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Current Account Dynamics and The Real Effective Exchange Rate: The Jamaican Experience

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Abstract

It is generally agreed that, particularly for a small open economy, changes in the real effective exchange rate can have a significant impact on economic activity by altering the relative returns in the tradeable and non-tradeable sectors. It is, however, a long held view that this standard prediction may not necessarily hold for Jamaica. There has been very little empirical investigation of this proposition. As such, this paper explores the dynamics of Jamaica's current account and the real effective exchange rate (REER). Short-run and long run responses are investigated. The results broadly suggest that the real exchange rate does not play a significant role in determining the major elements of the Jamaican current account. The overriding policy issue that arises from these observations is the usefulness of the real exchange rate as a tool for correcting Jamaica's external imbalance, as well as a metric that signals losses or gains in competitiveness.

Keywords: REER, current account, competitiveness
JEL Classification: **F31, F41**

[1] The views expressed are those of the authors and do not necessarily reflect those of the Bank of Jamaica

I. INTRODUCTION

The current account of the balance of payments is a statistical record of exports and imports of goods and services and transfers (Sodersten and Reed (1994))[2]. It measures the extent to which an economy is a net borrower or net lender vis-à-vis the rest of the world over a particular period. The current account balance is the outcome of investment and saving decisions of optimising agents[3]. Against this background, the behaviour of the current account is an important indicator of the resource balance in the domestic economy and as such is a critical variable in macroeconomic policy making.

Chronic current account deficits imply an excess of domestic absorption over aggregate supply/income. It has been a long held view that one way to correct current account deficits is to allow for a depreciation in the real exchange rate, which would alter international trading decisions through changes in relative prices. In this context, the policies advocated to redress Jamaica's current account deficit essentially involves nominal exchange rate adjustments above the inflation differential of Jamaica vis-à-vis its major trading partners. The primary motivation for this paper is to identify whether this proposition is valid for Jamaica. That is, this paper seeks to explore the influence of the real exchange rate and other factors on selected components of the current account over the period 1990 to 2001, in particular, imports and the major components of exports, including tourism.

The assessment suggests that the Real Effective Exchange (REER) does not play a significant role in the determination of the major components of Jamaica's current account in the short-run. In particular, no demand response for Jamaica's tourist product to changes in income among Jamaica's trading partners is indicated. In the long run, while some category of exports and imports respond appropriately to both changes in income and relative prices, the elasticities for the majority were counter to apriori expectations. In this context, the results suggest that policy aimed at correcting the current account deficit through real exchange rate changes may be ineffective.

[2] For alternative and more elaborate definitions of the current account, see the IMF's Balance of Payments Manual (1993) and Balance of Payments Textbook (1996).
[3] See Sachs (1981).

The remainder of the paper is structured as follows: Section II provides a brief review of the literature on current account determination to inform the choice of the model. A discussion on the REER and the other macroeconomic variables, which will be used to explain the current account dynamics, is also included in this section. Section III presents some of the stylised facts on the structure and major characteristics of Jamaica's current account. The data and estimation procedure are discussed in Section IV. Section V contains the results and analysis from the empirical investigation, while section VI offers some concluding remarks.

II. THEORETICAL BACKGROUND

1. The Real Exchange Rate (RER) and the Current Account

The standard theoretical representation of RER is the ratio of the price of non-tradable (Pn) to tradable (Pt) goods: $e = Pn/Pt$. A real exchange rate depreciation occurs when the price of tradables increases relative to the price of non-tradable goods.

There is, however, no exact empirical measure of the RER as the separation of goods and services into tradable and non-tradable categories is difficult to determine in practice[4]. Even where one is very familiar with the production and consumption patterns, the division can be arbitrary and the selection criteria are not transferable from one country to another. For this reason, economists and policymakers often rely on the real effective exchange rate (REER), which is an index based on the ratio of foreign and domestic consumer prices, to approximate the real exchange rate.

The REER can be broadly defined as $e= (r/r^*). (P/P^*)$ where r is the domestic exchange rate expressed in units of foreign currency, r* is a composite of trading partner exchange rates, P is a domestic price index and P* is a foreign price index. Based on the theory of purchasing power parity (PPP), the domestic exchange rate should adjust to compensate for any change in relative prices or trading partners' exchange rates and hence, the real exchange rate should remain in equilibrium. Sustained departures from the

[4] See Henry (2001) for a discussion.

equilibrium/base year value due to insufficient nominal exchange rate flexibility are sometimes used to explain external and internal imbalances, indebtedness and growth performance. The real exchange rate is thus usually accorded a great deal of attention in explaining the pattern of resource allocation and sectoral performance in an economy.

Two broad approaches are typically used to explain the impact of real exchange rate changes on the current account. The first, the *elasticities approach*, holds that an appreciation (depreciation) in the REER should result in higher (lower) levels of imported goods and services, and lower (higher) exports. This, given that imports would have become cheaper (more expensive) while exports would have become relatively more expensive (cheaper). The extent to which these changes may be realized will depend on the relative elasticities associated with export and import commodities. If, for example, a country relies heavily on imported intermediate inputs, i.e., there are no close substitutes; depreciation in the nominal exchange rate may not stimulate changes in imports, as the price elasticity of demand is low.

This idea is summarised in the Marshall-Lerner condition, which states that devaluation will have a positive effect on a country's balance of payments if the sum of the elasticities of demand for its exports and imports is greater than unity[5]. The converse holds if it is less than unity. Dornbusch (1988) also noted that the relative impact of adjustments to the REER on the current account depends on the extent to which domestic demand can switch from tradables to non-tradables, as well as the domestic economy's ability to generate additional output to meet export demand.

The absorption approach is based on the idea that the current account is equivalent to the difference between national income and domestic absorption arising from private and public consumption and investment. Devaluation affects the current account directly through its effects on real income and absorption and indirectly on the income elasticity of absorption.

[5] The condition is based on highly simplified assumptions.

2. Macroeconomic and Other Factors

In addition to the REER, there are a number of factors that may impact international trading decisions. The volume of commodity exports will depend on the extent of domestic demand for these commodities. If the local demand is high, then more of that commodity or service will be consumed domestically - less will be exported[6]. This level of excess demand can be proxied by the extent to which real spending or gross domestic product (GDP) deviates from full employment output.

Fluctuations in a country's trading partners' real income may also impact the demand for exports. Assuming that export commodities are normal goods, as the income of trading partners' increases, the demand for Jamaican exports should expand. In addition, exports may be influenced by past developments and future expectations of international developments. This argument provides justification for the introduction of lags and leads in empirical models. Other variables that could impact exports include the degree to which the export market is open (barriers to trade) and the level of subsidies given to local producers.

On the import side, consumers respond to relative price movements and actual and expected changes in income. In the case of price movements, if foreign goods become cheaper relative to domestically produced substitutes, local demand for imported goods should increase. However, adjustments of imports arising from relative price changes may not be instantaneous due to contractual arrangements with suppliers.

Imports should increase as income rises. By extension, if local spending is high relative to potential output, this should lead to an increase in the demand for imports as local supplies are exhausted.

