Measuring Currency Misalignment in LDCs

by

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The over or under valuation of currencies must be among the most frequently discussed issues of current economic policy in the western world. Unfortunately, much of the discussion is characterised by distressing imprecision about what is being measured. Careful economists have exposed this imprecision and documented the variety of concepts which may be admitted to the debate (see Maciejewski [1983]); none is of universal applicability. However, little of this conern for clarity has percolated to the levels of national and international policy making. The result must be flawed policy, because crucial issues turn on the way the exchange rate is conceived and computed. This paper takes the reader through some of these issues, suggests ways of approaching the question of exchange rate policy and makes a plea for explicitness in the discussion and measurement of a currency misalignment.

A Procedure for Determining Overvaluation, Addressing Trade Questions

To say that a currency is overvalued is to imply that there exists a 'correct' or 'equilibrium' value for that currency which is lower than its current worth[1]. We need a method for arriving at the correct value and a measure of the discrepancy between the correct and the actual.

The correct exchange rate for the currency is one which enables the country to attain its economic objectives. Since the exchange rate alone cannot secure every objective the usual

practice is to select one target for this instrument. For the moment we accept this practice, reserving our views on its aptness. The balance of external trade in goods and services is the end most people have in mind when discussing exchange rate issues. The correct value of the currency, from this viewpoint, is one which causes changes in exports and imports of goods and services sufficient to achieve a desired balance of external payments. That is still vague; we need to know the desired balance. Could it be to match earnings to payments exactly? Hardly; foreign finance for fixed capital formation is considered an essential ingredient for economic growth in many LDCs and for the past twenty years or more it has been a constant feature of Caribbean economies which we have studied closely. This finance allows a country to make purchases in excess of its earnings in foreign exchange. The desired balance of trade is therefore a deficit just large enough to allow for an optimal inflow of foreign capital. The issue now turns on the sustainable inflow of capital, which depends on current debt service capacity, the country's growth prospects, the capacity to absorb new investment and the terms on which foreign capital is available.

In principle, we can work out all these factors. We may then proceed as follows: first, set the balance of trade target at (the negative of) the sustainable rate of capital inflow. Next, derive the value of the domestic currency which secures this balance of trade and compare with the current value.

This exercise, though essential, will inevitably contain a large element of speculation. To calculate the sustainable capital inflow we need an upper limit for the country's capacity to absorb new investment. This involves information about what activities are being contemplated, how much know-how is available, what policies are in force for bringing in missing skills and how close to overload are communications networks, public utilities and transport systems. We cannot avoid controversial judgements about the best mix of activities, the market potential for each, the appropriate technology to employ, and the best projection of the world environment as it affects the country's external relations.

Extensive empirical tests are needed to establish the relationship between the exchange rate and exports and imports. Exhibit A suggests how the authorities might arrive at a rough guide to the magnitude of a useful devaluation, if their purpose were to correct an imbalance of trade. But they would need to temper their results with fine judgement, bearing in mind that they will have neglected large areas of vital importance about which they have inadequate information.

A Choice of Targets

The foregoing is just the beginning of the story. Were we right to accept a balance of trade target as the proper objective of exchange rate policy? Economic managers are usually concerned with the balance of payments rather than the balance of trade. If we target the trade deficit to match the inflow of

capital we allow no leeway for building up foreign exchange reserves, and no margin for borrowing to finance temporary shortfalls in earnings. It would seem that allowance ought to be made for a degree of foreign exchange insurance - made up of accumulated reserves and short-term borrowing capacity - within an overall target for the balance of payments.

But perhaps the country is concerned with quite different objectives. Suppose that the impact of exchange rate changes on trade and payments is found to be trivial compared with the effects on inflation or income distribution. That might justify substituting one or other of the last-mentioned variables for the payments target.

Alternatively, the focus might be on export competitiveness. The balance of payments will always swing randomly from year to year, if only because of 'errors and omissions'. The search for an underlying equilibrium trend is probably fruitless, since several changing combinations of trade balance, capital flows and unidentified items may be sustainable over the long run. Instead we might focus on the ability to carry forward an export drive by remaining competitive and ensuring that exporting remains profitable. The major objective, following this line of argument, might be to adjust the relative costs of producing for the home market and for export, hopefully to influence the distribution of investment between agriculture, mining, manufacturing and tourism on the one hand, and Government, construction and distribution services, on the other.

