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Determining the Appropriate Levels of Exchange Rates for Developing Economies: Some Methods and Issues

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(2) if the exchange rate level is found to be inappropriate by some criteria, choosing the appropriate level.

Any meaningful analysis of the appropriate exchange rate level should contain both backward- and forward-looking elements. The backward approach is designed to explain how past exchange rate policies, _pari passu_ with other economic policies and with the changing exogenous circumstances, brought the economy to where it is. We conduct a number of alternative backward-looking investigations into price competitiveness, the economic viability of production (measured in terms of profitability) and its trends, the implicit market value of foreign exchange, and the distortionary nature of the exchange regime. These backward approaches measure the recent movements in the various indicators with possible implications for the appropriateness of the exchange regime and the exchange rate, but any conclusion regarding the sustainability of an exchange rate at the existing nominal level would be premature without a forward-looking analysis. What is important is whether the prevailing rate is compatible with reasonable economic growth and a viable balance of payments position in the medium term. The two types of approaches (backward and forward analysis) are methodologically independent of one another, but conceptually, one is the extension of the other and can be mutually reinforcing.
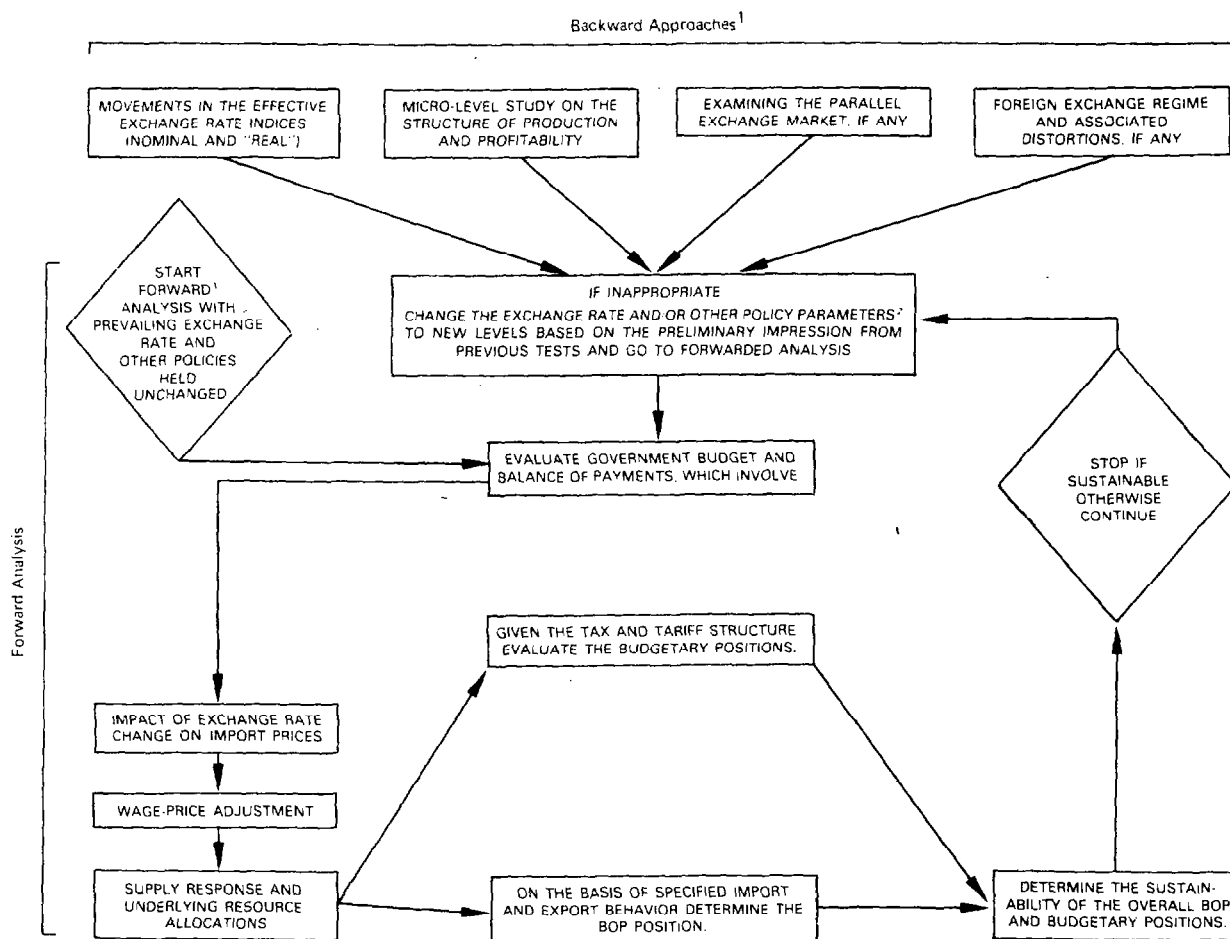
In the forward approach, the search procedure for the appropriate exchange rate level involves specification of the underlying adjustment mechanisms that follow a hypothetical exchange rate action. We consider different aspects of wage-price transmission mechanisms, resource allocation, and terms of trade effects. Consequent effects on the balance of payments 1/ and government budget are estimated to determine the overall sustainability of the exchage rate, given appropriately designed accompanying demand management policies. The integrated approach, as described in the following sections, is outlined in Figure I. This schematic diagram should not, however, give the impression that evaluations of the appropriateness of an exchange rate can be conducted in a mechanical way, devoid of substantial elements of judgment; the diagram is only intended to show the diversity of the issues to be considered in the backward and forward approaches, and how they are linked to each other.

The plan of the paper is as follows: Section II presents a conceptual framework for analyzing competitiveness and the role that the exchange rate can play to that effect. The next two sections (Sections III and IV), explore the methodological issues encountered in practical applications of this theoretical framework. Methodological issues are somewhat different for backward-looking analyses than for forward-looking

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1/ We ignore portfolio adjustments, monetary and capital movements, and confine ourselves to the effects on the current account balance. The countries we consider have limited commercial borrowing power in the world capital markets and thus exclude the open, "Latin American" type economies where capital flows, expectations, etc., play a large role.

A SCHEMATIC DIAGRAM OF THE VARIOUS TESTS SUGGESTED
TO DETERMINE THE ADEQUACY OF AN EXCHANGE RATE

Backward Approaches[1]

MOVEMENTS IN THE EFFECTIVE EXCHANGE RATE INDICES (NOMINAL AND "REAL")

MICRO-LEVEL STUDY ON THE STRUCTURE OF PRODUCTION AND PROFITABILITY

EXAMINING THE PARALLEL EXCHANGE MARKET, IF ANY

FOREIGN EXCHANGE REGIME AND ASSOCIATED DISTORTIONS, IF ANY

START FORWARD[1] ANALYSIS WITH PREVAILING EXCHANGE RATE AND OTHER POLICIES HELD UNCHANGED

IF INAPPROPRIATE CHANGE THE EXCHANGE RATE AND/OR OTHER POLICY PARAMETERS[2] TO NEW LEVELS BASED ON THE PRELIMINARY IMPRESSION FROM PREVIOUS TESTS AND GO TO FORWARDED ANALYSIS

EVALUATE GOVERNMENT BUDGET AND BALANCE OF PAYMENTS, WHICH INVOLVE

STOP IF SUSTAINABLE OTHERWISE CONTINUE

Forward Analysis

GIVEN THE TAX AND TARIFF STRUCTURE EVALUATE THE BUDGETARY POSITIONS.

