

*“Do Real Exchange Rates
Matter for Import Demand of
Small Open Economies? The case
of the Caribbean.”*

By

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Do economic growth and favourable real exchange rates increase the likelihood of external current account surpluses in developing countries?

Abstract

Much empirical research into the impact of both real exchange rate depreciation and economic activity on the current account balance have focussed on quantifying the causal relation between these variables. This study departs from the norm, by conducting the investigation in a probabilistic framework. As such, the logit estimation technique is applied to a large panel of developing countries, in order to arrive at probability estimates of the association between real exchange rates, and economic activity with current account surplus or narrow deficits. In doing so, the income level, foreign direct investments and geographical locations are controlled for.

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1.0 Introduction

The development of effective market friendly methods for improving the external current account of developing countries still remains a fundamental challenge for developing countries. The issue is unresolved as to whether the frequency of such deficits are sustainable, or what devices are necessary to subdue them.¹ A deficit in itself may not be detrimental to welfare, but its persistence can exert downward pressure on the exchange rate and lead countries to be net debtors.² Given that developing countries need to earn foreign exchange in order to finance their imports, at some point in time they would need to realise current account surpluses in order to be solvent in the eyes of creditors.³ An issue which emerges therefore, is whether such a transition can be achieved smoothly through the use of policy instruments, or whether it would be achieved by force in a manner that would dramatically disrupt consumption.

Much of the prescriptions for chronic current account deficits usually involves internal adjustments on the part of the country suffering such a crises.⁴ These prescriptions have emerged from various approaches, four of which can be identified as the elasticities approach, the absorption approach, the portfolio approach and the monetary approach. In

¹ See for example Milesi-Ferretti and Razin (1996) for a discussion on the interplay between borrowers and lenders.

² The effects of deficits are further elaborated on by Edwards (2001).

³ This assumes the absence of sustainable capital inflows

this vein, active research into the development of market based devices have been actively pursued, since the prevailing orthodoxy is that such measures are more sustainable than non-market ones.

This paper is primarily interested in the first two approaches, the elasticities and the absorption hypotheses. In the elasticities hypotheses, price adjustments are seen as useful for altering demand and supply conditions in favour of current account surpluses. The real exchange rate is seen as the most critical price, since in theory, depreciation of the exchange rate should have a "J" curve effect, where there would first be a current account deficit and then a surplus. Research has also been conducted on the absorption approach in which the current account is viewed as the difference between output and absorption, owing to the manipulation of the basic identity between savings and withdrawals. In this approach the current account deficit is seen as an imbalance between savings and investment, with the country using more of the world's resources for investment than it is supplying in return.

In order to explore these models, the study employs a probabilistic approach through the use of logit, and the analysis is applied to a pool of eighty-five developing countries. This approach is a bit of a departure from previous empirical research, where the investigation has been largely conducted along causal lines through the use of various quantitative regression techniques, and recently through VARs and impulse analysis. However, this approach should be complementary to causal type analysis since, with this

⁴ Another aspect of redress for current account deficits, but has been slow in forthcoming, concerns improved access to developed country markets by developing countries. See 2002 report prepared jointly

method, probabilities are attached to outcomes after allowing for disturbances, as opposed to just merely reporting what happens on average within a confidence interval, as is done in causal analysis. In estimating the probabilities, foreign direct investment, the wealth of the country, and geographical location are controlled for.

The wide spread incidence of current account deficits in developing countries is examined in the following section. Attention is then turned to the role of real exchange rates and economic growth in improving the current account balance of countries. Following this, the model and data are discussed. A brief outline of the logit model is put forward in Section 5.0, and is followed by a discussion of the results, and then the conclusion.

2.0 Severity of Current Account Deficits

A current account deficit financed by borrowing allows creditors a claim against the future output of the country. Most developing countries have a deficit in resources, as evidenced by the fact that they consistently record current account deficits. A cursory glance at Table 1 would suggest that for the three years considered, the percentage of the sample of developing countries recording external current account surpluses ranged between 10 and 25 per cent. Even where 25 per cent of the countries were able to achieve current account surpluses, over 50 per cent of the countries in that year, 1999, recorded deficits beyond 14 per cent of GDP.

