

## EXCHANGE RATE POLICY, AGGREGATE DEMAND MANAGEMENT AND THE REAL EXCHANGE RATE IN DEVELOPING COUNTRIES: AN EMPIRICAL NOTE

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Since March 1973, when generalized currency floating was adopted by developed countries, less developed countries (LDCs) have been faced with exogenous changes in the exchange rates among major currencies. While adding to the complexity of economic policymaking, it has also presented an opportunity for LDC policy makers to undertake more active exchange rate management in pursuing external balance and other policy objectives.

The time profiles of the monthly values of the effective exchange rate (EER)<sup>1</sup> for 22 sample LDCs over the period from March 1973 to December 1979 (Figure 1) indicate various types of "revealed" exchange rate policy. For some countries, the EER index shows no significant departure over time from the initial values. Some examples are Pakistan, Taiwan, Thailand, Morocco and Tunisia for which the monthly EER movements over the period have remained within 9 per cent of the March 1973 value. In a few countries, managed floating of the domestic currency has led to an appreciation vis-a-vis the major currencies, as exemplified by Malaysia and Singapore for which the effective exchange rates by late 1979 were about 10 per cent lower than the initial levels. At the other extreme, the "crawling peg" countries, namely Argentina, Brazil, Colombia, Uruguay, have more or less continuously and substantially depreciated their currencies during most of the period so that by

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<sup>1</sup>Defined as an index of the trade-weighted average of bilateral exchange rates of each LDC currency with the currencies of 12 developed countries. Calculation of the trade weights is based on the proportion of each LDC's exports for which prices are set in the currencies of the 12 developed countries on the assumption that world prices of primary agricultural products and fuels are set in U.S. dollars, metals and minerals in U.K. pounds, and other traded goods in the currencies of developed country destination markets of exports (cf. Bautista and Riedel, 1980).