Against this position it might be argued that it does not matter what sectors investment is directed to, so long as the economy is growing as fast as possible. Perhaps the country should choose to link its exchange rate strategy to the fastest growth rate that can be sustained.

If any of these arguments is persuasive, we must replace our earlier calculations, although we may retain the methodology. The easiest to accommodate is an adjustment to allow for balance of payments insurance. The target balance of payments deficit must be smaller by the amount of foreign exchange to be put aside in the reserve and something must be deducted from the desired capital inflow to leave room for short-term borrowing. The total of reserve accumulation and short-term borrowing capacity can be calculated from an estimate of the probability of foreign exchange shortfalls and an assessment of how cautious the foreign exchange managers wish to be. With these amendments the earlier calculations will serve.

If the effects on inflation, income distribution, production or growth are found to be more significant, or if the authorities deem them to be of more vital interest, we need new information and a new set of calculations. The procedure is the same as before: pick a value for the new target, estimate the relationships between the exchange rate and the target, calculate the exchange rate which achieves this target and compare with the actual exchange rate. The information base required is no less

forbidding than in the case of trade, and even less has been done to measure these effects of exchange rate changes.

We offer some comments on the choice of target. You will have as many values for the overvaluation of a currency as you have targets. Today's exchange rate may, at one and the same time, be 10% overvalued by a balance of trade criterion, 15% overvalued by a balance of payments criterion which allows for some additional foreign exchange insurance, five percent undervalued by an anti-inflation criterion and not much out of alignment by a growth criterion. The calculations will involve judgements of the investigator and/or implied judgements of public officials. Different people will therefore come up with rather different results, using the same information.

One may conceive the possibility of trade-offs between objectives. For example, the exchange rate may be adjusted to promote maximum growth, provided it does not push the rate of inflation above a certain maximum tolerable level or on condition that a minimum of foreign exchange security be provided at all times. Ideally, we would like a macro-economic model from which one could derive all the implications of the exchange rate change for ready comparison. But the exercise could be carried out piecemeal if that were the only alternative.

The Time Horizon

Our task is by no means finished. We have yet to fix a time horizon for the targets. The careful reader will have

noticed that alternative targets suggest different time frames: one may wish to secure balance of payments equilibrium over one or two years, but an income growth target implies an extended horizon. For whatever target (or combination of targets) is chosen, we should specify the time horizon. The authorities of most LDCs probably will not want to limit their attention to the short-term; results may appear fairly soon after they undertake an exchange rate change, but the outcome will usually be considered unsatisfactory if it does not have long-term effects. The choice between a medium-term horizon of, say, three to seven years and a long-term view is a matter of judgment and involves an attempt to represent the interests of citizens and/or to interpret the intentions of officials.

The Co-ordination of Exchange Rate and Other Policies

So far we have side-stepped the issue of policy co-ordination. If an open economy devalues, prices rise, driving up Government expenditure and revenue, altering the fiscal deficit and requiring a revised fiscal stance. Income distribution is affected, possibly resulting in altered levels of saving. Wages may react to the price increases and money holders may begin to switch between local and foreign deposits. These tendencies must be resisted or accommodated. The reactions, and what is done about them, will determine the efficacy of exchange rate changes for whatever purpose the authorities have in mind. For example, if Government wants to be sure that devaluation will make exporting more profitable it may have to combine the

devaluation with tax relief on the extra earnings exporters derive from the exchange rate change. Or it may be necessary to raise interest rates to stem an outflow of money in the immediate aftermath of devaluation.

We cannot know what exchange rate is associated with a particular value of a given target until we specify the associated policy regime. To simplify the matter for purposes of this exposition we list three possibilities - the policies obtaining in some base year, the current policy regime and a set of 'ideal' policies, chosen by the investigator. Recognise straight away that this is a gross compression of the actual choices, and that a description of what resides in each category might run to the length of a small pamphlet. For some countries current policies are clearly failing, so this category would not be available. Moreover, one doubts that consensus could readily be obtained on the content of any one of these packages. We make no attempt, with our simple typology, to give content to the choices for policy regime. However, any statement about currency alignment implies a position on the associated policy regime. Most knowledgeable people who discuss exchange rates are aware of this, though unfortunately the implied policies are not always laid out comprehensively.

Is the Structure of the Economy Changing?