Table 1 Severity of Current Account Deficits

Current Account Balance to GDP	1980	1990	1999
>0	10.4 (77)	15.1 (93)	24.7 (81)
>-14	66.2 (77)	52.7 (93)	42.0 (81)

Source: Tabulated from data extracted from the International Financial Statistics

Weak external current account deficits, have been accompanied in many cases by large capital inflows.⁵ Consequently, the question of whether these deficits are sustainable partly reduces to whether such capital inflows are sustainable.⁶ To a large extent, the sustainability of capital inflows is largely dependent on whether creditors regard the country as solvent. Critical to such an evaluation would be the savings investment levels, the structure of the economy, policy credibility, and the extent of debt servicing requirements.

3.0 Do Real Exchange Rates and Economic Growth Matter?

With the resurgence of neoclassical economics, market friendly policies, rather than protectionism is seen as the key to arresting current account imbalances. Theoretically, the elasticities approach and the absorption approach have been suggested, but the empirical evidence has not been decisive.

For the elasticities approach, the real exchange rate is seen as the key price that impacts on the current account. This approach involves an attempt to establish a reliable quantitative relationship between real exchange rates and the current account, in order to

⁵ See for example, Milesi-Ferritti and Razin (1996).

⁶ Adedeji (2001) shows that the sustainability of current account deficits in Nigeria is also threatened by bouts of macro economic stability.

judiciously target the current account balance.⁷ Consequently, various studies have examined the 'J' curve effect associated with a depreciation of the rate.

The standard theoretical approach to explaining the 'J' curve distinguishes between the short-run and the long-run response of the current account balance to a depreciation of the exchange rate. In the shortrun, it is assumed that the contracts are already signed for exports, so that the depreciation results in lower prices for the same quantum of exports, and likewise, it results in higher prices for imports, thus reducing the current account surplus or increasing the deficit initially. In the long-run, new contracts are signed so that demand increases for the exports as they become cheaper, once domestic prices remain low. With sufficiently high elasticities, it is assumed that demand for exports would expand while import prices rise. Elastic demand for imports therefore sets the stage for a current account surplus or a dampening of the deficit in the longterm.

It remains to be resolved empirically, whether the 'J' curve effect is observable in developing countries. The assumption that there would be no off-setting rise in prices following the initial depreciation is difficult to sustain, since evidence are emerging of a pass through effect, where price advantages gained by a depreciation of the exchange rate may be offset by rising inflation.⁸ Moreover, it may not necessarily be the case that demand for imports would be price elastic, especially since developing countries typically have a resource deficit, and the marginal propensity to import is high.

⁷ For example, See Isard and Faruqee (1988), and Wren-Lewis and Driver (1998).

In the absorption approach, the current account (*CAB*) balances reflect differences in output (*Y*) and absorption (*DA*), where,

$$CAB = Y - DA$$

and

$$DA = (C^p + C^g) + (I^p + I^g)$$

where

C^p denotes private sector consumption

C^g denotes government consumption

I^p denotes private sector investment

I^g denotes public sector investment

Current account balances can therefore be improved if output grows faster than domestic absorption.⁹ This is equivalent to allowing net financial savings to increase, as can be shown in the flow of funds version where,

$$CA = S - (I^p + I^g)$$

where *S* denotes financial savings.

Economic growth, and or the suppression of demand, are therefore considered useful contributors to improving the external current account balance of the country.

4.0 Model and Data

The model incorporates features of the absorption and elasticity approaches. In doing, so, it controls for foreign direct investment, wealth, and regional effects. Accordingly, the functional form is given by

$$CA = f(RER, Yg, FDI, INC, REG)$$

⁸ See for example Taylor (2000), Choudhri and Hakura (2001), Bhundia (2002), Billmeier and Bonato (2002) and Birchwood (2000) empirical estimation of pass through effects.

⁹ See Venura (2002) for a recent elaboration and analysis of this approach.

where CA is the ratio of current account balance to GDP, RER is real exchange rate, which is defined as $\frac{P_f}{P_d}ER$, with P_f denoting import unit price index, P_d denotes domestic price index, ER denotes nominal exchange rate; Y_g is economic growth; FDI is the ratio of the inflow of foreign direct investment to GDP; INC is the relative income level of the country, measured in terms of GDP per capita; and REG represents region.

