ESTIMATION OF EQUILIBRIUM REAL EXCHANGE RATES FOR THE EASTERN CARIBBEAN CENTRAL BANK UNIFIED CURRENCY AREA

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Abstract

This paper examines the behavior of the real effective exchange rate (REER) of the Eastern Caribbean Central Bank monetary union. Using a Generalized Method of Moments estimator, the results suggest the existence of considerable inertia in the adjustment of the REER. Plausible factors for this inertia include the existence of tax, price and wage distortions in the economies. The terms of trade, openness, government consumption and trade taxes were economic fundamentals that were significant explanatory variables. Despite, the existence of apparent misalignment of the REER, the longevity of the fixed exchange rate regime may hinge on the political consensus of commitment, fiscal discipline imposed by the monetary arrangement and the degree of foreign asset cover maintained by the banking system.

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1 The first two authors are economists in the Research and Information Department at the Eastern Caribbean Central Bank. Myrvin Anthony is a lecturer at the University of Strathclyde. The normal disclaimer that the views expressed in this paper are not those of the ECCB, its Directors and Monetary Council applies with special force. All errors and omissions accrue entirely to the authors.

I. Introduction

The renewal of interest in Unified Currency Areas (UCA) emerged with the recent debut of the Euro currency. In addition, the 50.0 per cent devaluation of the Commaunauté Financierè Africaine (CFA) franc in 1994 after having been fixed for some forty-six years raised the issue of the sustainability of fixed exchange rate regimes. Some of the underlying criteria for a UCA include a single currency, a common exchange rate policy, common pool of reserves and arrangements governing the administration of monetary policy through a common central bank. These criteria are seen as a mechanism for imposing monetary and fiscal discipline on members of the arrangement. Adherence to a single currency has the effect of fostering economic convergence or endogenising the conditions for a unified or optimum currency area. Frankel and Rose (1998) argue that countries may not need to satisfy the conditions for a currency union ex-ante as the establishment of a single currency may well create these conditions ex-poste. The Eastern Caribbean Central Bank (ECCB) constitutes the monetary authority that manages such an arrangement in addition to the European Central Bank and the central banks of the Western and Central African Monetary Unions.

The members of the ECCB monetary union have enjoyed low inflation, real GDP growth averaging between 4-6 per cent over the period 1980-96, investor confidence and a stable currency; the Eastern Caribbean (EC) dollar has been pegged to the United States dollar since 1976 at a nominal rate of 2.7:1.[1] The peg to the United States (US) dollar directly imposes monetary and fiscal discipline in order to ensure credibility of this choice of exchange rate regime. It also predisposes the UCA to shocks originating in the US given the preponderance of trade and investment between the monetary union and its major trading partner. The inability of member governments of the monetary union to monetise their fiscal deficits through inflationary finance has engendered price stability. Deviations in the real exchange rate should primarily reflect inflation differentials between the monetary union and the US and thus these changes should be zero according to the purchasing power parity hypothesis.[2] However, several studies using time series data have produced evidence of the failure of the purchasing power parity (PPP) doctrine (Frenkel, 1981; Baillie and Selover 1987; and Corbae and Ouliaris 1988) others such as Edison (1987) and Broadberry (1987) and Frenkel and Rose (1996) have produced evidence in favour of PPP. Despite the recent use of longer data sets through panel data methods the evidence remains mixed. In using panel data methods, Jorion and Sweeney (1996), Wu (1996) and Predroni (1995) found evidence against PPP while Papell (1997) findings were consistent with long-run PPP.

Several economists view changes from the real side of the economy as driving the real exchange rate (Balassa (1964; Samuelson 1964; Sebastian 1994 and Williamson 1994). It is in this spirit that this paper is motivated. It seeks to examine the extent to which the real effective exchange rate anchoring the EC dollar is consistent with a conventional set of economic fundamentals. In so doing a model describing the behaviour of the real effective exchange rate was developed to explain the deviation between the actual real exchange rate and the value given by the estimated relationship. The remainder of the paper is organised as follows. In section II, conceptual issues comparing the Fundamental Equilibrium Exchange Rate (FEER) and the Behavioural Equilibrium Exchange Rate (BEER) were examined. A behavioural model was developed in section III while in section IV econometric issues associated with modelling

[1] Foreign direct investment flows to the region over the period 1980-96 have averaged 9.0 per cent of GDP and have been concentrated in the communications and hotel sectors.

