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A Case for Regional Exchange
Rate Management for Caricom

by

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A CASE FOR REGIONAL EXCHANGE RATE MANAGEMENT
FOR CARICOM

INTRODUCTION

In the literature[1] the role of exchange rates in influencing international flow of goods and services is well established in both theory and practice. The efficiency of this tool for fostering regional economic integration, however, has depended on a high degree of harmonization of monetary and fiscal policies of the member states as evident from the experience of the EEC which aimed at creating a "zone of internal and external monetary stability"[2] and minimize fluctuations among currencies of member countries against a common numeraire for regional or sub-regional integration. As a result of policy divergences in the EEC there were frequent currency realignments in the European Monetary System (EMS) until March, 1983 when the French economic policy became consistent with exchange rate stability.

Among regional and sub-regional groupings in developing countries exchange rates have tended to be managed by each country independently of the overall framework for the promotion of

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[1] J. E. Meade, **The Balance of Payments: Mathematical Supplement** (New York: Oxford University Press, 1951); Harry G. Johnson, "Towards a General Theory of the Balance of Payments" in **International Trade and Economic Growth: Studies in Pure Theory** (London: Allen and Unwin, 1988) pp 153-68. Rudiger Dornbusch, "Devaluation, Money and Non-Traded Goods," **American Economic Review**, Vol 63, (December 1973) pp 1980-81.

[2] Bank of International Settlements **Review**, 10th Sep, 1990.

economic integration[3]. Generally, monetary co-operation has taken the form of operations of clearing arrangements instead of exchange rate management.

The purpose of this paper is two-fold. First, to highlight the need for an institutional framework for managing exchange rate changes within a regional economic grouping such as CARICOM. Second to suggest a simple model for exchange rate determination within the economic grouping. A major contention of the paper is that attempts to use a weighted unit of account as **a numeraire for intra-CARICOM transactions** would not in all cases smoothen the swings of intra-CARICOM changes in cross-rates as long as the currencies of CARICOM countries are pegged to the US dollar. For this reason, the intra-CARICOM cross-rates require management within an institutional framework. Such arrangements would take into account the objective economic factors obtaining in individual member states. It is suggested further that these factors should include relative monetary expansion, relative inflation rates and clearing balances at the Caribbean Multilateral Clearing Facility (CMCF) whose operations need to be revived.

Section II of the paper reviews selected theories of exchange rate determination which are considered appropriate for purposes of managing intra-CARICOM cross rate movements. The CARICOM experience in exchange rate changes is briefly outlined in Section III. A proposal for an institutional framework for managing intra-CARICOM exchange rates is presented in Section IV. The final part contains some concluding observations and suggests some modifications to the simple exchange rate determination model by incorporating the role of a clearing facility in determining intra-CARICOM exchange rates.

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[3] In French speaking West African and Central African States a common CFA Franc which is pegged to the French Franc is used, see Jonathan Derrick, "Has the CFA Franc any future?" **Africa Economic Digest** Vol 11 No.35, pp.4-10; September, 1990; p.3

II Exchange Rate Determination: Major General Theories

Frenkel and Johnson[4] reviewed two major theories of exchange rate determination: the Purchasing Power Parity doctrine and the Asset view and also examined the role of price expectations.

The Purchasing Power Parity

The basic tenet of the purchasing power parity theory of exchange rate determination is that the equilibrium exchange rate for country $_i$ (R_i) equals the ratio of domestic (Pi) to foreign prices (P_f).

$$R_i = P_i/P_f \ldots\ldots\ldots\ldots (1)$$

In its relative form the theory states that changes in the equilibrium exchange rate in the country $_i$ $(\triangleleft R_i)$ equals the changes in the ratio of domestic to foreign price $\triangleleft (P_i/P_f)$:

$$\triangleleft R_i = \triangleleft (P_i/P_f) \ldots\ldots\ldots\ldots (2)$$

As an expression of a parity or arbitrage condition for the equilibrium relationship between exchange rate and the ratio of price indices, the theory does not necessarily prescribe a one way direction of causation between prices and exchange rates. Nevertheless, it is assumed that an exogenous disturbance will lead to a change in the price indices which then cause a change in the exchange rate. The theory is also interpreted as a hypothesis of a fixed value of the expected long-run price relationships; or alternatively, that the real exchange rate should run towards equilibrium over time.

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4   Jacob A Frenkel and Harry G Johnson (ed)
     The Economics of exchange rates: Selected studies,
     (Addeson Wesley Publishing Company, 1978) pp 3.5, 6-22

The controversies surrounding the theory include the choice of the relevant price variables; the inclusion or exclusion of the prices of non-traded goods at theoretical level; the problem of the direction of the causal relationship between prices and the exchange rate as well as the definition of equilibrium situation itself. A major criticism of the theory is that "it simply states that prices in terms of any given currency, of any commodity must be the same everywhere ... whereas its essence is the statement. that exchange rates are the index of the monetary conditions in the countries concerned"[5].

Despite its severe limitations, the purchasing power parity (PPP) theory retains its "residual validity". In his excellent review article, Officer concluded that the theory was generally supported. Its application is valid even in conditions of moderate inflation. Specifically, it was observed that "the relative PPP is a reasonable approximation for the analysis of short-run disturbances...and provides a rough guide for policy makers obliged to decide the magnitude of exchange rate changes. As a matter of fact, the exchange rates of the major countries do not depart very far (typically less that 20 per cent) from purchasing power parity." [6]

Empirical evidence using the German hyper-inflation period (February 1920 - November 1923), however, supported the purchasing power parity doctrine. The results were also supportive of the theory using all the relevant measurements of prices. (Indices of wholesale, cost of living, wage rates). For instance, there was a very high degree of correlation between the Deutschemark/Pound Sterling exchange rate and the relative UK/German prices. The empirical findings, however, did not remove the problem of

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5   Frenkel and Johnson (ed) op cit pp 3-4.

6   Lawrence H. Officer, "The Purchasing Power Parity Theory of Exchange Rates: A Review Article, **Staff Papers** Vol. XXIII, No. 1 (March 1976) P. 36.

equilibrium versus causal relationships between prices and exchange rate changes. The conclusion was that "[w]hile the high correlation between the various price indices and the exchange rate is of some interest in describing an equilibrium relationship or in manifesting the operations of arbitrage in goods (depending on the index used), they are of little help in **explaining** and analyzing the **determinants** of the exchange rate. Commodity arbitrage was rejected as a determinant of exchange rate changes[7]. Support for the theory has, however, also been found for some Latin American countries.[8]

For an economic grouping like CARICOM, however, it is assumed that the theory would be applied in fostering long-run economic integration. An exogenous disturbance to a proposed CARICOM-currency basket numeraire arising from either the US dollar link or a member state, will lead to changes in the domestic price level. In order to approach a long-run equilibrium intra-CARICOM real exchange rate relationships (as a policy objective), an official adjustment can be made to the intra-CARICOM cross rates (based on a CARICOM-currency basket numeraire).

The Asset View

The point of departure of the asset view is that the exchange rate is a price of one currency in terms of that of another and that the relevant concept of money for consideration is stock rather than the flow. Stated differently, the exchange value of a currency at a given time is a function of the quantity of money after allowing for its internal demand. This view was subsequently

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[7] The rejection of commodity arbitrage as a determinant of exchange rate dates back to 1821. David Ricardo, **Principles of Political Economy and Taxation**, London 1821 EC Counor (ed) Ketley, New York, 1970.

[8] Officer, op cit. p.38

modified to incorporate the role of expectations to the effect that the demand for a currency like that of any other asset, depends on the expected rate of return. The change in expectations is therefore recognized as a factor in exchange rate determination[9]. On the basis of these views, in a hyper-inflationary situation the exchange rate determination model was formulated as follows:

The demand for real money balances $(M/p)^d$ is a function of the expected inflation rate (P^e).

$$(M/p_i)^d = f(P^e); \quad \delta f/\delta p^e < 0 \quad \ldots\ldots (3)$$

The supply of real money balances (M/p_i) is exogenously determined and therefore in equilibrium $(M/p = (M/p)^d)$.

The Combined Asset View and Purchasing Power Parity

The Asset view and Purchasing Parity theories are combined to provide a basis for the relevance of their features in exchange rate determination. The price level P_i is a function of exogenously determined real expected money balances:

$$P_i = M/f(P_e); \quad \delta P_i/\delta M > 0; \quad \delta P_i/\delta P^e > 0 \quad \ldots (4)$$

The purchasing power parity relates the price level for country $_i$ (P_i) to the foreign price (P_f) such that:

$$P_i = R \, P_f \quad \ldots\ldots\ldots (5)$$

On the assumptions that equation (5) holds and that P_f is fixed and unity (especially in the German case), equation (5) is substituted into equation (4) to express the exchange rate (R) as

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[9]   A. Marshall, **Money, Credit and Commerce**, (London 1923) p 178; K. Wicksell, "The riddle of foreign exchanges," **Selected Papers on Economic Theory**, (Kelley, New York, 1969), p 236.

a function of the stock of money (M) and inflationary exceptions (P_e):

$$R = M/f(P_e); \quad \delta R/\delta M^{>0}; \quad \delta R/\delta P^e \quad 0 > \delta R/\delta P^e > 0 \quad \ldots (6)$$

The sign for $\delta R/\delta P^e$ is ambiguous and depends on the alternative theories of exchange rate determination. For this reason, the correctness or otherwise of the sign of the partial derivative becomes an empirical issue. The alternative scenarios for an integrated and developed money and capital market are as follows:

(a) A rise in inflation expectations increases the nominal rate of interest which in turn attracts inflows of capital; the foreign capital leads to an appreciation (increase in the price) of the domestic currency ($\delta R/\delta P^e < 0$).

(b) A higher rate of interest reduces expenditure which improves the balance of payments. As a result, the spot exchange rate is reduced $\delta R/\delta P^e < 0$.

Generally, however, the combination of the assets view and the purchasing power parity doctrine (equation 6) explains exchange rate determination as follows: An increase in inflation expectations (P^e) reduces the demand for real balances. For a given stock of money balances real money supply can only be equaled to demand for real money balances through an increase in prices. Moreover, the domestic price level (P_i) is linked to fixed foreign price (P_f) assuming the purchasing power parity, it follows that the domestic price level (P_i) can only rise through a rise in the spot exchange rate (R) that is a lowering of the domestic currency exchange rate vis-a-vis foreign currency.

III Exchange Rate Movements: The Caricom Experience

The exchange rate determination in equation (6) is consistent with conditions in both developed and relatively undeveloped money and capital markets with varying degrees of restrictions on capital flows. It is also consistent with managed as distinct from market determined exchange rates.