The primary interest of the model, is to obtain the likelihood that the independent variables will yield current account surpluses. For example, if there is a high probability that countries with higher real exchange rates (as would be obtained after depreciation) would record favourable current account balances, then the elasticities approach would be useful in explaining current account balances. Similarly, if the probability is high that countries reflecting strong growth are likely to realise favourable current account balances, then the absorption approach would likewise be useful in explaining current account balances.

While foreign direct investment do not immediately affect the current account balance, it is assumed that in an investment constrained economy, it will generate output for exports, or at least stimulate economic activity. However, this will strongly be dependent on the type and quantum of such investment, so that it is largely an empirical matter concerning the relevance of foreign direct investment. Further, developing countries are

disaggregated to allow the results to be region specific, given the fact that countries are non-homogeneous.

All the data are converted to dummy variables. An attempt was made to divide current account, real economic growth, real exchange rate, and foreign direct investment evenly into categories, with the resulting definition illustrated in Table 2.

Table 2 Description of Sample Data Categories

Variable	Category	Definition of Categories	Percentage of Observations
Real Economic Growth	High	>6%	31.8
	Moderate	>2% to 6%	37.6
	Weak	≤2%	30.6
Real Exchange Rate	High	>6%	31.8
	Moderate	>3% to 6%	31.8
	Low	≤3%	36.4
Foreign Direct Investment	High	>4%	51
	Low	≤4%	49
GDP per Capita	Upper Middle to High	>US\$ 3126	32.0
	Low Middle	>US\$ 786 to US\$ 3126	37.1
	Low	≤US\$ 786	30.9
Region	1	East and Southern Africa	18.4
	2	West Africa	9.0
	3	East Asia and Pacific	17.1
	4	South Asia	2.8
	5	Eastern Europe and Central Asia	6.1
	6	Rest of Europe	2.9
	7	Middle East	10.2
	8	North Africa	3.6
	9	Americas	29.9

Source: Economic Growth, Real Exchange Rate, and Foreign Direct Investment are extracted from the International Financial Statistics. GDP per Capita and definition of regions are extracted from the World Bank World Development Database.

The data covers the period 1970 to 2000. Where observations across variables for any period were missing, that period was eliminated, so that 1273 data points remained.

5.0 Logit Estimation

Estimation of probabilities of a country exhibiting an external current account surplus or narrow deficit was done via logistic estimation. Consider a logistic random unobservable process, Z_i , in which a country may record a current account surplus or deficit over time.

Suppose Z_i is affected by a vector of explanatory variables X_i , so that

$$Z_i = X_i' B,$$

where $X_i' = [1 X_{i2} \dots X_{ik}]$ and B is a vector of coefficients, β_i , such that $B = [\beta_1 \beta_2 \dots \beta_k]$.

Based on the cumulative distribution function of the logistic distribution, Z_i can be approximated by the log-odds ratio as

$$Z_i = \ln[P_i / (1 - P_i)]$$

The odds ratio therefore gives the odds of a country recording a current account surplus or deficit as the relevant explanatory variable changes by one unit.

Using L_i as the response variable obtained from the regression for individual i , the probability of a particular response can be calculated by first finding,

$$\text{Antilog } L_i = P_i / (1 - P_i), \text{ and then by finding,}$$

$$P_i = (1 - P_i) \text{anti log } L_i = \text{anti log } L_i / (1 + \text{anti log } L_i).$$

6.0 Results

The predictive ability of the explanatory variables over the constant is examined in Table 3.

Table 3 Expected-Prediction (Classification) Table (%)
Dep=1 for current account surplus >-14% of GDP.

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
Correct	73.71	73.46	73.58	100.00	0.00	50.24
Incorrect	26.29	26.54	26.42	0.00	100.00	49.76
Gain	-26.29	73.46	23.35			
Per cent Gain	NA	73.46	46.92			

Overall, the model correctly predicts 74 per cent of the observations with a fairly even ability to predict external current account deficits (dep=0) and current account surpluses (dep=1). The gain in predicting the total percentage of observations over the constant probability model is 47 per cent.