IMPACT OF EXCHANGE RATE CHANGE ON IMPORT PRICES

WAGE-PRICE ADJUSTMENT

SUPPLY RESPONSE AND UNDERLYING RESOURCE ALLOCATIONS

ON THE BASIS OF SPECIFIED IMPORT AND EXPORT BEHAVIOR DETERMINE THE BOP POSITION.

DETERMINE THE SUSTAINABILITY OF THE OVERALL BOP AND BUDGETARY POSITIONS.

[1] Backward approaches and the first round forward analysis are used to determine the appropriateness of the current exchange rate; subsequent rounds of forward loops are processed to determine the sustainable exchange rate range.
[2] Taxes, tariffs, revisions of budgetary expenditure or policy combinations to affect relative prices, are some of the policy parameters

analyses, and are treated separately. Section III summarizes various backward approaches at both aggregated and disaggregated levels. Section IV describes the features of the adjustment mechanism that underlie any evaluation of the sustainability of an exchange rate level in the forward analysis, along with some discussion of the associated demand management and other economic policies. The concluding observations are given in Section V.

II. The Framework for Analyzing Competitiveness and the Appropriate Exchange Rate

The purpose of this section is to briefly discuss the conceptual framework that underlies the methodological approaches described in the following sections. Analytically, the appropriateness of an exchange rate has to be determined on the basis of the simultaneous external and internal competitiveness of tradeables, and the degree of external sector imbalances. Domestic producers of exportables (or tradeables) are in competition with producers of similar tradeables in other countries and also with producers of nontradeable goods in their home country. Internal competitiveness would ensure an adequate supply of traded goods through favorable internal relative price effects and the corresponding internal allocation of resources. An analysis of competitiveness can be linked to the evaluation of export receipts and import payments, and the forward analysis would then determine the sustainability of the prevailing exchange rate.

External competitiveness can be modeled in terms of a single-good economy, while domestic competitiveness is analyzed in a two-goods framework (containing tradeables and nontradeables). The real effective exchange rate (REER) provides a broader measure of external competitiveness, as it can be expressed as an index of relative prices deflated by an index of the nominal effective exchange rate (NEER). 1/ Similar measures of internal competitiveness can be obtained by the indices of export or import prices (in home currency), relative to home-goods prices. The measures of internal competitiveness provide a check on the measure of external competitiveness, and the two-goods framework is also central to the expenditure switching arguments offered in connection with exchange rate actions. However, partial equilibrium measures, in terms of profitability indices of major industries or commodities, can also be useful as implicit indicators of both internal and external competitiveness.

1/ In the standard formulation, REER indices are constructed by deflating the NEER indices by the corresponding indices of relative prices; Maciejewski (1982) points out that a deflated nominal index is not a meaningful exchange rate concept, as the exchange rate is inherently a nominal measure. However, he also shows that the standard formulation is in fact equivalent to an index of relative prices deflated by an index of NEER movements.

Starting from an initial equilibrium situation, in a two-goods model (with traded and nontraded goods), it can be shown that the exchange rate policy has at least a transitory effect on switching the expenditure and employable resources between tradeables and nontradeables, by altering the domestic relative prices. However, if the prices of nontradeable goods are not inflexible and the system is price neutral, i.e., wages and prices rise by the same proportion as the devaluation of the currency, devaluation has no real effect in the static equilibrium sense. This neutrality of devaluation is based on the absence of money illusion in the excess-demand functions for commodities and factors. Transitory improvements in the trade balance can be achieved through devaluation alone, but lasting real effects are only attainable with appropriate accompanying monetary and fiscal policies. If the monetary policy is accommodating, domestic price increases through devaluation will erode the purchasing power of money and reduce absorption to improve the trade balance. Fiscal intervention may also attain the same objective. The underlying neutrality of demand functions determines the long-run equilibrium, given the demand management policies; but the impact effect and the medium-term movements resulting from devalution are determined by the wage-price interactions and other forms of rigidities or rationing mechanisms frequently encountered in developing economies.

Moreover, in a situation of disequilibrium with rationing, which characterizes the predevaluation scenario in many developing countries, the exchange rate action is attractive. In a disequilibrium situation with nonmarket allocation rules (i.e., various forms of rationing), the nominal exchange rate matters; the relative prices of import-competing goods exceed their world relative prices, and the degree of variation depends on the exchange rate. If the quantitative restrictions remained unchanged, domestic prices of the import-competing goods would change little, with consequent effects on the relative prices of various classes of tradeable commodities. 1/

In the formulation of an adjustment path to a sustainable balance of payments position, it is necessary to determine to what extent the adjustment is to be concerned with aggregate demand and to what extent with expenditure switching. In the literature, a sharp distinction is sometimes made between deficits that are due to "excessive expenditure or aggregate demand" and deficits that are due to the noncompetitiveness of domestic products. However, except for limiting cases, such sharp distinction is not meaningful; every deficit implies that aggregate expenditure exceeds the money value of aggregate output. In a two-goods model, domestic relative prices can be altered, enabling exchange rate policy to assume an expenditure and resource switching role by restoring internal and external competitiveness. If the excess demand causes inflation to be higher than in partner countries, deflation is essential,

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1/ Aizeman (1981) modeled exchange rate behavior in a three-goods economy (exportable, importable, and nontradeable goods), and showed that with restrictive import quotas, devaluation lowers the relative prices of both the importable (which is subject to quota) and the nontraded goods.

but in itself cannot eliminate the deficits, as costs are adjusted to higher prices and tend to be downwardly rigid. When expenditure switching is the goal of the exchange rate policy, monetary and fiscal policies have a supporting role; on the other hand, if, on the basis of various indicators, the exchange rate is found to be appropriate, then the focus of the adjustment should be on appropriate demand-management policies.

All these conceptual issues related to the exchange rate policy are potentially important in the formulation of any adjustment program. Since the appropriate level of the exchange rate cannot be determined in isolation, the methodological approaches described in the following sections take these issues into account.

III. Determining the Adequacy of the Prevailing Exchange Rate Level

In this section, we employ a set of alternative steps to arrive at a judgment regarding the adequacy of the existing exchange rate level. To this effect, we suggest three different types of investigations (both backward- and forward-looking). These are:

1. Movements in the various weighted effective exchange rates, relative profitability, and in the relative price/cost developments adjusted for exchange rate changes from which inferences about the competitiveness of tradeables can be drawn; at a micro level, the structure of production and distribution of major export and import commodities are to be examined; these can indicate the extent of exchange rate action that may be needed to restore price competitiveness of the products and the profitability of production.

2. Exchange and trade regime and any associated distortions; examination of the operations of the parallel exchange market, if any, and the exchange rate movements in the official and parallel exchange markets.

3. Evaluation of past fiscal and monetary policies and their possible role in creating excessive absorption over aggregate supply and consequent balance of payments imbalances.

4. Medium-term forecasts of the country's economic growth and balance of payments performance in the absence of exchange rate action.