For developing countries, exchange rate adjustments which are officially determined are made taking into account both the purchasing power parity considerations and monetary expansion on a global basis. More often than not, however, the exchange rate changes arise from exchange rate fluctuations in developed countries' currencies regardless of the domestic economic conditions. The exchange rates cannot be determined by market forces since there is the absence of the inflows of capital through, interest rate arbitrage. "[U]nder such circumstances allowing the exchange rate to be determined by market forces is not a realistic option, and it is appropriate that the authorities directly manage the exchange rate ....."[10].

The promotion of economic integration among CARICOM countries entails the free flow of goods, services and ultimately capital[11]. It therefore assumed that in the context of CARICOM, the currencies issued by member states are substitutes in the portfolios of private wealth holders. It is further argued that even if the asset markets are not integrated, the intra-CARICOM exchange rates would be determined by current account flows particularly demand and supply of CARICOM currencies through the goods market.

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[10] Peter Wickham, "The Choice of Exchange Rate Regime in Developing Countries, A Summary of the Literature" IMF **Staff Papers** Vol 32 No 2 June, 1985 pp 254-255.

[11] **Treaty establishing the CARIBBEAN COMMUNITY**, Chaguaramas, 4th July, 1973 articles 14,37, 43.

Despite recognition by the member states "that exchange rate stability as between themselves is necessary to promote the smooth functioning of the Common Market ..."[12], existing exchange rate arrangements carry the risk that intra-CARICOM cross-rates may not be consistent with the economic integration process of the Common Market. The currencies of CARICOM member states are pegged to the US dollar or the SDR. Exchange rate changes for individual countries are therefore, affected by changes in the US dollar rate and adjustments associated with structural and balance of payments considerations on a **global** rather than CARICOM basis. Considerable fluctuations occurred in the US dollar exchange rate since 1973. The amplitude of the swings widened in the 1980s compared to the 1970s. There is therefore a strong exogenously determined element in the exchange rate changes between CARICOM member states which may be **unrelated** to the objective economic and monetary factors in the community. "Given the large share of the external sector in economic activity and the weaker ability of CARICOM countries to insulate the domestic economy, exchange rate variability [externally induced] affects domestic incomes and prices. Export performance [intra-CARICOM and extra-CARICOM] may also be affected by exchange rate changes among the industrial countries"[13].

The problem of reconciling exchange rate policies of the member states with intra-CARICOM economic integration has been articulated by Blackman[14]. He noted in particular that recent competitive exchange rate adjustment in CARICOM raised considerable difficulties for the promotion of intra-regional trade. It is further pointed out that intra-regional trade is now conducted

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[12]   CARICOM Treaty, op. cit, Article 43 Section 2

[13]   **Caribbean Development to the Year 2000, Challenges, Prospects and Policies,** Commonwealth Secretariat, Caribbean Community Secretariat, June, 1988 p. 38.

[14]   Courtney N. Blackman, "The Exchange rate in the Balance of Payments adjustment process of CARICOM States," CEMLA **Money Affairs** vol. 11/ Number 1, January/June, 1989 pp 51-69.

largely on the basis of bilateral deals, and amidst strident accusation and counter-accusation of unfair practice. The free-trade clauses of CARICOM are more honored in breach than in the observance"[15].

The nominal and real effective exchange rates (based on the US dollar) of four member states against each other[16] are shown in chart I (a), (b), (c) and (d). It will be observed that:

- In relation to CARICOM trading partners the US dollar real effective exchange rate of the Guyana dollar depreciated steeply from an index of 112.0 in 1970 to 40.0 in 1989. There were periods (1984-1986 and 1987-1988) when the currency appreciated (Chart 1 (a)).

- The Jamaican dollar alternated between depreciation and appreciation against CARICOM member states almost on a regular basis. Since 1984, the currency has appreciated (Chart 1 (b)) .

- The Barbados dollar depreciated moderately from 1975 to 1984. Since then, it has appreciated against CARICOM member states Chart 1 (c)).

- The Trinidad dollar swung from depreciations to appreciations. The currency appreciated during the period 1982-1984; depreciated from 1984 to 1985; appreciated in 1987 and after the 1987/88 depreciation it steeply appreciated from 1988 to 1989.

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[15] Blackman, op cit. p 52

[16] The methodology for deriving the rates is shown in the Appendix.

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Chart 1 (a)

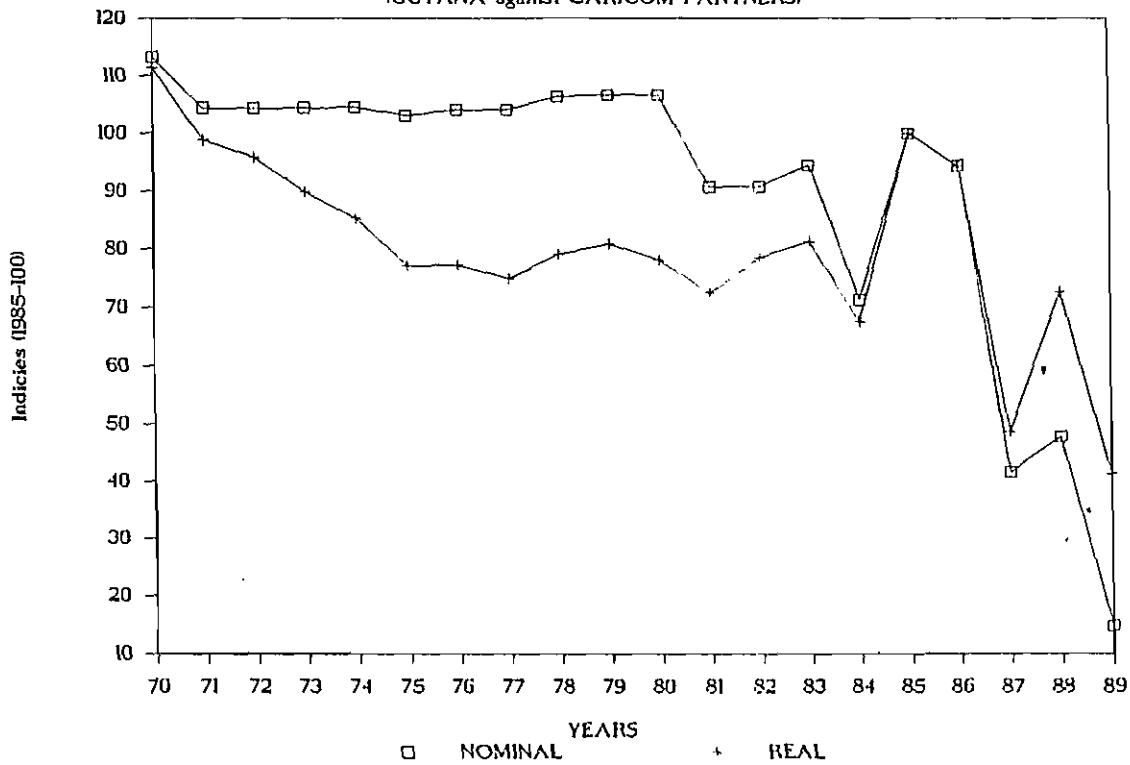# NOMINAL & REAL EFFECTIVE EXCHANGE RATE

(GUYANA against CARICOM PARTNERS)

YEARS

□ NOMINAL   + REAL

Chart 1 (b)

NOMINAL & REAL EFFECTIVE EXCHANGE RATE

(JAMAICA against CARICOM PARTNERS)

YEARS

□ NOMINAL   + REAL

11
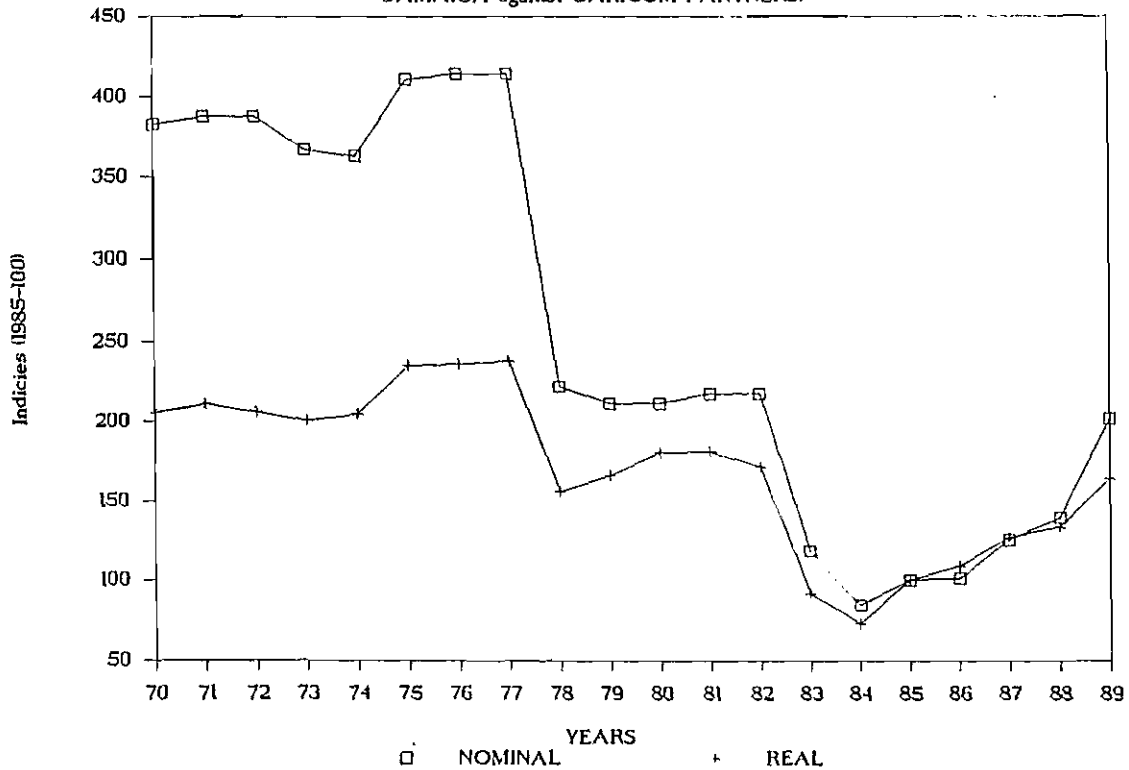
Chart 1 (c)

NOMINAL & REAL EFFECTIVE EXCHANGE RATE
(BARBADOS against CARICOM PARTNERS)

Indicies (1985=100)