6.1 Odds Ratio

The logit model estimated is shown in Table 4. The coefficients are not easily interpretable, so the odds ratio are computed to guide interpretation. The odds ratio gives the likelihood of a country recording a current account surplus or narrow deficit, following a unit change in variable, or the odds of an attribute different to the base category, leading to a current account surplus or narrow deficit. Following this, probabilities of scenarios will be computed and then the success of the model will be evaluated.

Table 4
Logit Estimation Results. Dependent variable: current account balance to GDP
Dep=1 for current account surplus >-14% of GDP

Variables		Coefficients	T ratio	Odds (%)
Intercept		-1.10093	-1.65	-27.50
Real Economic Growth	High	0.288555	1.68	7.21
	Moderate	0.525389	3.20	13.12
	Weak			
Real Exchange Rate	High	0.0874307	0.52*	2.18
	Moderate	-0.0109435	-0.07*	-0.27
	Low			
Foreign Direct Investment	High	-2.16779	-14.5	-54.14
	Low			
GDP per Capita	Upper Middle to High	1.48870	6.56	37.18
	Low Middle	0.659478	2.95	16.47
	Low			
Region	1	1.10027	1.65	27.48
	2	0.322000	0.46*	8.04
	3	1.79659	2.62	44.87
	4			
	5	1.41604	1.97	35.37
	6	0.247001	0.32*	6.17
	7	0.509385	0.72*	12.72
	8	0.882584	1.16*	22.04
	9	1.31876	1.95	32.94

In terms of real economic growth, the odds that a country experiencing high or moderate growth would record a current account surplus or narrow deficit is positive. However, the evidence suggests that it is more likely in the case of countries exhibiting moderate growth. Notwithstanding, the positive odds, suggests that there is some support concerning the usefulness of the absorption approach for improving the current accounts of developing countries.

Interestingly, the odds of current account balances improving owing to a depreciation in the real exchange rates was low and insignificant. It does not seem likely that a

depreciation would improve a country's current account. The result therefore do not lend much empirical support to the elasticities approach, after taking into account disturbances that may arise.

The odds of a country with high foreign direct investment realising a current account surplus or narrow deficit was highly negative, thus suggesting that these countries are less likely to exhibit positive balances. This is a surprising result, since it may have been assumed a priori that such investments would have boosted exports. The result suggests that the quality of these investment projects may not necessarily have increased exports in most countries.

The role of the income category of the country was as expected, so that countries in the upper middle to high income category were more likely to stage current account surpluses than those in the middle income category. This result emphasises the importance of wealth, and it also ties in with the positive odds with respect to growth and the current account.

In terms of regions, the region with the greatest odds of recording a current account surplus or narrow deficit is East Asia and Pacific, where it was 45 percent higher than the base, followed by 35 per cent for Eastern Europe and Central Asia, and by 33 per cent for the Americas. Of the variables that were significant, the odds are least likely with respect to East and Southern Africa.

6.2 Scenario Analysis

An advantage of logit, is that probabilities can be obtained for different combinations of categorical variables. However, as more categories are added, the possible combinations multiply at a rapid rate. For this model for example, even without considering the regional effects, the number of possible scenarios are already as high as 95, 040. For simplicity, the probabilities are illustrated for extreme cases, and for conventional policy, using GDP per capita as an anchor, see Table 5.

Table 5 List of Scenarios

Scenarios	Details
Conventional Scenario	High foreign direct investment, high real exchange rate, high growth, constant
Highest Probability	Low foreign direct investment, high real exchange rate, moderate growth, constant
Lowest Probability	High foreign direct investment, moderate real exchange rate, weak growth, constant

The conventional scenario for a middle income country in region 1 can be calculated by summing the coefficients such that

$$L_i = -1.10093 + 0.288555 + 0.0874307 - 2.16779 + 1.48870 + 1.10027 = -0.30376$$

$$P_i = \frac{\text{anti log } L_i}{(1 + \text{anti log } L_i)} = \frac{0.738035}{1 + 0.738035} = 0.43$$

