SECOND GENERATION MODELS OF CURRENCY CRISIS: AN APPLICATION TO TRINIDAD & TOBAGO

by

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Presented at the Annual Review Seminar, Research Department,
Central Bank of Barbados
July 25 - 28, 2000

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* The views expressed in this paper are those of the author alone and do not necessarily reflect those of the CDB or its Board of Directors.

ABSTRACT

This paper analyses the government's choice of exchange rate regime from a political economy perspective. Building on the theoretical insights of second-generation exchange rate crisis models, the paper presents a modified model in which the choice to devalue or maintain a currency anchor in the face of shocks to the real economy is explicitly modeled within a maximising framework.

The paper attempts to fit such a model to the experience of the Trinidad and Tobago economy over the twenty-five years. Trinidad and Tobago presents a useful example because it has devalued on a number of occasions and in response to various real shocks. Having estimated the coefficients of the model, the estimated ex ante probability of devaluation is ascertained for each period.

Generally speaking, the model performs well. Parameter estimates all have the 'correct' sign, although not all are statistically significant. On two of the three devaluation occasions, the estimated probability reaches a maximum at the point of devaluation. Hence, political economy factors appear to have played a significant role in the determination of exchange rate policy in Trinidad and Tobago.

I. INTRODUCTION

During the 1970s, 1980s and 1990s, countries which had adopted a fixed exchange rate policy often found themselves unable to defend the parity in the face of severe macroeconomic disequilibria, manifested in burgeoning parallel markets for foreign exchange and speculative attacks against their currency. The fate of some currencies, such as the Mexican Peso in 1994 and the currencies of East Asia in 1997, have attracted a great deal of attention, and have spawned new theoretical accounts of how such crises occur, as well as offering fertile ground for researchers. Others, such as the travails of the currencies of the Caribbean, have attracted less international attention, although researchers in the region have started to analyse exchange rate issues from a political economy perspective (see Worrell et al. (1998)).

Trinidad and Tobago (T&T) offers an interesting case study for research into currency crises in the Region. T&T is clearly the most successful of the three regional economies which have adopted, or had forced upon them, a strategy of devaluation and floating exchange rates. Exchange rate policy appears to have been more proactive than in Jamaica or Guyana, with devaluation used as a deliberate tool to boost competitiveness rather than being merely a reaction to massive current account deficits, widening parallel exchange market premiums and high inflation. Moreover, with the region's most vibrant manufacturing export sector, T&T would seem the most likely to reap the benefits, in terms of improved export performance, of a devaluation policy.

If devaluation can generate improved economic performance (even if only in the short to medium term), this begs the question, when should, and when do, governments choose to exercise the devaluation option? Framing the question in this way highlights the political economy dimension to the issue. Even when one allows for the impact of swings in sentiment, 'contagion effects' and the like, which can generate self-fulfilling crises (at least in theory), political economy arguments remain important. This is because the speculative forces that generate attacks on vulnerable currencies are likely to base their beliefs of how vulnerable the currency is upon their calculations of the government's decision-making process.

This paper analyses the exchange rate policy of T&T over the course of the 1980s and 1990s from an explicitly political economy perspective. It develops a model of the government's choice of exchange rate regime, in which the exchange rate impacts on prices and output and hence on the government's welfare function. The model is estimated to ascertain its applicability to the T&T situation. Overall, the model is found to perform well, in terms of its ability to 'predict' periods of crisis and in terms of the significance and sign of key economic relationships. Political economy factors are found to play a significant role in exchange rate policy in T&T.

The rest of the paper is organised as follows. Section II gives a brief description of exchange rate policy in T&T over the last forty years. Section III outlines theoretical developments in the area of currency crises and gives a survey of some existing empirical work. Section IV develops the paper's arguments in terms of a concrete political economy model, with the results and conclusions presented in Section V.

II. EXCHANGE RATE POLICY IN TRINIDAD AND TOBAGO[1]

On independence in 1962, T&T inherited a currency board arrangement, sharing a common currency with the entire British territories of the Eastern Caribbean. In 1964, the Central Bank of Trinidad and Tobago (CBTT) was established, with the Trinidad and Tobago dollar (TT$) pegged to sterling. In 1967, the TT$ depreciated against the US$ with sterling's devaluation within the Bretton Woods system. In 1976 the TT$ switched to an exchange rate peg against the US$, at a rate of TT$2.40 to US$1.00. As T&T experienced an oil boom in the 1970s as a result of the OPEC price hikes of 1973 and 1979, CBTT accumulated significant foreign exchange reserves with which to defend the currency anchor.