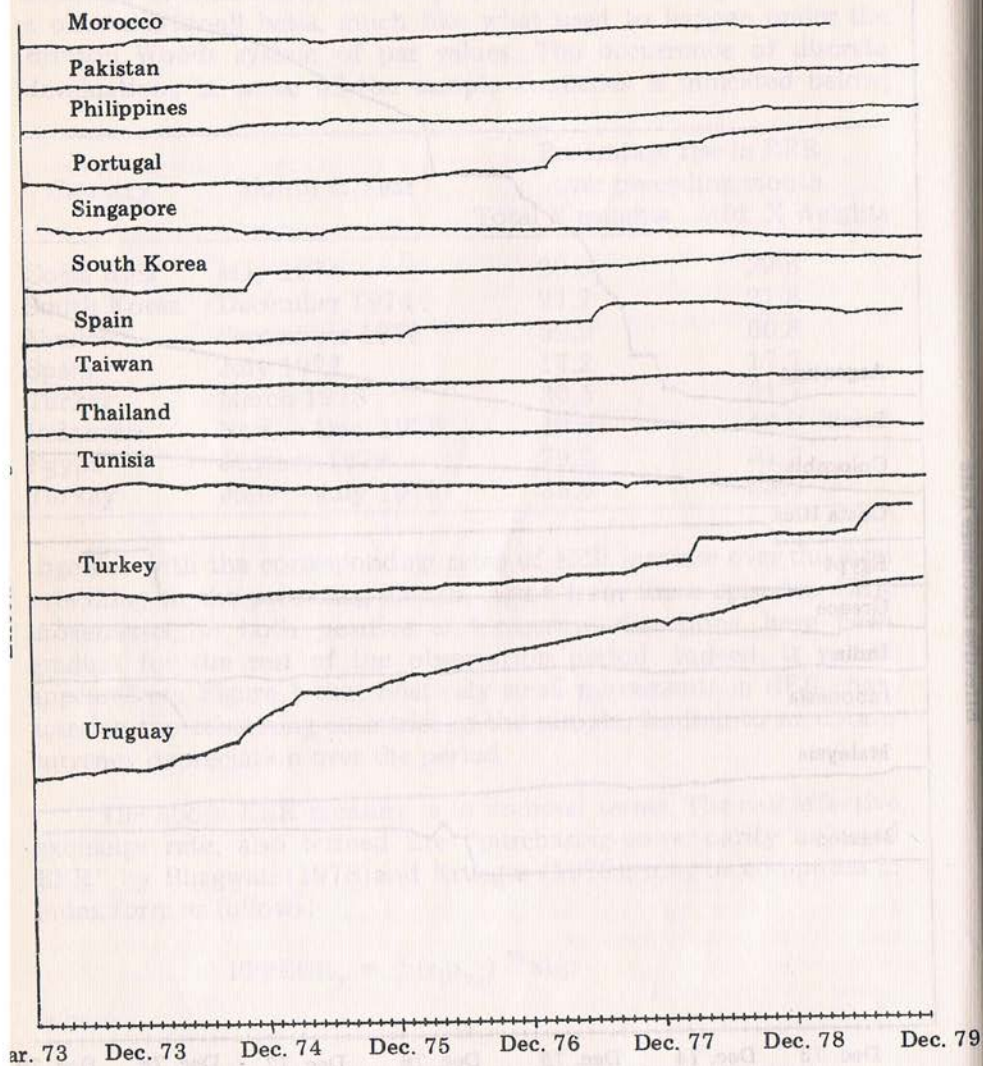


Figure 1 (Continued)

This index is commonly used as a measure, admittedly of a partial nature, of international competitiveness, reflecting one aspect of relative export profitability, i.e., in relation to the substitutability in production between exports and home goods. It is determined not only by the country's exchange rate policy but also by exogenous foreign price changes and by a host of factors affecting the general price level. Thus, the improved competitiveness accorded export industries by a depreciating home currency could be undercut by a rise in domestic prices relative to foreign prices.

Figure 2 contains the time profiles of the real exchange rate from March 1973 to December 1979 for the 22 sample countries, based on total export weights and, alternatively, on manufactured export weights. The number of sample LDCs showing positive trends in the  $PPPEER_x$  index is about equal to those with negative trends. The real exchange rate has apparently improved the most in India, Singapore, Malaysia, Egypt and Taiwan; at the other extreme of deteriorating  $PPPEER_x$  are such countries as Colombia, Indonesia, South Korea, Pakistan and Turkey.

It is important to observe that the trend of the real exchange rate is not unambiguously related to the conduct of exchange rate policy in the sample LDCs as revealed by the nominal exchange rate changes over the period. Thus, among those that showed relatively significant positive trends in  $PPPEER_x$ , India and Taiwan had a rather stable EER pattern, Malaysia and Singapore effectively appreciated their currencies slightly, and Egypt underwent a large, once-and-for-all currency devaluation but otherwise kept a stable exchange rate over the period. On the other hand, Colombia's crawling peg regime and the large episodic devaluations in Indonesia and South Korea failed to provide a sustained improvement in relative export profitability but instead resulted in a declining real exchange rate overall. Lastly, sample LDCs showing no trend in  $PPPEER_x$  are seen to be also a heterogeneous group as far as exchange rate management is concerned: Uruguay followed a policy of rapid and sustained depreciation of its currency throughout the period, while Greece at the other end had very gradual EER movements leading to a modest currency depreciation overall.

A specific issue on which the recent experience of developing countries in our sample might throw some light concerns the relationship, if any, between the type of exchange rate adjustment adopted by LDC governments and the ability to undertake supportive fiscal and monetary policy measures. Does a gradual depreciation of the domestic currency allow the national authorities to conduct macroeconomic policy in line with the requirements of real

