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DO TOURISM RECEIPTS CONTRIBUTE TO THE SUSTAINABILITY OF CURRENT ACCOUNT DEFICITS IN BARBADOS

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Do Tourism Receipts Contribute to the Sustainability of Current Account Deficits in Barbados

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Abstract

Given Barbados' recent history of persistent current account deficits and its reliance on tourism as a major source of foreign exchange and driver of the economy, this paper investigated the contribution of tourism receipts to the sustainability of Barbados' current account deficits in the long-run. Utilizing the inter-temporal budget approach of Hakkio and Rush (1991) and Husted (1992), and the conditions outlined by Quintos (1995), we found that Barbados' current account deficits were weakly sustainable as a result of tourism's contribution. Without tourism, Barbados' trade balance exhibited no indication of sustainability, underlining the island's dependence on the industry. Due to our finding of only weak sustainability, a number of implications arise with respect to the vulnerability of the Barbadian economy to external shocks and the over-reliance on an increasingly vulnerable tourism sector. Careful and proactive measures should be taken to ensure that drastic changes to the economic framework of Barbados are unnecessary in the medium- to long-term. Policies must be put in place to lower deficit levels in the future and to reduce the over-reliance on a single sector. Indeed, further diversification of the Barbadian economy, and Barbadian exports by extension, should be at the forefront of policymakers' thinking and discussions in charting a way forward for the island. Indeed, further diversification of the Barbadian economy, and Barbadian exports by extension, should be at the forefront of policymakers' thinking and discussions in charting a way forward for the island. The EPA provides opportunities for such diversification. Efforts to slow down the growth in credit by the monetary authorities, as well as fiscal incentives provided by the Government for using credit for foreign exchange earning purposes are other avenues that should be explored.

Keywords: inter-temporal budget approach, current account sustainability,

JEL classification:

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1. Introduction

An essential indicator of the general performance of a country's economy is the health and sustainability of its current account balance, which represents a country's trade in goods and services with the rest of the world. As the health of the current account is very susceptible to changes in the economic fortunes of a country's trading partners, close attention must be paid to the persistent deficits which characterize the current accounts of many countries, particularly developing countries. Such deficits by themselves are not a problem, as expanding economies oftentimes record current account deficits in response to increased import demand from citizens and investors. Nonetheless, it is the sustainability of these deficits, and the ability of countries to finance the resulting debts which accompany them, that pose great concern.

Unsustainable current account deficits can lead to a number of problems for small open economies. Issues can arise concerning the repayment of foreign debts, and may in turn lead to the reluctance of larger countries and international institutions to lend to the affected country. There are also concerns about the ability of countries with fixed exchange rates to maintain their pegs given the imbalance in their current accounts.

For a small open economy like Barbados, the matter of current account sustainability is of critical importance given the country's fiscal profile. Debt has exceeded 100 percent of GDP, and current account deficits have averaged 8 percent of GDP in recent years. The issue holds even greater resonance within the context of the recent downgrading in 2009 of the country's economy and currency by international rating agency, Standard and Poor's, and the associated

negative outlook, which has implications for the cost of external funds to help finance future deficits.

Tourism is a mainstay of the Barbadian economy. Over the last three decades, and particularly since the early 1990s, the country has become increasingly reliant on this sector to such an extent, that tourism has become the key driver behind the economy's growth, and the primary Earnings from the tourism industry are thus critically important to the health of Barbados' external current account.

Against this background, this study seeks to assess the sustainability of Barbados' current account deficits over the period 1990Q1-2006Q4. While recent studies (see Coppin et al., 2005; Greenidge et al., 2007) have examined the sustainability of current account deficits in Barbados, this study goes further by analyzing whether tourism earnings have an impact on such sustainability and, if it exists, the nature of such sustainability. The framework used to analyse the current account balance is an intertemporal method by Hakkio and Rush (1991) and Husted (1992), and modified by Quintos (1995). It allows us to assess whether deficits are sustaibable, and also the degree of sustainability.

The paper continues as follows. Section 2 provides a contextual background for the problem of persistent current account deficits in Barbados. Section 3 provides a brief review of the relevant literature. Section 4 outlines the theoretical framework and also describes the statistical methods employed. Section 5 presents the results and analysis. Section 6 provides concluding remarks.

2. A Contextual Background of Current Account Deficits in Barbados

During 2006, the visible trade deficit expanded by BBD $329.4 million[1] (16.2 percent) to $2,359.1 million. Visible trade payments were $3,288.6 million, up from $2,894.0 million in 2005, which represented the largest outflow over the previous 10 years. This expansion was in the main caused by a higher volume of merchandise imports, specifically in capital and intermediate goods imports.

As a consequence of the strong import growth, high international energy prices, and a moderate decline in tourist arrivals, severe pressure was placed on the Net International Reserves (NIR). For example, the modest rise of $42.5 million in the NIR in 2006 was primarily the proceeds foreign borrowing in the amount of $130 million during the year. Other significant increases in the NIR, such as in 1994, 1995, 1999, 2000, 2001, 2005 and 2006 were supported by high amounts of foreign borrowing. While Barbados registered a surplus on the capital and financial account ($732.6 million) in 2006, $103 million above the balance recorded in 2005, this was insufficient to offset the external current account deficit.

Several factors can be identified as responsible for persistent current account deficits in Barbados. First, there is a huge and rapidly growing import bill. At the end of 2005, retained imports amounted to $2911.0 million, a growth of 11.3 percent over the previous year. Further, the price of oil had more than doubled, moving from USD $30 per barrel to the then

[1] All figures in the paper are in Barbados dollars (BBD $2 = USD $1).

unprecedented level of USD $70 per barrel by the end of 2005. Figure 1 shows the close relationship between the trade deficit and current account deficits from 1990-2006.

Second, Barbados has inherited a weak export structure that was too heavily reliant on preferential access of agricultural commodities to the European Market (Arthur, 2005; Francis et al., 2009). It has been argued that the price concessions and guaranteed access for many African, Caribbean and Pacific (ACP) States' exports to the European Union (EU) encouraged many ACP states to remain heavily dependent on a few traditional primary products that are hardly competitive in the global market place. As such, it is believed that trade preferences, such as the four successive Lomé Conventions, contributed to inefficiency in production in many developing countries, including Barbados. The view is that such preferences merely served to provide a safety net for inefficient and non-innovative exporters, who could not otherwise survive in the open international export market.