Of importance, irregular and structural changes may affect both supply and demand. However, their impact may be difficult to quantify. An irregular change may take one of

[6] This assumes that supply is finite in the short-run.

two possible forms: a one-time shock with an instantaneous adjustment or a shock with a gradual adjustment. If the impact of the shock is instantaneous, it may be possible to capture the influence of this factor with a dichotomous variable. Structural changes may include adjustments to the tariff structure, the introduction or removal of import licenses and direct quantitative controls over imports.

III. THE JAMAICAN CURRENT ACCOUNT & THE REAL EXCHANGE RATE

The structure of the Jamaican current account is based on the IMF's 5th Manual. The most important sub-accounts are the goods, services and transfer accounts (see Table A1 in Appendix A). In the case of imports, this account is sub-divided into three main groups: consumer goods, capital goods and raw material imports.

As shown in Table A1, Appendix A, major traditional exports account for approximately 64.0 per cent of total goods exports over the 12-year sample period. In relation to imports, the raw materials sub-group is dominant, accounting for more than 55.0 per cent of total imports, followed by consumer goods and capital goods with shares of 25.6 per cent and 18.8 per cent, respectively. The structure of imports reflects the fact that the Jamaican manufacturing sector is heavily dependent on imported inputs. Tourism services have been the major source of exports with tourist arrivals growing at an average annual rate of 5.4 per cent during the 12-year sample period. Earnings from tourism services accounted for approximately 35.0 per cent of goods and services exports over the period.

Figures A1 and A2 in Appendix A show that both the goods and the current account deficit have been widening, especially after 1995. With the exception of 1992 and 1994, Jamaica's current account has consistently been in deficits. In fact, during the last 5 years of the sample period, the deficit on the current account grew from 4.0 per cent of GDP in 1996 to 9.0 per cent of GDP in 2001[7].

Figure A2 depicts the path of Jamaica's REER index since 1989, which was not always consistent with the trends in the current account. There are two distinct phases to the evolution: 1989/90 –1996/97 and 1997/98 –2001/02. The earlier period was dominated by high rates of domestic inflation that exceeded the rate of depreciation, despite the free float of the currency after 1990 and the absence of capital controls after 1991. Consequently, there was a trend loss of external competitiveness as measured by the REER. Policy, subsequently, was devoted to stabilizing the economy. Since March 1997,

the REER has remained generally stable. While relative prices have moved against Jamaica, this has been compensated by exchange rate depreciation. The slight fall in FY 2001/02 (0.5 per cent) was related to a spike in inflation in mid 2001, while exchange rate stability during that fiscal year was been buoyed by exceptional capital inflows and a rise in international reserves. External competitiveness has thus been preserved over the latter period.

In terms of the relationship between the current account and the REER, figure A2 indicate that there are periods where the two variables have run counter to theoretical predictions. For example, appreciation in the REER in 1992 and 1994 coincided with surpluses on the current account. Similarly in 1993 and 1995, in the context of substantial depreciation in the REER, the current account recorded significant deficits. There is, however, nothing in the literature that suggests that the current account adjustment to changes in the REER must be instantaneous. In a dynamic setting, the improvement on the current account in a particular year may be associated with depreciation in the REER in prior years. In this context, it is difficult to draw firm conclusions from figure A2. This points to the need for more rigorous empirical work to ascertain the relationship between the two variables.

[7] The jump in the current account deficit in the latter years has been related to the events of 11 September as well as shocks to the mining sector.

IV. EMPIRICAL FRAMEWORK

1. Model

Based on the elasticities approach, to study the impact of changes in the REER on the current account, the paper estimates the demand functions for various internationally traded commodities and services. Consistent with the discussion in the theoretical section, the demand for exports is given as:

$$XP_t = f(REER_t, TGDP_t, GAP_t)^{8}, \quad (1)$$
$$(-) \quad (+) \quad (-)$$

where XP_t is the volume of exports at time t; $REER_t$ is Jamaica's real effective exchange rate, $TGDP_{it}$ is the income of foreign consumers proxied by the GDP of Jamaica's trading partners, and GAP is excess demand in the domestic economy (∞<GAP<∞). Similarly imports are determined by

$$IM_t = f(DGDP_t, REER_t, GAP_t) \quad (2)$$
$$(+) \quad (+) \quad (+)$$

where *DGDP* is domestic income.

Equations (1) and (2) are estimated in log linear form. While a number of techniques are available to recover the short and long run relationships between the variables in the behavioural equations, this paper adopts the unrestricted error correction model (UECM) suggested by Bullock, Grenville and Heenan (1993)[9]. The model suggests itself as natural candidate given that the long run elasticities are easy to calculate. The short-run dynamics can also be uncovered from the equation, taking into account the response lags discussed in the preceding section. Moreover the small sample size precludes the use of multivariate frameworks such as Vector Auto Regressive (VAR) or Vector Error Correction (VEC) models.

[8] The impact of changes in tariff structures and other structural shocks are excluded from the current analysis. They will however form the basis of a very interesting extension to the current framework.
[9] See Phillips and Hansen (1990) for an alternative technique used to capture long run elasticities.

Assuming that the variables are integrated of order one, the general specification of the UECM is as follows:

$$\Delta Y_t = \alpha_i + \sum_{i=1}^{l} \beta_i \Delta Y_{t-i} + \sum_{i=0}^{k} \Phi_i \Delta X_{t-i} + \sum_{i=0}^{n} \lambda_i \Delta R_{t-i} + \gamma Y_{t-1} + \eta X_{t-1} + \varphi R_{t-1} + \varepsilon_t \qquad (3).$$

In this specification, the short-run dynamics are captured by the variables in changes, while the long run elasticities are recovered from the last three variables on the right hand side of equation (3). The long run elasticities in this formulation would be -η/γ and -φ/γ, representing the responsiveness to X and R, respectively. A general to specific modelling approach was used in which the Akaike Information (AIC) and Schwarz Information criteria were used to obtain the most parsimonious model.

To assess the significance of the overall model, we first employ an Engle and Granger (1987) test of cointegration among the variables. The presence of cointegration justifies the use and interpretability of the long run estimates produced by the model.

Of paramount importance in this single equation framework is the issue of endogeneity of the independent variables. In particular, the REER may be endogenous to the extent that shocks to imports or exports will affect the demand for foreign exchange, thus precipitating adjustments in the nominal exchange rate. Davidson and MacKinnon's (1993) version of the Hausman (1978) consistency test is used to determine whether the REER is endogenous. This test involves running an auxiliary regression, involving the suspected endogenous variable and the other explanatory variables, including a set of instruments that are likely to be highly correlated with the suspected variable, but not correlated with error process generated by the initial behavioural equations. The residual from this process is then included in the original behavioural regression as an additional explanatory variable. The system is consistent if the Hausman residual is not statistically different from zero[10]. Given that relative prices are likely to be highly influenced by monetary factors, the paper uses broad money (M3) for both Jamaica and the United

States as instruments in the Hausman test for endogeneity. Where necessary, dummy variables are added to capture any substantial shock to the dependent variable over the period.