[2] Weak for purchasing power parity (PPP) requires the residuals of the equation which conditions the exchange rate on relative prices to be stationary while strong from PPP requires both stationarity of the residuals plus homogeniety.

dynamic panel were explored. The results and policy implications for the fixed exchange rate regime are presented in Section V. Some concluding comments on the study's findings are made in the final section.

II: Conceptualising the Fundamental Equilibrium Exchange Rates (FEER) and Behavioural Equilibrium Exchange Rates (BEER)[3]

There are two prominent approaches to the concept of the equilibrium exchange rate. These are the FEER after the tradition of Williamson (1985) and the BEER as postulated by Edwards (1989). The FEER is that exchange rate that is consistent with internal and external macroeconomic balance over the medium term (Clarke and McDonald 1998; Agelvi et al 1991). Internal balance is defined as that underlying level of potential output that is consistent with full unemployment and low inflation. External balance is associated with achieving equilibrium in the capital and current accounts of the balance of payments i.e. a current account balance that is consistent with sustainable capital inflows.

Based on the above definitions the FEER is a normative concept that focuses on that level of the exchange rate which is consistent "ideal" economic fundamentals. It does not focus on the behavioural determinants of the exchange rate but on the determinants of the current account (CA) of the balance of payments such as domestic (y_d) and foreign aggregate demand (y_f) and the real effective exchange rate (REER) (q) . The real effective exchange rate constitutes the mechanism for equilibrating the current account with a sustainable capital account (KA).

$$CA = \beta_0 + \beta_1 y_d + \beta_2 y_f + \beta_3 q = -KA \qquad (1)$$

In this regard the balance of payments in the key economic fundamental determining the equilibrium exchange rate (Clarke and McDonald, 1998). FEER's can be calculated using a forward looking or backward looking approaches. The former involves an estimate of the current equilibrium rate by searching for a period of historical equilibrium and updating that rate for adjustments between that benchmark and the present (Clarke and McDonald 1998). The latter involves a search for that rate that would yield a future equilibrium position based on a postulate of the medium term movements in the fundamentals (op. cit). In this approach the real effective exchange rate is viewed as an asset price consistent with the monetary approach of the exchange rate (McDonald and Taylor, 1993). For a given set of parameters in equation (1) the FEER can be calculated using an assumed level of sustainable net capital inflows (Williamson 1994; Wren-Lewis and Driver 1997 and Bayoumi et al. 94).[4]

The BEER on the other hand estimates a reduced form equation to explain the behaviour of the REER over time. Edwards (1989) provided a theoretical and empirical analysis of the economic fundamentals determining the behaviour of the REER. The degree of current misalignment is derived as the difference between the actual and REER conditional on the values of the economic fundamentals. Current misalignment is therefore a residual of transitory factors and random disturbances.

$$q_t = \beta_1 Z_{1t} + \beta_2 Z_{2t} + \tau T_t + \varepsilon_t \qquad (2)$$

[3] This section builds on the conceptual expositions of Williamson (1994),McDonald (1998) and Hinkle and Montiel (1997)

Where Z_1 represents a vector of economic fundamentals expected to be persistent over the long run while Z_2 a vector of economic fundamentals which affect the REER over the medium term. T constitutes a vector of transitory factors that affect the REER over the short run. β_1 β_2 and τ are reduced form coefficients while ε_t a random disturbance term.