The first two classes of indicators in their various forms are essentially backward-looking, the third one is also retrospective, but like the last one, can also be forward-looking. Backward measures indicate shifts in the competitive position, the supply situation in exports and import substitutes, intensity of any distortionary effects of the exchange regime, and the underlying balance in demand and supply of foreign exchange. While these are indicative of the potential need for exchange rate actions, more definite conclusions can be derived from

forward approaches based on balance of payments and budgetary projections as described in the next section.

1a. Movements in the Real Effective Exchange Rate Indices (REER)

The REER indices refer to an average change of the reporting country's exchange rate against all other countries adjusted for price or cost developments. The appeal of these indices derives from the interpretation generally attached to them, i.e., when the real effective exchange rate of a country appreciates, it suffers a loss of international price competitiveness. This in turn contributes to a deterioration of the trade balance (by reducing exports and increasing imports) and causes balance of payments difficulties. Various aggregate weighted (trade, export, and import weights) Nominal Effective Exchange Rate (NEER) and REER indices have been suggested in the literature and are being widely used in various Fund studies. [1] In general terms, the NEER index can be denoted as

$$NEER_t = \sum_j W_{jt} \, R_t \, E_{jt}$$

where, W_{jt}: are the relevant weights (imports, export or trade shares of partner countries).

E_{jt}: Value of the unit of the currency of trading partner country in terms of numeraire currency (say, U.S. dollar or SDR).

R_t : Value of a unit of numeraire currency in terms of domestic currency.

The REER index is obtained by deflating the NEER index with the weighted relative price or cost index:

$$REER_t = \frac{NEER_t}{RP_t}$$

where, $RP_t = \sum_j W_{jt} \, (P_t/P_{jt})$

P_t : relevant price index for home country at period t.

P_j : appropriate price index of country j at period t $(j=1,\dots,N,$ N being the total number of relevant trading partners).

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[1] For the origin and development of the EER concept, see Hirsch and Higgins (1970), Rhomberg (1975), Thakur (1975), Feltenstein, Goldstein, and Schadler (1979).

The interpretation of the index depends on the choice of weights, while the weights employed depend on the policy objectives selected as the "focal point of the index" [Rhomberg, (1976)]. If external price competitiveness is the main point of interest, we should look at the performance of domestic currency relative to the currencies of the major competitors in exports. For each major commodity, the choice of competitor countries used in the calculations should be based on the share of their exports in total world trade of the commodity in question. This points to the importance of the commodity approach discussed later in this section. Various forms of REER indices have been used in the applied literature; Maciejewski (1982) provides a fairly exhaustive taxonomy of indices and their differences.

The use of REER indices has both theoretical and practical limitations, which have been discussed in detail in the relevant literature. Abstracting from the conceptual difficulties and the desirability of the implicit product composition associated with the policy of re-establishing original (base period) price competitiveness, it is not possible to derive from these any precise conclusion regarding the value of the exchange rate that would minimize balance of payments difficulties over the medium term. Experience with practical applications suggests that calculated values of effective exchange rate or exchange rate indicators may result in wide quantitative differences and may give rise to imprecise and sometimes contradictory conclusions. A major problem is the identification of the base period. For example, in one case, it was difficult to gauge whether 1975-76 was a better base than 1977-78. If the earlier period is a better base, the appreciation of REER indices may be regarded as a short-term phenomenon and the argument for currency depreciation is tenuous. With 1977-78 as a better base, the potential case for depreciation would be stronger.

Variations in the weights and deflators used in the construction of indices may often yield significantly different quantitative results. In one application, export competitiveness was determined using as weights 1973-75 exports by ten other exporters. The results indicated an erosion of the competitive position (from January 1973 to 1980) by 48.3 per cent. On the other hand, the relative CPI index deflated by a relative trade weighted exchange rate index of 14 major countries indicated a 27.8 per cent appreciation of the currency compared to the base period. The quantitative difference in the extent of apparent appreciation is noteworthy. In conclusion, it is appropriate to note only the approximate range for the effective past appreciation or depreciation of the exchange rate, instead of any point estimate.

1.b Biases in the exchange rate action and REER determination

The methodologies implicit in the construction of REER indices, based on the principle of restoring the underlying price competitiveness, are designed to maintain the status quo of the base period. The policy of maintaining the REER unchanged attempts to restore the base year commodity composition by restoring the competitiveness of the base year

products. This implicitly biases the outcome to an unchanged product
composition. In a changing world with deteriorating terms of trade for
many primary products over the medium-term period (as noted in various
studies on coffee, tea, rice, cocoa, etc.), the relevance of this status
quo policy may be questionable. The exchange rate policy needed to
develop new export industries may be different from past policies; it
may serve to ease the short-run and medium-term balance of payments
problem, but its long-term effects may not be desirable.

The bilateral export weighted index of nominal EER is essentially
a Laspeyre's index [Maciejewski (1982)]. This index shows (holding price
and quantity of exports constant at the base period level) how much the
value of export earnings would change in period t, due to changes in the
exchange rates of the home country and its export partners. This equiva-
lence between the bilateral weighted index of nominal EER and Laspeyre's
index helps us to understand the underlying properties and shortcomings
of the indices applied in the studies under consideration. It is well
known that Laspeyre's price index is biased downwards compared to
Paasche's or Fisher's Ideal Index if price and quantity tend to move in
the same direction over time, and that Laspeyre's index is biased upward
if price and quantities tend to go in opposite directions [see Allen
(1975) for proof and discussion]. In the construction of REER, the real
relative exchange rate (nominal exchange rate adjusted for inflation dif-
ferential) plays the role of prices, and the base year value of exports
is analytically similar to the role of quantities. Thus, for the coun-
tries in which the exchange rate adjusted for price levels (using
relative foreign-to-home price ratio) appreciates while the value of
exports increases over time, the index would be biased upward. Thus,
this index might suggest a greater exchange rate action than is actually
needed because of the underlying bias. No quantitative information
regarding the extent of this bias is available in the context of EER
indices; but studies on price indices indicate that this bias (or
deviation) could be very significant over time.

1.c Microlevel analysis and the determination of profitability

Microlevel studies on the structure of the costs of production,
competitiveness, as well as profitability of certain economic activities,
can provide necessary information on relative production incentives
underlying an exchange regime. In their various forms, the micro-
analyses may serve as indicators of external, as well as internal,
competitiveness in both relative and absolute terms.

In some applications, the microlevel analysis is based on sample
surveys, while in most other cases profitability indices are constructed
for major export categories, and also relative to importables and non-
traded goods. In the absence of export unit costs of production, index
analysis can be performed in terms of different proxies, and experience
with other applications suggests that the evaluation of export profit-
ability depends crucially on the choice of proxy for the unit cost
index.

In some economies, domestic procurement prices for export products are fixed by the monopoly trading institutions, effectively severing the relationship between the exchange rate and producer prices for exportables. The exchange rate in this case ceases to perform its traditional role of inducing resource allocation through changes in relative prices, and plays only the accounting role in determining the profits and losses of the trading agencies. To generate an adequate supply response of exportables under this kind of institutional arrangement, it may be necessary to raise the relative domestic producer prices of exportables, and the consequent loss to the trading organizations can be compensated through devaluation.