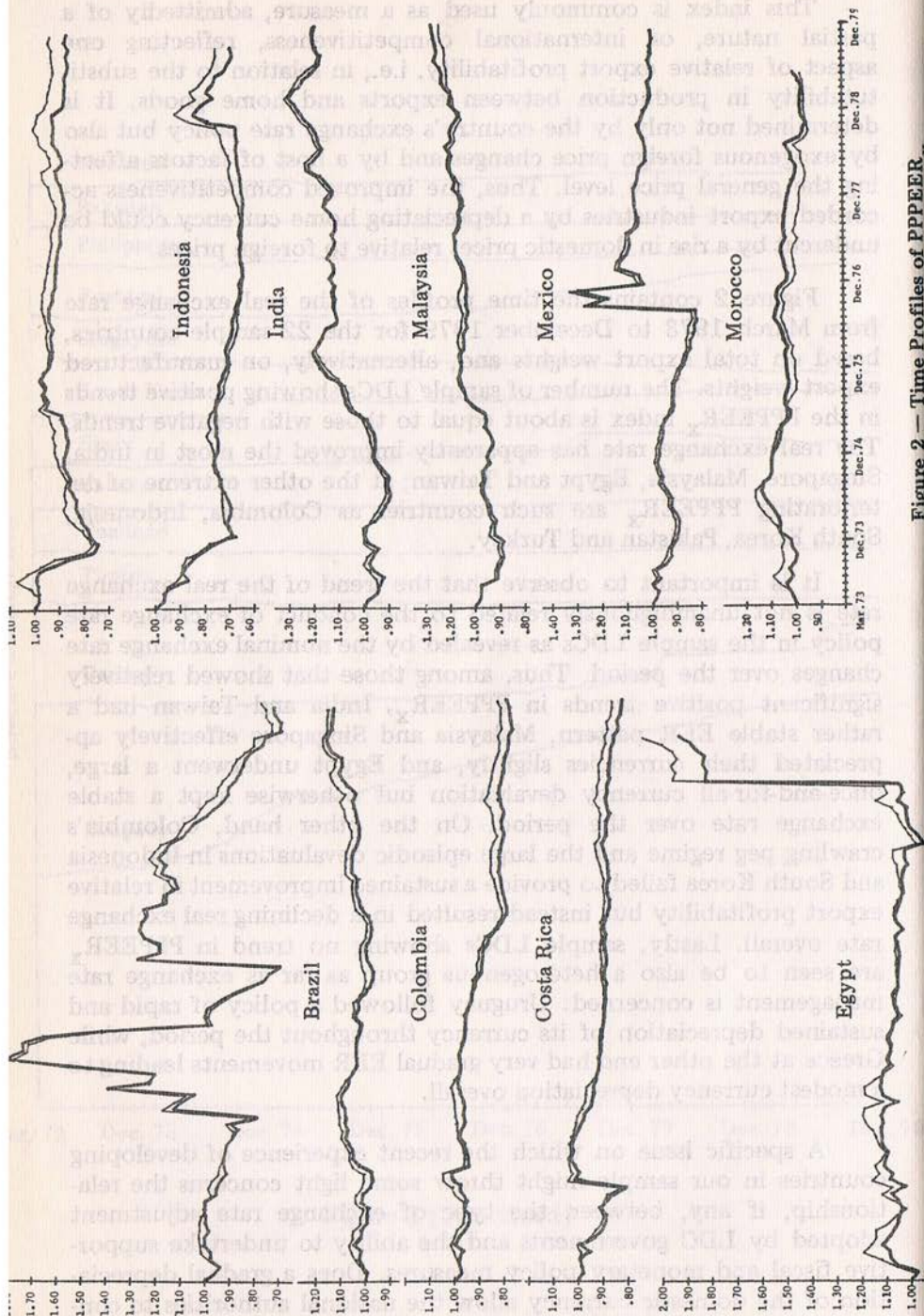
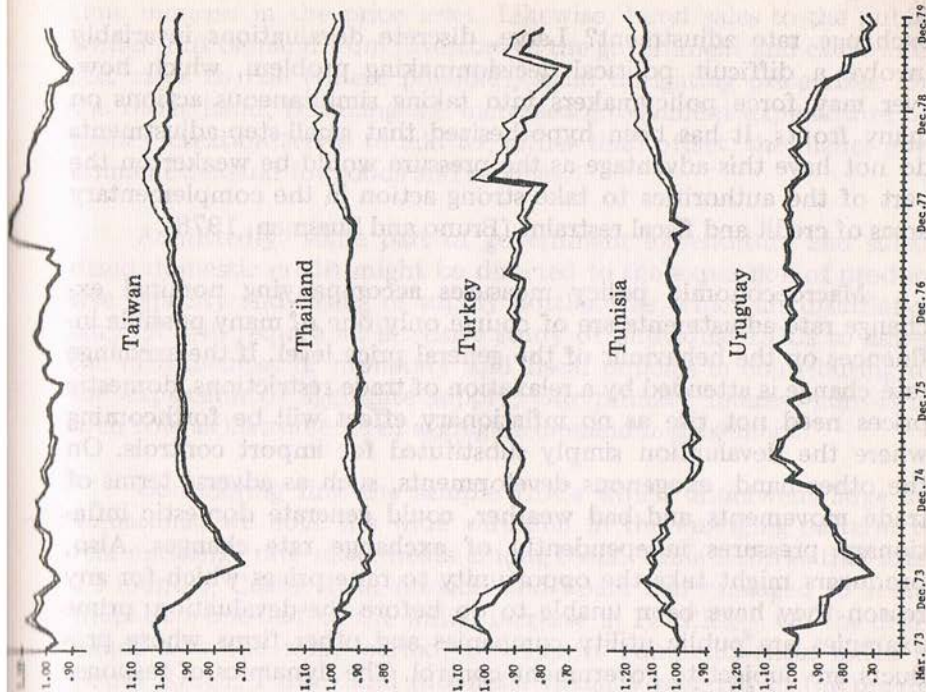
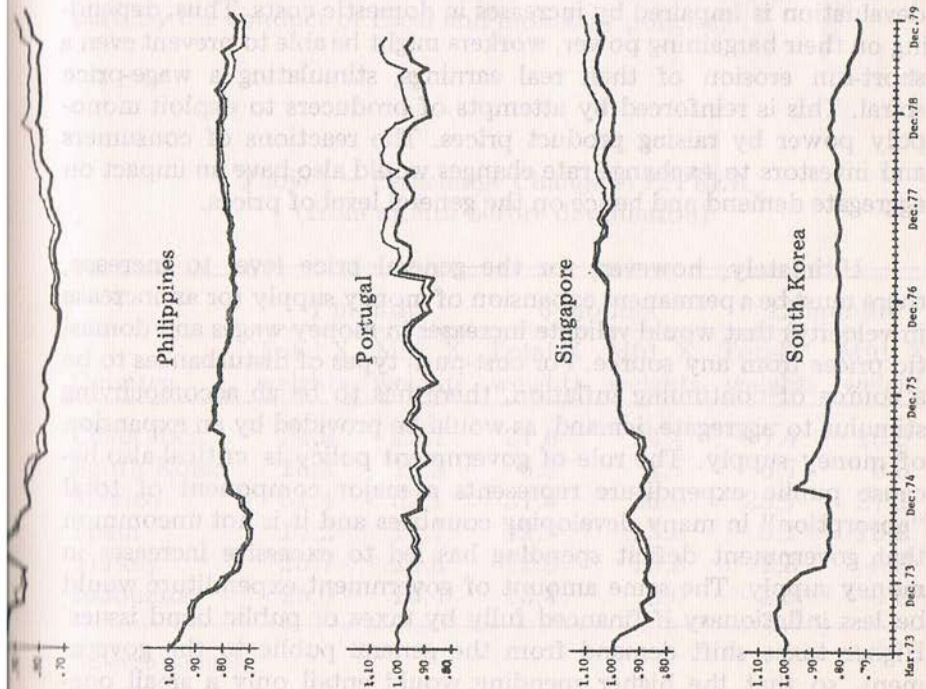