Third, the external problems facing the Barbadian economy can also be traced to macroeconomic forces affecting the country (Arthur, 2005; Francis et al., 2009). A surge in credit creation in excess of the growth in liquid assets in the financial system puts additional pressure on a country's international reserves. As noted in the Central Bank of Barbados *Annual Report 2005*, the robust growth in imports was reflected by the surge of non-financial private sector credit relative to the rate of growth in deposits. During this period, commercial bank credit to the non-financial private sector grew by $687.2 million (23.3 percent) compared to a growth of only 11.2 percent growth in domestic deposits during the year, marking the largest annual growth in credit

since 1972. The situation was exacerbated by a reduction in import duties from 45 percent on average during the 1980s to 20 percent at present, as more outward-oriented policies were pursued, advocated by institutions such as the IMF and World Bank—the Washington Consensus[2]—which oppose import protection. This reduction in duties not only lowered the cost of extra-regional imports into Barbados, but also increased the competitive position of imports.[3]

Figure 1 also shows that the tourism balance (net tourism receipts), an important determinant of the current account, was always positive over the period under study, 1990-2006, never falling below 6 percent of GDP, highlighting its contribution to the economy and, by extension, current account balances. Over the period, travel credits consistently made up approximately 50 percent of total credits to the current account, with no other inflow coming close in terms of its contribution. On average, 15 percent of real GDP was attributed to tourism, with approximately 11 percent of the labour force being employed in the sector.

In sum, given Barbados' problem of surging imports and weak merchandise export performance, it falls mainly to the tourism sector to generate an amount of foreign exchange necessary to compensate for the growing demand of imported consumer goods and the inadequate performance of other traded sectors of the Barbadian economy. The question as to whether

[2] The basic argument supporting this view is that openness to foreign competition and capital and elimination of export biases would engender structural change in accordance with the dictates of comparative advantage.

[3]Arthur (2005) discusses other factors such as: the significant reduction in revenue generation from offshore financial services transactions and international business; the consolidation of all of Barbados' indirect taxes into one Value Added Tax; trade liberalization efforts under the auspices of the World Trade Organization; the implementation of the CARICOM Common External Tariff (CET); the Organization for Economic Cooperation and Development harmful tax competition initiative that threatened the survival of the international business and financial sector; and China joining the World Trade Organization and its subsequent production of most of the world's textiles.

tourism receipts are able to sustain the level of current account deficits in Barbados will be answered in the upcoming sections.

3. Literature Review

In the literature on sustainability of current account deficits, Hakkio and Rush (1991) and Husted (1992) were among the first to employ an inter-temporal budget approach. Hakkio and Rush established that if government spending and government revenue were cointegrated and the cointegrating vector (1, -*b*) was equal to (1, -1), then government budget deficits were sustainable over the long run. The authors found that from 1964 to 1988, United States (US) government spending and revenue appeared not to be cointegrated, but using a larger sample ranging from 1950Q2-1988Q4, the relevant variables were indeed cointegrated; however, the cointegrating factor, *b*, was less than 1, which violated the necessary condition for sustainability. Thus, Hakkio and Rush concluded that the budget deficit was unsustainable. Husted also used this approach to test the sustainability of US current account deficits but took the issue of structural breaks in the data into account. Excluding structural breaks, the US current account appeared to be non-stationary which implied unsustainability of the deficits. Taking structural breaks in the data into account, and re-testing for cointegration between the variables, his results generally indicated that the deficits were sustainable.

Quintos (1995) building on the work of her predecessors, tested for cointegration between US government expenditures and revenues over different sample periods. She established that a weaker condition of sustainability could be used to characterize the post-break period when

cointegration does not appear to hold or when the cointegrating factor *b*, lies between 0 and 1. This weaker condition requires that the necessary and sufficient condition for sustainability is that the growth in debt be less than the growth in the mean interest rates of that debt. While her results generally supported those of Hakkio and Rush (1991), Quintos was able to prove that the accumulated debt in recent years was "mildly explosive" but still sustainable, albeit in a weaker sense.

Apergis et al. (2000) and Gulcan (2008) employed similar approaches to the previous authors in testing for deficit sustainability of the Greek and Turkish current accounts respectively between 1960-1994 in the case of Apergis et al. and 1992:Q1-2006:Q1 for Gulcan. Both studies allowed for structural breaks in the data after initially finding results which implied unsustainable current accounts. Again, no long-run relationship was found in the Turkish analysis, but was present in the Greek case. This implies that Turkish current account deficits were not sustainable and measures should have been taken to reverse this position so as to prevent further problems to the economy (Gulcan, 2008), while Apergis et al. concluded that the Greek current account deficits were indeed sustainable and efforts to devalue the local drachma to correct these deficits were unnecessary.

Two other studies were conducted on current account sustainability in Turkey and both yielded similar results to that done by Gulcan (2008) with current account deficits found to be unsustainable. Ogus and Sohrabji (2008) utilized the inter-temporal benchmark model to test the current account's inter-temporal solvency, as well as tested for cointegration between actual and

optimal net external liabilities from 1992-2004. They found that the inter-temporal solvency position was not valid and further, there was also no cointegration between the actual and optimal net external liabilities. Due to the presence of structural breaks in the latter part of the data, the authors believe that this conclusion may not be valid for latter years. The other Turkish study by Ongan (2008) utilized the traditional approach outlined by Hakkio and Rush (1991), Husted (1992) and Quintos (1995). However, this study's purpose was to examine the contribution of the tourism sector to the sustainability of the current account deficits. Despite tourism's increasing contribution to the current account balance, Ongan still found that persistent deficits were unsustainable in the long-run, especially after considering structural breaks in the data caused by capital account liberalization and exchange rate regime changes.

Yol (2009) analysed the long-run sustainability of current account deficits of three African countries—Egypt, Morocco and Tunisia—using the bounds testing approach to cointegration. Yol, utilizing a sample from 1972-2005 for each country, found cointegrating relationships existing between exports and imports in all cases. The author found that the cointegrating factors for Egypt and Morocco were statistically different from one, while that of Tunisia was statistically equal to unity. Without reference to the strong and weak conditions of sustainability, Yol concluded that in the long run, current account deficits in Egypt and Morocco were unsustainable, but were sustainable in Tunisia's case.