Movements in the constructed indices of NEER or REER are not necessarily similar to the movements in the profitability index, although they happen to be so in many cases. Changes in profitability are not uniform across the board for every exportable in sample survey studies. The effect depends on the variations in real prices faced by the products in the world market, changes in the domestic costs of production, implicit taxes on exportables by public trading or export agencies, and so on. In the case of one country, for example, the average effective tax on the value of output for cocoa, coffee, and palm kernels was estimated to be 52 per cent. Thus, a distinction should be made to determine the extent of reductions in profitability due to variations in REER, implicit taxes on exportables, and the general decline in the real world prices for the products. A longer-term deterioration in the terms of trade of certain primary products (i.e., the so-called weak commodities) may necessitate a speedy diversification of the export base and, in that case, simple restoration of profitability and status quo in domestic production (through exchange rate and other actions) may not be desirable.

1.d   Single commodity approach to evaluate export performance

Any significant trend in the aggregate or disaggregated competitiveness indices generally indicates changes in the average competitive position, but large deviations do not necessarily imply that a corrective measure in the form of an exchange rate action is essential. To a great extent, the spur for exchange rate action comes from the potential effects of exchange rate changes on exports and imports and consequent balance of payments repercussions. While the evaluations can be done in many ways, for many developing countries where a limited number of products account for a large proportion of export receipts, we can adopt a commodity-by-commodity approach. One such procedure has been suggested by Ridler and Yandle (1972) and Belanger (1975). Using a partial equilibrium analysis, this approach evaluates the effects of exchange rate changes on exports, based on the shifts in the supply and demand of the commodity concerned; then, aggregating the results for several commodities, this analysis allows inferences to be drawn about the net gains or losses for a country's exports as a whole. Given each suppliers' responsiveness to price changes, the export receipts of individual producers are identified. Using simple world demand and supply specifications with equilibrium conditions for products and prices,

percentage change in the value of exports for country j (ΔVX_j), measured in numeraire currency is:

$$\Delta VX_j = \Delta P(1+N_{sj}) - \Delta e_j \, \Delta N_{sj} \qquad (III-3)$$

where, ΔP represents the percentage change in world price in numeraire currency and

$$\Delta P = \frac{N_s \cdot \Delta e_x - N_d \cdot \Delta e_m}{N_s - N_d}$$

Δe_m: weighted average percentage change in importers' exchange rate

Δe_x: weighted average percentage change in exporters' exchange rate

N_d: price elasticity of world demand for imports

N_s: price elasticity of world supply of exports

Δe_j: percentage change in j-th exporters' exchange rate

N_{sj}: export supply elasticity of the j-th exporter

While this formulation captures the simultaneous variation of more than one exchange rate change by importers and exporters, an individual producing or exporting country comes out as a special case. When $e_m = 0$ and $e_x = 0$, so that importers and major exporters exchange rates are approximately unchanged, P would tend to zero. Under such circumstances, if a small country (j) increases its exchange rate (in terms of numeraire currency), this would cause the percentage change in the value of exports to be negative (due to underlying volume effect); the magnitude would be proportional to the elasticity of supply. [1]

This measure, while partial equilibrium in nature, can provide information as to what extent the changes in the value of exports are attributable to exchange rate changes; the significance of exchange rate changes compared to other variations would indicate the relative usefulness of exchange rate actions in reversing the situation.

2.a Phases of exchange regime and associated distortions

The evolution of restrictive regimes can be traced through different phases, based on the restrictive content and associated blend

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[1] Ridler and Yandle (1972) show the value effect as the sum of price ($\Delta \bar{P}$) and volume (ΔQ_j) effects, i.e., $\Delta V_X = \Delta P + \Delta Q_j$
$$= \Delta P + N_{sj} \, (\Delta P - \Delta e_j), \text{ from}$$
which follows the relationship (III-3).

of control and price instruments. Historically, it has been found that when countries face some unsustainable payments deficit, they begin to impose quantitative restrictions. Gradually, as a result of many small ad hoc decisions, rather than an overall policy design, the detailed workings of the regulations become increasingly complex. Many developing countries maintain overvalued currencies with rigid exchange controls supported by quantitative restrictions. The value and composition of imports are determined by import licensing, and the actual value of imports does not reflect the outcome of market forces. The widespread interference with market forces causes misallocation of resources and, if it persists long enough, both the static and dynamic effects could reinforce each other causing significant damage to the economy. Payments arrears may develop which strongly indicate the medium- to long-term unsustainability of the prevailing form of the exchange regime.

In some instances, the overall tax structure is biased against exports, creating an apparent case for export subsidies. Imposition of import taxes and quotas for revenue and balance of payments purposes may reduce the relative profitability of exports in various ways: (i) a reduced volume of imports tends to yield a domestic currency premium for importers; (ii) import-substituting activities are generally more profitable; and (iii) higher costs of imported or import-substituting inputs lower the profitability of the export activities in both absolute and relative terms. For specific resource allocative reasons, a case could be made for specific subsidies for exports, but these piecemeal solutions, taken together, could be detrimental to the overall efficiency of the allocation process.

One simple method of establishing a link between economic efficiency and the foreign trade regime is to examine indicators of "productivity for a possible association between levels and turning points vis-a-vis the trade regime. 1/ In another approach, economists calculate the domestic resource cost (DRC) of earning a unit of foreign exchange in alternative activities and treat these costs as an approximate index of the differential returns obtained from different activities, as observed at any point in time. In spite of some well-known difficulties in computation and interpretation, DRC and its parallel concept, the effective rate of protection (ERP), do provide a reasonable explanation for the wide variations in the social returns to different activities in the system. 2/ Both are indicative of the differences in the returns to the use of

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1/ Leith (1974) for Ghana, and Behrman (1976) for Chile found that the degree of restrictionism has been associated with the marginal output-capital ratio; investments shifted to capital-intensive sectors during the restrictionist regime. In a separate study of Israel, Michael Michaely (1975) uses Kendrick-type estimates of overall factor productivity; he notes that the period of rapid transition to price mechanism (to regulate imports and other economic activities) was marked by rapid increases in the rate of productivity.

2/ The rationale for use of ERP has been given by Corden (1966) and, for DRC, by Bruno (1972) and Kruger (1966, 1972).

domestic resources, using the often used approximation that observed unit export values measure the true opportunity costs to the society.

While the standard error of the differential rates of effective protection and DRC indicates potentially significant losses to the economy, some idea of the magnitude of the costs can be obtained by using the simple measure suggested by Johnson (1960). The welfare loss due to a distortionary tax, subsidy, or various forms of quantitative restrictions can be more comprehensively evaluated by solving multi-sector general equilibrium models [Shoven and Whalley (1972) and Whalley (1982)]. For more on Johnson's method and general equilibrium measures, see Appendix I.c.

The measures suggested above in this section indicate the degree of potential losses to the economy due to the distortionary components of the exchange and trade regime. In order to restore allocational efficiency, various reforms may be needed in the form of a currency devaluation-cum-liberalization package. Before establishing any schedule to correct various distortions, it is necessary to estimate the effective rates of protection offered to individual industries under consideration. Effective rates of protection and/or domestic resource cost should be estimated before measures to reform the protection regime are introduced.

So far, we have discussed various indicators of competitiveness; the quantitative relationships between these indicators and the volume of exports and imports can also be established. One simple approach may be to estimate econometrically the import demand and export supply functions, and simulate the effects of changes in relative prices and competitiveness under alternative scenarios. Application of the single-commodity approach detailed in III.1.d may also be useful if a limited number of tradeables account for a large proportion of total trade. There are a number of conceptual and methodological problems associated with the determination of the effects of income and prices (including the exchange rate) on exports and imports. For more on the issues related to specification (imperfect and perfect substitute modeling), choice of variables, lag structure, stimultaneity, and stability of trade relationships, see Goldstein and Khan (1982), Leamer and Stern (1970), Magee (1975), and Stern et al. (1976).