YEARS
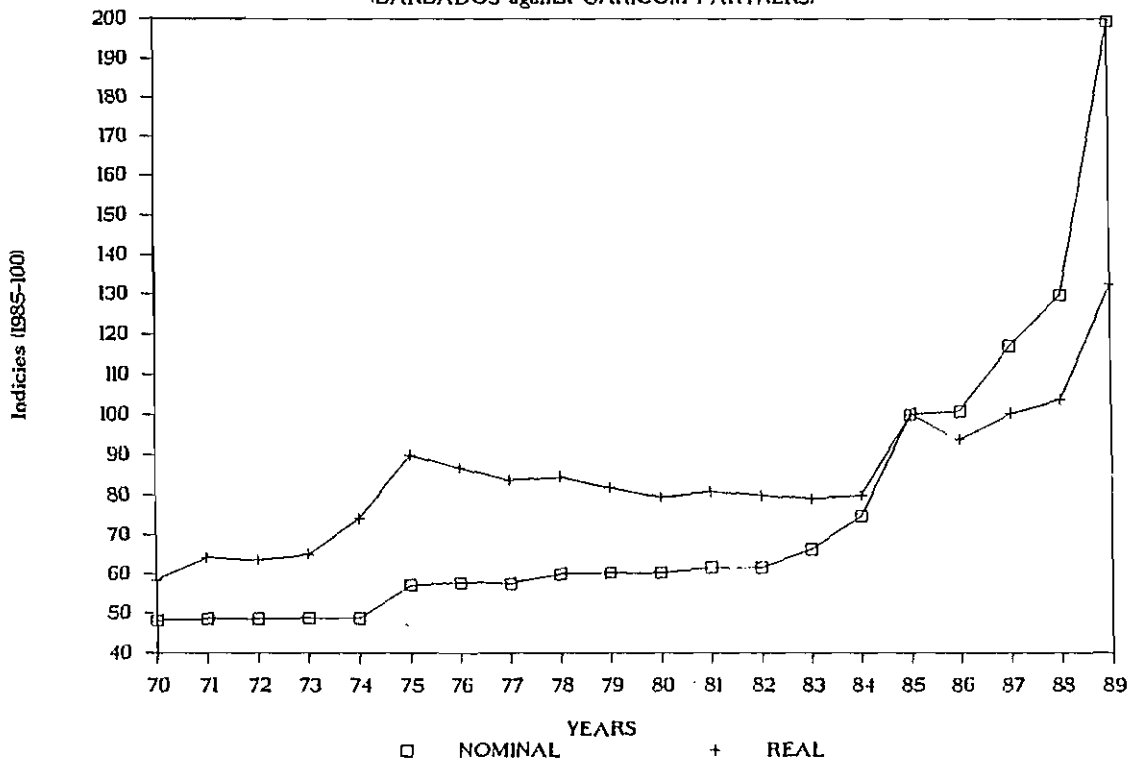
□   NOMINAL   +   REAL

Chart 1 (d)

NOMINAL & REAL EFFECTIVE EXCHANGE RATE
(TRINIDAD against CARICOM PARTNERS)

Indicies (1985=100)

YEARS

□   NOMINAL   +   REAL

12
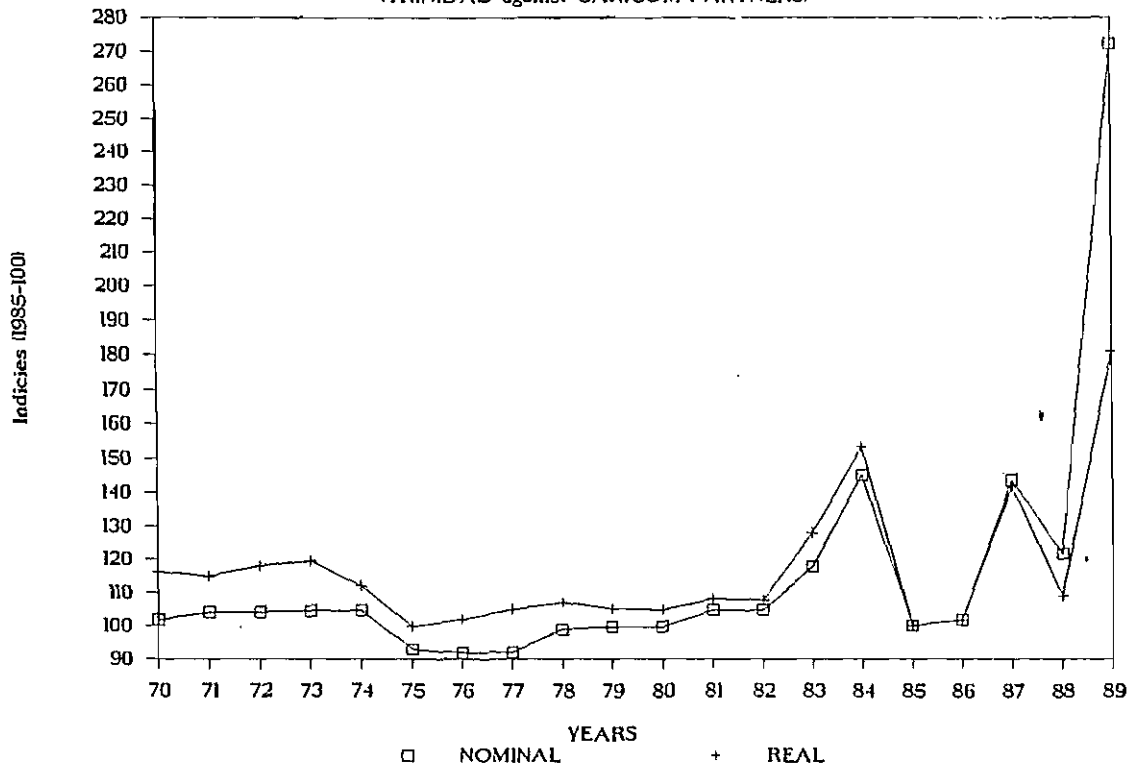
The exchange rate movements of the four Caricom countries were dictated by individual country considerations vis-a-vis the global (extra-CARICOM) imperatives. As pointed out in the Report on a Special Consultation on the future of the Common Market, "..... it was accepted that devaluation was not essentially a policy designed specifically to improve competitiveness in the regional market, although large changes in exchange rates might provide a significant competitive edge, particularly in the short-run"[17].

Based on the purchasing Power Parity and the asset view of exchange rate determination, relationships (non-parametric) between relative changes in prices and monetary expansion between Guyana and the three Caribbean partners (Trinidad and Tobago, Barbados and Jamaica) are depicted in charts 2(a), (b), (c), (d), (e) and (f). It will be observed from the charts that movements of relative prices and monetary expansion were **not** in **all cases** related to the US dollar based cross-rates and that the cross-rates changes were determined independently of the economic situation in member states.

(i) Relative Prices and Cross-Rates

The relative price movements (Guyana/other three Caribbean countries) was generally stable up to 1980 when compared with Trinidad and Barbados and up to 1986 vis-a-vis Jamaica. It will be noted that during the stable period for relative prices, the cross rates moved randomly. From 1986, relative prices were on the rise and the cross-rates oscillated in relation to Trinidad; depreciated vis-a-vis the Barbados in three out of four years; a similar experience occurred when related to Jamaica. There were several, periods when the cross-rate movements were perverse considering movements in the relative prices.

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17   "Issues in Monetary and Financial Co-operation", **Integracion Latino Americana- The Caribbean Community,** Special English Issue, October, 1987, p 78.

13

Chart 2 (a)
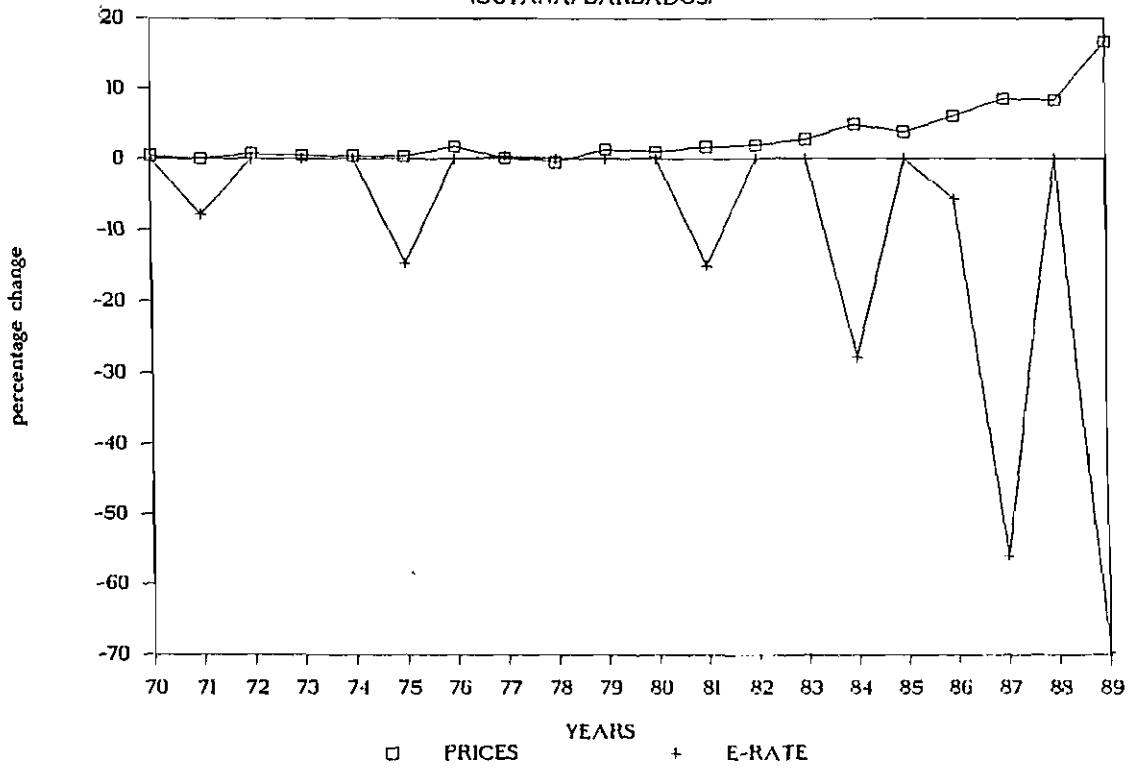# RELATIVE CHANGES IN PRICES & CROSS RATE

(GUYANA/BARBADOS)

YEARS

□ PRICES   +   E-RATE

Chart 2 (b)
RELATIVE CHANGES IN MONEY & CROSS RATES

(GUYANA/BARBADOS)