2. Data

The analysis uses quarterly data from 1990 to 2001. Data on the components of the current account and the REER were extracted from the Bank of Jamaica's database. With the exception of the major traditional export group and tourism, for which volumes were readily available, the deflators for the remaining items had to be constructed[11]. The data on quarterly domestic real GDP, for the period 1996 to 2001 were obtained from the Statistical Institute of Jamaica (STATIN), while Allen (2001) provided estimates for the pre-1996 period[12]. Potential output is proxied by the trend component of GDP obtained by applying the Hodrick-Prescott (1997) (HP) filter. The difference between real GDP and the filtered series is a measure of the output gap. All the series were tested for seasonality and, where appropriate, seasonally adjusted.

Real GDP data for Jamaica's individual trading partners were obtained from the International Financial Statistics (IFS). In order to obtain an overall index, the data for the individual countries were weighted by the share of Jamaica's trade with these countries over the period 1996 to 1999. All the series, with the exception of non-traditional exports that had a base year of 1995 due to data limitations, were adjusted to a common base year of 1990.

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[10] See Davidson and MacKinnon (1989, 1993) for more on testing for consistency using artificial regression.

[11] See Appendix B for more on the choice of deflators.

[12] The two series were combined by extrapolating the series from STATIN with estimated growth rates taken from Allen (2001).

IV. RESULTS

1. Model Adequacy

The augmented Dickey-Fuller tests suggested that all the variables possessed a single unit root i.e. integrated of one [I (1)] (see Table A2 in the Appendix). In relation to the long run cointegrating properties of the selected models, the Engle-Granger test indicated the presence of a cointegrating relationship among the variables[13]. The results from the parsimonious UECM are given in Tables 1 through 4. The diagnostic tests indicate that the residuals are serially uncorrelated[14]. With the exception of the models for overall consumer goods, food and durable imports and coffee exports, White's (1980) test[15] for heteroscedasticity revealed that the variance of the error terms for most of the models were constant. In the instances where heteroscedasticity was present, use was made of White's heteroscedasticity consistent covariance matrix estimator. The reported OLS estimates were consistent as determined by the insignificant coefficient on the Hausman residuals (H) in each of the equations. In addition, the reported adjusted R^2 suggests that the models possess a reasonable amount of explanatory power.

2. Results

Table 1 presents the estimated demand functions for Jamaica's main exports. The estimates for alumina and bauxite exports revealed that there were no significant short-run relationship between changes in the demand for these commodities and changes (contemporaneous and lagged) in Jamaica's trading partners' real income, the REER and the GAP. The absence of any short-run response may reflect the fact that adjustments to these exports require significant capital investments, decisions which are likely to be premised on a longer-term outlook, as well as relative costs in other major producing areas of the world, and not necessarily in those countries with whom Jamaica trades[16].

[13] The Dickey-Fuller statistic was employed.
[14] Pair wise correlations of the errors generated from each UECM model suggest very weak correlations.
[15] White (1980) has derived a heteroskedasticity consistent covariance matrix estimator which provides correct estimates of the coefficient covariances in the presence of heteroskedasticity of unknown form.
[16] Leads were included, but were found to be insignificant up to four displacements.

Table 1: Regression Estimates for Exports

	Dependent Variables								
Regressors	DLALU	DLBAUX	DLTOURSA	DLSUGSA	DLBANSA	DLRUMSA	DLCOF	DLCOCOSA	DLNONTRSA
Constant	4.31 [4.25]*	6.7 [7.33]*	1.84 [5.63]*	1.44 [0.95]	2.60 [2.91]*	1.34 [0.14]	0.45 [-0.23]	7.27 [2.45]*	7.84 [2.64]*
$DLGAP_t$	-0.06 [-1.03]			0.11 [0.42]	0.02 [0.99]	0.04 [0.71]	-0.02 [-0.07]	0.18 [1.75]**	-0.00 [-0.13]
$DLGAP_{t+1}$									
DLTGDP t-2			3.28 [1.46]				11.21 [0.46]		
DLTGDP t-1			3.01 [1.22]						
DLTGDP t	1.50 [0.53]	6.38 [1.5]			1.23 [0.49]	-4.60 [-0.82]		-17.02 [-1.91]**	-0.08 [-0.03]
DV_{t-3}			-0.48 [-1.24]						
DV_{t-2}				-0.44 [-1.51]					
DV_{t-1}	0.5 [1.24]	-0.03 [-0.13]		-0.08 [-0.2]	-0.29 [-1.96]**	0.36 [1.61]	0.10 [0.29]	-0.03 [-0.17]	0.22 [0.89]
$DLREER_{t-4}$			-1.91 [-0.35]						
$DLREER_{t-3}$									
$DLREER_{t-1}$			-0.12 [-1.14]		0.49 [0.52]				
$DLREER_t$	-3.34 [-0.90]	-7.93 [-1.07]		3.79 [0.24]		2.50 [0.85]	0.70 [0.04]	5.52 [1.03]	0.55 [0.46]
DUMMY		-0.99 [-4.51]*					-0.32 [-1.58]		
$LREER_{t-1}$	0.10 [0.75]	0.11 [0.63]	-0.15 [-1.85]**	0.02 [-0.06]	-0.02 [-0.08]	0.80 [0.90]	-2.34 [-3.41]*	1.05 [0.68]	-0.04 [-0.24]
LDV_{t-1}	-1.45 [-4.73]*	-1.2 [-11.36]*	-0.88 [-5.85]*	-0.63 [-2.26]*	-0.21 [-2.19]*	-1.65 [-2.94]*	-0.67 [-4.84]*	-0.57 [-2.74]*	-0.79 [-2.80]*
LTGDP(-1)	0.49 [3.02]	-0.34 [-1.50]	0.64 [3.88]*	0.25 [0.63]	-0.31 [-1.01]	0.54 [1.01]	3.17 [3.57]*	-2.03 [-1.42]	-0.86 [-2.35]*
R2	0.59	0.82	0.61	0.62	0.36	0.57	0.53	0.45	0.40
AIC	-1.36	-1.36	-3.12	-0.09	-1.30	-0.97	0.71	0.92	-2.31
DW	1.82	1.87	1.78	1.65	1.97	2.06	2.26	1.94	2.14
H	3.53 (P=0.35)	7.94 (P=0.30)	1.71 (P=0.76)	3.49 (P=0.83)	-0.25 (P=-0.26)	-2.26 (P=-0.76)	-2.48 (P=-0.14)	-6.09 (P=-1.13)	-0.54 (P=-0.46)
Q(2)	0.01 (P=1.00)	0.21 (P=0.90)	1.43 (P=0.49)	1.91 (P=0.38)	1.28 (P=0.53)	0.19 (P=0.92)	1.53 (P=0.47)	0.23 (P=0.89)	0.29 (P=0.87)
Q(3)	0.02 (P=1.00)	1.28 (P=0.73)	1.48 (P=0.69)	1.96 (P=0.58)	1.51 (P=0.68)	2.05 (P=0.56)	1.55 (P=0.67)	0.48 (P=0.92)	0.90 (P=0.83)
Q(4)	2.35 (P=0.67)	1.36 (P=0.85)	1.90 (P=0.76)	3.31 (P=0.51)	1.57 (P=0.82)	2.08 (P-0.72)	4.13 (P=0.39)	4.99 (P=0.29)	5.9 (P=0.20)
JB	2.97 (P=0.23)	2.73 (P=0.25)	0.43 (P=0.80)	2.92 (P=0.23)	2.78 (P=0.82)	1.50 (P=0.47)	1.12 (P=0.57)	0.01 (P=1.00)	1.07 (P=0.59)
FLMSC (4)	0.73 (P=0.58)	0.34 (P=0.85)	0.57 (P=0.68)	2.15 (P=0.06)	0.56 (P = 0.69)	0.70 (P=0.60)	1.42 (P=0.25)	1.08 (P=0.38)	1.86 (P=0.17)
FH	0.54 (P=0.91)	1.19 (P=0.33)	0.90 (P=0.59)	1.09 (P=0.41)	1.41 (P = 0.21)	0.95 (P=0.53)	3.8 (P=0.00)	0.37 (P=0.98)	0.21 (P=1.00)
CI	-7.40	-6.22	-3.15	-3.42	-2.84	-5.50	-2.83	-5.03	-3.86