2.b Parallel exchange market

A parallel exchange market is one of the by-products of restrictionist exchange policies. The development of a parallel foreign exchange market is contingent upon unofficial supplies of foreign exchange fed by various illegal or legal sources, and corresponding demand arising out of various government regulations. The demand for illegal foreign exchange is normally fed by the supply created by

phenomena, such as "leaked" inward remittances and capital flows, and primarily by underinvoicing exports and overinvoicing imports. 1/

The focus on the parallel exchange market should be determined on the basis of its size, i.e., how much economic activity is performed through this channel. If its size is significant, a few other relevant issues should be addressed, some of which are:

(a) What detrimental effect the parallel market has on the official foreign exchange reserves, balance of payments, and the economic objectives of the government.

(b) How to interpret the parallel market rate which mostly reflects the tightness and the effectiveness of exchange control.

(c) What should be the appropriate exchange rate policy to draw resources away from the parallel market.

(d) The role of nonexchange rate policies (e.g., interest rate policy, reforms in import policy, etc.) to achieve the same objectives independently or in combination with any exchange rate action.

Although for many developing countries the parallel market could be quite sizable and potentially influential in the consideration of exchange rate policy, its overall size relative to official activities is hard to determine due to lack of reliable data. Sufficient incentives for underinvoicing exports and overinvoicing imports could potentially attract significant amounts of foreign exchange to the parallel market over time (Appendix Ia). Moreover, if the suspected and sometimes observed premium on foreign currency is significantly higher than the corresponding official rate, a significant proportion of remittances would eventually pass through the parallel market. Much of the evidence and conclusions on the level of smuggling, another potential source for generating a higher recording effect, is impressionistic. An obvious approach would be to look at the data on confiscation and, based on some expected risk of confiscation, infer the volume of smuggling.

All the verifications may suggest the significance of potential sources for fueling the activities of the parallel market, and we can draw some tentative inferences about its overall size. The detrimental effects of the parallel market on the official foreign exchange reserves,

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1/ Sometimes parallel commodity markets exist in key exportables and in selected importables. In some economies, precious minerals are exported through bordering countries, and this kind of parallel market for commodities can potentially develop, if the official procurement prices are substantially lower than the corresponding world prices.

balance of payments position, and various economic objectives of the government are well known and need not be mentioned in detail. 1/

The parallel market exchange rate generally does not represent the market clearing equilibrium rate; it reflects mostly the tightness and the effectiveness of exchange control. The equilibrium rate lies somewhere in between the parallel and official exchange rates, and a devaluation of the official rate would generally lead to an appreciation of the parallel rate. The two exchange rates are inversely related to each other, and this holds under both partial and general equilibrium frameworks [Nowak (1982)]. 2/ The parallel rate is generally more depreciated than the restriction-free rate and, thus, proper caution should be exercised in using the parallel rate as an indication of the exchange rate adjustment necessary to attain balance of payments equilibrium.

The appeal of a devaluation, if a sizable parallel market exists, is that it allows the authorities to reduce overinvoicing or underinvoicing and attract foreign exchange back to the official economy. Activities attracted out of the parallel market would be recorded as official transactions and may be significant without any change in the overall real level of economic activity. Our impression is that for many countries these unrecorded economic activities are substantial, and the tapping of them could be a strong case for exchange rate action with immediate positive effects on the recorded balance of payments and the tax base.

3.   Developments in the fiscal and monetary policies

For many economies, external payment imbalances are the result of excessive domestic demand generated through expansionary fiscal and monetary policies. Ambitious development efforts, generally in the form of extensive capital expenditure without commensurate mobilization of domestic resources, create a situation of fiscal disequilibrium with adverse implications for the balance of payments. Various indicators may be employed to determine the role that past fiscal and monetary policies could have played in creating macroeconomic imbalances. Some of these indicators are: recent developments in the overall budget deficit, patterns of expenditure and revenue, expansion of net bank credit to the public sector, increases in total liquidity, and other similar measures. The emergence of fiscal disequilibrium [Tanzi (1982)],

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1/ Revenue collected, given a tariff, would always be smaller when there is smuggling; a given revenue could be collected at a lower tariff rate in the absence of smuggling, when revenue collected by tariff is assumed to increase with increases in tariff rate. From a government's budgetary point of view, smuggling reduces the (import) tax revenue below what it would otherwise be and so reduces the amount of public good provided by the government.

2/ Nowak (1982) points out that a devaluation of the official rate contracts the parallel market but increases the exports; since this parallel rate equilibrates the demand and supply of foreign exchange, it would appreciate.

through expansionary policies of the past may be examined by looking
at the pattern of government expenditure (e.g., permanent components of
public sector expenditure and revenue). 1/

A more sophisticated quantitative analysis can be made using
appropriately specified macroeconomic models. The model should be
specified in such a way that a change in the budget deficit affects both
the private sector absorption and the current account balance, depending
on the empirically observable spending behavior of the private sector,
the financing of the budget deficit, and the stance of monetary policy.
The monetary sector can be linked to the macromodel, and this can be
done in a manner that is usuable in the context of a complete adjustment
program. In a simple illustration, the effects of budgetary adjustments
on the current account balance may be specified to be felt through their
contribution to aggregate demand, and via its effects on the supply and
demand for money. The model should contain behavioral equations deter-
mining real private sector absorptions, price level, exports, imports,
budget deficit, and demand for money. A number of identities defining
nominal income, current accounts balance and money supply, and the
equilibrium condition for money market would complete the model.

This model may also be used to perform dynamic simulations and form
the basis of various counterfactual experiments with alternative sets of
policy packages.

IV.   Forward-Looking Analysis and Determination
of Associated Policy-Mix

So far the discussion has mostly been based on developments in the
recent past. But it is well known that the adequacy of the exchange
rate level cannot be determined only on the basis of past events; what
is more important is the medium- to long-term prospect of maintaining
a given exchange rate. In this context, it is useful to draw two types
of scenarios with various degrees of analytical comprehensiveness;
first, the effects of maintaining the same exchange rate and, second,
if found inadequate, determine the effects of an x per cent change in
the exchange rate. For both the scenarios the necessary analytical steps
are similar and should emphasize the effects on the balance of payments,
the government budgetary position, income distribution, and welfare
implications. We confine ourselves to the effects on the current account
deficit by ignoring portfolio adjustments, and monetary and capital
movements.

1/   For many primary product exporting countries, temporary commodity
booms might cause a permanent increase in expenditures resulting in
future fiscal disequilibrium. Tanzi (1982) attempts to classify the
countries according to factors that caused fiscal disequilibrium by
examining the current expenditures, ordinary sources of revenues, and
capital expenditures of selected countries.

The analysis can be performed with various degrees of sophistication; a simple approach may be to rely on the traditional elasticities approach, using reduced form export supply and import demand functions. 1/ In this specification for a small open economy, the outcome mostly depends on two parameters, the export supply and import demand elasticities, and the system can be specified using some simple external sector closure rules. In the simplest form, foreign and domestic prices are exogenous or predetermined and, thus, the exchange rate depreciation changes domestic relative prices with real effects on demand and supply; export supply increases and import demand falls depending on their respective elasticities, and the trade balance improves.