Figure 2 — Time Profiles of PPIER.



exchange rate adjustment? Large, discrete devaluations invariably involve a difficult political decisionmaking problem, which however may force policymakers into taking simultaneous actions on many fronts. It has been hypothesized that small-step adjustments do not have this advantage as the pressure would be weaker on the part of the authorities to take strong action in the complementary areas of credit and fiscal restraint (Bruno and Sussman, 1978).

Macroeconomic policy measures accompanying nominal exchange rate adjustments are of course only one of many possible influences on the behaviour of the general price level. If the exchange rate change is attended by a relaxation of trade restrictions, domestic prices need not rise as no inflationary effect will be forthcoming where the devaluation simply substituted for import controls. On the other hand, exogenous developments, such as adverse terms of trade movements and bad weather, could generate domestic inflationary pressures independently of exchange rate changes. Also, producers might take the opportunity to raise prices which for any reason they have been unable to do before the devaluation; prime examples are public utility companies and other firms whose products are subject to government control. The dynamics of response by wage earners and employers to the initial increases in costs and prices will partly determine the extent to which the effectiveness of devaluation is impaired by increases in domestic costs. Thus, depending on their bargaining power, workers might be able to prevent even a short-run erosion of their real earnings, stimulating a wage-price spiral. This is reinforced by attempts of producers to exploit monopoly power by raising product prices. The reactions of consumers and investors to exchange rate changes would also have an impact on aggregate demand and hence on the general level of prices.