However, lower oil prices led to a sharp economic decline from 1981 onwards. With a widening external current account deficit and declining foreign exchange reserves, a large black-market premium emerged on the parallel foreign-exchange market. In December, 1985, the official TT$ rate devalued by 50%, to $3.60. Despite the adoption of contractionary fiscal measures, the external disequilibrium continued, and in August 1988 the currency was devalued further, to $4.25. This devaluation was part of an overall package of fiscal and monetary retrenchment drawn up by the government and IMF. In April 1993 the government took the decision to fully liberalise the external account and move to a floating exchange rate regime. The TT$/US$ exchange rate immediately devalued to a rate of around TT $5.75=US$1.00. Since then, the exchange rate has remained at around $6.00-$6.50.

[1] The discussion in this section is derived largely from Worrell et al (1998). That paper presents a fuller discussion of exchange rate policy in Trinidad and Tobago and the wider Caricom region.

III. CURRENCY CRISIS MODELS AND EVIDENCE

In economies that maintain a fixed exchange rate, macroeconomic disequilibria usually find their ultimate expression in exchange rate or balance of payments crises. First generation models (FGMs), such as those examined by Krugman (1979), Flood and Garber (1984), Obstfeld (1986) and Dornbusch (1987), tend to focus on inappropriately expansionary fiscal policy fuelling domestic credit growth as the essential cause of balance of payment crises. Excessive growth in domestic credit in relation to the private sector's demand for domestic monetary assets leads to a run-down of reserves.

The key insight offered by these models is that speculative behaviour leads to an abandonment of the exchange rate peg *before* the government runs down its reserves to the level at which it is no longer prepared to defend the currency. Suspecting a future devaluation, the private sector becomes unwilling to hold domestic currency and the government's remaining reserves are wiped out in a speculative attack, thereby causing a devaluation and ratifying the expectations which led to the attack. The major weakness of FGMs is that the government's decision-making process is not modeled explicitly, so that the mutually incompatible policy stances with regards to credit creation and exchange rate policy cannot be rationalised within the model.

Later 'second generation' models (SGMs) have attempted to approach the issue of currency crises from a political economy perspective. The tension between domestic policy goals and exchange rate stability (which is treated exogenously in the FGM) is central to the second generation account. Such a tension is usually generated by some form of nominal price rigidity that introduces real costs to the nominal exchange rate anchor. For instance, if nominal wages are sticky then the option of reducing unemployment in export sectors by cutting real wages through a reduction in nominal wages will not be available. However, the same outcome could be achieved by devaluing the currency and hence increasing the price of export goods in domestic currency. Therefore, maintaining the fixed parity involves costs in terms of higher unemployment

and lower output. In a political economy framework, the government's decision to devalue can be explicitly modelled as a balancing of the costs and benefits of alternative exchange rate regimes.

Rational private sector agents will believe a devaluation to become more likely as the cost of defending the exchange rate parity increases. As Krugman (1998) outlines, an additional element can be added to second generation models. A feedback relationship between private sector beliefs and the costs of defending the exchange rate parity may exist, whereby the costs of maintaining the exchange rate parity are increasing as the private sector's belief in the government's willingness to defend the parity wanes. For instance, tighter monetary policy may be necessary to convince a sceptical market of the government's resolve. This means that a fall in confidence, caused by a belief that the government will be unwilling to bear the costs of a fixed exchange rate over the long term, increases these costs and thus accelerates the fall in confidence still further. A dynamic process of spiralling economic costs of maintaining the currency regime and declining confidence in the government's willingness to bear these costs eventually forces the government to devalue, possibly after a series of pre-emptive speculative attacks on the currency. This second element can introduce the possibility of self-fulfilling crises, in which private sector beliefs can become self-fulfilling.

Although work in the currency crisis area appears to have concentrated on the developing new theory rather than empirically testing existing models, there have been some attempts to bring the models to the data. In an earlier piece of work (Crowe, 2000), this author estimated a FGM for Barbados over the 1976-99 period, and derived an estimate of the 'shadow exchange rate,' where the latter represents the floating exchange rate which would pertain should a devaluation occur. A devaluation is predicted to occur if and when the shadow exchange rate becomes greater than the actual fixed rate. The model's predictions are in keeping with Barbados's exchange rate experience, in that it suggests that a devaluation should not have occured (as was the case), and identifies late 1982 and late 1991 as the periods of greatest threat to the currency anchor. These were the periods in which the Barbados authorities approached the IMF for standby facilities, with attendant conditionalities in terms of fiscal targets, to defend the exchange rate peg.