Notes: a) DLALU, DLBAU, DLSUGSA, DLTOURSA, DLBANSA, DLRUMSA, DLCOF, DLCOCOSA and DLNONTRSA represent alumina, bauxite, sugar, tourism, banana, rum, coffee, cocoa and non-traditional exports, respectively

b) All other variables are in logs and were found to be difference stationary.

c) D - Difference, L - Log, T - Trading Partner's, J - Jamaica, DV - Dependent Variable (log)
FLMSC (4) is the F - version of the Lagrange multiplier test for serial correlation and FH is the F - version of White test for heteroscedasticity. H - Hausman Residual, SA - Seasonally Adjusted, CI – Engle Granger. Cointegration Test - cointegrated at the 1% level

d) Figures in the square [ ] brackets are t-statistics.

e) * (**) Significant at the 95 per cent (90 per cent) confidence interval.

Moreover, the impact of relative price adjustments arising from changes in the REER is likely to be constrained by the system of wage indexation in the mining industry[17].

The results for the tourism industry are somewhat surprising. While, as expected, adjustments in the REER do not appear to affect tourism demand, there was no evidence of a demand response to changes in income among Jamaica's trading partners. In relation to the absence of a relative price effect, the prices in the Jamaican tourism industry are in US Dollars, which would prevent the tourist from receiving a price reduction resulting from a depreciation in the nominal exchange rate. The absence of a significant statistical relationship between the income of Jamaica's trading partners and tourism demand may be reflective of a mature product, and would suggest that renewed emphasis be placed on expanding new areas of the industry. In addition, this result suggests that transitory movements in income do not influence demand, consistent with the permanent income hypothesis, which emphasizes the expected long run changes in income as a main factor influencing demand.

With respect to the sugar industry, there is also no relationship between either the REER or trading partners' GDP on sugar exports in the short run. Exports are done under quota arrangements with Europe and the United States of America. The combined quotas limit total sugar exports to 226.0 thousand tonnes per year. Further, the commodity is sold at market rates in the USA market, while the price is set above international levels in the European market. The industry has not met its quota requirements for most of the 1990s. This suggests that (a) export adjustments are unlikely to reflect the broad trends in relative prices and the income of Jamaica's trading partners and (b) the short run behaviour of the industry will more highlight domestic supply conditions than developments in the external environment.

The export of rum and coffee does not response to changes in the REER and GDP. For cocoa, the absence of any response to relative prices changes is explained by the fact that it is a long-term crop and as such adjustments to output will not depend on short-run

[17] Wages are indexed to the exchange rate vis-à-vis the US Dollar.

volatility but rather on longer terms prospects for the industry. The negative response of cocoa exports to income, however, is counter to expectations.

Contrary to prior expectation, non-traditional exports do not respond to changes in the REER and income. This group of exports is dominated by output from the garment sector[18], which, in addition to relative prices, has had to consider other costs in the 1990's, particularly security costs. That is, rising security costs, as well as increased competition from lower cost jurisdiction (in particular Mexico) may have overshadowed the responsiveness of garment output to changes in price competitiveness. The absence of an income response may be related to the gradual decline in activity in the garment sector over the review period.

Given the weak response of export volumes to the REER, a more industry specific measure of competitiveness was used to test the response of selected major traditional exports. This is premised on the grounds that decisions to increase or decrease export volumes are likely to be driven by the behaviour of international commodity prices rather than general changes in relative consumer prices or exchange rates. This hypothesis was tested for alumina, bauxite, sugar and bananas by calculating a new REER. In this measure, the trading partner's price index in the REER is replaced with the price of these commodities on the international commodity market. The results, reported as model DLALU(2), DLBAUX(2), DLSUG(2) and DLBANSA(2) in Table 2, also indicate that these commodity exports do not respond to changes in the real exchange rate.

[18] Attempts to get data on garment export volumes proved unsuccessful, given the different units of measurement used in this category of exports.

Table 2: Regression Estimates for Exports

	Dependent Variables			
Regressors	DLALU (2)	DLBAUX (2)	DLSUGSA (2)	DLBANSA (2)
Constant	4.08 [4.28]*	7.09 [4.42]*	3.63 (1.17)	1.56 [1.07]
$DLGAP_t$	-0.01 [-0.33]		0.08 (1.31)	
$DLGAP_{t+1}$				-0.00 [0.05]
DLTGDP t-2				
DLTGDP t-1		2.84 [1.29]		
DLTGDP t	-0.42 [-0.24]		-4.39 (-1.00)	2.98 [1.01]
DV_{t-3}			0.24 (1.93)**	
DV_{t-2}			-0.18 (-1.72)**	
DV_{t-1}		0.20 [2.21]*		-0.33 [-1.95]**
$DLREER_{t-4}$				
$DLREER_{t-3}$				-0.22 [-0.50]
$DLREER_{t-1}$		-0.10 [-0.14]		
$DLREER_t$	-0.077 [-0.09]		0.42 (0.51)	
DUMMY		-0.76 [-10.8]*		
$LREER_{t-1}$	-0.06 [-0.74]	0.10 [0.56]	0.27 (0.57)	-0.07 [-0.64]
LDV_{t-1}	-1.23 [-6.77]*	-1.14 [-11.4]*	-0.66 (-3.87)*	-0.15 [-1.34]
LTGDP(-1)	0.46 [3.46]*	-0.48 [1.03]	-0.46 (-0.41)	-0.11 [-0.35]
R2	0.56	0.82	0.69	0.34
AIC	-2.10	-1.38	-0.27	-1.32
DW	1.86	1.66	1.87	2.04
H	0.12 (P=0.89)	0.32 (P=0.41)	-0.06 (P=0.06)	0.37 (P=0.81)
Q(2)	1.31 (P=0.52)	1.34 (P=0.51)	4.18 (P=0.12)	0.67 (P=0.72)
Q(3)	1.33 (P=0.72)	1.86 (P=0.60)	4.21 (P=0.24)	0.73 (P=0.78)
Q(4)	3.97 (P=0.41)	1.88 (P=0.76)	4.72 (P=0.32)	0.88 (P=0.93)
JB	9.40 (P=0.01)	0.48 (P=0.79)	3.78 (P=0.15)	1.01 (P=0.60)
FLMSC (4)	1.49 (P=0.23)	0.74 (p=0.57)	2.62 (P=0.05)	0.28 (P=0.89)
FH	0.70 (P=0.77)	0.66 (P=0.81)	1.25 (P=0.30)	1.09 (P=0.41)
CI	-7.27	-3.96	-3.81	-2.64