Ultimately, however, for the general price level to increase, there must be a permanent expansion of money supply (or an increase in velocity) that would validate increases in money wages and domestic prices from any source. For cost-push types of disturbances to be a source of continuing inflation, there has to be an accompanying stimulus to aggregate demand, as would be provided by an expansion of money supply. The role of government policy is critical also because public expenditure represents a major component of total "absorption" in many developing countries and it is not uncommon that government deficit spending has led to excessive increases in money supply. The same amount of government expenditure would be less inflationary if financed fully by taxes or public bond issues. Higher taxes shift demand from the general public to the government, so that the higher spending would entail only a small one-

time increase in the price level. Likewise, bond sales to the public would shift demand from investors to the government and cause interest rates to rise (where possible), again mitigating price rises. On the other hand, financing the increased government expenditure by money creation serves to add to, rather than offset, the higher government demand for goods and services.

Admittedly, some part of government expenditure and subsidized domestic credit might be directed to the expansion of productive capacity and easing of supply bottlenecks, which are disinflationary. It will require an intensive study of individual LDCs to assess the effectiveness of monetary and fiscal policies in contributing to the expansion of aggregate supply. Our primary interest here is in their role as instruments of aggregate demand management.

Considering first the sample LDCs which underwent large devaluations, we note the wide variation in the emerging patterns of *real* exchange rate movements among them. Table 1 shows that after 12 months, Costa Rica, Mexico and Spain had managed to retain more than one-half of the initial increase in  $PPPEER_x$ . On the other hand, over the same period, the export competitiveness index in South Korea, Turkey and Indonesia virtually reverted to the pre-devaluation level. Could this marked difference in real exchange rate behavior in the aftermath of devaluation be explained, at least in part, by the conduct of fiscal and monetary policies?

Table 1 — Percentage Change in  $PPPEER_x$   
(from month before devaluation)

Country	1 month		6 months		12 months	
	Total X weights	Mfd. X weights	Total X weights	Mfd. X weights	Total X weights	Mfd. X weights
Costa Rica	24.9	25.1	27.3	24.4	17.4	16.9
South Korea	15.3	15.3	6.3	4.7	0.7	0.0
Mexico	51.4	52.1	37.6	36.9	28.7	27.1
Spain	14.2	14.7	12.9	13.8	9.1	10.2
Turkey	25.7	26.6	12.9	13.3	-2.3	-0.6
Indonesia	25.0	15.4	13.4	8.6	1.9*	-0.6*

\*Eleven months.

Table 2 compares the annual growth rates of money supply in the six countries, calculated from monthly data, during specified periods before and after the month of devaluation. Costa Rica and South Korea are seen to have reduced markedly the expansion of money supply in the four quarters after devaluation (relative to the three-year average before devaluation). Such contractionary policy would have contributed to the observed lasting improvement in the real exchange rate for Costa Rica; in the case of South Korea, the unfavorable behavior of  $PPPEER_x$  after devaluation would not be attributable to the conduct of aggregative monetary policy. For the other devaluing countries, monetary policy had not helped the cause of devaluation: Spain and Turkey appear to have virtually maintained the pre-devaluation rate of money supply increase, while Mexico and Indonesia even show slightly higher rates.

**Table 2 — Growth of Money Supply Before and After Devaluation: Selected LDCs**

Country	Average annual increase in money supply (in per cent)					
	3-year Period Before Devaluation	Q <sub>1</sub>	Q <sub>2</sub>	Q <sub>3</sub>	Q <sub>4</sub>	Average Q <sub>1</sub> to Q <sub>4</sub>
Costa Rica	27.4	25.9	18.2	16.7	16.1	19.2
South Korea	38.4	21.8	27.0	21.1	26.8	24.2
Mexico	23.7	29.1	30.4	26.2	22.0	26.9
Spain	19.2	21.5*	18.9	18.5	19.2	19.5
Turkey	32.9	28.1	32.3	37.0	—	32.5
Indonesia	25.0	22.5	30.9	31.9	33.2	29.6

Note: Q<sub>i</sub> = *i*th quarter after month of devaluation (i = 1, 2, 3, 4).

\*Based on end-of-quarter, 1976 III and 1977 III.

Dash (—) indicates data not available.

Source: IMF, *International Financial Statistics* (various issues).