Blanco and Garber (1986) estimated a first generation model to predict the timing of speculative attacks against the Mexican Peso over the period 1973-1982. The estimated probability of a devaluation reached maxima immediately prior to the 1976 and 1982 devaluations. Moreover, the rate of domestic credit growth and money demand variables were found to be important determinants of the probability of devaluation.

Flood and Marion (1998) survey a number of studies that examine currency crises in developing countries from a second-generation perspective. Although the studies generally support the political economy perspective inherent in the second generation approach (finding that declining macroeconomic fundamentals and certain political variables are important determinants of crises), they adopt a cross-sectional approach rather than analysing specific countries using a fully specified structural model. A similar approach is adopted by Milesi-Ferretti et al. (1998). This paper attempts to isolate some empirical regularities characterising exchange rate crises in low and middle-income countries. It finds that low foreign exchange reserves, appreciated real exchange rates, and unfavourable external conditions are associated with episodes of devaluation. These results illustrate the important role played in the devaluation process by declining economic fundamentals and real exchange rate appreciation, as in SGMs.

Jeanne and Masson (2000) develop a reduced-form second-generation model in which the net benefit of devaluation is assumed to be a positive function of the private sector's belief that the currency will be devalued, and a negative function of economic fundamentals. This characterisation of the government's choice problem captures the relationship between macroeconomic fundamentals, the government's policy choice and the private sector's beliefs discussed above. They show that there may be multiple equilibria based on fundamentals alone, introducing the possibility of exogenous shifts in expectations leading to jumps from one fundamentals-based equilibrium to another (and therefore producing self-fulfilling crises). They approximate these expectational shifts by a Markov process (essentially, a stochastic process governing shifts from one regime to another), and estimate the resulting model for the experience of the French franc during the 1987-1993 period. The paper concludes that the model's predictions of speculative attacks against the franc are considerably improved when the number of Markov regimes is increased from one to two, indicating that there may have been exogenous swings in expectations, independent of economic fundamentals, behind much of the speculative activity.

The 1997 East Asian Financial Crisis, and attendant currency collapses, has turned the focus of debate away from inappropriate or contradictory government policies and towards the impact of private sector behaviour on the sustainability of fixed or managed exchange rate regimes. The East Asian crisis was a shock to most economists (with a few exceptions), because the Asian 'Tiger' economies appeared, by most measures, to have strong economic fundamentals and market-friendly, fiscally conservative government policies. Attention has focussed on firm-level issues such as over-leveraged debt positions, excessive speculation in land and other assets, hasty liberalisation of capital markets resulting in rapid inflows of volatile short-term portfolio investment, and corruption or 'crony capitalism' that masked weaknesses in corporate governance (see, for instance, Radelet and Sachs (1998) and Corsetti et al. (1998)).

Some recent theoretical work has attempted to model these arguments explicitly as a means of explaining currency crises. Aghion et al. (2000) present a model with multiple equilibria, including 'good' states where the value of the currency is protected and 'bad' states where a devaluation occurs. With sticky prices and credit constrained firms, both reasonable assumptions, a devaluation leads to increased foreign currency debt obligations for domestic producers, which lowers their profits. Credit-constrained firms tend to rely heavily on retained profits to fund investment, so that a devaluation leads to lower investment and output, and hence lower demand for domestic currency. Reduced demand for money leads to a fall in its value, and hence a devaluation.

Episodes of devaluation can therefore be self-fulfilling. It the private sector anticipates devaluation, the demand for money falls. This leads to devaluation, which then causes lower corporate profits and lower output through the mechanism discussed above, thus ratifying the initial shift in expectations.

This 'third generation' approach to currency crises offers an extremely interesting avenue of research. However, its relevance to the Caribbean's past experiences is probably limited, as the region did not receive the same magnitude of foreign capital inflows as East Asia during the emerging markets boom of the 1990s, even in relative terms. On the other hand, as countries, such as T&T and Jamaica, have opened their capital accounts, one might expect the kind of processes analysed in Aghion et al. to play a more significant role in any future currency crisis in the region.