Hinkle and Montiel (1997) attempted to identify the predetermined, policy and exogenous variables that encompassed the economic fundamentals. Their investigations concentrated on the estimation of the parameters of the model explaining the behaviour of the REER. Predetermined variables were defined as those that evolve endogenously over time and are influenced by policy and exogenous variables as well as the current and future values of endogenous variables (Hinkle and Montiel 1997). The country's net international indebtedness and capital stock fall into this category. Policy variables, conversely evolve dynamically conditional on the economic conditions, policy stance and its responsiveness to economic developments. Exogenous variables fall within the realm of world economic conditions, which change over time. As in the case of the FEER operationalising medium to long term sustainable values of the three types of variables is challenging given different rates of convergence towards steady-state values.

III. Model Development

A number of economic fundamentals are thought to determine the behaviour of the REER. Developing countries frequently experience terms of trade shocks especially given that 25.0 per cent of merchandise trade consists of primary commodities (Cashin et al. 1999). Foreign price shocks such as oil in 1973 and 1981 resulted in large devaluation in oil importing countries (Cottani et al. 1990). A deterioration in the terms of trade results in a depreciation in the REER if due to a decline in the price of exportables. The current account worsens due to the excess demand for exportables given the excess supply of nontradables. The imbalance in the current account is corrected when there is a reduction in the price of nontradables (Agelvi et al. 1991). An improvement in the terms of trade has the opposite effect particularly if the income effect dominates the substitution effect hence the sign of the estimated parameter can be ambiguous.

An increase in government consumption of nontradables results in a real appreciation of the REER through the increase in demand on the price of nontradables (Khan and Lizondo 1987;and Khan and Montiel 1987). However the increase in government consumption depends primarily on composition as if the increase falls on primarily on tradables a real exchange depreciation results.[5] Changes in fiscal measures such as the structure of taxes that impact on savings and investment patterns have a bearing on the equilibrium real exchange rate. Tariff reform and the reduction in exchange controls are conventionally accompanied by a depreciation of the ERER.

Differential rates of technical progress or the "Balassa Samuelson effect" impact on the ERER if productivity rises faster in the tradable sector relative to the nontradable sector. Given the price of tradables are exogenously determined the ERER appreciates. The degree of openness reflects the explicit commercial policy stance as well as implicitly regarding import restrictions and other exchange controls.

Net capital inflows tend to appreciate the RER due to increased spending on all goods. Excess credit expansion given a constant RER i.e. domestic inflation equalling foreign inflation plus expected devaluation, requires the restriction in growth in money in order for the RER not

[4] It is implicitly assumed that the actual real effective exchange rate will converge with the FEER. The adjustment process is based on judgement and the magnitude of the parameters.

[5] Rogoff (1992) these effects cannot be permanent if capital and labor are mobile across sectors while Alesina and Perotti (1995) note that long run effects are possible where government spending is financed by distortionary taxes.

to appreciate. Alternatively, McDonald (1997) and Masson et al. (1993) incorporate net foreign assets as an economic fundamental that is linked to savings and investment

IV. Econometric Issues

The deviation between the desired (q_t^*)and the actual level of the REER (q) can be accounted for by some adjustment parameter γ and can be specified as follows:

$$(q_t - q_{t-1}) = (1-\gamma)(q_t^* - q_{t-1}) + \beta_1 Z_{1t} + \beta_2 Z_{2t} + \tau T_t + \varepsilon_t \qquad (3)$$

With time series data cointegration methodology would be appropriate for the estimation of a flexible dynamic adjustment model of the REER towards the equilibrium or desired REER. Such approaches have been employed by Elbadawi (1994), and Clark and McDonald (1998). In the case of pooled time series and cross section data which applies to the current study the estimation of dynamic panel models presents particular problems. Working with original annual date in order to minimise information loss will require a dynamic specification to capture inertia. Inertia in the RER arises due to price and tax distortions, import and capital controls. Some of the variables such as openness and the proxies for productivity growth are likely to be endogenous. The presence of the lagged dependent variable renders the estimated parameters biased when ordinary least squares are used in short panels. This is due to the correlation of the lagged dependent variable and the error term. Instrumental variables are one approach in attempting to alleviate this dilemma but the choice of appropriate instruments can be challenging. Anderson and Hsiao (1992) developed a first difference estimator to eliminate the country specific effect.