Due to data limitations, quarterly fiscal performance after devaluation can be examined here only for Costa Rica, South Korea, Mexico and Spain. Comparing levels of government deficit spending deflated by WPI in each country before and after devaluation as done above for money supply growth, contractionary fiscal policy appears to have been the rule, without exception, in the first four quarters



after devaluation among these countries. The large government deficits occurring in the pre-devaluation period were drastically reduced such that during the 12-month period after devaluation, the average amounts (in 1975 prices) were only about one-fifth (in South Korea and Mexico) and one-tenth (in Costa Rica and Spain) of the three-year average values before devaluation.<sup>2</sup> It would appear therefore that both monetary and fiscal policies were supportive of real exchange rate adjustment in Costa Rica and South Korea. For Costa Rica, this proved sufficient in avoiding a reversion of the real exchange rate to the predevaluation level.<sup>3</sup> For South Korea, it cannot be said that the choice of inappropriate macroeconomic policy had been responsible for the observed domestic price increases which rapidly undercut the initial improvement in competitiveness provided by the December 1974 devaluation.<sup>4</sup>

Among countries that had small gradual changes in effective exchange rates, monetary and fiscal policy would seem expansionary in most cases during 1973-78 relative to the five-year period before the adoption of generalized floating among major currencies (see Table 3). The exceptions are Singapore which reduced substantially the rate of increase of its money supply, and Morocco and the Philippines whose fiscal performance was contractionary. Interestingly enough, only three (Morocco, Pakistan and the Philippines) of the ten countries suffered a loss in export competitiveness due to real exchange rate changes (see Figure 2) while India and Malaysia which registered the largest improvement in  $PPPEER_x$  in the entire sample appear to have increased both the average rate of monetary expansion and government deficit spending.

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<sup>2</sup>As calculated from IMF *International Financial Statistics* data.

<sup>3</sup>Notice from Table 2 that, over the entire observation period 1973-79 Costa Rica suffered a negative trend in  $PPPEER_x$ . As shown in Figure 2, there was a substantial fall in the real exchange rate before the May 1974 devaluation which was not fully offset by the subsequent rise.

<sup>4</sup>While it is beyond the scope of the present discussion to analyze the possible causes of domestic price level movements in the sample countries, we may note that the growth rate of real output (GDP in 1975 prices) in South Korea was much lower in 1975 (8.1 per cent) compared to the annual average in 1973-1974 (11.8 per cent), perhaps attributable in large part to the sharp decline in foreign demand.

Table 3 — Indicators of Monetary and Fiscal Policy:  
Sample LDCs With Small Changes in EER Under Generalized Floating

Country	Average Annual Rate of Increase in Money Supply (end-of-year values), %		Average Annual Ratio of Government Deficit to GDP (x100)	
	1967-72	1972-78	1968-72	1973-78
Greece	11.6	20.2	-1.99	-3.41
India	11.3	16.6	-3.52	-4.37*
Malaysia	12.4	18.2	-5.80	-7.29
Morocco	11.7	19.2	-4.04	-3.62**
Pakistan	14.2	15.8	-6.38	-8.14
Philippines	15.6	17.5	-2.60	-.05
Singapore	22.6	12.9	1.98	.92
Taiwan	18.9	28.2	—	1.65
Thailand	9.7	13.7	-3.56	-3.89
Tunisia	13.0	16.4	—	-2.92

Note: \*Based on 1972-77 data.

\*\*Based on 1972-74 data.

Dash (—) indicates data not available.

Source: IMF, *International Financial Statistics* (various issues).

Finally, does active exchange rate management as exemplified by the "crawling peg" policy promote the adoption of supportive monetary and fiscal policies? Table 4 compares average money supply growth and government deficit spending in five sample countries during specified periods of crawling peg since 1973 and earlier years. Only Brazil seems to have exercised *both* monetary and fiscal restraint during the period of active exchange rate management, which must have contributed to the observed improvement in the real exchange rate. Monetary policy in Colombia and Uruguay was relatively expansionary despite an improved fiscal performance, while both the rate of monetary expansion and government deficit spending went up in Argentina. Thus, no clearcut conclusion emerges on the ability of LDC authorities to accommodate, through aggregate demand management, the expenditure-reducing mechanism of currency depreciation under a crawling peg exchange rate regime.