IV. THE MODEL

The model utilised in this paper is derived from Obstfeld's (1994) second-generation currency crisis model, with the government's devaluation decision modeled explicitly.[2] The relevant loss function includes inflation and output as its arguments, and the choice variable is the nominal exchange rate. The loss function which the government faces is given in Equation (1) below. The one-period flow equation for this loss function is given in (2). Essentially, government's one-period choice is to choose the optimal nominal exchange rate with respect to desired outcomes for inflation and output. A devaluation has a positive effect on output by increasing competitiveness. Devaluing also has an inflationary impact by increasing the price of imported goods. These offsetting impacts are captured in equations (3) and (4) respectively. Equation (5) gives a wage setting equation. Substituting these relationships into (2) and minimising with respect to the exchange rate (with w_t predetermined by period t-1 expectations) gives the optimal exchange rate, as shown in (6) below. In the equations, p represents the log of the domestic price level, e the nominal exchange rate, y output, y^* desired output and z a vector of exogenous variables. w represents the wage rate, and E denotes the expectations operator.

$$L_t = \sum_{i=0}^{\infty} \delta^i \left\{ \frac{\theta}{2}\left(p_{t+i} - p_{t+i-1}\right)^2 + \frac{1}{2}\left(y_{t+i} - y^*\right)^2 \right\} \tag{1}$$

$$l_t = \frac{\theta}{2}\left(p_t - p_{t-1}\right)^2 + \frac{1}{2}\left(y_t - y^*\right)^2 \tag{2}$$

$$y_t = \alpha(e_t - w_t) + \beta z_t + u_t; \qquad u_t \sim iid(0, \sigma_u^2) \tag{3}$$

$$p_t = \phi p_{t-1} + (1-\phi)e_t + \gamma + v_t; \qquad v_t \sim iid(0, \sigma_v^2) \tag{4}$$

$$w_t = E_{t-1} p_t \tag{5}$$

[2] Obstfeld presents two models in the 1994 paper, one based on debt service considerations and one based on macroeconomic shocks. The model in this paper is derived from the latter.

$$\bar{e}_t = p_{t-1} + \frac{(\alpha^2 - \theta(1-\phi))}{(\alpha^2\phi + \theta(1-\phi)^2)}\gamma + \frac{\alpha}{(\alpha^2\phi + \theta(1-\phi)^2)}y^* - \frac{\alpha\beta}{(\alpha^2\phi + \theta(1-\phi)^2)}z_t + \varepsilon_t \quad (6)$$

In the above discussion, the government attached no loss to devaluation *per se*. In reality, governments are likely to view the devaluation option as bearing an inherent cost, due to a perceived loss in credibility, political fallout, and the impact on future inflationary expectations (particularly as the latter will impact on the rate of interest government faces on its bonds). This one-off loss in government welfare from devaluation can be modeled as an additional cost in the loss function, C, which is incurred in the period in which devaluation occurs. As in Obstfeld (1994), this additional factor implies that, rather than devaluing gradually over time, devaluation occurs in discrete stages, whenever the loss from exchange rate misalignment becomes sufficient to outweigh the one-off loss in credibility.

This one-off loss is essentially intangible. However, generally speaking, the increase in the loss function due to maintaining the present exchange rate rather than devaluing (ignoring C) will be an increasing function of the difference between the optimal exchange rate given in (6) and the actual rate. This is illustrated in figure 1 below. The greater the difference between optimal and actual exchange rates, the greater the probability that the incremental loss to the government incurred by not devaluing is sufficient to merit a devaluation and to justify the one-off welfare loss, C, associated with such a policy. This implies that the devaluation decision can be modeled as a discrete choice problem with the right hand side of equation (6), minus the actual exchange rate, as causal variables. The resulting equation can then be estimated utilising relevant econometric techniques.

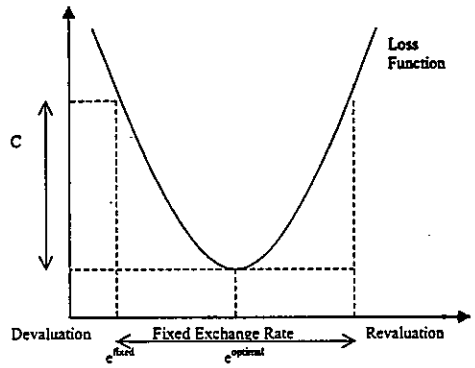
Testing the model outlined above proceeds in three stages. Firstly, equations (3) and (4) are estimated to give parameter estimates for the impact of exchange rate changes on prices and output, as well as the parameters for the exogenous variables. Secondly, the discrete choice model for the devaluation decision is estimated. Finally, the estimated choice equation is used to derive forecasts for the probability of devaluation. Three propositions can then be tested against the data:

1. Coefficients on variables in (3) and (4) are significant and carry the 'correct' signs;

2. Coefficients on variables in the discrete choice equation are significant and carry the 'correct' signs, and, in particular, are consistent with the coefficient estimates from (3) and (4);

3. The predicted devaluation probability reaches a maximum in the periods in which devaluation occurs.

FIGURE 1: LOSS MINIMISATION PROBLEM WITH A FIXED COST TO DEVALUATION



V. RESULTS AND CONCLUSIONS

Specification[3]

1. Output Equation

Several versions of equation (3) are estimated, with different combinations of potential exogenous variables within the vector z_t.[4] The preferred specification includes a time trend (to capture exogenous technical change) and the log of Trinidad crude petroleum production. The latter is expected to be largely independent of real exchange rate changes, as the oil industry is heavily capital intensive (so that the impact of domestic prices through wage pressure is insignificant) and output is priced in US dollars rather than domestic currency. Following equation (5) and assuming rational expectations, the price level is substituted for the wage variable, giving (7), which is estimated using OLS and IV (to capture the endogeneity of the competitiveness variable (e_t-p_t)).[5]

$$y_t = \alpha(e_t - p_t) + \beta z_t + u_t \tag{7}$$

2. Price Equation

The price equation (4) is estimated imposing the constraint that the coefficients on e_t and p_{t-1} sum to unity. In addition, a dummy variable D_t is created and set equal to one for the flexible exchange rate period (Q2 1993 onwards) and zero for the fixed exchange rate period. D_t is then included in the equation to be estimated (given in (8) below). This is to allow for the fact that during the fixed exchange rate period, the impact of parallel market rates (for which consistent time series do not exist) on the price level will tend to reduce the degree of measured pass-through from the official rate to prices. In short, over the 1977-93 period, the estimated equation is likely to suffer from omitted variable bias.

$$\Delta p_t \equiv p_t - p_{t-1} = (1-\phi)(e_t - p_{t-1}) + \gamma + D_t + (1-\phi)(e_t - p_{t-1})D_t + v_t \tag{8}$$

The dummy variable is included both on its own, to allow for a different intercept term in the fixed and flexible periods, and multiplied by (e_t-p_{t-1}) to allow for a shift in the parameter ϕ. In the liberalised exchange regime that has been pursued since 1993, the parallel market premium has disappeared and the measured pass-through from the exchange rate to prices is not contaminated by the unmeasurable impact of the black market exchange rate. The flexible period estimate for ϕ and the constant term γ can therefore be considered the superior estimates.

3. Discrete Choice Equation

As discussed above, the government's devaluation decision is assumed to be related to the difference between the optimal and actual nominal exchange rate, ($\tilde{e}_t - e_t$). One means of estimating discrete choice problems is to utilise a logit model, in which the expected value of the dependent variable (equal in our case to Π_t, the probability of devaluation), is specified as a function of the explanatory variables with the following functional form:

$$\Pi_t = \{1 + \exp(\kappa(\tilde{e}_t - e_t))\}^{-1} \tag{9}$$

The curve described by (9) is S-shaped in form and bounded in the interval (0,1), making it a useful tool in analysing discrete choice problems. Substituting (6) into (9) gives the following specification for the choice equation:

[3] T&T data was taken from IMF International Financial Statistics. Thanks to Ms Mills in CBB library for access to IFS on CD ROM. T&T prices were normalised by dividing through by the US price level. US consumer prices were obtained from the Federal Reserve Bank of St Louis website. GDP data at a quarterly frequency is unavailable; hence industrial production is used as a proxy. The IV version of equation (7) uses (e_t-p_t) lagged one period as an instrument, for want of a better alternative.

[4] Potential variables not included in the final specification include the 3-month treasury bill rate, the log of real balances (money supply in constant prices), the log of real private sector domestic credit (in constant prices), and the log of crude oil prices.