Two recent papers investigated current account deficit sustainability in Barbados. Coppin et al. (2005) and Greenidge et al. (2007) used different approaches in evaluating this issue. The

former utilized the 'signals approach' to identify indicators which can be used to predict current account crises 24 months in advance, while the latter utilized the previously discussed inter-temporal budget constraint approach by Hakkio and Rush (1991) and Husted (1992). Both studies found that Barbados' current account deficits were sustainable. Coppin et al. found that from 1998-2003, current account deficits were sustainable because the probability of a crisis did not exceed critical values of 25 percent or 50 percent. However, the study did not address the nature of sustainability. Greenidge et al. found that from 1960-2006, exports and imports were cointegrated and concluded that the deficits were sustainable. Again, the latter did not offer a conclusion on the nature of sustainability. While the authors normalized their cointegrating vector on imports rather than exports as outlined in the literature (see Hakkio and Rush, 1991; Husted, 1992; Quintos, 1995), their results appear to suggest the strong form sustainability.

4. Theoretical Framework, Statistical Methods and Data

4.1 *The Models*

The model utilized for the purpose of our research is that made popular by Hakkio and Rush (1991) and Husted (1992) and later enhanced by Quintos (1995). The model begins with the assumption that an economy is characterized by an individual with a budget constraint without restrictions on borrowing and lending in international financial markets. As such we have:

$$C_t = Y_t + B_t - I_t - (1+r_t)B_{t-1} \tag{1}$$

where C_t represents present levels of consumption; Y_t represents current income levels; B_t is current levels of borrowing (lending); I_t is current investment; r_t represents the current global rate of interest and $(1+r_t)B_{t-1}$ is debt accumulated in previous periods (borrowing plus interest

incurred). Given that this identity must hold for all time periods *t*, successive budget constraints can be combined over time to arrive at the economy's intertemporal budget constraint, given by:

$$B_t = \sum_{t=1}^{\infty} \varphi_t TB_t + \lim_{n\to\infty}(\varphi_n B_n) \tag{2}$$

where $TB_t = X_t - M_t (= Y_t - C_t - I_t)$ represents the trade balance at time *t*; X_t is exports; M_t is imports; and φ_0 denotes the discount factor defined as the product of the first *t* values of φ.

Assuming that the second term on the right hand side of Equation 2 is equal to zero, this suggests that the level of borrowing at time *t* is equal to the present value of future trade deficits. Given this condition, we must now derive a testable model to determine whether $\lim_{n\to\infty}(\varphi_n B_n) = 0$ holds.

Equation 1 can be rewritten as:

$$Z_t + (1+r_t)B_{t-1} = X_t + B_t \tag{3}$$

where $Z_t = M_t + (r_t - r)B_{t-1}$ and *r* represents the unconditional mean of the world interest rate, which is assumed to be stationary. Hakkio and Rush (1991) and Husted (1992) show that we can further simplify this model to obtain the testable empirical model:

$$X_t = a + bM_t + \xi_t \tag{4}$$

Quintos (1995) argues a necessary and sufficient condition for sustainability is that $0 < b \leq 1$ while cointegration is only a sufficient condition. Thus, if X_t and M_t are cointegrated and $b = 1$, then the strong form of sustainability exists. If cointegration exists, but $0 < b \leq 1$ or, there is no cointegration but $b = 1$, then the weak form of sustainability holds. Finally, if there is no cointegration and $b = 0$, then the current account is not sustainable in the long run.

Following Ongan (2008), our focus is on the importance of tourism receipts to the sustainability of current account balances, given the high dependence of the Barbadian economy on this sector. Accordingly we introduce tourism receipts and expenditures into our model. As tourism receipts, TR_t are included in the credits of the current account, we include that variable on the left hand side Equation 4. Additionally, expenditures on tourism, TE_t, is also a component of the debits in the current account and thus we add that variable to the right hand side of Equation 4. This gives rise to our second empirical model:

$$X_t + TR_t = a + b(M_t + TE_t) + \xi_t \tag{5}$$

where $X_t + TR_t$ represent current account receipts and $M_t + TE_t$ denote current account disbursements to Barbados' trading partners.

Equations 4 and 5 will both be used to test current account sustainability, that is, without and with the inclusion of the tourism receipts and expenditure. These results will allow us to determine whether the tourism industry has a significant impact on the long-term health of the Barbadian current account.

4.2 *Statistical Methods*

Several unit root tests are used to determine the stationarity property of the variables. First, the KPSS test by Kwiatkowski, Phillips, Schmidt, and Shin (1992) is employed. As the series used in the study are quarterly and there may be the possibility of seasonal effects, we test for the presence of seasonal unit roots using the HEGY procedure by Hylleberg et al. (1990). This test is used to assess the separate influence of seasonal and non-seasonal components. The test for

quarterly data is based on the following regression which is estimated by ordinary least squares (OLS):

$$\varphi(L)x_t = \pi_1 x_{1,t-1} + \pi_2 x_{2,t-1} + \pi_3 x_{3,t-1} + \pi_4 x_{4,t-1} + \mu_t + \varepsilon_t \tag{6}$$

where $\varphi(L) = (1 - L^4)$ is the seasonal differencing operator; $x_{1,t-1} = (1 + L + L^2 + L^3)x_{t-1}$; $x_{2,t-1} = -(1 - L + L^2 - L^3)x_{t-1}$; $x_{3,t-1} = -(1 - L^2)x_{t-1}$; $x_{4,t-2} = -(1 - L^2)x_{t-2}$; μ_t is a set of deterministic components such as a constant, three seasonal dummies, or linear time trend; and ε_t is a white noise process. A *t* test is used to examine the significance of π_1 and π_2 respectively; and an *F* test is used for the joint significance of π_3 and π_4. Failure to reject $\pi_1 = 0$ means that the series possesses a unit root at the zero frequency, that is, the series possesses a nonseasonal unit root; failure to reject $\pi_2 = 0$ means that there is a unit root at the semi-annual or biannual frequency; and finally, failure to reject $\pi_3 = \pi_4 = 0$ means that the series possesses a unit root at the annual frequency. A rejection of all three hypotheses implies that the series is stationary. Critical values are found in Hylleberg et al. (1990, pp. 226-227). Finally, since unit root tests have reduced power if they are applied to time series with a structural break(s), we utilize the test by Lanne et al. (2002), which takes structural breaks into account. Critical values are found in Lanne et al. (2002, p. 678).