YEARS

□   MONEY   +   E-RATE
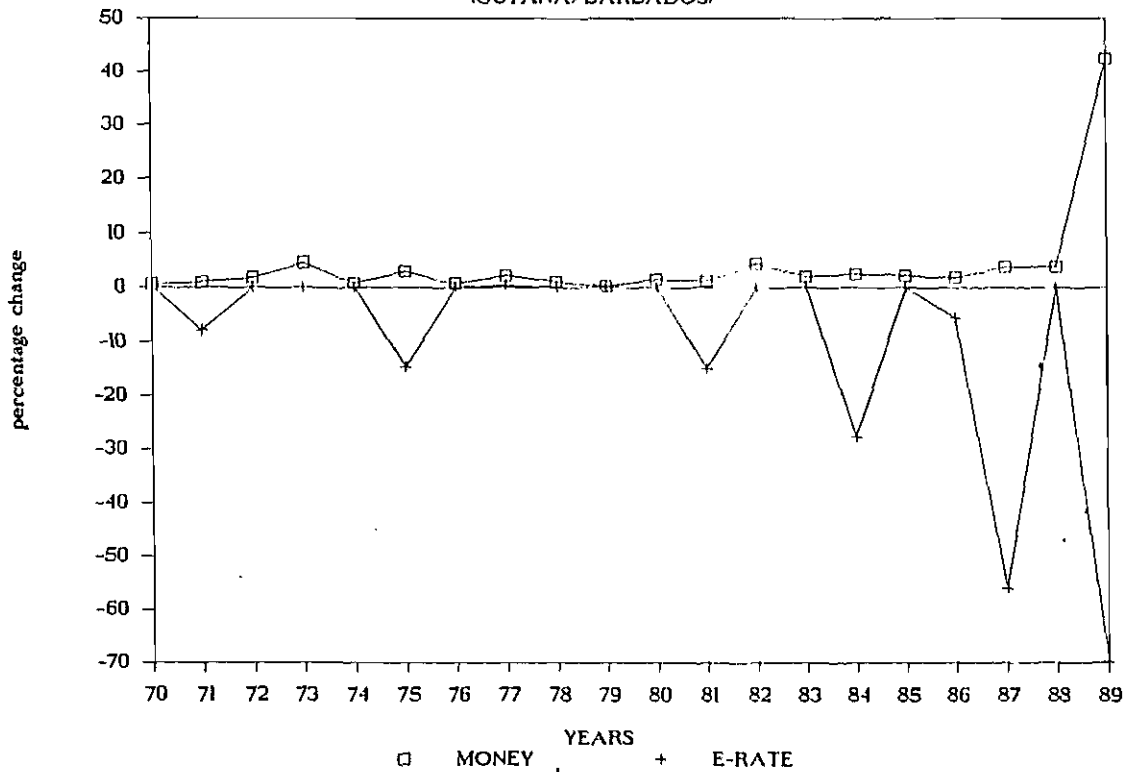
Chart 2 (c)

RELATIVE CHANGES IN PRICES & CROSS RATE
(GUYANA/JAMAICA)

YEARS

□   MONEY   +   E-RATE
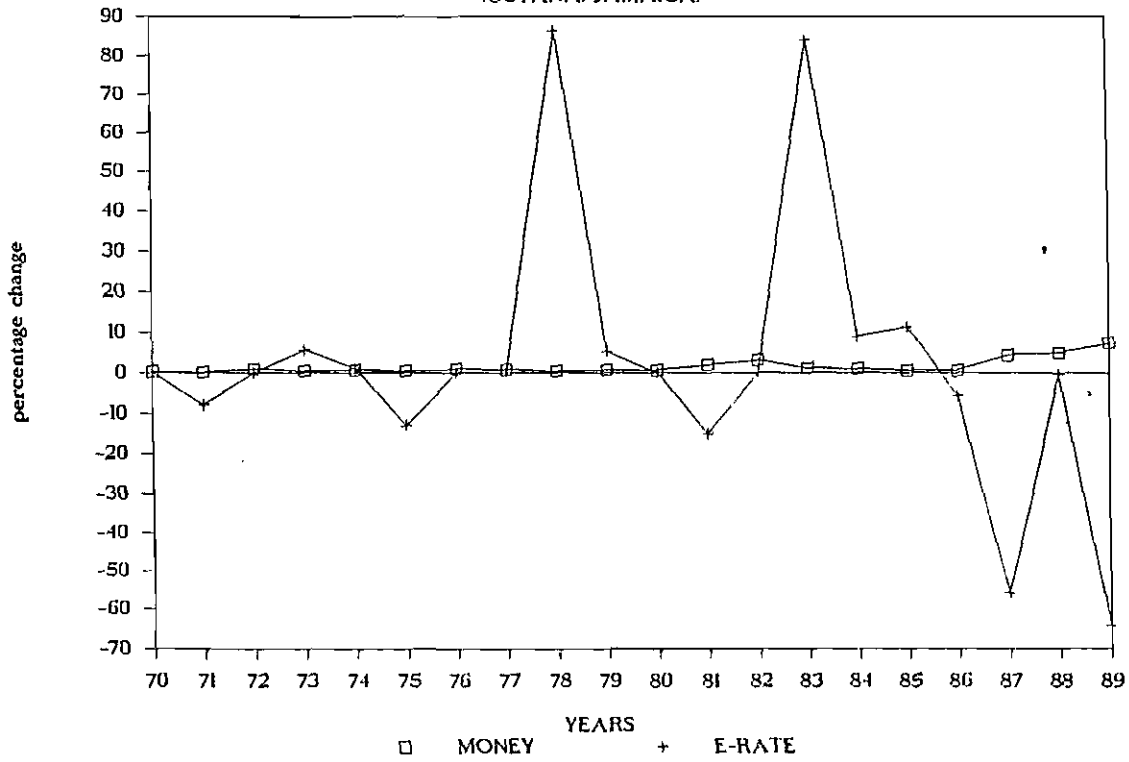
Chart 2 (d)

RELATIVE CHANGES IN MONEY & CROSS RATES
(GUYANA/JAMAICA)

YEARS

□   MONEY   +   E-RATE

15
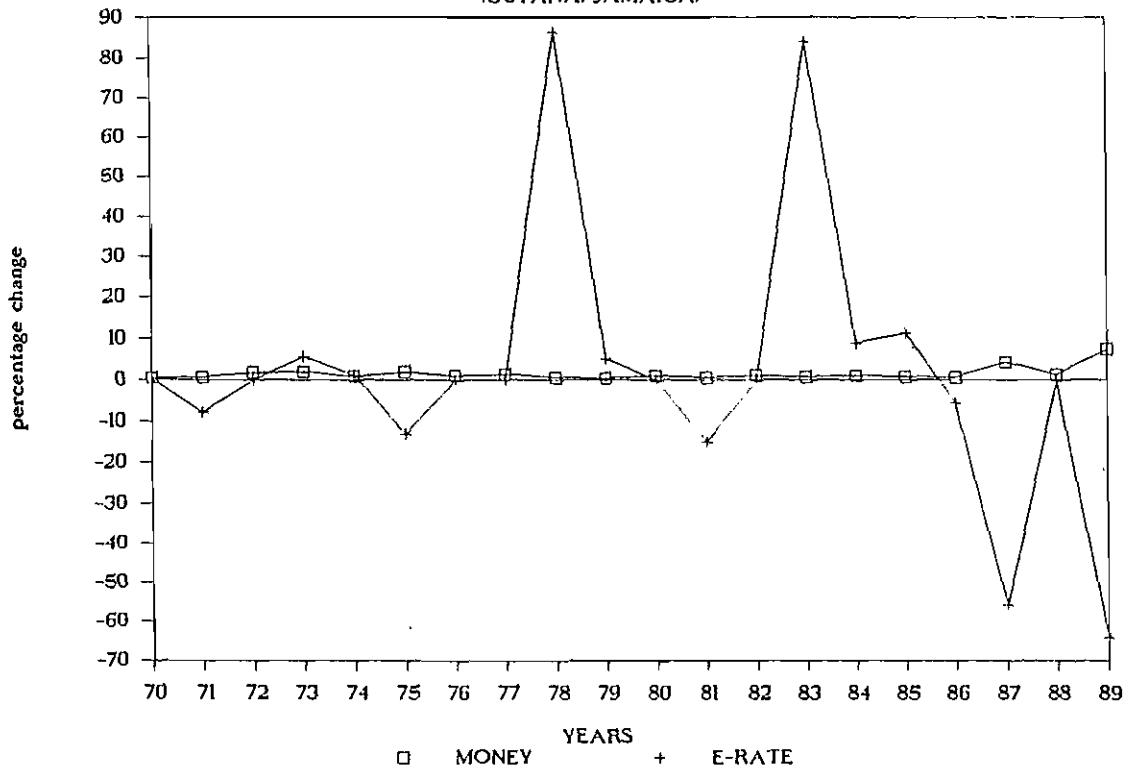
Chart 2 (e)

RELATIVE CHANGES IN PRICES & CROSS RATE
(GUYANA/TRINIDAD)

□ PRICES   + E-RATE
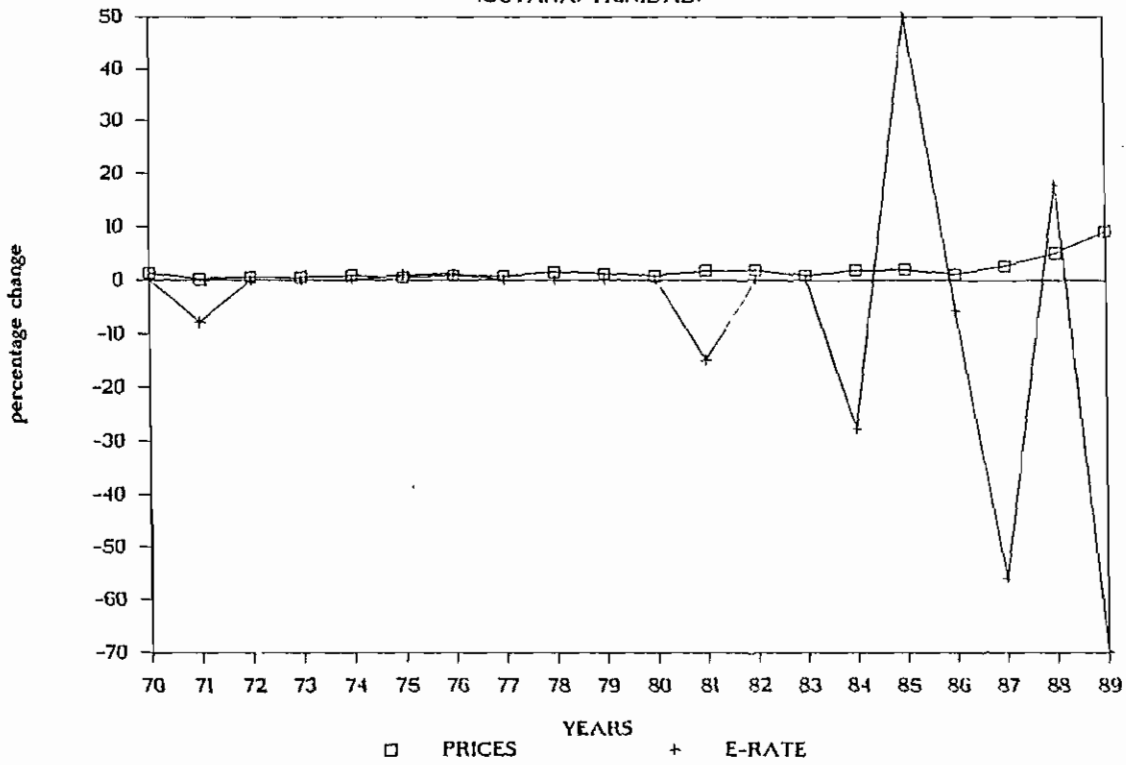
Chart _2 (f)