Notes: a) All other variables are in logs and were found to be difference stationary.
b) D - Difference, L - Log, T - Trading Partner's, J - Jamaica, DV - Dependent Variable (log)
FLMSC (4) is the F - version of the Lagrange multiplier test for serial correlation and FH is the F - version of White test for heteroscedasticity. H - Hausman Residual, SA - Seasonally Adjusted, CI – Engle Granger.
Cointegration Test - cointegrated at the 1% level
c) Figures in the square [ ] brackets are t-statistics.
d) * (**) Significant at the 95 per cent (90 per cent) confidence interval.

In terms of the long run elasticities, Table 3 reveals that, with the exception of tourism, banana, coffee and non-traditional exports, the signs on the REER were inconsistent with

a priori expectations. The positive response of tourism services, alumina, sugar, coffee and rum to changes in trading partners' income were, however, as expected.

The size of the price elasticity of demand for coffee exports suggests that the expenditure on coffee accounts for a significant portion of consumer's income and or that the product is easily substituted. The long-run income elasticities reported in Table 3 indicate that alumina, tourism, sugar, and rum are normal goods, while coffee is a superior good. In light of the fact that our trading partners have been enjoying economic growth over the sample period, this result helps to explain the steady adjustments in capacity in the tourism sector over time, particularly if the concept of permanent income is applicable. The results in Table 3 also suggest that bauxite, banana, cocoa and non-traditional goods are inferior commodities[19]. The performances of coffee and non-traditional exports are, however, consistent with expectation.

Table 3: Long-Run Export Elasticities

Selected Exports	REER	TGDP
Alumina	0.07	0.34
Bauxite	0.09	-0.28
Tourism	-0.17	0.73
Sugar	0.03	0.40
Banana	-0.10	-1.48
Coffee	-3.48	4.61
Cocoa	1.84	-3.56
Rum	0.48	0.33
Non-Traditional	-0.05	-1.09

[19] An inferior good is one where demand falls as income rises, that is the income elasticity of demand is negative.

Table 4: Regression Estimates for Imports

	Dependent Variables					
Regressors	DLCGSA	DLCGF	DLCGDSA	DLCGNDSA	DLRMSA	DLRFSA
Constant	-3.10 [-0.96]	0.92 [0.25]	1.14 [0.28]	0.44 [0.07]	-0.63 [-0.32]	5.54 [0.39]
$DLJGDPSA_{t-2}$						
$DLJGDPSA_{t-1}$	-0.16 [-0.36]	0.49 [0.80]				
$DLJGDPSA_{t}$			-0.73 [-1.34]	-0.56 [-0.72]	0.15 [0.47]	-0.48 [-0.25]
$DLGAP_{t}$	0.20 [0.63]	0.02 [0.70]	0.05 [2.51]*	-0.01 [-0.23]		0.3 [0.38]
DV_{t-4}		-0.33 [-1.80]**	-0.58 [-2.44]*		0.52 [2.96]*	-0.02 [-0.12]
DV_{t-3}	0.25 [1.24]					
DV_{t-2}	0.37 [1.74]**					
DV_{t-1}				-0.26 [-1.27]		-0.19 [-0.60]
$DLREER_{t-4}$						
$DLREER_{t-3}$						
$DLREER_{t-1}$			0.58 [0.55]	1.05 [0.51]	-1.03 [-1.60]	
$DLREER_{t}$	-0.26 [-0.68]					2.06 [0.52]
$DLREER_{t+1}$		0.80 [1.32]				
DUMMY			0.27 [1.99]*			
$LREER_{t-1}$	-0.21 [-2.01]	0.70 [2.24]*	0.15 [0.39]	0.11 [0.20]	0.30 [2.62]*	0.64 [1.67]**
LDV_{t-1}	0.39 [1.63]	-0.43 [-2.36]*	-0.07 [-0.57]	-0.14 [-0.60]	-0.60 [-3.45]*	-0.59 [-1.72]**
LGDPSA(-1)	0.43 [0.75]	-0.47 [-0.61]	-0.31 [-0.47]	-0.07 [-0.06]	0.49 [1.16]	-1.13 [-0.38]
R2	0.32	0.45	0.50	0.32	0.46	0.60
AIC	-1.00	-0.29	-1.05	-0.88	-2.36	-0.51
DW	1.52	2.31	1.64	2.21	2.05	2.07
H	-2.56 (-1.00)	0.44 (P=0.71)	-1.15 (P= -1.02)	-1.62 (P=-0.80)	0.95 (P=1.44)	-2.79 (P=-0.70)
Q(2)	1.18 (P=0.55)	1.25 (P=0.54)	1.34 (P=0.51)	1.09 (P=0.58)	0.12 (P=0.94)	0.41 (P=0.81)
Q(3)	1.40 (P=0.71)	1.26 (P=0.74)	1.42 (P=0.70)	1.25 (P=0.74)	1.66 (P=0.67)	0.45 (P=0.93)
Q(4)	4.19 (P=0.38)	1.27 (P=0.09)	1.43 (P=0.84)	3.28 (P=0.51)	1.65 (P=0.80)	0.80 (P=0.94)
JB	4.62 (P=0.10)	0.19 (P=0.91)	0.20 (P=0.90)	4.33 (P=0.11)	0.23 (P=0.89)	3.24 (P=1.12)
FLMSC (4)	0.72 (P=0.58)	0.85 (P=0.51)	0.49 (P=0.74)	1.99 (P=0.19)	0.40 (P=0.80)	0.20 (P=0.94)
FH	3.12 (P=0.00)	3.38 (P=0.00)	5.27 (P=0.00)	1.60 (P=0.13)	0.87 (P=0.60)	0.38 (P=0.99)
CI	-3.83	-5.42	-5.08	-4.84	-3.60	-5.68

Notes: a) Dependent variables DLCGSA, DLCGF, DLCGDSA, DLCGNDASA, DLRMSA, DLRFSA, DLRFUSA, DLROSA, DLCAPG, DLCAPGC, DLCAPGO AND DLCAPGOM represent consumer goods, consumer goods food, consumer goods durables, consumer goods non-durables, raw material, raw material food, raw material fuel, raw material other, capital goods, capital goods construction, capital goods other and capital goods other machinery, respectively.

b) All other variables are in logs and were found to be difference stationary.

c) D - Difference, L - Log, T - Trading Partner's, J - Jamaica, DV - Dependent Variable (log)
FLMSC (4) is the F - version of the Lagrange multiplier test for serial correlation and FH is the F - version of White test for heteroscedasticity. H - Hausman Residual, SA - Seasonally Adjusted, CI – Engle Granger. Cointegration Test - cointegrated at the 1% level.