[5] The variables in equation (7) were investigated for stationarity, and found to be I(1) non-stationary. The residuals from (7) were, however, found to be stationary, indicating that (7) describes a cointegrating relationship, and that the parameter estimates are therefore consistent.

$$\Pi_t = \left\{1+\exp\left(\kappa\left(\begin{array}{l}-(e_t - p_{t-1}) + \dfrac{(\alpha^2-\theta(1-\phi))}{(\alpha^2\phi+\theta(1-\phi)^2)}\gamma + \dfrac{\alpha}{(\alpha^2\phi+\theta(1-\phi)^2)}y^* \\ -\dfrac{\alpha\beta}{(\alpha^2\phi+\theta(1-\phi)^2)}z_t + \varepsilon_t\end{array}\right)\right)\right\}^{-1} \quad (10)$$

In estimating (10), the dependent variable is given a value of 1 for periods in which a devaluation occurs, and 0 for all others. The fitted value for Π_t gives a forecast of the probability of devaluation, which can be compared to Trinidad and Tobago's devaluation experience to test the predictive capacity of the model. Note that in estimating (10), e_{t-1} is used as a proxy for e_t, since the observed exchange rate in period t, should a devaluation occur, will be biased upwards by the occurrence of the devaluation during the period.

The government's output target y^* is not directly observable. However, a reasonable proxy can be arrived at by regressing output against time and obtaining the trend value for output.[6] This proxy is based on the assumption that government has in mind some achievable level of output based on trend economic performance. Note that, since the proxy for y^* is a linear function of the Time variable, the latter is omitted from (10). The coefficient on y^* then captures the combined effect of Time and y^*.

Results

Tables 1 and 2 give the results of estimating (7) and (8), respectively. The estimated price and output equations carry the expected signs. With respect to the output equation (7), the exogenous variables are significant at the 1% level, whilst the competitiveness measure is significant at the 5% level.

The price equation (8) performs less well, with no coefficients significant at the 10% level. However, the variables carry the correct signs, and the predicted difference in parameter estimates between the fixed and floating periods is observed. Utilising the estimates for the floating period, for the reasons discussed above, the derived estimate for ϕ is .792.

[6] Note that government's output target y^* may well be above the trend output growth (i.e. $y^*_t = a.time_t + b$, where b is some positive constant). In this case, the government is attempting to exploit the private sector's t-1 expectations to achieve higher output through a 'surprise' devaluation. This places the model within the tradition of Kydland-Prescott (1977) time-inconsistency models.

TABLE 1: REGRESSION ESTIMATES FOR EQUATION (7)

Dependent Variable: y_t; 82 Observations (1978 Q1 – 1998 Q2); t-ratios in parentheses[7]

Variable	OLS	IV
Constant	-.449	-.468
	(-.594)	(-.613)
e_t-p_t	.224***	.217**
	(3.011)	(2.604)
$time_t$	.0149***	.0150***
	(11.368)	(11.035)
oil_t	.751***	.757***
	(4.791)	(4.726)
R^2	.925	.925
Adjusted R^2	.922	.922
F-Statistic (Pr.)	318.78***	317.98***
	(.000)	(.000)
DW-Statistic	1.405	1.405

[7] In this and subsequent tables, the level of significance is indicated as follows: ***=significant at the 1% level; **=significant at the 5% level; *=significant at the 10% level.

TABLE 2: REGRESSION ESTIMATES FOR EQUATION (8)

Dependent Variable: $(p_t - p_{t-1})$; 89 Observations (1977 Q2 – 1999 Q2); t-ratios in parentheses

Variable	OLS
Constant	.00501 (.174)
$e_t - p_{t-1}$	.00371 (.250)
D_t	-.440 (-1.349)
$D_t*(e_t - p_{t-1})$	.205 (1.330)
R^2	.049
Adjusted R^2	.016
F-Statistic (Pr.)	1.462 (.231)
DW-Statistic	1.690

TABLE 3: REGRESSION ESTIMATES FOR EQUATION (10)

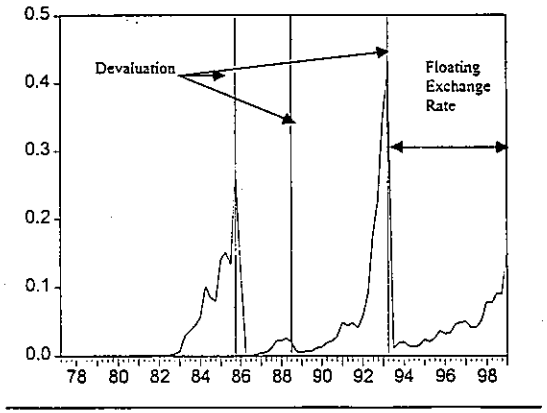
Dependent Variable: Devaluation (set to 1 for 1985 Q4, 1988 Q3 and 1993 Q2); 65 Observations (1977 Q2 – 1993 Q2); z-ratios in parentheses