RELATIVE CHANGES IN MONEY & CROSS RATES
(GUYANA/TRINIDAD)

□ MONEY   + E-RATE

16
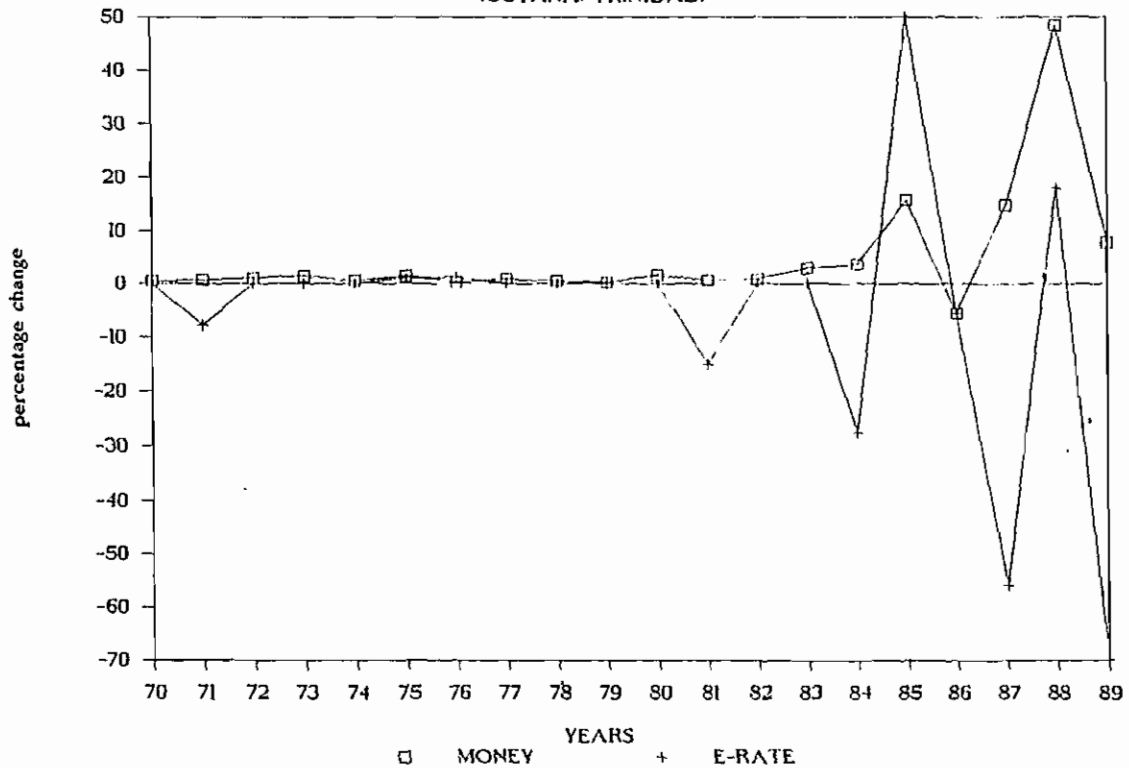
(ii) Relative Monetary Expansion and Cross-Rates

Monetary expansion for Guyana was fairly stable in relation to Trinidad from 1970 to 1982; from 1970 to 1988 vis-a-vis Barbados, and up to 1988 versus Jamaica. As can be noted, exchange rate changes occurred perversely during periods of relative monetary expansion stability. In most cases volatility of cross rates in relation to relative monetary expansion was pronounced after the demise of the Caribbean Multilateral Clearing Facility (CMCF) in 1983.

These observations suggest that for these countries at least, the purchasing power parity relationship performed better than the asset view. A simple regression analysis using relative prices and changes monetary expansion is shown in Appendix 1. The results indicate that cross-rates between the Guyana dollar and the other three partner countries were determined without reference to the economic conditions in the member states. Generally therefore there is the need to relate the movements in cross-rates to the economic factors obtaining in the trading partners within CARICOM.

IV A Framework For Exchange Rate Determination Within CARICOM

(a) A case for an intra-CARICOM Numeraire

The heavy burden which exchange rate fluctuations impose on the individuals and firms in developing countries has been recognized and the need to minimize the amplitude of the changes, is of major policy concern. This problem together with extra-CARICOM induced competitive devaluations have been addressed by Bennett[18]. He proposed the use of a composite unit of account known

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[18] Karl M. Bennett, "A Note on Exchange Rate Policy and Caribbean Integration" Institute of Social Economic Research, University of West Indies Jamaica, **Social and Economic Studies**, Vol 34 No 24 December, 1985 pp 35-43.

as Caribbean Unit of Account (CUA). The CUA was derived from a hypothetical weighted average of cross-rates of the US dollar and the local currencies of six Caribbean countries. It was demonstrated that the fluctuations in the US dollar/local currency rate were wider as a result of exchange rate change by any individual country, and that the use of the CUA as a numeraire for intra-CARICOM transactions would moderate exchange rate shocks originating from outside CARICOM. That objective is consistent with the promotion of regional economic integration.

It was nevertheless clear that **competitive** currency depreciations would occur within the context of intra-CARICOM trade using the CUA. The author did not explicitly recognize the need to relate the resulting cross-rates to intra-CARICOM economic factors although mention was made of possible realignments of CARICOM currencies. The conclusion was also reached that with the use of the CUA a devaluation by a member state, given the weights chosen, "would also operate to enhance the competitive position of ... CARICOM partners in their [extra-CARICOM] market"[19].

This paper develops a framework within which the CUA based exchange rate alignments of the CARICOM member states can be made taking into account on the objective economic factors obtaining in CARICOM member countries.

In constructing the weights for the CUA, Bennett used hypothetical weights of 25 percent (Trinidad and Tobago dollar), 20 percent (East Caribbean dollar) and 5 percent (Belize dollar). An attempt has been made in this study to construct a CUA based on average total trade (exports and imports) among four Caribbean countries (Barbados, Guyana, Jamaica and Trinidad and Tobago) for the period 1970 to 1982. The weights of the CUA derived were 13 percent for Barbados, 15 percent for Jamaica, 15 percent for Guyana

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[19]   Bennett op cit p 43.

and 57 percent for Trinidad and Tobago. The selection of the countries was dictated by the significance of their trade share in total CARICOM trade.

US\$/CUA = .13(US\$/BDS\$)+.15(US\$/J\$)+.15(US\$/G\$)+.57(US\$/TT\$)

Tables 1 shows the exchange rates between the US dollar and the CUA and US dollar/national currencies. The derived CUA/national currency rates are in table 2, while table 3 compares CARICOM cross-rates using the CUA and the US dollar. On the assumption that the trade weights remained representative during the 1970-1989, Chart 3 shows the change in shares of the national currencies in the CUA. Trinidad and Tobago, and Barbados raised their respective shares from 47.1 percent and 10.7 percent in 1970 to 59.2 percent and 28.5 percent in 1989. Correspondingly, the shares for Jamaica and Guyana were reduced to 10.2 percent and 2.0 percent in 1989 from 29.8 percent and 12.4 percent in 1970. The corresponding intra-CARICOM cross-rates for the period December 1970 and December 1989 are shown in Table 3.

The exchange rate movements of the four countries (Barbados, Jamaica, Trinidad and Tobago and Guyana) using the US dollar and the CUA have been compared in charts 4, (a), (b), (c) and (d). It was noted that the CUA numeraire **did not** moderate the amplitude or frequency of exchange rate changes in **all** the four countries.

- For Guyana (chart 4(a)) and (chart 4 (c)), the fluctuations were moderated by the CUA compared to the US dollar and the trend was in the same direction (depreciation of the local currencies) during the period 1970-1989.

Table 1: COMPOSITION OF THE CARIBBEAN UNIT OF ACCOUNT (CUA)

YEARS	CUA/US$	US$/CUA	US$/BDS$	US$/G$	US$/J$	US$/TT$
1970	1.66	0.6034	0.0648	0.0748	0.1795	0.2842
1971	1.57	0.6372	0.0691	0.0735	0.1914	0.3031
1972	1.71	0.5861	0.0636	0.0676	0.1761	0.2788
1973	1.75	0.5707	0.0629	0.0669	0.1650	0.2759
1974	1.74	0.5751	0.0636	0.0676	0.1650	0.2789
1975	1.89	0.5290	0.0649	0.0588	0.1650	0.2403
1976	1.90	0.5262	0.0649	0.0588	0.1650	0.2375
1977	1.90	0.5260	0.0646	0.0588	0.1650	0.2375
1978	2.22	0.4495	0.0646	0.0588	0.0885	0.2375
1979	2.25	0.4452	0.0646	0.0588	0.0842	0.2375
1980	2.25	0.4452	0.0646	0.0588	0.0842	0.2375
1981	2.29	0.4363	0.0646	0.0500	0.0842	0.2375
1982	2.29	0.4363	0.0646	0.0500	0.0842	0.2375
1983	2.51	0.3979	0.0646	0.0500	0.0458	0.2375
1984	2.71	0.3687	0.0646	0.0361	0.0304	0.2375
1985	3.49	0.2865	0.0646	0.0361	0.0274	0.1583
1986	3.52	0.2844	0.0646	0.0341	0.0274	0.1583
1987	3.77	0.2652	0.0646	0.0150	0.0273	0.1583
1988	4.15	0.2411	0.0646	0.0150	0.0274	0.1341
1989	4.42	0.2264	0.0646	0.0045	0.0231	0.1341