The inferences from the above analysis, which simply makes a before-and-after comparison of money supply growth and government deficit spending, are valid to the extent that other influences on macroeconomic policy decisions are attributable to the type of

**Table 4 — Indicators of Monetary and Fiscal Policy: Sample LDCs With Crawling Peg Exchange Rate Regime**

Country	Average Annual Rate of Increase in Money Supply (end-of-year values), %		Average Annual Ratio of Government Deficit to GDP (x100)	
Argentina	1969-74:	52.0	1970-74:	-3.56
	1974-78:	194.0	1975-78:	-6.87
Brazil	1962-67:	56.6	1963-67:	-2.36
	1972-78:	39.5	1973-78:	.14
Colombia	1961-66:	16.6	1962-66:	-.95
	1972-78:	26.6	1973-78:	.04
Uruguay	1966-71:	58.7	1967-71:	-2.63
	1972-78:	65.4	1973-78:	-2.32

Source: IMF, *International Financial Statistics* (various issues).

exchange rate regime adopted. A more rigorous analysis can be provided by the use of multiple regression in representing quantitatively the conduct of monetary and fiscal policies during the period under study.

Relative monetary performance among the sample LDCs adopting different methods of exchange rate adjustment can be further examined by fitting a money supply equation, based on their collective experience during 1973-79, with dummy variables that allow the intercept to shift from one exchange rate regime to another. It is hypothesized that the expansion of money supply is determined (by the national authorities) on the basis of current output growth and the accommodation of such sources of inflationary pressures as the balance of payments, government deficit spending, money wage increases and exchange rate adjustment. The following estimated equations are based on average values of the variables for the sample countries over the period 1973-79:

No. of observations: 19 (excluding Egypt, Indonesia and Thailand)

$$(1) \dot{M} = -1.512 + 1.868 \dot{Y} - .062 CR - .058 GSD + .302 \dot{W} \\
\begin{matrix} (-.19) & (2.37) & (-.14) & (-.07) & (1.02) \end{matrix} \\
+ .151 \dot{E}_m^* + 1.257 DS - 7.216 DC \\
\begin{matrix} (3.14) & (.31) & (1.12) \end{matrix}$$

$$\bar{R}^2 = .959 \quad \text{s.e.e.} = 6.70$$

No. of observations: 15 (excluding Egypt, Indonesia, Thailand and crawling peg countries)

$$(2) \dot{M} = 11.61 + 1.321 \dot{Y} + .019 CR + .208 GSD + .178 \dot{W} \\
\begin{matrix} (1.62) & (2.28) & (.07) & (.42) & (.90) \end{matrix} \\
+ .058 \dot{E}_m^* - 4.066 DS \\
\begin{matrix} (1.42) & (-1.36) \end{matrix}$$

$$\bar{R}^2 = .540 \quad \text{s.e.e.} = 4.14$$

No. of observations: 22

$$(3) \dot{M} = 5.556 + 1.462 \dot{Y} + .192 \dot{E}_m^* - .255 DS - 8.12 DC \\
\begin{matrix} (1.10) & (2.55) & (15.29) & (-.08) & (-1.58) \end{matrix}$$

$$\bar{R}^2 = .959 \quad \text{s.e.e.} = 6.26$$

where:

$\dot{M}$  : average annual growth rate of money supply, in per cent

$\dot{Y}$  : average annual growth rate of GDP (at 1975 prices), in per cent

CR : average annual ratio of change in reserves to GNP (at current prices)

GSD : average annual ratio of government surplus (+) or deficit (-) to GDP (at current prices) x 100

$\dot{W}$  : average annual rate of increase in nonagricultural (industrial, manufacturing) wage rate, in per cent

$\dot{E}_m^*$  : average monthly rate of increase in import-weighted effective exchange rate, in per cent

DS : dummy variable: 1 for countries with small, gradual exchange rate changes, 0 for other countries

DC : dummy variable: 1 for crawling peg countries (Argentina, Brazil, Colombia and Uruguay), 0 for other countries.

In regression equation (1) which is based on observations for

19 countries — not including Egypt (no available GSD data), and Indonesia and Thailand (no available W data) — only the output and exchange rate variables yield estimated coefficients significantly different from zero at the 5 per cent level. The coefficients for DS and DC are positive and negative, respectively, but both insignificant. Equation (2), in which the crawling peg countries are also excluded, shows significance of the GDP variable but not  $\dot{E}_m^*$ . It is worth noting that the DS coefficient now has a negative sign, although it is still insignificant at the 5 per cent level. In equation (3), which includes all 22 countries, significant coefficients for GDP and  $\dot{E}_m^*$  are observed, but again not for the two exchange rate regime dummies.