Variable	Logit
Constant	37.613 (.338)
$e_{t-1} - p_{t-1}$	-16.770* (-1.651)
Oil_t	-8.580 (-.649)
y^*_t	7.403 (.577)
Mc Fadden R^2	.291
LR-Statistic (Pr.)	7.069* (.0697)

The results of estimating the discrete choice equation (10) are given in table 3. The estimated value for κ is 16.770, yielding an estimate for θ of 6.559, which implies that the authorities in Trinidad and Tobago weight a one percent decrease in inflation over six times as highly as a one percent increase in output. All the variables carry the expected signs. In particular, the coefficients on the exogenous variable Oil carry the opposite sign in (7) and (10), as predicted. However, only the measure of competitiveness is significant at the 10% level. Overall, the equation is significant at the 10% level.

The forecast devaluation probability is shown in figure 2. The 1985 and 1993 devaluations are well forecast, although in the case of the 1988 devaluation, the forecast probability reaches a fairly low local maximum in the *prior* period, and is in decline at the point of devaluation.

Figure 2: Estimated Devaluation Probability Based on 1977-1993 Sample



Overall, the model performs well. With regards to the first criterion, both (7) and (8) yield parameter estimates with the right signs. Moreover, the parameter estimates in (7) are significant at the 5% level. The performance with regards to the second criterion is also good. The parameters in (10) have the right signs, although the coefficients on Oil and y^* are not significant. The coefficient on $(e_{t-1}-p_{t-1})$ is significant at the 10% level. The third criterion is met for the first and third devaluations although the model does not forecast the second devaluation very effectively.

Conclusions

Second generation 'political economy' models of devaluation differ from first generation speculative attack models in that they explicitly examine the political costs and benefits of alternative policies. They can also allow for the existence of multiple equilibria, based on self-fulfilling expectations, although in the model outlined above the decision to devalue is based purely on economic fundamentals and self-fulfilling speculative attacks are therefore not allowed for. By modeling the government's decision making process explicitly rather than taking government policies as given, these second generation accounts of devaluation have considerably enriched the policy debate.

The model outlined above is, to my knowledge, the first attempt to explicitly evaluate the relevance of the second generation literature to the Caribbean's rich exchange rate experience. For T&T, the model works well in forecasting the government's decision to devalue. As the model predicts, the major causal factors appear to be declining external competitiveness and deteriorating economic fundamentals (proxied by oil output).

One interesting result from the estimation of the model is the apparently high weight given to controlling inflation in the government's loss function. The parameter θ, which indexes the comparative weights assigned to inflation and output, is estimated to be around six. This offers a political economy perspective on the comparative success of Trinidad and Tobago in avoiding the severe inflation-devaluation cycles which have plagued Jamaica and Guyana, the other Caricom countries which have adopted devaluation and floating exchange rate strategies. A comparatively large weight assigned to price stability by the political leadership may have been the principal reason for Trinidad's comparative success in maintaining exchange rate and price stability.

A number of questions remain unanswered. In particular, the model does not account for the decision in 1993 to move to a floating exchange rate rather than a straight devaluation to a new fixed parity. Once can speculate as to potential causal factors, such as a desire to fully liberalise the foreign exchange regime (which is unlikely, for most countries, to be consistent with a fixed currency anchor), or the experience of the 1980s (which indicated that repeated devaluations would be the norm should a fixed currency regime be maintained). However, it would be more desirable to account for this decision within the model.

The relatively poor performance of the model in forecasting the 1988 devaluation raises a number of questions. It may be that the self-fulfilling speculative attack literature has some bearing on the situation in this case. If the 1988 devaluation was largely a result of self-fulfilling expectations, it would explain why the fundamentals-based model estimated in this paper performed badly in forecasting this episode. Future research could usefully focus on enriching the government's policy choice to include the type of post-devaluation regime, and on modeling and estimating models including self-fulfilling attacks.[5]

[5] With regards to the latter, Jeanne and Masson's (2000) work provides a useful starting point. Extending this work to the Caribbean, where less developed capital markets preclude the use of financial variables as proxies for expectations, will prove a challenge.

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