When projecting the balance of payments, budgetary position, and other performance indicators, several methodological issues need to be addressed. These include: formulation of the wage-price adjustment mechanism; analysis of the supply response with the underlying reallocation of resources; and the consequent internal terms of trade effects—all of which follow an exchange rate action accompanied by appropriate demand management policies. In a general equilibrium framework, all of them should be determined simultaneously, while in a partial equilibrium analysis they are addressed sequentially. If the sequence is worked out and repeated a few more times, a significant proportion of the feedback effects can be captured and the approximation would be close to a general equilibrium formulation. These considerations should provide the background information needed to determine the three types of changes (i.e., valuation effects, recording effects, 2/ and real effects) in the balance of payments and budget analysis. Exchange rate action emphasizes the role of expenditure and resource switching between traded and non-traded goods through changes in relative prices. This expenditure switching adds an additional dimension to exchange rate policy that is not present in the demand management policies, but the lasting effects of the exchange rate action is contingent upon the commensurate fiscal and monetary restraints and, thus, requires closer quantitative examination.

1. Demand management policies

In the aggregate form, the current account balance may be defined in terms of domestic investment and savings of the private and public

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1/ Various approaches have been developed over the last few decades to measure the effect of exchange rate changes on the current accounts. Most of these can be classified under four broad categories: (i) elasticities approach; (ii) absorption approach; (iii) monetary approach to the balance of payments; and (iv) small dimensional multisector general equilibrium approach. Each of these contains some elements which are relevant for real world specifications.

2/ Activities attracted out of the parallel or black market would be recorded in official market transactions even without any change in the level of real economic activity and, thus, influence both the balance of payments and budget outcome.

sectors, i.e.:

$$CAB = (S^p - I^p) + (S^g - I^g)$$

$$= (S^p - I^p) - (G - T)$$

where CAB is the current account balance, equaling the balance in goods, services, and transfers; S and I are savings and investment, with superscripts p and g referring to the private and public sector, respectively; G is government expenditure; and T is government revenue. This is an ex post identity, and if we assume that private sector surplus (SP-IP) is "stable," any increase in the budget deficit would cause an equal deterioration in the current account balance. This relationship shows the qualitative relationship between budget deficit and trade balance; but, in any quantitative evaluation, the private sector surplus should not be treated as independent of the overall budget deficit and its financing. 1/ The composition of government expenditure is also important; an increase in government spending on traded commodities (exported or imported) causes an equivalent increase in the trade balance deficit. For the nontraded sector, the process is different--government expenditure on nontraded goods expands production in that sector, contracts traded goods industry (under a full employment situation), and, consequently, increases the deficit in the trade balance. All these indicate that for many countries, when an adjustment program is being framed, the financial operations of the government and public sector enterprises deserve close attention. 2/

Along with the requisite fiscal discipline, adjustment programs should be accompanied by domestic credit restraint. Under a fixed exchange rate regime, any attempt by the authorities to reduce a deficit or increase a surplus is facilitated by domestic credit control which releases resources to expand exports and reduce imports. A relationship can be established between domestic credit expansion and the balance of payments to show that excessive domestic credit expansion relative to the rate of growth of the demand for money will induce an overall balance of payments deficit. The transmission mechanism operates through a complex link with major variables, such as expenditure, income, domestic prices, and the demand for money [Guitian (1977)].

1/ An analytical framework for evaluating the effects of fiscal policy changes on the current account balance has been briefly discussed in Section III.3.

2/ As a part of an "expenditure reducing" policy, very often a reduction in the ratio of the overall public sector deficit to GDP is called for, which is thought to be an important operational policy step in reducing the ratio of current account to GDP. It is frequently necessary to bring the overall government deficit under control and to improve the profitability of public sector enterprises.

2. Wage-price adjustment mechanism

Devaluation has some induced effects on the country's costs and prices which tend to offset the competitive advantage achieved by the devaluation. The larger the rise in money costs and domestic prices, ceteris paribus, the smaller would be the real effect on relative prices, and the consequent improvement in the trade balance. The attractiveness of exchange rate action arises in the situation of disequilibrium with rationing, which characterizes the predevaluation scenario in most developing countries. The effects of devaluation on the price of import-ables would be different under restrictive quota and tariff barriers; for quota, the price is determined by the excess demand at home, the quantity imported being exogenous, but, with tariff, the price is deter-mined by world supply (with allowance for the tariff rate) and the quantity imported is endogenous.

One simple approach may be to use data on the structure of pro-duction and final demand to estimate primary and secondary effects on CPI and wages assuming a fixed proportional change. An alternative formulation is to focus on the wage-price interaction in terms of a simple two-equation wage and price model to determine both rounds of effects. This type of model has been used in many empirical studies of wage and price behavior, and simpler versions (with one price) have been suggested in the context of exchange rate actions by Goldstein (1974) and Bruno (1978). A variant of this model can be expressed as:

$$\dot{W}_t = a_{10} + a_{11}U_{t-1} + a_{12}\dot{P}_{t-1} \; ; \; a_{11}<0, \; a_{12}>0$$

$$\dot{Px}_t = b_{10} + b_{11}\dot{W}_{t-1} + b_{12}\dot{Q}_{t-1} + b_{13}\dot{Pm}_{t-1}; \; b_{12}<0; \; b_{11}, \; b_{13}>0$$

$$\dot{Pn}_t = b_{20} + b_{21}\dot{W}_{t-1} + b_{22}\dot{Q}_{t-1} + b_{23}\dot{Pm}_{t-1}; \; b_{22}<0; \; b_{21}, \; b_{23}>0$$

$$\dot{P}_t = \theta_1 \dot{Px}_t + \theta_2 \dot{Pn}_t + \theta_3\dot{Pm}; \; 0 \leq\theta_1, \; \theta_2, \; \theta_3 \; \leq 1; \; \sum_i \theta_i = 1$$

where W, P, U, Q, and Pm are, respectively, the indices of money wage rate, retail price, unemployment rate, labor productivity, and the price of importables; Px and Pn are the price indices of traded and nontraded goods, respectively. The variables with dots represent proportional changes from their previous value. This formulation allows for differential price effects for the exportable and nontraded goods sectors due to devaluation and the consequent wage-price effects. The effect of the exchange rate change on the price of importables (Pm) should be based on the nature of the import restrictions (quota or tariff) and should be determined simultaneously or independently. 1/ The exact formulation should vary from country to country to capture

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1/ The specification considered above is ad hoc and a more choice theoretic specification may be attempted by employing an appropriately specified set of excess demand functions.

individual characteristics and, to that effect, the above specification
should be viewed merely as an illustrative example.

Price determination is one of the most unsettled issues in
macroeconomic analysis; general equilibrium formulations, while satis-
factory for equilibrium relative prices in terms of chosen numeraires,
are not so uncontroversial about the general price level. Given these
conceptual difficulties, it is practical to use some less satisfactory
method which takes care of the wage-price interaction and has the poten-
tial to analyze the effects on resource reallocations in terms of a
two-sector model of traded and nontraded goods.