The measurement of currency misalignment depends on an understanding of how the economy responds over time to new

technologies, to citizens' newly awakened aspirations, to unexplored opportunities, and to unfamiliar ways of doing things. These are all aspects of what economists refer to as 'structure'. Take a simple illustration. Country X has embarked on export strategy which gradually replaces sugar with tourism as the most important source of foreign exchange. Tourism and sugar will react differently to the same exchange rate change because of differences in market arrangements, production processes and use of imported raw material. The appropriate exchange rate for balance of payments or export promotion will therefore depend on how far the country has progressed in the export transformation. For the same change in the nominal value of the currency the extent of over or undervaluation differs, depending on whether the country is still mainly a sugar exporter or whether it has graduated to a more even mix of sugar and tourism.

Policies for structural change are a deliberate part of most development strategy. They are needed to cope with a changing external environment and the ever growing aspirations of the peoples of developing countries. This creates a basic dilemma for policies with a long horizon. We judge probable quantitative effects of any policy by measuring the effects of similar actions in the recent past; to the extent that the future will not resemble the past our inferences are invalid. Structural changes, by their very nature, unfold slowly, and they may often be neglected in short-term analysis. However, the

more distant our horizon the more dangerous it is to leave them out of explicit consideration. We must essay the hazardous task of specifying potential structural parameters which are at once consonant with the country's development strategy and within the attainable universe. This is an exercise so speculative that no-one can be asked to stake a reputation on it. We suggest a comparison between the conclusions derived from this calculation and those obtained by using the existing structure, to provide insight into the sensitivity of exchange rate valuation to structural change.

The Value of Local Currency in Terms of What?

Finally, we need to choose among the many ways of valuing local currency - in terms of U.S. dollars, sterling, deutchmarks, yen or some combination of these and other currencies. The extent of currency misalignment depends on the choice.

If the overwhelming proportion of the country's foreign transactions are with a single trading partner, one may attack the multi-currency problem by simply pegging and valuing the domestic money in terms of the trading partner's currency. For transactions in other currencies the private sector may be left to devise ways of coping with misalignment; or special foreign exchange or financial institutions may be set up to compensate agents in these markets.

The alternative is to use a weighted average of a basket of currencies as an indicator of the value of the local money.

Trade shares are the most commonly used weights, and the least defensible; in a recent article in IMF Staff Papers (Maciejewski [1983], Appendix I) they are condemned as 'measurement without theory'. For the most part, they measure the effect exchange rate changes would have on the prices of traded goods if there were absolutely no other response, although most people who use trade-weighted exchange rates seem unaware of this. It makes more sense to use elasticity weights. The elasticity is a measure of the responsiveness of an objective to a change in a stimulus. We may calculate trade elasticities, for example, to measure the responsiveness of imports and exports to exchange rate changes. Similarly, we may devise elasticities for cost competitiveness, for domestic prices and for the growth of output. Each set of elasticities provides us with a different measure of currency alignment. Several are linked explicitly to the choice of objective in our earlier exposition.

Over 600 Measures of Overvaluation

According to the highly simplified typology described in this article, the statement that, at a particular date, a given currency was overvalued by x% may mean any one of 648 different things. The choices are listed in the accompanying table 1; they result from the combination of six targets, each of which may be defined over three time periods, with one of three domestic policy regimes to go with each target-time combination. These combinations may then be analysed with two alternative economic

structures and the whole lot measured in six different ways. The reader is entitled to know whether the author means to say "The December 1983 value of the Ruritanian crown in terms of US dollars was too high by x% in view of the Ruritanian authorities' short run balance of trade targets, given the economic policies in force in 1980 (the base year) and the current economic structures"; and if not, then what.

We cannot admit less precise statements because anyone who makes a pronouncement on exchange rate valuation implicitly takes a view on each one of these issues. If he is unable to state his position he may be confused or he may not be thought out the full implications of his position. This poses grave dangers for policies based on his exchange rate calculations. They may contain internal inconsistencies and they may entail unexplored costs far greater than their potential benefit. The calculation of exchange rate movements in a world of floating rates is a complex business, and economists owe it to those who depend on their analyses at least to be thorough.

