emphasis is therefore being placed on the Generalised IR functions.

The study uses annual data from the Annual Statistical Digest of the Central Bank of Barbados and the International Financial Statistics Yearbook of the International Monetary Fund for the period 1970-2004. Real GDP has been used as a proxy for real domestic income and the wage index of Canada has been used as a proxy for foreign wage costs. In all cases, the base year used in this study is 1990. In attempting to arrive at a measure for the removal of capital account controls, we are guided by Eichengreen (2002), who argues that most studies use a dummy variable for the presence or absence of controls. The dummy variable will assume values of zero prior to 1998, when there were no controls except one thereafter. EVIEWS 5.0 was used to perform the estimations.

(c) Results

Since the main objective for embarking on cointegration analysis is to study the long-run co-movement of a group of variables, an investigation of the order of integration of the individual series has to be undertaken. All of the variables have been found to be integrated of the first order, that is, I(1). The results, with the use of the technique used by Phillips-Perron (1988), which looked at the mean changing unit root test, are shown in Table 1.

Our attention is now turned to selecting the order of the VAR, ρ. With a short time period (35 observations), we cannot run the risk of over-parameterization and therefore choose to restrict the order of the VAR to two (2). In this case, one must ensure that the individual equations do not exhibit problems of serial correlation. The Akaike Information Criteria (AIC) and the Swartz Bayesian Criteria (SBC) each select the order of one (1) with an intercept and trend. Furthermore, an examination of the residuals of the error correction model for serial correlation provides a clean bill of health for the order of one (1). Hence this order has been chosen.

Table 1. Phillips-Perron Unit Root Test

	Intercept & Trend (Level)	95% critical value	Intercept & Trend (First Difference)	95% critical value
NFDI	-3.154	-3.548	-9.785	-3.552
Y	-3.098	-3.548	-4.786	-3.552
RW	-2.211	-3.548	-5.155	-3.552

Table 2 provides the results for the test for cointegration based on the trace eigenvalue statistics. These strongly reject the null hypothesis that no cointegration relationships between the variables (namely r = 0) exists, but indicate that there is one cointegration relationship between them. The maximum eigenvalue statistics were also calculated, but not reported, since they yielded the same conclusions. Maximum likelihood estimates of the cointegrating vector are obtained by imposing Johansen Exactly Identifying Restrictions.

Table 2. Tests For The Number Of Cointegrating Vectors (Trace Statistics)

Null	Alternative	Statistic	95% Critical Value
r = 0	r = 1	43.86901	40.17493
r < 1	r = 2	18.17192	24.27596
r < 2	r = 3	6.338365	12.32090

Let us now turn our attention to tables 3 and 4 below. Table 3 shows us that all of the variables are statistically significant at the 5 percent level. Further, it provides us the results of the long-run cointegration equation normalised on net FDI. It shows that the removal of capital account controls will boost net FDI inflows for Barbados. Further, a per unit increase expansion in real domestic income will increase net FDI inflows by some $0.11 million while a similar expansion the real wage costs will decrease net FDI by $0.77 million.

Table 3. Long-Run Cointegrating Equation (Normalised on FDI)