The probabilities attached to the other scenarios of interest are exhibited in Table 6

Table 6 Probability of current account surplus given scenarios occurring

Relative Income		Region								
		1	2	3	5	6	7	8	9	
Middle to Upper Income	Conventional	0.43	0.25	0.60	0.58	0.24	0.29	0.37	0.48	
	Highest Probability	0.89	0.79	0.94	0.94	0.78	0.82	0.87	0.91	
	Lowest Probability	0.33	0.19	0.50	0.48	0.18	0.22	0.29	0.38	
Lower to Middle Income	Conventional	0.24	0.13	0.39	0.37	0.12	0.15	0.21	0.29	
	Highest Probability	0.78	0.62	0.88	0.87	0.60	0.66	0.74	0.81	
	Lowest Probability	0.18	0.09	0.31	0.29	0.09	0.11	0.15	0.21	
Low Income	Conventional	0.14	0.07	0.25	0.24	0.07	0.08	0.12	0.17	
	Highest Probability	0.65	0.46	0.79	0.77	0.44	0.51	0.60	0.70	
	Lowest Probability	0.10	0.05	0.19	0.18	0.05	0.06	0.08	0.13	

Surprisingly, the conventional scenario do not yield the highest probability estimates per region. Rather, probability estimates are highest where the ratio of foreign direct investment to GDP is low, and growth is moderate. From the evidence, it appears that the interaction between moderate growth and high real exchange rates accompanied by low levels of foreign direct investment, is critical to improving the current account balance. The chances of favourable current account balances seems to be lessened by high levels of foreign direct investment and either high or low growth.

The fact that low foreign direct investment appears to yield high probabilities of current account surpluses is surprising. The result may suggest that where moderate growth is generated by internal capital resources rather than by foreign direct investment, the country is more likely to realise a current account surplus. The extremities of growth on the other hand can be explained from the absorption approach, where, high growth may result in over expansion of absorption, thereby lessening savings, while low growth do not allow the country to increase its savings.

7.0 Conclusion

The evidence supports the absorption approach for improving the current account balance in developing countries. Indeed, the odds of a country improving its current account balance was significant and positive with respect to growth. Moreover, the income level mattered to the likelihood of a country recording a current account surplus. However, the evidence did not support the elasticities approach, as the odds of real exchange rate improving the current account balance proved to be insignificant.

Nevertheless, the scenario with the highest probability in favour of countries achieving current account surplus was where countries exhibit high real exchange rates, moderate growth, and low foreign direct investment. The evidence also suggested that regional characteristics matter to the likelihood of a country recording current account surpluses, after these economic qualities are met. It is surprising that high foreign direct investment did not increase the probability of countries achieving current account surplus. A closer examination would be necessary, since the type of foreign direct investment was not modelled, and the model did not allow for dynamic effects.

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**Appendix
List of Countries**

Belize	Madagascar	Venezuela
Bolivia	Malawi	Vietnam
Botswana	Malta	Yemen
Brazil	Mauritius	Zambia
Burkina Faso	Morocco	Zimbabwe
Burundi	Mozambique	
Cameroon	Mynamar	
Chile	Nambia	
China	Nepal	
Columbia	Niger	
Congo Republic	Oman	
Costa Rica	Pakistan	
Croatia	Panama	
Cyprus	Papa New Guinea	
Czech Republic	Paraguay	
Dominica	Peru	
El Salvador	Philippines	
Estonia	Poland	
Fiji	Romania	
Ghana	Rwanda	
Guatemala	Saudi Arabia	
Haiti	Senegal	
Honduras	Seychelles	
Hong Kong	Sierra Leon	
Hungary	Singapore	
India	Slovak Republic	
Indonesia	Sri Lanka	
Iran	St. Kitts	
Israel	St. Lucia	
Jamaica	Suriname	
Jordan	Swaziland	
Kazakhstan	Syrian Arab Republic	
Kenya	Thailand	
Korea	Trinidad and Tobago	
Kuwait	Tunisia	
Kyrgyz	Turkey	
Lao PDR	Uganda	
Latvia	United Arab Emerates	
Lesotho	Uruguay	
Lithuana	Vanuatu	