In evaluating the effects of exchange rate changes on import prices,
we should take into account the nature of the devaluation "package."
Devaluation generally involves a simultaneous trade liberalization and a
stabilization program of contractionary monetary and fiscal policy to
reduce the level of aggregate demand along with some degree of exchange
rate unification. It is noninflationary to the extent that import quotas
are effectively replaced by the depreciated exchange rate. As the dis-
tributor of foreign exchange, the monetary authorities would receive the
scarcity rents which previously accrued to the privileged importers.
Since price rationing is replacing quantitative rationing, the effects
on the final market price for the users would be partially offset.

While specifying the wage-price dynamics, we should also be aware of
several other potential factors that may cause a devaluation to affect
domestic expenditure directly, apart from the indirect effects due to
devaluation-induced changes in monetary conditions. Some of these fac-
tors which have received theoretical and empirical significance are
described below:

(i) In discussing price effects, Hirshman (1949) demonstrates
that the critical sum for trade balance improvement is lowered if a
developinging country has a trade deficit initially. 1/ Jones (1960)
points out that an initial trade deficit may even reverse the expected
impact of changes in the external terms of trade on the trade balance,
reinforcing rather than weakening the effects of devaluation. The
conditions that combine to make this happen, expressed in terms of
elasticities and marginal propensities to save and import, can be
found in Jones (1960).

(ii) Exchange rate actions generally redistribute income, which,
on occasion, may play an important role in the postdevaluation period.
Diaz (1963) notes that the devaluation of the Argentine peso in 1958
redistributed income from workers to landowners, causing a sharp reces-
sion in the following year. Finland also had a similar experience after

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1/ The critical sum refers to the familiar "Marshall-Lerner" condi-
tion which states that, for devaluation to be effective in improving the
trade balance condition, the sum of import and export demand elasticities
should be greater than unity.

its 1957 devaluation. However, under different circumstances, the redistributional effects could induce a spending boom as well.

(iii) Expectation effects may influence the short-run outcome. If devaluation is widely anticipated, expenditure would generally be higher, followed by a period of lower than normal expenditure in the post-devaluation period. However, expectation effects would only last during the period when excessive inventories are being worked off.

(iv) If there are excessive distortions in the economy, the liberalization program associated with devaluation will increase real output through more efficient resource allocation. If domestic and foreign demand do not increase to absorb the excess supply, deflationary pressures will emerge. The time dimensions required for the realization of this resource allocation effect would depend on the nature of the factors and the structure of production in the economy.

Thus, in a range of circumstances common to many developing countries, devaluation may be deflationary or could, to some extent, offset the preliminary inflationary impact. Devaluation will, of course, increase the domestic prices of imports and import-competing goods, and this is deflationary since higher money payments for imports absorb purchasing power and reduce expenditure on domestic goods. These issues, wherever relevant, should be taken into account in the formulation of the wage-price adjustment mechanism; the model described above should be appropriately adjusted to this effect.

3. Supply response and underlying resource allocation

Once the price changes are determined, the next step is to derive the expected supply response and the underlying resource allocation effects. The first step is to determine the responsiveness of factors of production to changes in the foreign exchange regime and, if sensitivity is significant, to check for any potential bottleneck in achieving the supply response due to resource immobility or nonavailability. It is generally recognized, that a major objective of any exchange rate action is to reinstate price competitiveness, which would ensure desired supply responses, i.e., a real effect, apart from the valuation and recording effects on the balance of payments and the budget. Given the economy's endowments, any policy aimed at stimulating supplies of exportables (for example) could only be effective if relative prices for products and corresponding factor rewards are adequate, and barriers against efficient resource flow are minimized. The impact on the supply of other products (e.g., nontradables) due to this resource shift should also be taken into account.

Crosssectional data can be used to determine any significant association between the variance in protection across subsectors and factor-to-factor or factor-to-output ratios. If, for example, protection is positively correlated with the capital-labor ratio, this would suggest that the structure of production might have caused capital

intensification despite the abundance of labor. This was evident in the case of Ghana by Leith (1974) and in Israel by Michaely (1975). This method might help to determine the responsiveness of factor movements to changes in the foreign exchange regime.

Using the estimates of sectoral elasticities of substitution between the various factors of production, we can determine the allocational impact of specific foreign trade regime or commercial policies. Potential bottlenecks in the availability of factors, which may jeopardize the attainment of production and export targets, can be identified and appropriate actions may be taken (either by revising the targets or by implementing allocational priorities).

However, the simple analysis of supply response based on elasticities of supplies may not be able to capture the outcome adequately. The transmission mechanism and the associated supply response based on the accepted elasticity values may yield different results under partial and general equilibrium simulations. It has been noted by Behrman (1976) in the context of Chile that, while the partial equilibrium supply responses are found to be significant, in the general equilibrium simulations, when allowance has been made for indirect effects, the final outcome may not be as significant. Thus, in the absence of general equilibrium computation, the partial equilibrium outcomes should be interpreted with due caution.

4. External terms of trade effects and exchange rate policy

The external terms of trade effects of the supply response often do not receive much attention in the evaluation of the effects of exchange rate action. An assumption of a typical small economy with no impact on world prices is implicit when the external terms of trade effects are ignored. However, for many developing countries, it has been observed that a sustained short- to medium-term downturn in export prices is one principal cause of balance of payments difficulties. Seen from a global point of view, the policy of stimulating "weak" commodities (experiencing deterioration in real prices) could turn out to be unrewarding and to some extent "immiserizing." 1/ In the case of some commodities, such as cocoa in Ghana, jute in Bangladesh, copper in Zaire and so on, one

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1/ Bhagwati (1958) notes the case of "immiserizing growth," where a country faces acute growth-induced deterioration in its terms of trade, implying a sufficiently large loss of welfare that outweighs the gain from growth. While this applies to countries with some degree of monopoly power in trade, Johnson (1967) shows that this phenomenon may arise in the case of a small country without monopoly power, if there is technical progress in a tariff-protected, import-competing industry, or if any significant increase in the supply by those countries would cause a deterioration in their terms of trade. In some instances, countries nical progress in a tariff-protected, import-competing industry, or if the factor in whose use this industry is intensive is augmented.

country does supply 1/ a significant proportion of world market supply;
are operating under an International Commodity Price Agreement (e.g.,
coffee, sugar, tin, etc.) with binding quota restrictions on sales.
These agreements, if implemented properly, make the prices firmer but
eliminate the short-term potential to increase export receipts through
price incentives in the form of a devaluation.

Devaluation would, however, be effective in other respects 2/ and
should, in the above circumstances, be accompanied by an export tax or
its equivalent to prevent accumulation of unsold stock or deterioration
in the terms of trade. It may be recalled that, in the context of immi-
serizing growth, the imposition of an optimum tariff is suggested
[Bhagwati (1958), Johnson (1967) and others] to eliminate the paradoxical
effects. However, both the Bhagwati (1958) and Johnson (1967) examples
of immiserizing growth belong to the class of cases where immiserization
is caused by the welfare-reducing distortions in the economy, and the use
of optimum tariffs or export taxes should be viewed as a second-best
solution.