The maximum likelihood method developed by Johansen (1988, 1991) is utilized to test for the presence of a long-run relationship. Johansen (1991) proposes two test statistics for testing the number of cointegrating vectors: the trace and the maximum eigenvalue statistics. The null hypothesis for the trace test is that there are at most *r* cointegrating vectors, while for the max

eigenvalue test, the null $r = 0$ is tested against the alternative that $r = 1$; $r = 1$ is tested against the alternative $r = 2$; and so forth. The Schwarz Information Criterion (SIC) is used to select the number of lags required in the cointegration test. Finally, to examine whether any short-run relationships exist, the Granger-causality test developed by Granger (1969) is employed.

4.3 *Data*

Observations on imports, exports, tourism receipts and tourism expenditure are observations are from 1990Q1-2006Q4 and were obtained from the Central Bank of Barbados database. Tourism receipts are proxied by tourism credits. As there is no readily available data for tourism expenditure, we use the tourism component of GDP. All series are logged for estimation purposes.

5. Results and Analysis

5.1 *Unit Root Tests*

Plots of all series are shown in Figure 2. Each variable has an upward trend, suggesting that they may be non-stationary. Results from the unit root tests are presented in Table 2. The KPSS and Lanne et al. (2002) tests indicate all series are integrated of order 1. The HEGY procedure also supports these results, that is, it finds that each variable possesses a nonseasonal unit root only.

5.2 *Sustainability of Trade Deficits*

First, we test for the presence of a cointegrating relationship between exports and imports, using the Johansen procedure. Both the trace and maximum eigenvalue test find no evidence of

cointegration (see Table 3) which implies that the trade balance is not strongly sustainable. We then test for the weak form of sustainability[4] ($b = 1$ against the alternative of $b < 1$) of the trade deficit by estimating Equation 4. Estimates are show below:[5]

$$\log X_t = \underset{(0.198)}{1.678***} + \underset{(0.025)}{0.767} \log M_t *** \tag{7}$$

The hypothesis that $b = 1$ is strongly rejected and we infer that Barbados' trade balance is also weakly unsustainable as $0 < b < 1$. That is, the trade balance is neither strongly or weakly sustainable. Short-run dynamics indicate that X_t Granger-causes M_t ($\chi^2 = 14.741$, $p = 0.012$).

5.3 *Sustainability of Current Account Deficits*

Next we account for the role of tourism inflows on current account sustainability by including tourism receipts and expenditure in our model (Equation 5). Results from the Johansen test are presented in Table 4, and indicate the presence of cointegration. As it is possible that structural changes over the period under study could have significant impacts on our vector error correction model (VECM) and may well produce biased results if they are not considered, we test for the stability of the VECM using the Chow forecast (CF) test by Chow (1960). The CF test tests against the alternative that all coefficients including the residual covariance matrix may vary. It rejects the null hypothesis of constant parameters for large values of the test statistic. As opposed to choosing specific break dates to conduct the test, we use a search grid of 1991Q4-2006Q4 to carry out the test. The test statistic for each quarter in the search range fails to reject the null of constant parameters for each period over the search grid; *p*-values range from a low of

[4] The hypothesis that $b = 0$ against the alternative of $b \neq 0$ is tested first.
[5] Standard errors are in parentheses. *** indicates statistical significance at the 1% level.

0.102 in 1998Q4 to 0.950 in 1996Q2. Stability of the VECM allows us to conclude that that the deficits are sustainable in the long-run. Estimates from Equation 5 are shown below:

$$\log(X_t + TR_t) = \underset{(0.187)}{2.304}*** + \underset{(0.024)}{0.699}\log(M_t + TE_t)*** \quad (8)$$

The nature of sustainability is tested and the hypothesis that $b = 1$ is strongly rejected. Current account deficits are thus sustainable; however, sustainability exists only in a weak sense when we consider the effect of tourism.

In the VECM, the error-correction term is negatively signed (-0.091) and significant at 5 percent in the $X_t + TR_t$ vector, suggesting that $X_t + TR_t$ adjusts to restore short-run deviations from long-run equilibrium. This is consistent with the notion that the government provides incentives and other forms of support to attract higher numbers of arrivals to increase earnings from tourism given its key role in providing necessary foreign exchange and keeping the economy afloat.

Our finding of long-run current account deficit sustainability is in agreement with the two aforementioned studies for Barbados, Coppin et al. (2005) and Greenidge et al. (2007). We, however, find that deficits are only weakly sustainable. In Greenidge et al.'s study, to which our research can be more readily compared, their results imply strong-form sustainability of the deficits. One reason for the disparity could be the samples employed (annual data from 1960-2006 for Greenidge et al. versus 1990Q1-2006Q4 for our study). The composition of the Barbadian economy and the international trading environment would have been quite different to the post-1990 period, which we investigated. Certainly, from 1960-1966, Barbados was still a colony of Britain and had limited discretion to pursue its own policies. While balanced budgets

or small deficits were indeed the norm (DaCosta, 2007), the likelihood of budget support from Britain, should the need have arisen, would have had a bearing on the behaviour of the local fiscal authorities. Basically, the probability of support would have been akin to insurance. Prior to 1967 then, current account dynamics were to some extent a function of Barbados' colonial relationship with Britain. Another possible reason for the disparity in results may lay in the fact indicated earlier, that Greenidge et al.'s cointegrating vector was normalized upon current account outflows rather than inflows. Our result also differs from that by Ongan (2008) who also analyzed the impact of tourism receipts on current account deficit sustainability but found that tourism receipts did not result in sustainability of current account deficits in Turkey.

It is also useful to analyze the short-run dynamics generated by Equation (8). According to the associated VECM, $M_t + TE_t$ Granger-cause $X_t + TR_t$ ($\chi^2 = 13.660$, $p = 0.034$). This result suggests that when authorities increase tourism expenditures, for marketing the country, to provide and improve necessary infrastructure or other purposes, that receipts from tourism increase as a consequence.

5.4 *Forecasts*

Finally, we forecast the deficits implied by the unrestricted vector autoregressive (VAR) model (model that does not include tourism receipts and expenditures) derived from Equation (7) and the VECM (model that does include tourism receipts and expenditures) derived from Equation (8) for the horizon 2007Q1-2011:Q4. Results are presented in Tables 5 and 6.