Table 2: CUA per National Currency

YEARS	CUA/US$	US$/CUA	CUA/BDS$	CUA/G$	CUA/J$	CUA/TT$
1970	1.66	0.6034	0.1074	0.1240	0.2975	0.4711
1971	1.57	0.6372	0.1085	0.1153	0.3005	0.4757
1972	1.71	0.5861	0.1085	0.1153	0.3004	0.4757
1973	1.75	0.5707	0.1103	0.1172	0.2891	0.4834
1974	1.74	0.5751	0.1106	0.1175	0.2869	0.4849
1975	1.89	0.5290	0.1226	0.1112	0.3119	0.4542
1976	1.90	0.5262	0.1233	0.1118	0.3136	0.4514
1977	1.90	0.5260	0.1229	0.1118	0.3137	0.4516
1978	2.22	0.4495	0.1438	0.1309	0.1969	0.5284
1979	2.25	0.4452	0.1452	0.1321	0.1892	0.5335
1980	2.25	0.4452	0.1452	0.1321	0.1892	0.5335
1981	2.29	0.4363	0.1481	0.1146	0.1930	0.5443
1982	2.29	0.4363	0.1481	0.1146	0.1930	0.5443
1983	2.51	0.3979	0.1624	0.1257	0.1150	0.5969
1984	2.71	0.3687	0.1753	0.0980	0.0825	0.6441
1985	3.49	0.2865	0.2256	0.1262	0.0955	0.5527
1986	3.52	0.2844	0.2272	0.1199	0.0962	0.5567
1987	3.77	0.2652	0.2437	0.0566	0.1028	0.5969
1988	4.15	0.2411	0.2681	0.0622	0.1135	0.5562
1989	4.42	0.2264	0.2854	0.0201	0.1022	0.5923

Table 3

EXCHANGE CROSS RATES
(with refference to CUA)

DEC. 1970	BDS$	G$	J$	TT$
BDS$	1.000	0.867	0.361	0.228
G$	1.154	1.000	0.417	0.263
J$	2.769	2.400	1.000	0.632
TT$	4.385	3.800	1.583	1.000

EXCHANGE CROSS RATES
(with reference to US$)

DEC. 70	BDS$	G$	J$	TT$
BDS.$	1.000	1.000	0.417	1.000
G$	1.000	1.000	0.417	1.000
J$	2.400	2.400	1.000	2.400
TT$	1.000	1.000	0.417	1.000

EXCHANGE CROSS RATES
(with refference to CUA)

DEC. 1989	BDS$	G$	J$	TT$
BDS$	1.000	14.220	2.792	0.482
G$	0.070	1.000	0.196	0.034
J$	0.358	5.093	1.000	0.173
TT$	2.075	29.506	5.794	1.000

EXCHANGE CROSS RATES
(with reference to US$)

DEC. 89	BDS.$	G$	J$	TT$
BDS.$	1.000	16.407	3.222	2.113
G$	0.061	1.000	0.196	0.129
J$	0.310	5.093	1.000	0.656
TT$	0.473	7.765	1.525	1.000

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Chart 3

COMPOSITION OF CARICOM UNIT OF ACCOUNT

(1970)

BARBADOS (10.7%)

GUYANA (12.4%)

TRINIDAD (47.1%)

JAMAICA (29.8%)

COMPOSITION OF CARICOM UNIT OF ACCOUNT

(1989)

BARBADOS (28.5%)

TRINIDAD (59.2%)

GUYANA (2.0%)
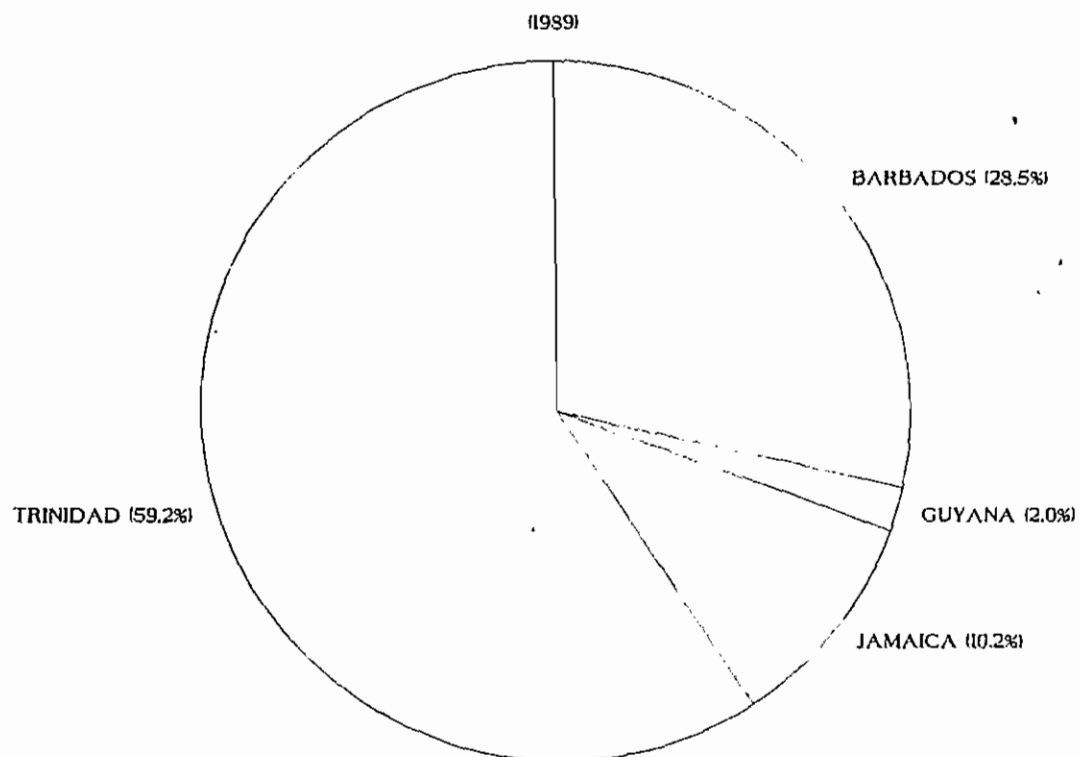
JAMAICA (10.2%)
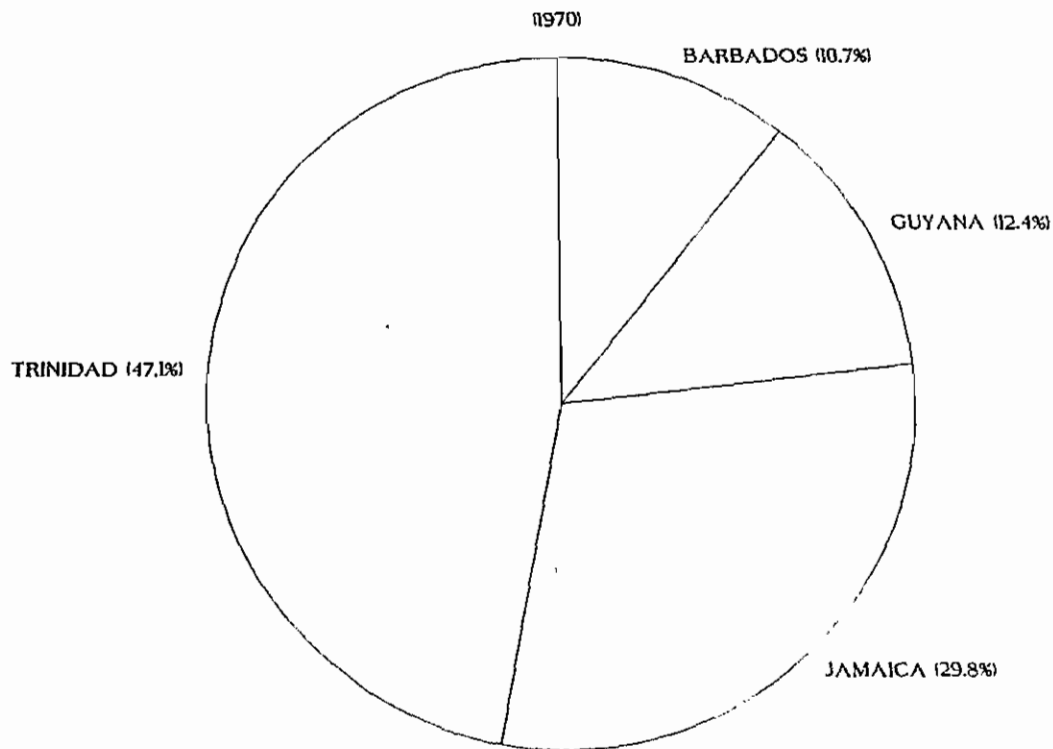
Chart 4 (a)

MOVEMENTS IN VALUE OF CURRENCY
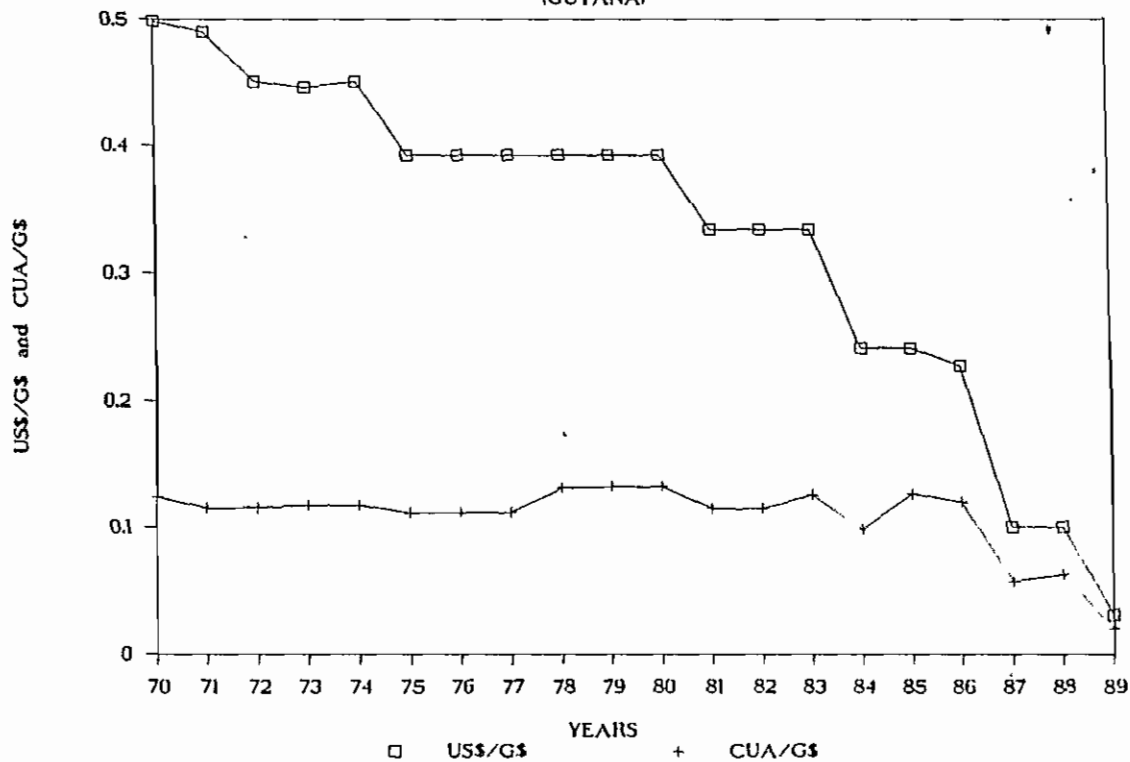### (GUYANA)