$$q_{it} - q_{it-1} = \gamma(q_{it-1} - q_{it-2}) + \beta_{it}(Z_{it} - Z_{it-1}) + \tau_{it}(T_{it} - T_{it-1}) + (\varepsilon_{it} - \varepsilon_{it-1}) \qquad (4)$$

However this transformation introduces a correlation between the lagged real exchange rate and the differenced error term. Chamberlin (1984) relaxed the assumption of strict exogeneity of the explanatory variables to allow for simultaneity and reverse causality by assuming weak exogenity i.e. uncorrelated with future realisations of the error term. The difference estimator eliminates the cross-country relationship if this is indeed important to the data generation process. Blundell and Bond (1997) demonstrated that if the explanatory variables are persistent over time, their lagged levels are poor instruments with this type of estimator as the aymptotic precision of the estimator deteriorates. Griliches and Hausman (1986) argued that first differencing may exacerbate bias due to errors in the variables.

Arrelano and Bover (1995) and Arrelano and Bond (1991) developed a system estimator that reduced the potential bias and other shortcomings of the above estimator by combining in a system the regression in differences with instruments in lagged levels of the explanatory variables. The appropriateness of the chosen instruments can be ascertained using Sargan J statistic for over-indentifying restrictions and the degree of serial correlation of the error term. The above system can be estimated using the Generalized Method of Moments (GMM) using Econometric Views 3.0. All transformations such as lags were done in each panel to avoid overlap or "bleeding" across the various panels.

V. Data Sources and Definitions

The model of the RER based on the discussion of the economic fundamentals was estimated using GMM over the period 1980-1996. The instruments utilised were the G-7 interest rates,

growth in industrialised countries, the terms of trade, lagged excess credit, country specific dummies, lagged government consumption, lagged real exchange rate, lagged nominal exchange rate. These instruments were chosen based on work done by Edwards (1994) Data was only available for the six independent members of the ECCB monetary union, Antigua and Barbuda, Dominica, Grenada, St. Kitts, St. Lucia and St. Vincent and the Grenadines. The real exchange rate (q) is a multilateral CPI-based real effective exchange rate of these economies relative to major trading partners. It is defined in terms of foreign currency per unit domestic currency so that an increase denotes a real effective appreciation. This variable was converted to logs and was obtained from the IMF International Financial Statistics. Figure 1 illustrates the movements in the aggregate real effective exchange rate for the ECCB monetary union. The cumulative changes in the REER during 1980-85 recorded an appreciation of 15.3 per cent but depreciated between 1986-90 by 18.6 per cent. Over the period 1990-96 there was a cumulative depreciation of 1.0 per cent. The presentation of this aggregate REER for the monetary union, is for illustrative purposes only and is not used in the actual estimation due to the availability of sixteen annual data points and the unavailability of economic fundamentals at a higher level of frequency. The terms of trade (LTOT) was defined as the ratio of the export unit value to the import unit values and was also converted to logs. Trade taxes (LTX) were obtained from ECCB Statistical database and were expressed as a ratio to GDP and converted to logs. Government consumption (LGCN) was obtained from the ECCB statistical database, expressed as a ratio to GDP and converted to logs. Excess credit (XCR) defined as the growth in domestic credit less lagged growth in real GDP following Sebastian (1989). Net capital flows (LKAP) were defined as net position of the capital and financial account of the balance of payments, expressed as a ratio to GDP and converted to logs. Net foreign assets (NFA) were those of the banking system, expressed as a ratio to GDP. These were not converted to logs because of the preponderance on net liabilities in some years. These were obtained from the IMF's IFS yearbooks. Openness (OPEN) was measure as the sum of exports and imports of to GDP and was obtained from the ECCB database. Growth in real GDP (GRW) was obtained from the ECCB database. The model was estimated using GMM.