Point forecasts from the VAR (see Table 5) indicate that exports will average $5,419.2 million per quarter (growing at 3.0 percent each quarter or 12.6 percent on an annualized basis) while imports will average $8,354.4 million (growing at 4.9 percent each quarter or 21.1 percent on an annualized basis). This implies an average trade deficit of $2,935.2 million every quarter ($11,740.8 million each year). More specifically, our forecasts show that the deficit is expected to deteriorate each and every quarter in the forecast horizon (see Figure 3, panel (a)). Although its growth rate fluctuates significantly, it is always positive with the exception of 2008Q4 (see Figure 3, panel (b)). The forecast of continued deterioration in the trade deficit is consistent with our lack of finding evidence of sustainability.

Table 6 shows that current account receipts are expected to average $4,607.1 million for the next five years. These inflows have positive growth until 2008Q3 and negative growth thereafter, growing overall at a quarterly rate of -0.8 percent (-3.2 percent on an annualized basis). In contrast, current account outflows average $6,344.0 million/quarter growing at a quarterly rate of 0.9 percent (3.6 percent on an annualized basis). Put another way, the growth rates suggest that the gap between current account inflows and outflows is expected to grow. The implied current account deficit over the next 5 years shows that its growth will be explosive in the first 5-7 quarters, and declines exponentially as time passes, even becoming negative (see Figure 4, panel (b)). Current account deficits will average $1,636.8 million/quarter ($3,547.2 million a year), growing at the quarterly rate of 11.5 percent (8.3 percent on an annualized basis), which is mainly due to the projected high rates of growth from 2007Q2-2008Q3. By the first quarter of 2010 when the growth rate becomes negative, an improvement in the current account balance is

predicted (see Figure 4, panel (a)), which supports our earlier conclusion about the sustainability of the external deficit as a consequence of tourism inflows.

Finally, the difference between projected deficits when we account for tourism receipts is $1,198.3 million/quarter on average ($4,793.2 million a year). Benefits of tourism receipts to current account balance are anticipated to grow over time (see Figure 5); the contrast between the two deficits becomes especially stark from 2010Q1 onward.

5.5 *Implications*

Our results, if valid, hold several implications for Barbados. First, they suggest, as expected, that without a high level of earnings from tourism, the country is unable to sustain the gap between inflows and outflows on its current account. Second, these findings underscore the high and growing dependence of the country on a sector that is highly vulnerable to external shocks, such as economic and financial crises, natural disasters, political instability, wars, crime, terrorism and disease outbreaks. Moreover, Barbados' main tourism source markets are either mature (United Kingdom) or in decline (the US and Canada), which reduces their ability to help maintain the sustainability of the current account. We propose that Barbados must make greater efforts at diversification of its economy to combat its tourism dependence. If these broader efforts fail, then it becomes critical that there must be diversification of its tourism markets, as well as attempts to resuscitate markets in decline.

Third, the condition $0 < b < 1$ indicates that Barbados' debt exhibited a high degree of inertia over time, or, in other words, growth in Barbados' debt was less than the growth in the average interest rates on that debt,. On the other hand, this condition also holds potentially dire economic and social consequences for Barbados. Countries that continue to spend more than they earn have a higher risk of default and would have to offer increasingly higher rates of interest to service their debt, reducing the resources available for other necessary services.

The prudent choice by the Government would be to introduce mechanisms to stem the rate of outflows and at the same time increase inflows. We pointed out earlier that a weak export structure and excess credit creation helped to increase the gap between current account inflows and outflows. These are two areas that should be targeted.

With respect to the weakness of the export structure, the recently signed Economic Partnership Agreement (EPA) with the European Union (EU) is one avenue that could help to address the inherent weakness. Indeed, the EPA presents opportunities for restructuring the economy and institutional framework in Barbados. This will require adaptation, the enhancement of human, legal and institutional capacity, and the embrace of new technologies. However, these necessary adjustments will depend largely on the political will of policymakers as resistance by domestic economic agents with vested interests in maintaining the *status quo* is likely (Lorde et al., 2010).

As expansion in credit creation was fuelled mainly by the commercial banking system, it would be incumbent on the monetary authorities to slow this growth by making greater use of the tools

at their disposal. On the other hand, fiscal incentives from the Government, such as investment tax credits for investing in sectors that earn foreign exchange is another way in which credit growth can be helpful to the economy.

Fourth, and finally, because sustainability is weak, any sufficiently strong external shock, such as a rapid increase in the price of oil, might sever the long-run relationship between current account inflows and outflows, perhaps resulting in the deficit becoming explosive. Such extreme deterioration in the island's external positions would undoubtedly place added pressure on the island's net international reserves and accordingly its commitment to the current fixed exchange rate regime.

6. Conclusion

Given Barbados' recent history of persistent current account deficits and its reliance on tourism as a major source of foreign exchange, this paper and driver of the economy, investigated the contribution of tourism receipts to the sustainability of Barbados' current account deficits in the long-run. Utilizing the inter-temporal budget approach of Hakkio and Rush (1991) and Husted (1992), and the conditions outlined by Quintos (1995), we found that Barbados' current account deficits were weakly sustainable as a result of tourism's contribution. Without tourism, Barbados' trade balance exhibited no sign of sustainability, underlining the island's dependence on the industry in maintaining a relatively healthy Balance of Payments.

Our findings generally agree with those of Coppin et al. (2005) and Greenidge et al. (2007), who both found sustainability of Barbadian current account deficits. However, due to our finding of only weak sustainability, a number of implications may arise with respect to the vulnerability of the Barbadian economy to external shocks and the over-reliance on an increasingly vulnerable tourism industry. Careful and proactive measures should be taken to ensure that drastic changes to the economic framework of Barbados are unnecessary in the medium- to long-term. Policies must be put in place to lower deficit levels in the future and to reduce the over-reliance on a single sector. Indeed, further diversification of the Barbadian economy, and Barbadian exports by extension, should be at the forefront of policymakers' thinking and discussions in charting a way forward for the island. The EPA provides opportunities for such diversification. Efforts to slow down the growth in credit by the monetary authorities, as well as fiscal incentives provided by the Government for using credit for foreign exchange earning purposes are other avenues that should be explored.