d) Figures in the square [ ] brackets are t-statistics.

e) * (**) Significant at the 95 per cent (90 per cent) confidence interval

Table 4 Cont'd: Regression Estimates for Imports

	Dependent Variables					
Regressors	DLRFUSA	DLROSA	DLCAPG	DLCAPGC	DLCAPGO	DLCAPGOM
Constant	-2.28 [-0.36]	2.67 [1.04]	-22.96 [-1.12]	5.21 [1.28]	-8.77 [-1.18]	-12.18[-1.41]
$DLJGDPSA_{t-2}$				-0.65 [-0.47]		
$DLJGDPSA_{t-1}$	-0.85 [-1.52]		-0.33[-0.53]		0.59[0.42]	-1.33 [-1.41]
$DLJGDPSA_{t}$		0.18 [0.33]				
$DLGAP_{t}$	-0.04 [-0.71]	0.01 [0.66]		0.13 [1.42]	0.01 [0.12]	-0.04 [-0.60]
DV_{t-4}						
DV_{t-3}		0.22 [1.58]				
DV_{t-2}						
DV_{t-1}	-0.38 [-0.82]		0.13 [-0.56]	0.14 [1.06]	-0.27[-1.43]	-0.27 [-1.92]**
$DLREER_{t-4}$						
$DLREER_{t-3}$			1.00 [0.33]	-5.28 [-1.60]	3.11[1.27]	
$DLREER_{t-1}$						
$DLREER_{t}$	-2.07 [-0.48]	0.93 [0.83]				-5.81[-0.99]
$DLREER_{t+1}$						
DUMMY	0.11 [0.74]					
$LREER_{t-1}$	-0.19 [-0.20]	0.20 [1.79]**	0.46 [1.12]	1.71 [3.15]*	0.52[0.95]	-0.39 [-0.51]
LDV_{t-1}	0.06 [0.05]	-0.44 [-4.19]*	2.75 [1.07]	-1.26 [-3.83]*	-0.55 [-2.00]*	0.14[0.24]
LGDPSA(-1)	0.63 [0.53]	-0.27 [-0.45]	2.53 [1.90]**	-1.60 [-1.63]	1.87 [1.19]	2.94 [1.40]
R2	0.43	0.48	0.50	0.68	0.61	0.44
AIC	-0.86	-2.17	-0.47	0.33	0.88	-0.05
DW	1.77	2.21	2.30	1.50	1.56	2.00
H	2.44 (P=0.56)	-0.97 (P=-0.86)	-1.18 (P=-0.38)	4.22 (P=1.27)	-4.75 (P=-1.58)	5.4 (P=0.92)
Q(2)	0.32 (P=0.85)	1.79 (P=0.41)	1.54 (P=0.46)	2.52 (P=0.28)	0.07 (P=0.60)	0.11 (P=0.74)
Q(3)	0.39 (P=0.94)	3.04 (P=0.39)	1.55 (P=0.67)	2.78 (P=0.43)	-0.02 (P=0.80)	0.02 (P=0.89)
Q(4)	1.92 (P=0.75)	3.89 (P=0.42)	1.90 (P=0.75)	4.02 (P=0.40)	-0.12 (P=0.79)	0.02 (P=0.96)
JB	1.87 (P=0.39)	1.40 (P=0.50)	5.57 (P=0.06)	1.00 (P=0.61)	1.92 (P=0.38)	5.61 (P=0.06)
FLMSC (4)	1.94 (P=0.13)	1.23 (P=0.32)	1.15 (P=0.35)	1.95 (P=0.13)	0.65 (P=0.63)	1.9 (P=0.05)
FH	1.94 (P=0.17)	1.51 (P=0.17)	0.52 (P=0.89)	0.91 (P=0.56)	2.0 (P=0.06)	0.27(P=0.90)
CI	-6.13	-3.61	-4.24	-5.45	-5.59	-2.94

Notes:

a) Dependent variables DLRFUSA, DLROSA, DLCAPG, DLCAPG, DLCAPGC, DLCAPGO DLCAPGOM represent raw material fuel, other raw materials, capital goods, construction goods and other capital goods.

b) All other variables are in logs and were found to be difference stationary.

c) D - Difference, L - Log, T - Trading Partner's, J - Jamaica, DV - Dependent Variable (log)
FLMSC(4) is the F - version of the Lagrange muntiplier test for serial correlation and
FH is the F - version of White test for heteroscedasticity
H - Hausman Residual, SA - Seasonally Adjusted,

* Significant at the 95 per cent confidence interval

* * Significant at the 90 per cent confidence interval

Table 4 present the results for import demand. Surprisingly, the coefficients on the REER for all three major categories - consumer goods, raw material and capital goods, as well as their main components are statistically insignificant in the short run. This finding precludes a role for exchange rate and relative price adjustments in compressing import demand in a stabilisation programme in Jamaica.

Table 4 also indicate that imports do not respond to short-term changes in domestic income. While this is surprising for consumer goods, changes in spending decisions for raw material and capital goods may not necessarily relate to short run fluctuations in domestic income (or a perceived temporary increase or decrease in income levels), and in some cases may precede increases in income. In addition, bulky purchases for public sector investment projects may be independent of the business cycle.

The long run import elasticities are presented in Table 5. The elasticities of consumer food and durable goods imports with respect to relative prices are above one, which highlights the extent to which locally produced goods for domestic consumption are probably readily substituted by imports from abroad. In particular, the domestic agricultural sector and other small manufacturers of durables items such as furniture have been severely affected by an increasingly liberalized environment in the 1990s.

Table 5: Long-Run Import Elasticities

Components of Imports	REER	JGDP
Consumer Goods	0.54	-1.10
Food	1.63	-1.09
Durables	2.14	-4.43
Non-Durables	0.79	-0.50
Raw material	0.50	0.82
Food	1.08	-1.92
Fuel	3.17	-1.05
Other	0.45	-0.61
Capital Goods	-0.17	-0.92
Construction	1.36	-1.27
Other Machinery	0.95	3.40
Other	2.79	-21.00

The performance of raw material imports is consistent with expectations. That is, imports will increase with an appreciation in the REER and vice versa. The elasticities reported for food and fuel imports are encouraging because they highlight the significant influence of relative prices on these categories of imports. For capital goods imports, notwithstanding that the sign on the overall category runs contrary to prior expectations, all the signs on the sub-categories are consistent with expectations.

In relation to the income elasticities, the parameters are unrealistically large, and the sign for most import categories runs counter to expectations.

An analysis of the elasticities revealed that in the long-term, the trade balance and consequently the current account will not improve with a depreciation in the exchange rate as suggested by the Marshall-Lerner condition. A weighted summation of the elasticities of demand for imports and exports yielded a total of 0.4. This result may reflect the extent to which trading arrangements and preferences may have affected Jamaica's trade with the rest of the world.