Chart 4 (b)

MOVEMENTS IN VALUE OF CURRENCY
(BARBADOS)

23
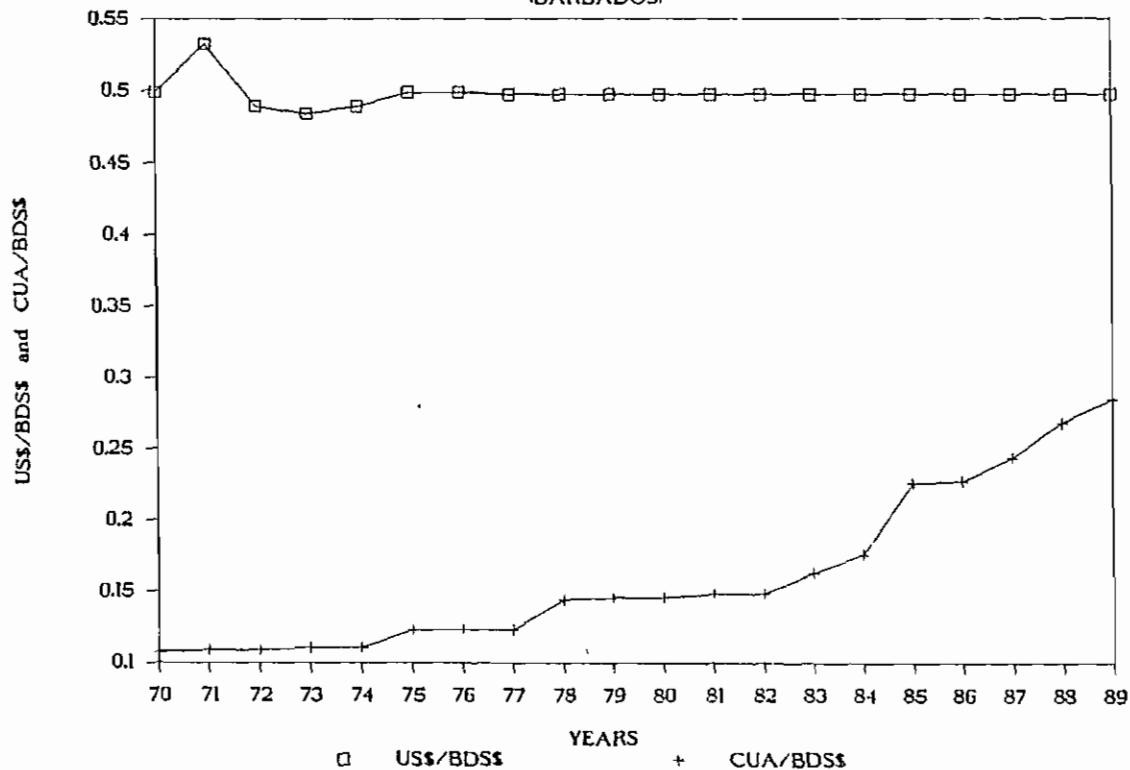
Chart 4 (c)
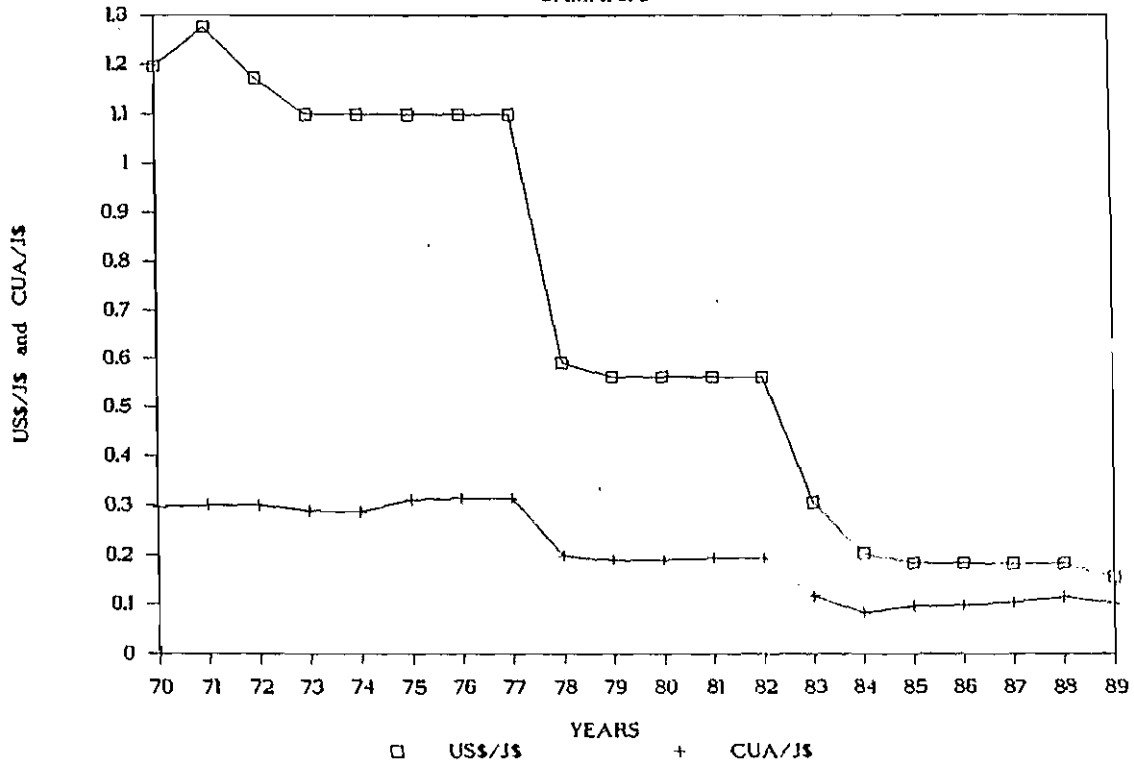
MOVEMENTS IN VALUE OF CURRENCY
(JAMAICA)

YEARS

◻ US$/J$ +   CUA/J$

Chart (d)
MOVEMENTS IN VALUE OF CURRENCY
(TRINIDAD)

YEARS

◻ US$/TT$ +   CUA/TT$

24
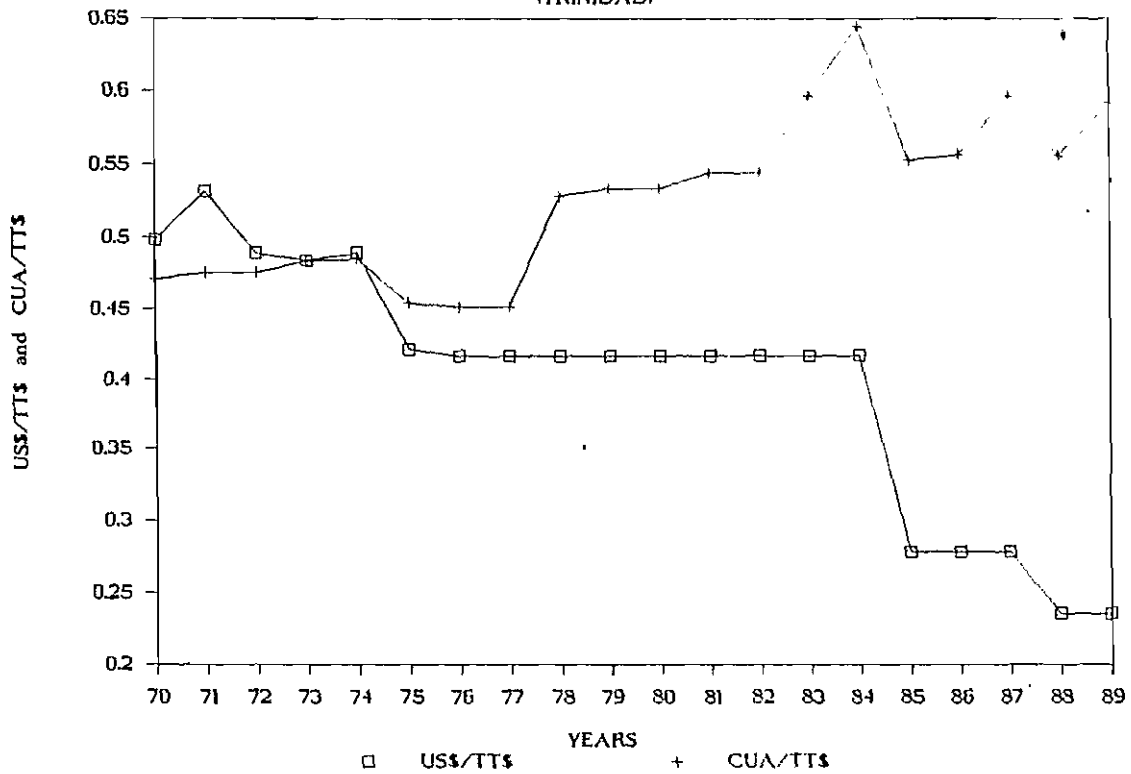
- For Barbados (chart 4 (b)), the exchange rate changes were more frequent when pegging to the CUA than the US dollar; and the local currency appreciated in relation to the CUA between 1970 and 1989.

- Jamaica showed smaller amplitudes in the variations of the CUA exchange rates compared to the US dollar. The trend for the two pegs was in the same direction (chart 4(c))

- For Trinidad (chart 4 (d)), there was evidence of more frequent variations in the exchange rate based on the CUA numeraire than the US dollar. Moreover, whereas the US dollar/Trinidad dollar rate was depreciating the CUA/Trinidad dollar appreciated during the 1970-1989 period.

It can be observed that the use of the intra-Caribbean numeraire (CUA) may or may not smoothen the amplitude of exchange rate changes for intra-regional transactions without conscious and deliberate efforts to achieve that objective. It has also been demonstrated that the cross-rate movements do not always conform to the relative price changes (Purchasing Parity) and monetary growth (Asset View). In other words, the insulation of the CARICOM countries from the external shocks arising from the use of the US dollar by adopting the CUA as a numeraire is not certain. Table 3 shows the cross rates based on US dollar versus the CUA as the numeraire as at end of December, 1989:

- For Guyana, the use of the CUA compared with the US dollar would result in a saving in terms of Barbados dollars (14.8 percent); no change in relation to the Jamaica dollar; and a loss of 74 percent in term of Trinidad and Tobago dollars.

- Barbados would loose 57.0 percent in Guyana dollars; 57.0 percent in Jamaica dollars; and forgo 89.0 percent in Trinidad dollars.