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Table 1: Net International Reserves (BBD million)

Year	Changes in Net International Reserves (- increase/+decrease)	Bonds and Notes	Changes in Net International Reserves without Foreign borrowing (- increase/+decrease)
1990	88.7	-44.4	44.3
1991	80.3	29.3	109.6
1992	-58.8	-15.6	-74.4
1993	-41.9	1.1	-40.8
1994	-118.1	90.9	-27.2
1995	-82.8	80.8	-2.0
1996	-173.2	-8.0	-181.2
1997	-36.1	-48.0	-84.1
1998	11.0	-48.2	-37.2
1999	-73.9	90.0	16.1
2000	-356.0	200.0	-156.0
2001	-445.4	300.0	-145.4
2002	47.7	-20.0	27.7
2003	-136.9	-20.0	-156.9
2004	312.9	-24.9	288.0
2005	-46.1	250.0	156.8
2006	-42.5	130.0	87.5

Source: Central Bank of Barbados *Balance of Payments of Barbados 2006*

Table 2: Unit Root Tests

Series	KPSS	Lanne et al. (2002)	HEGY		
			π_1	π_2	$\pi_3 \cap \pi_4$
log(X)	(a) 0.977*** (b) 0.224	(a) 1.056 (b) -5.768***	-0.223	-4.584***	6.050*
log (M)	(a) 0.993*** (b) 0.174	(a) -0.179 (b) -3.578***	-0.284	-7.400***	57.115***
log (X+TR)	(a) 0.982*** (b) 0.268	(a) -0.108 (b) -2.283*	-0.250	-6.712***	46.246***
log (M+TS)	(a) 0.993*** (b) 0.180	(a) -0.153 (b) -3.514***	-0.288	-7.291***	55.809***

Notes: Results at the level are denoted by (a) and those at first difference are denoted by (b) for the KPSS and Lanne et al. tests. *** indicates significance at the 1% level; ** indicates significance at the 5% level; and * indicates significance at the 10% level.

Table 3: Cointegration Test Results for Trade Deficits

Null hypothesis	Alternative hypothesis	Test statistic	P-value
Trace test			
r = 0	r $\leq$ 1	10.325	0.608
r = 1	r $\leq$ 2	2.555	0.667
Max. Eigenvalue test			
r = 0	r = 1	7.769	0.575
r = 1	r = 2	2.555	0.667

Table 4: Cointegration Test Results for Current Account Deficits

Null hypothesis	Alternative hypothesis	Test statistic	P-value
Trace test			
r = 0	r ≤ 1	20.331**	0.049
r = 1	r ≤ 2	3.139	0.555
Max. Eigenvalue test			
r = 0	r = 1	17.192**	0.031
r = 1	r = 2	3.139	0.555

Notes: Figures in parentheses are standard errors. ** indicates significance at the 5% level.

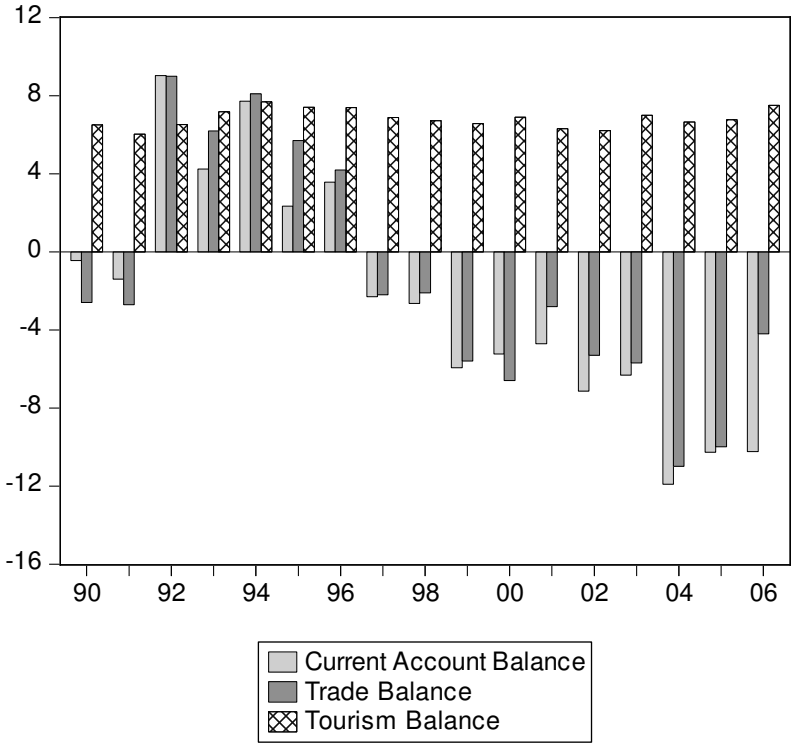
Table 5: Forecast of Trade Deficits

Period	*X* (BBD $m)	*M* (BBD $m)	Deficit (BBD $m)	Growth in *X* (%)	Growth in *M* (%)	Growth in Deficit (%)
2007Q1	3,979.7	4,867.5	-887.8	-	-	-
2007Q2	4,219.2	5,198.4	-979.2	6.0	6.8	10.3
2007Q3	4,225.9	5,605.5	-1,379.7	0.2	7.8	40.9
2007Q4	4,525.5	6,062.7	-1,537.2	7.1	8.2	11.4
2008Q1	4,569.9	6,476.7	-1,906.8	1.0	6.8	24.0
2008Q2	4,799.0	6,835.2	-2,036.1	5.0	5.5	6.8
2008Q3	4,830.6	7,148.7	-2,318.1	0.7	4.6	13.8
2008Q4	5,108.4	7,403.0	-2,294.7	5.8	3.6	-1.0
2009Q1	5,171.5	7,656.8	-2,485.2	1.2	3.4	8.3
2009Q2	5,384.9	7,943.4	-2,558.5	4.1	3.7	2.9
2009Q3	5,425.7	8,276.6	-2,850.9	0.8	4.2	11.4
2009Q4	5,674.0	8,663.8	-2,989.8	4.6	4.7	4.9
2010Q1	5,750.6	9,098.1	-3,347.5	1.4	5.0	12.0
2010Q2	5,945.2	9,551.4	-3,606.2	3.4	5.0	7.7
2010Q3	6,008.2	10,005.6	-3,997.4	1.1	4.8	10.8
2010Q4	6,254.7	10,434.8	-4,180.1	4.1	4.3	4.6
2011Q1	6,358.8	10,842.8	-4,484.1	1.7	3.9	7.3
2011Q2	6,574.6	11,246.5	-4,671.9	3.4	3.7	4.2
2011Q3	6,668.0	11,665.5	-4,997.5	1.4	3.7	7.0
2011Q4	6,910.3	12,104.9	-5,194.6	3.6	3.8	3.9
Average	**5,419.2**	**8,354.4**	**-2,935.2**	**3.0**	**4.9**	**10.1**