VI. Results and Discussion

The results of the estimated models are presented in Table 1. The Arellano and Bond estimator did not provide an adequate characterization of the data generation process, nevertheless a GMM estimator was used. The coefficient of adjustment γ was 0.13 based on model 1. This suggests considerable inertia in the adjustment between the actual and desired REER. It takes approximately 6.0 years for 50.0 per cent of the adjustment to take place. Plausible explanations for this inertia may be the existence of price, wage, tax and other distortions in the economy. The degree of factor mobility across the region is constrained by the inability of labour to move freely across the single economic space. The existence of high unemployment levels in some territories suggest that rigidities in wages setting may exist. While purchases of foreign exchange are limited to approximately US$100,000 per transaction, this proviso is not binding given the avenues for multiple transactions as well as relatively easy approval by the Ministry of Finance for transactions in excess of US$100,000. Strictures in the payments system that do not easily facilitate clearance of cheques across the economic space are other factors.

The estimated elasticity of the terms of trade (LTOT) was negative and significant at the 1.0 per cent level. The magnitude of the long run elasticity was 0.55 per cent. The deterioration in the terms of trade over the period of study is related to the unfavourable price movements in primary commodity exports of bananas and sugar cane. Additionally, the devolution of

preferential access to markets in the European Union under the Lomé Convention and to the US and Canada the Caribbean Basin Initiative (CBI) and the Caribbean Canada programmes (CARIBCAN) respectively. The worsening of the terms of trade would have an effect on income and wealth particularly on the four territories within the monetary union that rely on banana exports. While capital transactions in excess of US$100,000 are for reporting purposes only, other implicit controls may exist that lead to indeterminacy of the sign of the estimated coefficient (Edwards and Ostry, 1992).

The estimated coefficient of government consumption (LGCN) was of expected sign (positive) suggesting the preponderance of consumption is allocated to nontradables. The long run elasticity was 1.18. The standardised coefficient suggests that this variable has the largest impact on the REER. The nature of the adjustment in this monetary union is primarily fiscal, the conventional balance of payments crisis does not arise under this monetary arrangement. The reasons are predicated on the degree of financing from the central bank which is limited to 5.0 of a three year average of current revenue, holdings of treasury bills are restricted to 10.0 per cent of current revenue and of government securities other than treasury bills are restricted to 15.0 per cent of currency in circulation. In this setting the exhaustion of credit allocated to members of the monetary union safeguards against the rapid expansion in credit and the decumulation of reserves. Changes in the arrangement requires unanimity of all members. This is unlike what obtains in the CFA zone where the French treasury provided credit in excess of ceilings resulting in the accumulation of net liabilities by member countries.

The heavy reliance on taxes on international trade and transactions (LTX) by governments of the monetary union could also affect the REER by altering savings and investment patterns.[6] The estimated coefficient was negative suggesting that this variable results in a real depreciation of the REER. The long run elasticity was 0.64. Trade taxes have been used in a previous study by Nyatepe-Coo (1994) to proxy for quantitative restrictions in a real exchange rate model of Dutch disease and were postulated to result in a real appreciation. However, the members of the monetary union have been undertaking trade reform by continuously lowering the magnitude of the common external tariff (CET).

The coefficient of excess credit variable (XCR) was not of expected sign and was not significant. This result may also be predicated on the nature of the monetary arrangement. It should also be noted that in a fixed exchange rate setting assuming a unitary income elasticity of demand for money, the rate of growth in domestic money is determined by the rate of growth of real output plus the world inflation rate (Krugman, 1979; Agelvi et al, 1991). In the case of the ECCB the inflation rate of greatest import would be that of the US. The estimated coeffcient of net capital inflows (LKAP) was not significant neither was that of real GDP growth (GRW). The incremental capital output ration (ICOR) was also used as an alternative to growth in real GDP to capture changes in productivity but this variable was not significantly different from zero.

The coefficient on openness was of expected sign and significantly different from zero at the 5.0 per cent level. The long run elasticity associated with this variable was 0.27. The implication of this result for the choice of exchange rate regime is that small open economies require a more depreciated exchange rate especially in a liberalized trading environment. It can also be argued that given the structure of these tourist economies which are increasingly service driven, a larger traded goods sector (openness) may strengthen the rationale for the fixed exchange rate regime. This rationale would be due to the potential costs in international

[6] taxes on international trade and transactions accounted for 50.0 per cent of current revenue of the monetary union

transactions related to frequent exchange rate adjustments. Although openness can assist these countries in stabilizing output in the face of external shocks it also increases the degree of vulnerability to these shocks.