Similarly, gains and losses can be calculated for Jamaica, and Trinidad and Tobago. The switch from pegging to the US dollar for intra-CARICOM transactions to CUA would result in depreciations and appreciations in the cross rates as shown in the following table:

Effects on Exchange rate of a Change from US$ to CUA as a numeraire				
DEC. 1989	BDS$	G$	J$	TT$
BDS$	0	–	–	–
G$	+	0	0	–
J$	+	0	0	–
TT$	+	+	+	0
From left to right a plus (+) sign indicates that the currency on the left-hand column has appreciated against that of the partner country listed in top row; a minus (-) sign represents a depreciation of the currency; and zero (0) indicates no change in the currency value.				

The general conclusion is that the "fairness" or otherwise of these gains and losses can only be assessed in the context of an institutional framework which would permit realignments of the currencies using objective criteria for the determination of intra-CARICOM cross rates. As noted by Wickham, "although pegging to a basket of currencies will stabilize an equivalently weighted average bilateral exchange rates, each individual bilateral rate will vary." Since exchange rate changes affect several macro-economic variables, it is important in a common market setting that cross-rate realignments should be the norm rather than the exception.

(b) **Towards an Institutional Framework**
    for Managing Intra-CARICOM Exchange Rates

The need for an institutional framework to manage the exchange rates of a common market was realized by the EEC in its administration of the European Monetary System. Despite the high level of development of the asset market, it became necessary to intervene in the market and foster appropriate policy changes to ensure relative stability of the EMS. Outside of a common currency zone, a simple use of a common numeraire does not automatically ensure exchange rate changes which are consistent with broader regional economic co-operation objectives.

It is therefore proposed that an exchange rate institutional arrangement for the Caribbean be considered with the following features:

(i) **The Adoption of a CUA:** The common numeraire would have weights which would minimize the amplitudes of intra-CARICOM exchange rate changes arising from exchange rate action by any single member country.

(ii) **The Intra-CARICOM Exchange Rate Realignments:** Following any country"s exchange rate change (extra-CARICOM induced) realignments of intra-CARICOM cross-rates be guided by other objective criteria within the member states. These criteria should be principally the relative inflation rates or inflationary expectations and relative monetary expansion. The realignments could be triggered by any changes in the US\$/national currency rate or changing relative economic conditions in member countries.

(iii) **Regular Fixing of the CUA Weights:** It is proposed that Central Banks of the region collectively decide at regular intervals on the weights of the numeraire (CUA).

(iv) **The use of a Multilateral Clearing Arrangement:** As pointed out by Whitehead[20], there was no need for the Caribbean Multilateral Clearing Facility (CMCF) to stop functioning provided that its purpose was strictly that for clearing payments rather than balance of payments support. It is further proposed that a revived CMCF would use the CUA as its numeraire and that the size of the debit and credit balances at the end of the transactions period should be included as a major factor in determining the appropriate cross-rates in addition to the relative monetary and price developments. A creditor position of a country versus the rest of the member states should **ceteris paribus** lead to an appreciation of its currency vis-a-vis other member states; and vice-versa.

(v) Persistent net creditor countries in the CMCF could utilize their balances for fostering intra-CARICOM investments as a means of stabilizing cross-rate changes based on clearing balances.

(b) **A Model for Exchange Rate Determination for CARICOM**

It has been argued in part II that the simple model in equation (6) suits the conditions in developing country where exchange rates are not determined through the market mechanism. Within the framework of equation (6), both higher monetary

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[20] Judy A. Whitehead, **The Nature and Impact of the CMCF Problem**, Mimeograph, Department of Economics, University of West Indies, Cave Hill, Barbados.

expansion and acceleration of inflation rate in relation to other CARICOM partners should lead to a depreciation of the local currency versus that of trading partners. For CARICOM under the regime of a CMCF, an additional factor, the net debtor or credit position at the end of a transaction period would be included as a determinant of cross-rate adjustment; a net creditor position would lead to an appreciation and a net debtor balance would suggest the need for depreciation.

A weighing system could be devised for currency realignments such that clearing balances carry a weight (positive or negative) to enforce the need for speedy adjustment and settlement of outstanding balances.

V Concluding Observations

The paper set out to underscore the problem of exchange rate determination in a developing country in general and within a regional integration context in particular. It is evident that even in the context of a simple theoretical model, exchange rate determination in CARICOM has occurred under the aegis of extra-CARICOM imperatives and bore little relation to economic integration. There is therefore need to adopt a numeraire, the CUA, which would take into account the regional integration objective for CARICOM.

However, it is also noted that the use of the CUA would not on its own ensure appropriate cross-rates which should· take into consideration relative inflation and monetary expansion rates. Moreover, the re-opening of the CMCF would add a dimension to the determination of cross-rates. It is finally suggested that within the context of CARICOM, the CUA and the cross-rates would be regularly fixed and managed using a model of exchange rate determination which takes into account the purchasing power parity and the asset view.

APPENDIX 1

Econometric Tests of Determinants of of Cross-Rates Between Guyana and Three CARICOM Partners, 1970-1989

The Purchasing Power Parity and Asset View of exchange rate determination were regressed on bilateral cross-rates between Guyana on the one hand, and Barbados, Jamaica and Trinidad on the other as follows:

$$E_{ij} = \alpha + \beta P_j/P_i + \delta M_{j}^{j}/M_i \quad \ldots\ldots\ldots \quad (4)$$
$$\beta < 0; \quad \delta < 0$$

where E = The partner currency per Guyana dollar

P = The price level measured by the consumer price index;

M = Money balances broadly defined to include currency in circulation, demand deposits savings and time deposits.

subscripts i and j denotes partner country and Guyana respectively.

The equation (4) was tested for the period 1970-1989 in log-linear form.

The econometric results were as shown below. It will be noted from the table that the cross-rates have not historically reflected the relative economic situation in partner countries.

$$E_{ij} = \alpha + \beta P_j/P_i + \delta M_j/M_i$$

E_{ij}	α	β	δ	R^2	DW	F
Barbados/ Guyana	6.058 (0.67)	9.732 (-079)	-1.009 (-1.13)	.58	2.25	(3,17)
Jamaica/ Guyana	404.818 (2.68)	-390.910 (-2.88)	108.568 (3.210)	.43	1.65	(3,17)
Trinidad/ Guyana	-113.55 (-2.763)	89.258 (2.16)	1.087 (2.06)	.33	1.85	(3,17)

Need F values

Barbados/Guyana Cross Rates: The coefficients for the price ratios carried the correct signs but were not significantly different from zero although the R^2 was 58 percent.

Jamaica/Guyana: The coefficient of the price ratios was significantly different from zero at 10 percent level of confidence and carried the correct sign. Though significant, the money balance ratio coefficient had a perverse sign and the R^2 was only 43 percent.

Trinidad/Guyana: The coefficients of both the price and the money balances ratios were significant at 10 percent level of confidence but had perverse signs.

APPENDIX 2

Adjustment of intra-CARICOM Cross-Rates for Guyana (G) and Trinidad and Tobago (TT)

It is proposed that the intra-CARICOM cross rates be adjusted using the following procedures:

Step 1: The unadjusted cross-rates are derived using the numeraire of a basket of CARICOM currencies, the CUA:

$$US\$/CUA = .13 \ (US\$/BD\$) + .15 \ (US\$/J\$)$$
$$+ .15 \ (US\$/G\$) + .57 \ (US\$/TT\$)$$

$$TT\$/CUA = US\$/CUA \times TT\$/US\$$$
$$G\$/CUA = US\$/CUA \times G\$/US\$$$

Therefore the $G\$/TT\$ = G\$/CUA \times CUA/TT\$$
$$= 0.034$$

Step 2: Derivation of ratios of relative price changes, $\triangleleft P_G / \triangleleft P_{TT}$, and monetary expansion, $\triangleleft M_G / \triangleleft M_{TT}$.
$$\triangleright P_G / \triangleright PTT = 1.021 \ ; \ \triangleright M_G / \triangleright MTT = 0.942$$

Step 3: Adjustment of the $G\$/TT\$$ cross-rates:

The adjusted cross rate $(G\$/TT\$)$ would be done using the formula:

$$(G\$/TT\$) = G\$/TT\$ \times \triangleright P_G / \triangleright P_{TT} \times \triangleright M_G / \triangleright M_{TT}$$
$$= 0.034 \times 1.021 \times 0.942$$
$$= 0.327$$

The adjusted cross rate takes into account the relative price and monetary changes. The impact of the relative price movements (1.021) would tend to depreciate the G$ from the unadjusted rate (0.034); but the lower relative monetary expansion (0.942) offsets the effect of the price movements to produce an appreciation from 0.034 G$/TT$ to 0.327 G$/TT$.

APPENDIX 3

Calculation of Bilateral Effective Exchange Rates [21]

Although CARICOM consist of thirteen countries, the bilateral trade weighted exchange rate indices were constructed only for the members states (Barbados, Guyana, Jamaica and Trinidad and Tobago) due to availability of data.

Trade Weights

The trade weights were based on data from the **Direction of Trade Statistics** (DOT) published by the International Monetary Fund. The trade weights (Z^P) for the four countries were derived from an average of imports and exports for the period 1982-1988:

$$Z^P = W^P/\Sigma W^P$$

where: W^P = share of partner country in total trade of reporting country.

ΣW^P = represents the sum of the shares of partner countries in the total trade of reporting country.

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[21] For a discussion on the various approaches to the construction of the effective exchange rate indices see Rudolf R. Rhonrbery "Indices of Effective Exchange Rates", IMF **Staff Papers** Vol. XXIII, No.1 (March 1976) pp. 88-112. and Edouard B. Mariejewski, "Real Effective Exchange Rate Indices, A Re-examination of the Major Conceptual and Methodological Issues", IMF **Staff Papers**, Vol 30, No. 3 (September 1982), pp.491-541.

Nominal Effective Exchange Rate Index

The nominal effective exchange rate index (N) was derived as follows:

$$N = \Sigma \{Z^p (e^{pr}/e^{pr}) \times 100\}$$

Where: $e^{pr} = e^p/e^r$ and $e^{pr} = e^p/e^r$

are the exchange rates of the home currency in terms of partner currency, at time 0 (1985) and time 1 respectively.

Real Effective Exchange Rate Index

The real effective exchange rate (E_r) indices were calculated as follows:

$$E_r = \Sigma Z^p \{(e^{pr}/e^{pr})/(P^{pr}/P^{pr})\} \times 100$$

where: $P^{pr} = P^p/P^r$ and $P^{pr} = P^p/P^r$

are the ratios of consumer price of the partner countries to those of the home country at the 0 (1985) and time 1 respectively.

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