Table 6: Forecast of Current Account Deficits

Period	*X + TR* (BBD $m)	*M + TE* (BBD $m)	Deficit (BBD $m)	Growth in *X + TR* (%)	Growth in *M + TE* (%)	Growth in Deficit (%)
2007Q1	4,581.2	4,882.8	-301.6	-	-	-
2007Q2	4,727.5	5,220.6	-493.1	3.2	6.9	63.5
2007Q3	4,844.0	5,623.4	-779.4	2.5	7.7	58.1
2007Q4	4,920.3	6,066.7	-1,146.4	1.6	7.9	47.1
2008Q1	4,980.2	6,424.3	-1,444.1	1.2	5.9	26.0
2008Q2	5,021.7	6,689.8	-1,668.1	0.8	4.1	15.5
2008Q3	5,038.7	6,866.7	-1,828.0	0.3	2.6	9.6
2008Q4	5,033.8	6,951.8	-1,918.0	-0.1	1.2	4.9
2009Q1	4,981.4	7,020.0	-2,038.6	-1.0	1.0	6.3
2009Q2	4,891.4	7,050.7	-2,159.2	-1.8	0.4	5.9
2009Q3	4,775.4	7,040.3	-2,264.9	-2.4	-0.1	4.9
2009Q4	4,645.3	6,988.1	-2,342.8	-2.7	-0.7	3.4
2010Q1	4,527.9	6,865.1	-2,337.2	-2.5	-1.8	-0.2
2010Q2	4,423.0	6,693.1	-2,270.1	-2.3	-2.5	-2.9
2010Q3	4,328.6	6,498.3	-2,169.7	-2.1	-2.9	-4.4
2010Q4	4,244.6	6,298.6	-2,054.0	-1.9	-3.1	-5.3
2011Q1	4,158.1	6,126.7	-1,968.6	-2.0	-2.7	-4.2
2011Q2	4,075.2	5,981.6	-1,906.4	-2.0	-2.4	-3.2
2011Q3	4,002.3	5,856.0	-1,853.7	-1.8	-2.1	-2.8
2011Q4	3,941.9	5,734.9	-1,793.0	-1.5	-2.1	-3.3
Average	**4,607.1**	**6,344.0**	**-1,736.8**	**-0.8**	**0.9**	**11.5**