In Model 3 the estimated coefficient of net foreign assets (NFA) of the banking system was significant but not of expected sign. The inclusion of this variable rendered several of the previously significant variables insignificant despite a correction for heteroscedasticity using White's correction. Overall model 1 provided the best approximation of the data generation process given significance of the explanatory variables, the J statistic of overidentifying restrictions and the absence of first, second and third order serial correlation. The J statistic suggest that the choice of instruments were valid for the estimated model.

Regarding the level of current misalignment based on the statistical measure outlined in the conceptual framework and that developed by Edwards (1989), the REER was misaligned by 26.0 per cent in the 1980's.[7] Part of the reason for this may be due to higher imported inflation from the US and the rest of the world in the early 1980's and the strong terms of trade due to favourable prices for primary commodity exports such as bananas. Other shocks that may have contributed to this include the emergence of the twin deficits in the US and the subsequent Volkerian tightening of monetary policy in a bid to bring inflation down that led to the first debt crisis. Although the ECCB accounted for 62.0 per cent of long term capital flows to the Caribbean region in the mid-1980's these did not appear to contribute to the appreciated REER based on the estimated results. By comparison the measure of misalignment averaged 19.0 per cent in the 1990's. Given the targetted nominal exchange rate, and the potential for imported inflation, it would appear that the regime adopted by the monetary union is sustained by the adherence to strict monetary and fiscal policies. The absence of parallel markets for foreign exchange would render the empirical assessment of the credibility of the regime using a Markov switching model useless. The adoption of financial discipline has facilitated price stability and the attractiveness of the region to long term capital flows, which have averaged 9.0 per cent of GDP over the period 1986-96. These flows have been critical to the 60.0 per cent foreign asset cover rule of the monetary union, which covers all demand liabilities issued by the authority. Although the monetary authority functions as a quasi currency board the effective foreign asset cover is in the 90 percentile. Periodic episodes of misalignment may be the consequence of this fixed exchange rate regime given the surrender of monetary policy to a larger neighbour, the United States. In addition the degree of openness of these economies will also predispose these economies to external shocks which may not dissipate quickly due to distortions in factor markets.

in 1997 up from 40.0 per cent in 1983.

[7] Edwards (1989) uses the deviation between the actual and fitted RER as a measure of misalignment, others have used the Beveridge Nelson decomposition with time series data, still others use moving averages of the fundamentals weighted by the long run elasticities in calculating the equilibrium RER.

VII Conclusions

Considerable inertia was discovered in the behaviour of the real effective exchange rate. It took some six years for at least 50.0 per cent to the desired adjustment of the real effective exchange rate to occur. The terms of trade, openness, trade taxes, and government consumption were significant determinants of the REER. Although, government consumption tended to result in a real appreciation, the upper bound on the degree of financing from the monetary authorities would contain any expansionary fiscal stance. The deterioration in the terms of trade due to the diminution in preferential access to US and EU markets resulted in a real depreciation. The wealth effects associated with a worsening of the terms of trade would inhere to those sectors that depend heavily on primary commodity exports. Despite the strong reliance on trade taxes, these appear to have contributed to a real depreciation of the REER and may reflect a gradual reduction in the common external tariff.

The longevity of this fixed exchange rate regime hinges on the fiscal discipline imposed by the monetary arrangement. In addition the relative smallness of the economies, the shallowness of capital markets and the narrow resource base are other factors that would strengthen the case for the continued peg to the US dollar. The existence of a strong political consensus may be another reason for commitment. The degree of foreign asset cover in conjunction with the inability to monetise deficits ought to engender reputation and credibility despite the apparent misalignment. Misalignment may be a feature of this arrangement given the degree of openness and the surrender of monetary policy to developments at the Federal Reserve Board. However, the existence of inflexible labour markets, price and other tax distortions would tend to induce persistence in the degree of misalignment. Factor market, fiscal and price reform would be necessary conditions to a speedier adjustment to the desired or equilibrium exchange rate.