V. CONCLUDING REMARKS

This paper examined the relationship between the REER and the components of the current account, in particular, the goods account and tourism services. Short and long run responses were considered. The investigations broadly suggest that the real exchange rate does not play a significant role in the determination of the major elements of the Jamaican current account. Moreover, with the exception of coffee and cocoa, the long run export elasticities are relatively small with some of the signs running counter to traditional theoretical predictions. It is also important to note that altering the REER to reflect industry specific prices did not result in any significant changes in the result for selected exports. There is some concern that the tourism industry does not exhibit a significant short run elasticity with respect to foreign income, but this may be reflective of a mature product.

A principal issue relates to the weight accorded to non-price factors in explaining production and trading decisions in Jamaica. Trading arrangements, the existence or non-existence of research and marketing support, social factors, as well as the overall quality and work ethic of the labour force are but some of the structural factors that affect the performance of the Jamaican economy.

The overriding policy issue that arises from these observations is the usefulness of the real exchange rate as a tool for correcting external imbalance and fostering economic growth in Jamaica, as well as a metric that signals losses or gains in competitiveness. Perhaps more refined measures of the real exchange rate may yield more useful results. For instance, unit labour costs by industry might very well be a more significant factor in explaining export performance than a CPI-based REER. In relation to the other macroeconomic variables, the paper suggests that the measure of income that is traditionally monitored by Jamaican policy makers may not be representative of actual income flows within the economy.

REFERENCES

Allen, C., 2001, "Estimating Quarterly Gross Domestic Product for Jamaica." Bank of Jamaica.

Brath, R. and W. Hemphill. 2000. "Financial Programming and Policy: The Case of Turkey." IMF Institute, Washington.

Bullock, M., S. Grenville and G. Heenan, 1993, "The Exchange rate and the Current Account." Reserve Bank of Australia.

Chipman, J. S. and C.P. Kindleberger. (Ed). 1980. *Flexible Exchange Rate and the Balance of Payments Essays in Memory of Egon Sohmen*. North-Holland: Studies in International Economics, 7.

Davidson, R. and J.G. MacKinnon, 1989, "Testing for Consistency using Artificial Regressions," *Econometric Theory*, 5, 363–384.

Davidson, R. and J.G. MacKinnon, 1993. *Estimation and Inference in Econometrics*, Oxford University Press.

Debelle, G. and H. Faruqee. 1996. "What Determines the Current Account? A Cross-Sectional and Panel Approach." *IMF Working Paper* No. WP/96/58.

Dornbusch, R. 1988. *Open Economy Macroeconomics*, 2nd edition. New York.

Engle, R.E. and C.W.J. Granger. 1987. "Cointegration and Error-Correction: Representation, Estimation and Testing." *Econometrica*, 55, 251-76.

Hausman, J.A. 1978. "Specification Tests in Econometrics." *Econometrica*, 46, 1251–1272.

Henry, C., 2001, "Measuring Competitiveness in the Jamaican Economy", Bank of Jamaica.

Hodrick, R.J. and E.C. Prescott. 1997. "Postwar U.S. Business Cycles: An Empirical Investigation," *Journal of Money, Credit, and Banking*, 29, 1–16.

International Monetary Fund. 1993. *Balance of Payments Manual,* 5th edition. Washington.

Machlup, F. 1980. "Explaining Changes in Balances of Payments and Foreign Exchange Rates: A Polemic without Graphs, Algebra, and Citations," *in Flexible Exchange Rates and the Balance of Payments: Essays in Memory of Egon Sohmen*. Ed.: Chipman, J. S. and C. P. Kindleberger. North-Holland: Studies in International Economics, 7.

Phillips, P.C.B. and B.E. Hansen. 1990. “Statistical Inference in Instrumental Variables Regression Analysis with I (1) Processes.” *Review of Economic Studies*, 57, 99-125.

Sachs, J. 1981. “The Current Account in the Macroeconomic Adjustment Process.” *National Bureau of Economic Research Paper Series*, No. 796.

Sodersten, B. and G. Reed. 1994. *International Economics*. USA: Macmillan Press Ltd.

Spilimbergo, A. and A. Vamvakidis. 2000. “Real Effective Exchange Rate and the Constant Elasticity of Substitution Assumption.” *IMF Working Paper* No. WP/00/128.

Appendix A

Table A1: Components of Jamaica's Current Account

Major Accounts	12 Year Average Values (US$ Millions)	12 Year Average (Percentage Share)
Goods Account		
Total Exports	**1242.4**	**100.0**
Major Traditionals	**795.0**	**64.0**
Bauxite	79.5	6.4
Alumina	588.9	47.4
Sugar	89.3	7.2
Bananas	37.2	3.0
Other Traditionals	**61.0**	**4.9**
Citrus	5.3	0.4
Cocoa	4.2	0.3
Coffee	23.0	1.8
Pimento	4.1	0.3
Rum	23.2	1.9
Gypsum	1.2	0.1
Non Traditionals**	**386.5**	**31.1**
Total Imports	**2605.6**	**100.0**
Consumer Goods	**667.8**	**25.6**
Food	196.4	7.5
Other Non-durables	214.6	8.2
Durables	256.8	9.9
of which motor car*	133.9	5.1
Raw Materials	**1448.8**	**55.6**
Fuel	398.5	15.3
Food	180.2	6.9
Other Raw Materials	870.0	33.4
Capital Goods	**489.1**	**18.8**
Transport	125.1	4.8
Construction	128.0	4.9
Other Machinery	229.0	8.8
Other Capital	6.9	0.3
of which motor cars*	12.1	0.5

* Nine Year Average

en Year Average

Figure A1: Jamaica's Imports and Exports (1990 - 2001)