Figure 1: Current Account, Trade and Tourism Balances as % of GDP 1990-2006



Source: Central Bank of Barbados *Balance of Payments of Barbados 2007*

Figure 2: Variables 1990Q1-2006Q4

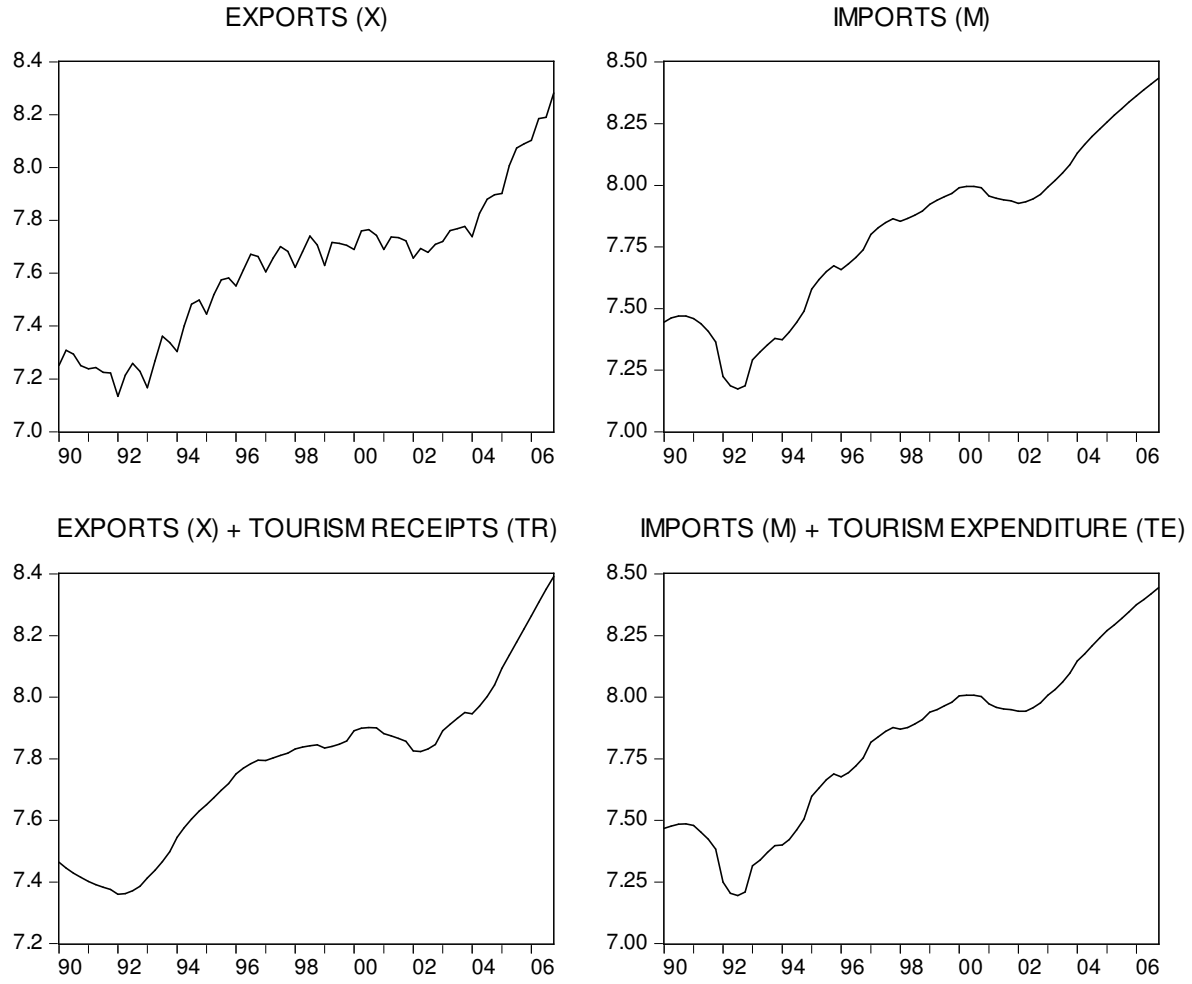


Figure 3: Forecast of Trade Deficit

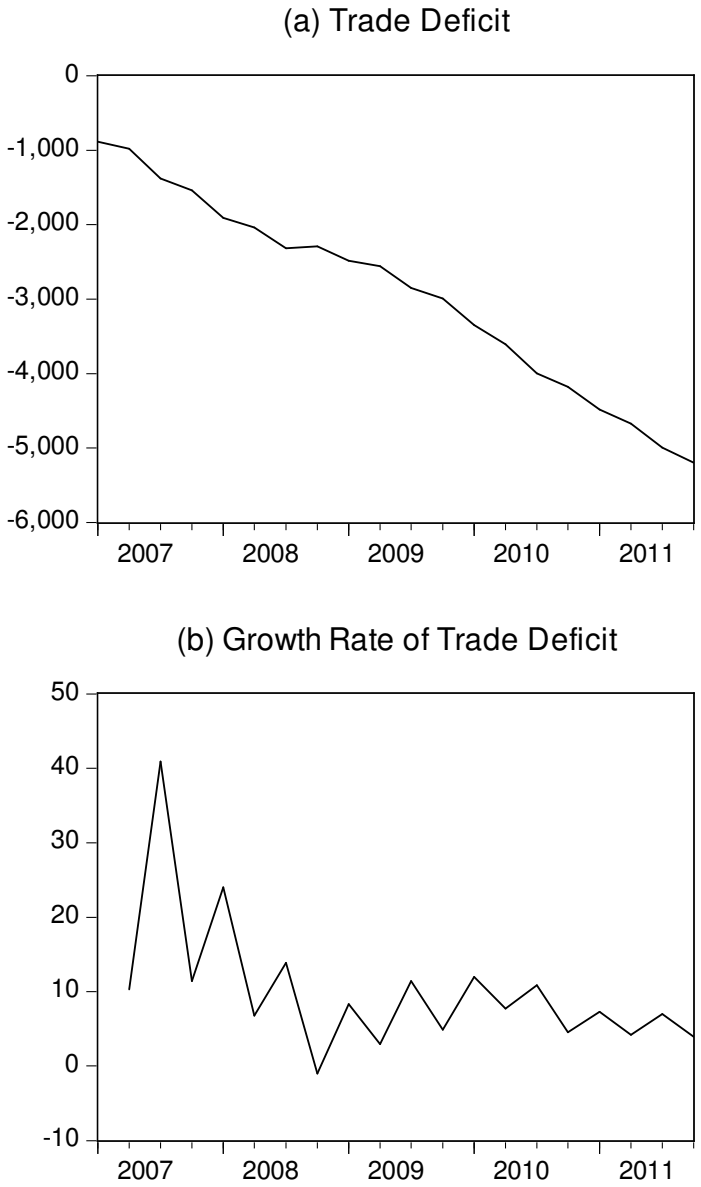
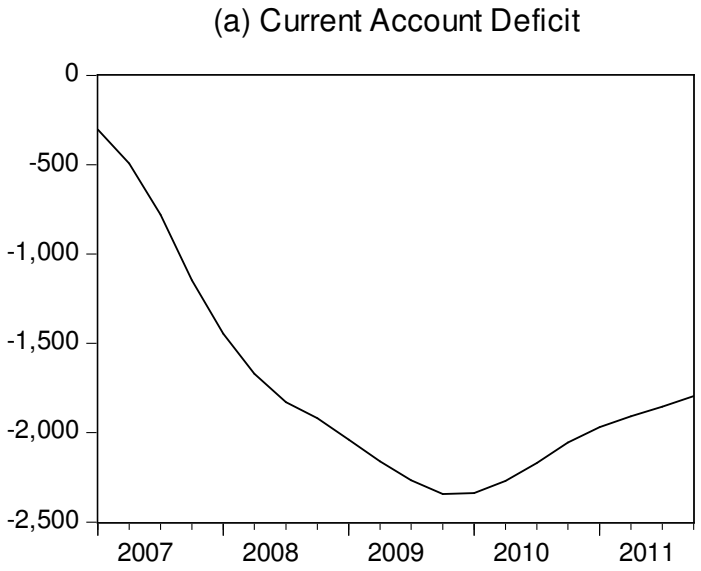


Figure 4: Forecast of Current Account Deficit



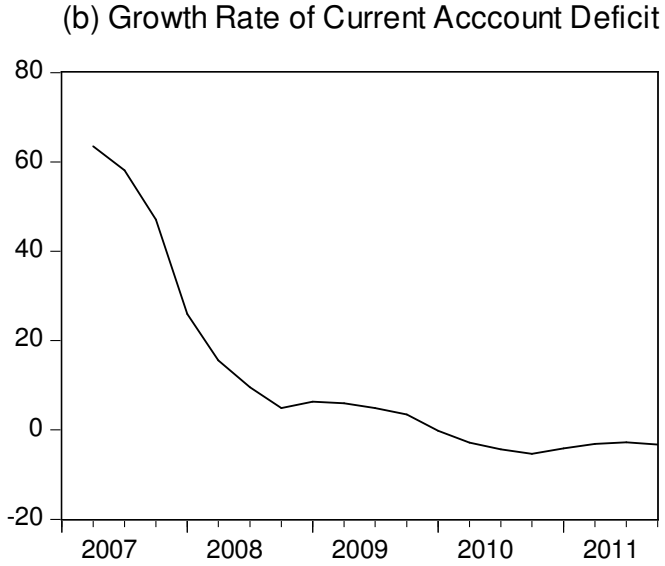


Figure 5: Forecast of Difference in Deficits when Accounting for Tourism Receipts