Table 1

Measuring Overvaluation: A Menu of Choices

Targets	Time Periods	Policies	Structure	Measures
1. The balance of trade	1. Short	1. Base year	1. Present	a. Currencies, separately
2. Trade balance with FX insurance	2. Medium	2. Current	2. Potential	b. Trade shares
3. Inflation	3. Long	3. 'Ideal'		c. Trade elasticities
4. Income distribution				d. Inflation elasticities
5. Relative profitability				e. Cost elasticities
6. Growth				f. Output elasticities

Exhibit A

Calculating Overvaluation, Using a Trade Target

The procedure is as follows:

(1) Set the target for maximum sustainable capital inflow, taking into consideration the debt service capacity, the growth rate of exports, the potential for investment, borrowing costs and maturities on available loans. Formally,

$$K^* = f_1 [r_f K/x, x, I^*, c(k); t(k)]$$

(See list of variable names below; asterisks indicate targets on desired levels)

(2) Put the balance of trade trade equal and opposite to the capital inflow target

$$T^* = - K^*$$

(3) Calculate the change in trade balance induced by exchange rate changes, taking account of the relevant elasticities

$$T = x_j(-1)[e_j (1+ \quad) + {}_{jk}\, e_k] - m_i(-1)[e_i(1- {}_i) + {}_{il}\, e_l]$$

The elasticities are derived from import and export equations

$$m_i = f_{2i}(y, P_{mi}/P, P_{mi}/P)$$

$$x_j = f_{3j}(P_j, P_k, Z_n)$$

(4) Generate values of e_i, e_j, e_k, e_l, to yield a trade balance of T^* and compare with the values at (3) to give the extent of misalignment

Appendix A (Cont'd.)

(5) Implicit assumptions:

(a) a policy regime which leaves income, prices and export incentives unchanged;

(b) structure unchanged from the period in which 's and 's were calculated.

To illustrate, apply this procedure to the imaginary Caribbean state of St. Francis, to calculate the extent of overvaluation at the end of 1983. The currency is the Franciscan dollar, pegged to the U.S. dollar

(1) The target for capital inflow is F$100 million, assuming that the debt service ratio is to be held below five percent, that costs of foreign capital will average 10% per annum over the next 10 years, that exports will grow (in real terms) at five percent per annum, that investment of 25% of current income is the maximum the country can absorb and that average maturities on foreign loans are 10 years.

Current account (1982), adjusted for errors = F$-87 million
Required change in current account for 1983 = F$-13 million

Elasticities of Real Imports with Respect to Exchange Rate Changes

Currency	Sources of Imports		
	U.S.	U.K.	Canada
	..	0.1	..
CN$	0.01	..	0.2

Exhibit A (Cont'd.)

Elasticities of Real Exports with Respect to Exchange Rate Changes

Destination of Exports

Currency	U.S.	U.K.	Caribbean
US$	0.1	..	..
Pound	..	0.2	..
CR$	..	..	0.01
Mex. Peso	0.2	..	..

Trade shares (%)

	U.S.	U.K.	Canada	Caribbean
Imports	40	20	10	30
Exports	60	20	-	20

Exchange Rate Changes (%)

	CN$	CR$
-10.5	-0.8	-

Visible Trade (%)

1982 ($FM)	
Imports	1,200
Exports	1,113

Conclusion, using formula at (3)

For the given balance of trade target, the Franciscan dollar was overvalued by eight percent at the end of 1983, in terms of a trade-elasticity weighted basket of currencies, provided that the trade structure of the Franciscan economy remained unchanged and that policies were followed to prevent any increase in real income, domestic price or factors which might have expended exports.

Exhibit A

Symbols

- i - elasticity of imports from country i with respect to i-currency
- il - elasticity of imports from country i with respect to l-currency
- j - elasticity of exports to country j with respect to j-currency
- jk - elasticity of exports to country j with respect to k-currency
- $c(k)$ - transactions costs of borrowing
- e_i - value of i-currency in local money
- e_j - value of j-currency in local money
- e_k - value of k-currency in local money
- e_l - value of l-currency in local money
- I - domestic capital formation
- K - foreign capital inflow
- m_i - imports from country i
- P - domestic price index
- P_j - price index for exports to country j
- P_k - " " " " of country k
- P_{mi} - price index for imports from country i
- P_{ml} - " " " " " " l
- r_f - interest rates in international financial markets
- $t(k)$ - the average maturity of foreign debt outstanding
- T - the balance of trade in goods and services
- x - exports
- x_j - exports to country j
- y - real national income
- Z_n - a vector of unspecified variables affecting exports

Footnotes

1. The currency's current worth may itself be a matter of dispute, where several foreign exchange markets operate in parallel. Parallel markets, whether officially sanctioned or not, increase the information requirements for establishing exchange rate effects. In practice the equilibrium exchange rate is harder to calculate, though in principle the methodology remains applicable.

Reference

Maciejewski, E., '"Real" effective exchange rates: a re-examination of the major conceptual and methodological issues', IMF Staff Papers, September 1983.