These results tend to corroborate the earlier inference about the lack of a clear relationship between the conduct of monetary policy and type of exchange rate adjustment. Certainly no support is given to the hypothesis mentioned earlier that large, discrete devaluations have an advantage in that they strongly pressure the national authorities to exercise monetary restraint. If anything, the signs of the estimated dummy coefficients with t-values greater than unity (which add to the explanatory power of the regression equation) point to a relatively more restrictive monetary policy pursued in countries adopting the crawling peg regime and small-step exchange rate adjustments when account is taken of other influences on money supply expansion.

Turning now to the quantitative representation of the conduct of fiscal policy among the sample LDCs during 1973-79 to test for the separate influence of the type of exchange rate regime adopted, it seems reasonable to hypothesize that government deficit spending would be affected by the growth of real output, per capita income and the balance of payments. Other things being the same, the larger tax base associated with higher levels or more rapid gains in real income implies a less urgent need for an LDC government to increase deficit spending. An improvement in the balance of payments, on the other hand, may or may not lead to contractionary fiscal policy. As a means of offsetting the monetary repercussions of an increase in foreign reserves, the national authorities may decide to restrain public spending. However, it is also possible that the improved reserve position would provide the stimulus for increasing government spending.

Distinguishing also the 21 sample LDCs (excluding Egypt) by type of exchange rate adjustment, regression of these explanatory variables on GSD, again based on average values over the period 1973-79, yielded the following:

$$(4) \text{ GSD} = -8.988 + .844 \dot{Y} + .152 \text{ PCY} - .256 \text{ CR} \\
(-4.48) \quad (3.64) \quad (2.44) \quad (-2.13) \\
- 1.353 \text{ DS} + 1.008 \text{ DC} \\
(-1.24) \quad (.73)$$

$$\bar{R}^2 = .394 \quad \text{s.e.e.} = 2.09$$

where PCY is average per capita GDP, in hundred U.S. dollars at 1975 prices, and the other variables are as defined earlier.

The estimated coefficients for the three non-dummy variables are significant at the 5 per cent level,<sup>5</sup> but those for the two exchange rate regime dummies are not. The latter finding is consistent with the earlier discussion about the ambiguous association between the method of exchange rate adjustment and conduct of fiscal policy in the sample countries.

No clearcut conclusion has thus emerged on the comparative experience of sample LDCs classified by method of exchange rate adjustment in relation to their ability to undertake supportive monetary and fiscal policies. It would seem neither necessary nor sufficient that a developing country adopt any particular type or method of *nominal* exchange rate adjustment to be able to achieve *real* exchange rate adjustment. It should be recognized, nevertheless, that for endemically inflationary countries, i.e., where existing institutions and policies have a strong built-in inflationary bias so that increases in the domestic price level greatly exceed the foreign inflation rate, active exchange rate management as exemplified by the crawling peg may represent the only feasible option (short of a drastic overhaul of institutions and policies) to achieve and sustain export competitiveness. For other LDCs, the above results suggest that even without substantial currency depreciation, policy measures directed toward domestic price stability could provide at least as good a basis for promoting real exchange rate adjustment.

Perhaps due to the severity of the external shocks buffeting the developing countries during the period, the conduct of macro-

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<sup>5</sup>While we make no attempt here to examine in depth the influence of these variables on government finance, it is worth noting that the estimated relationship given by equation (4) shows a negative effect of the change in reserves variable, suggesting that fiscal policy had generally not been used to compensate for the domestic monetary consequences of the balance of payments among the sample LDCs.

economic policy has not always appeared as a dominant factor in the observed changes in real exchange rates,<sup>6</sup> except in the case of the crawling peg countries. This does not imply that the choice of macroeconomic policy is unimportant. Unquestionably, exchange rate management under generalized floating can facilitate the correction of currency overvaluation and improvement of the incentive structure for exports only if it is properly coordinated with other policy instruments affecting the domestic price level.

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<sup>6</sup>Moreover, in the context of developing economies, domestic credit and fiscal policy measures would have affected not only aggregate demand but also aggregate supply to the extent that they contribute to the removal of supply bottlenecks and creation of additional production capacity, and hence their effects on the general price level are likely to differ in different countries.

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