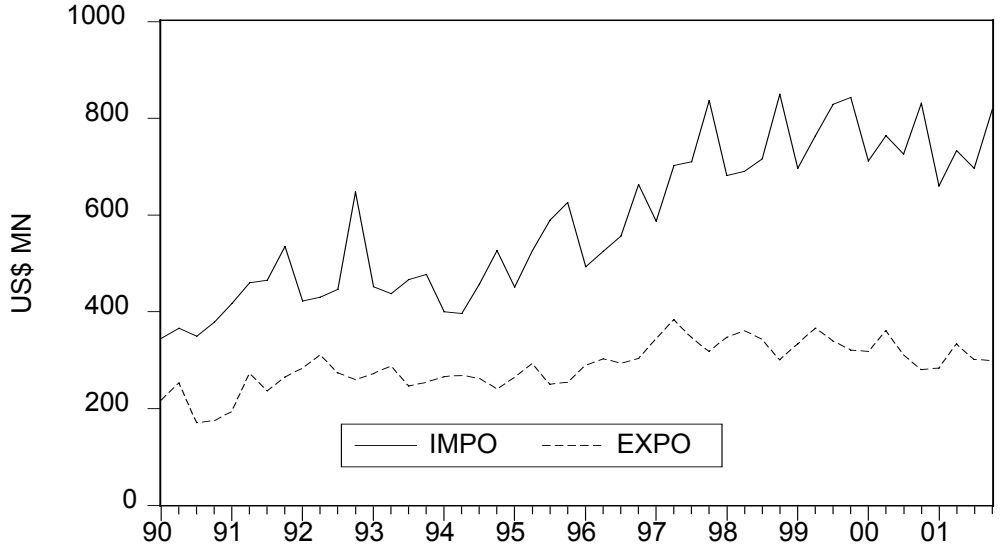

Figure A2
Indicies of Jamaica's REER and Current Account Balance

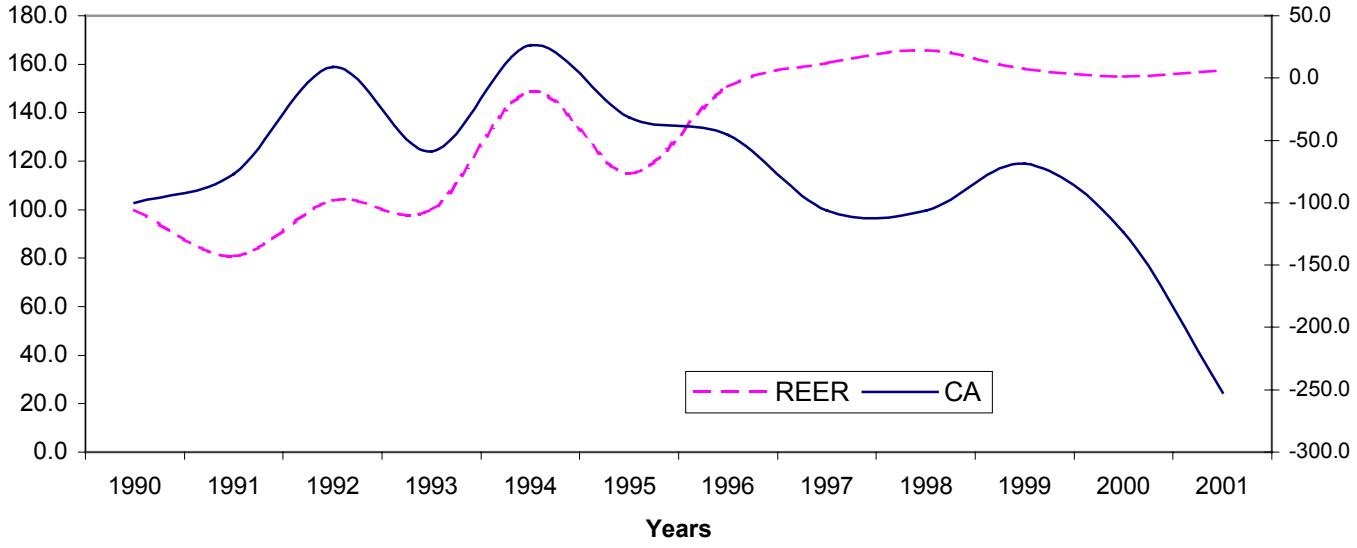

Table A2: Unit Root Tests

	ADF				PP	
Variables	Lagged Diff	Levels	Lagged Diff	1st Diff	Levels	1st Diff
Imports						
LCGSA	1	-0.93	1	-5.72	-0.96	-10.02
LCGF	1	-0.71	1	-4.55	-2.11	-12.67
LCGDSA	1	-1.19	1	-6.11	-1.19	-6.22
LCGNDSA	1	-1.05	1	-10.89	-1.46	-11.45
LRMSA	1	-3.02	1	-8.12	-2.66	-10.23
LRFSA	1	-3.09	1	-7.53	-3.74	-13.00
LRFUSA	1	-2.10	1	-7.58	-3.25	-26.95
LROSA	1	-3.43	1	-5.88	-3.42	-8.13
LCAPG	2	-2.11	1	-9.41	-3.45	-9.28
LCAPGC	1	-2.79	1	-8.63	-3.63	-10.98
LCAPGO	1	-2.65	1	-6.72	-4.20	-11.59
LCAPGOM	1	-2.35	1	-6.50	-3.46	-11.07
Exports						
LALUSA	1	-2.36	1	-6.77	-3.59	-11.65
LBAUX	1	-3.08	1	-7.44	-3.03	-8.00
LSUGSA	3	-3.05	1	-11.63	-6.27	-13.97
LBANSA	1	-0.60	1	-6.22	-0.99	-10.24
LRUMSA	1	-2.48	1	-7.60	-3.35	-12.04
LCOF	1	-2.12	1	-6.91	-2.63	-8.61
LCOCOSA	1	-2.44	1	-7.30	-3.19	-12.73
LNONTRSA	1	-1.77	1	-3.73	-2.04	-5.19
Services						
LTOURSA	1	-2.45	1	-5.75	-2.09	-5.92
Other						
LTGDP	1	-0.68	1	-4.43	-0.45	-5.44
REER	1	-1.62	1	-4.67	-1.43	-5.63
LJGDPSA	2	-2.22	1	-8.05	-4.17	-10.38
Critical Values		-3.578		-3.581	-3.575	-3.578

Appendix B: Estimating Import & Export Price Indices

For most of the sample period, information on unit price and volumes for some items in the balance of payments were non-existent. This created a need to find suitable trade indices to calculate series on the volume of transactions over time.

In a best-case scenario, an import price index can be obtained by multiplying the price of each item imported by its contribution to total imports. Prices (or trade indices) are typically obtained by dividing the total value of each item by its corresponding volume in the base year. That is,

$$\text{Imp Price} = \sum w_i \, (v_i/q_i) \qquad \text{(B1)}$$

Where,

v_i = Value of good *i* imported

q_i = Quantity of good *i* imported

w_I = Ratio of the value of good *i* imported to the total value of goods imported

While price data is available, time constraints made it difficult to construct detailed price indices from individual items in the balance of payments over an extended period of time.

An alternate procedure is to use proxies for the price series. In this approach, imports are disaggregated into its main constituents: consumer goods, raw material and capital goods. Table 4 indicates that the bulk of Jamaica's imports are purchased from the United States of America (USA). Given that more than fifty per cent of Jamaica's imports are from the USA, import prices are likely to have a significant correlation with export prices of that country. Data on USA export prices were used to formulate disaggregated indicators of Jamaica's import prices. The information required for this was obtained from the Bureau of Labour Statistics (BLS) in the USA.

Consumer goods were disaggregated into the components: food, non-durables, durables and motorcars, a classification that is similar in nature to the respective categories in the BLS database. Raw materials were disaggregated into fuel, food and other raw material. An index of food prices was available and was employed. In relation to other raw materials, the index of industrial production was utilised. For the fuel component, the West Texas Intermediate Index (WTI) was used. With respect to capital goods imports, this sub-category was disaggregated into transportation equipment, construction material, other machinery, other capital goods and motorcars. For transportation equipment, construction material, other machinery and motorcars, price indices were identified for these goods. For the category other capital goods, the overall capital goods index was used.

B.2 Exports

An approach similar to the one used to formulate import price indices was employed for the other traditional and non-traditional exports. Indices of coffee and cocoa export prices were obtained from the IFS, while indicators for citrus, rum and textiles were obtained from the BLS.

Table B1: Percentage Contribution to Imports

Jamaica's Major Trading Partners	Contribution to Imports (%)
United States of America	62.3
United Kingdom	4.9
Canada	4
Trinidad & Tobago	9.9
Japan	8
France	3.6
Netherlands	1.2
Norway	0.3
Mexico	3.2
Venezuela	2.7