NFDI	1.000
CAP	36.76 (11.338)
Y	0.105 (0.0257)
RW	-0.768 (-0.2159)
INTERCEPT	6.421

Note: Standard Errors given in parenthesis

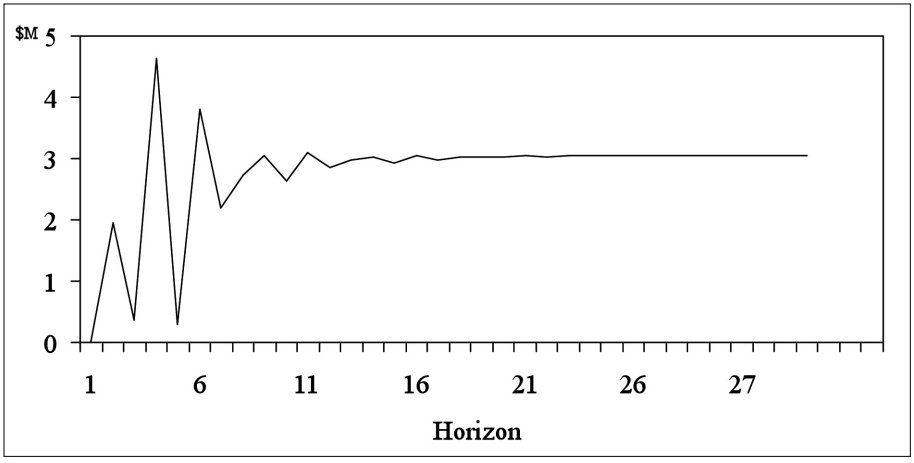
In table 4 below, it should be observed that the explanatory variables, namely the full removal of capital account controls, real domestic income and relative wage costs, are forcing variables since, when the system is in disequilibrium, equilibrium will then be achieved by the response of one or a combination of these variables. The error correction term is negative and also significant at the 5 percent level and its coefficient of 0.638 shows that any disequilibrium experienced by this model will be corrected by around 64 percent each year, for a period of just over a year.

Table 4. Speed Of Adjustment From Disequilibrium

NFDI	-0.638 (0.2262)
CAP	-0.0014 (0.0024)
Y	1.816 (1.524)
RW	0.016 (0.042)

Note: Standard Errors given in parenthesis

Figure 1. Response of Net FDI Inflows to The Full Removal of Capital Account Controls



Source: Central Bank of Barbados

We now turn our attention to the impulse response function analysis (Figure 1), which seeks to look at the response of net FDI inflows to a shock in capital account control regime, which in this case, is the full removal of capital account controls. Figure 1 indicates that a standard error or unit shock to the capital account control policy will cause net FDI inflows to behave in a very unstable manner over the first five years. Fortunately, the expansions and slowdowns which occur during this period are above the original equilibrium, and are therefore beneficial to Barbados. After the sixth year, however, there is less volatility and more smoothing of net FDI inflows to Barbados with a new and higher equilibrium of around $3 million occurring around the twelfth year. The results of this model imply that if capital account controls are fully removed, then net real FDI inflows to Barbados will move to a higher equilibrium and improve by $3 million. This result is promising since an increase in FDI gives rise to higher foreign exchange receipts and boosts foreign reserves, which are the lifeblood of the Barbadian economy. Further, rising FDI inflows result in increasing economic activity. One would therefore expect to see a rise in the level of employment and this should improve Government's revenue intake both through direct and indirect taxes. The Government, in turn, will then be able to use some of these proceeds to further enhance the country's infrastructure.

CONCLUSION

Over the years, Barbados has been extremely cautious in its approach to the removal of capital account controls. This is understandable since the maintenance of its current exchange peg and the independence of its monetary policy are some of its top economic priorities. Indeed, its fixed exchange rate peg of Bds $2 per US dollar has been maintained since 1975. However, this study shows that removal of capital account controls will improve net real FDI proceeds to Barbados by approximately $3 million over the long-term. In other words, the maintenance of capital controls will hinder inward FDI into Barbados. An increase in FDI inflows will increase the net foreign reserves of the country and give rise to higher economic activity. This will in turn generate higher employment, resulting in additional Government revenues.

It is important to note however, that the capital account comprises FDI, portfolio investment and other investments (for example, long-term loans and trade credits). Net portfolio investment transactions for Barbados have generally been negative, suggesting that Barbadians have always been more eager to purchase these financial instruments from overseas than foreigners have been to acquire local securities. Net movements from the other investment category have been for the most part positive and, in some cases, have actually surpassed net FDI inflows. Therefore, while the results of this study are encouraging for Barbados, it may be argued that the impact of the full removal of capital account controls on other categories of the capital account can be taken into consideration, before reaching a definitive position on this matter.

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Résumé

L'étude démontre que l'enlèvement des contrôles entraîne une volatilité importante au cours des cinq premières années mais, comme le niveau d'activité est supérieur au niveau originaire, il y a des bénéfices pour Barbade. Un nouveau équilibre, plus élevé, est atteint après douze années ce qui suggère que Barbade peut attirer davantage des capitaux si les contrôles sont éliminés.