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Table 1: Estimated Results

Variables	GMM IV Estimation		
	Model 1	Model 2	Model 3
Constant	0.02	0.21	0.09
	(0.31)	(4.30)	(1.31)
$Lq_{(t-1)}$	0.89	0.92	0.91
	(12.8)***	(15.6)***	(14.2)***
$LTOT_t$[a]	-0.05	-0.04	-0.02
	(2.76)[b]***	(2.13)**	(1.37)
$LGCN_t$	0.13	0.09	0.07
	(3.10)***	(2.83)***	(1.82)*
XCR_t	-0.05	-0.02	-0.04
	(1.41)	(0.80)	(1.44)
LTX_t	-0.07	-	-0.02
	(2.13)**		(1.10)
$LKAP_t$	-0.01	-0.01	0.004
	(0.74)	(0.59)	(0.21)
GRW_t	-0.20	-0.27	-0.12
	(0.84)	(1.33)	(0.61)
$LOPEN_t$	-0.04	-0.06	-
	(2.44)**	(2.11)**	
NFA_t	-	-	-0.12
			(2.70)***
No. of observations	90	90	90
Adj. R^2	0.74	0.80	0.82
S.E of Regression	0.04	0.03	0.03
Wald Test of Joint Significance[c]	0.000	0.000	0.000
Sargan J Test $X^2(6)$[d]	7.2	15.3	10.7
1st order serial correlation	0.85	0.99	0.99
2nd order serial correlation	0.98	0.99	0.99
3rd order serial correlation	0.99	0.99	0.99

a L denotes logarithims
b t-statistics in parentheses *** significant at 1 percent, **5 per cent, * 10 per cent
c denotes probability value
d Chi Square critical value 12.6

Table 2. Long Run Elasticities and Standardized Coefficients

Variables	Long Run Elasticities	Standardized Coefficients
Terms of Trade	-0.55	-1.50
Government Consumption	1.18	3.25
Excess Credit[a]	-0.03	-0.09
Trade Taxes	-0.64	-1.75
Net Capital Inflows	-0.09	-0.25
Real GDP Growth	-0.09	-0.25
Openness	-0.27	-0.75

a elasticities for Excess Credit and Growth were calculated at the means.

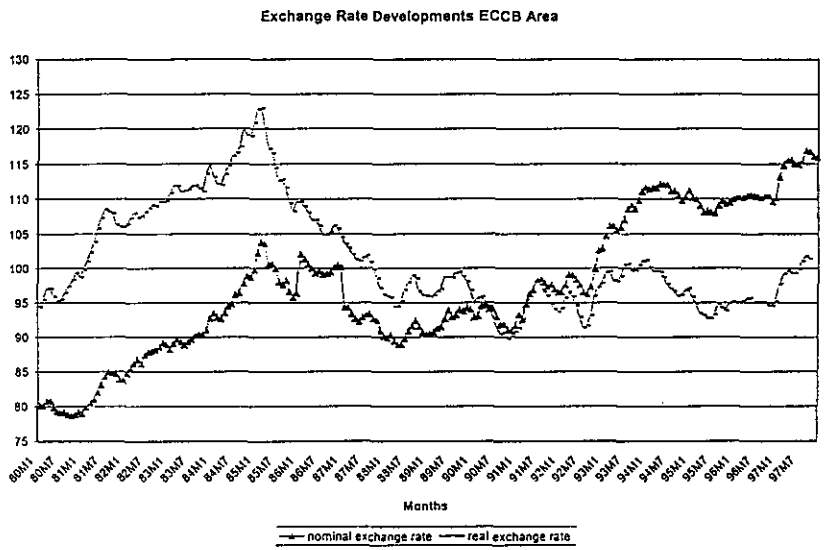

Figure 2. Actual and Predicted Real Effective Exchange Rate