5. Balance of payments projections, budgetary analysis,
   and other related issues

   a. Balance of payments

Given the derivations of price and supply responses, balance of
payments and budgetary projections can be performed taking into account
the resulting valuation, recording, and real effects. For many countries
with exchange restrictions and an overvalued currency, the recording
effect may be very significant, with important implications for the
treatment of parallel market activities (discussed in Section II.2.b).
To the extent that parallel market activity is significant but not taken
into account in the balance of payments forecasts, the results could be
significantly biased toward a deficit in the official accounting balance.

Separate projections are needed for important categories under the
balance of payments accounts with major emphasis on the performance of
exports and imports. For many developing countries, where a few major
primary products play a key role in export earnings, a commodity-by-
commodity approach (described in Section III.1.d or its variants) would
be appropriate. For imports, an aggregate approach may be used, while
for some important categories a more detailed approach may be desirable.

1/ For many countries, exports are unofficially passed through neigh-
boring countries (cocoa for Ghana, diamonds for Sierra Leone, jute for
Bangladesh), and thus a substantial recording effect may be experienced
by the individual countries without any external terms of trade effect.

2/ From a long-term point of view, diversification of the export base
can minimize the potential for terms of trade deterioration. By increas-
ing the profitability of exportables in general, devaluation can augment
the process.

On the basis of the payments and receipts of foreign exchange, along
with expected foreign grants and loans, we can determine the sustain-
ability of the balance of payments position. In this evaluation of
sustainability, we may look at the ratio of current account deficits
to GDP, the ratio of debt service payments to the receipts of foreign
exchange earnings on the basis of projected developments in foreign debt,
and other suitable indicators.

b. Budgetary analysis

The objective of this analysis is to see if the government budget
would be in a sustainable position after the exchange rate action, or
what fiscal adjustments are necessary to make it so. Since the emergence
of a relatively large budget deficit normally leads to excessive money
creation in developing countries, it is expected that adjustment programs
should contain elements to stabilize the budget deficit. If the budget
deficit is not found to be compatible with the fiscal targets specified
earlier, appropriate fiscal measures should accompany the exchange rate
action.

The revenue effects of devaluation depend on the change in the
aggregate nominal value of imports, exports and their composition—all
of which are essentially determined by the price transmission and supply
response as discussed in the context of balance of payments analysis.
Institutional arrangements, like procurement, marketing, and price con-
trol operations of the government agencies, significantly influence the
budget deficit after devaluation. Effective subsidies to the exporters
are reduced as the procurement prices of exportables can be improved;
the opposite happens if the government subsidizes the importables. The
revenue effect also depends on the prevailing or suggested tax struc-
ture, more specifically, on the proportion of import duties in specific
as opposed to ad valorem terms. An extensive analytical framework for
estimating the impact of devaluation on the central government budget
can be found in Klein (1972) and Byrne (1981). Klein analyzes the bud-
getary outcome in terms of price effects (due to changes in prices) and
income effects caused by changes in various tax bases induced by changes
in income. Price effect covers the effects of changes in imports and
exports and the duties received and subsidies paid, government receipts
from abroad, and expenditures to be made given the new set of prices.
If the government plans to maintain a certain level of real expenditure,
some additional outlays are called for, owing to higher domestic prices
as determined from the specified wage-price adjustment mechanism. Debt
servicing obligations of the government should also be evaluated at the
new exchange rate. Byrne (1981) considers the money market adjustment
in evaluating the impact of devaluation on the budget and the corres-
ponding implications for credit ceilings to attain a desired balance of
payments target. In reality, balance of payments and budgetary analysis
are interdependent systems, and, to the extent possible, should be
treated as such.

The effect of devaluation on the overall budgetary deficit and the consequent bank financing required by the public sector is not unambiguous. Depending on the direction and the magnitude of the change in the budget deficit, we can determine the fiscal implications of the hypothetical exchange rate. An appropriate exchange rate level should not only be consistent with the balance of payments sustainability, but should also be in line with the budgetary position. However, devaluation should not be treated as a means of attaining budget balance, and changes in the expenditure or tax structure may be needed to supplement the exchange rate policies.

c. Other issues

Income distribution and welfare implications of exchange rate action are two other aspects that may merit attention from policymakers. Income distribution effects help the authorities to determine the potential gainers and losers of any exchange rate or combined policy action. Although not directly relevant for sustainability of the balance of payments and government budgetary position, it reflects to what extent the social and political fabric would be strained due to the adopted policies. There have been cases where the effects on income distribution among various segments of the population have influenced the size of feasible exchange rate adjustments. In many instances, adverse redistributional effects against the low income groups are cited as a case against devaluation. While an overvalued currency through lower price levels may imply a higher real wage for labor, on the other hand, restrictive systems tend to discriminate against workers because they do not capture any of the large private gains from the distortionary nature of the system. Another possibility may be that labor productivity (and, thus, real wages) may have been lower because of protection from competitive forces. There are other relevant issues in the context of income distribution effects of exchange rate action, and no qualitative generalization is possible, a priori.

V. Conclusions

In this paper we have assembled a number of simple methods, some of which are widely used, to determine the appropriate level of the exchange rate for a developing country. Our objective has been to assemble enough evidence to generate a consensus and thereby obtain "a sustainable level" rather than "an optimum level" of the exchange rate derived from some optimizaton process. Thus, although from a theoretical point of view this sustainability approach is not as elegant as a fully specified optimization solution, it is intuitively more appealing, being more amenable to quantitative evaluation, given the scarcity of data.

Various aspects of the exchange rate issue have been considered in this paper which should be addressed in any comprehensive evaluation of the appropriateness of an exchange rate. These substantive issues are described below:

(a)   The adequacy of an exchange rate level cannot only be determined on the basis of past events; both backward- and forward-looking elements should be considered simultaneously.

(b)   Apart from various effective exchange rate indices which are widely employed in various studies, other microlevel studies on the production and cost structure, analysis of distortions stemming from restrictive policies, and their costs should be given proper attention.

(c)   The effects of exchange rate actions should be seen in conjunction with other supporting policies. As a matter of fact, analytically, any exchange rate policy can be validated by appropriate adjustments in the level of economic activity or the rate of monetary expansion. While devaluation can be effective to initiate corrective forces, it may not be able to bear the full burden of adjustment, especially if the imbalances arise from the demand side.

(d)   Consideration of underlying adjustment mechanisms that follow an exchange rate action is crucial to the outcome of any forward approach. Implicit price dynamics should be adequately specified, taking various institutional and other rigidities into account.

It should finally be emphasized that the adoption of the approaches reviewed in this paper will not lead to an unambiguous specific conclusion regarding the "right" exchange rate level. These should, however, improve the basis for judgments that will always be required of the policymakers. Economic analysis can convincingly establish that an exchange rate will have to be changed to a new level within a certain range if certain economic objectives are to be achieved. However, the choice of the precise new level will be influenced by judgments of policymakers regarding the mix of associated policies; these judgments are likely to be strongly influenced by the perceived sustainability of the adjustment strategy envisaged.

Measuring the Size and the Costs Due to the
Distortions in the Exchange Regime

1. Determining the size of the parallel market

Underinvoicing of imports may be in response to high tariffs, as
recorded by Bhagwati (1964) for Turkey, using the classic partner coun-
try trade data comparison technique. Comparing the trade flow data from
origin and destination sources and allowing for possible statistical
reasons for some discrepancies, Bhagwati concludes that significant
differences remained which could only be explained by underinvoicing of
imports. Application by Bhagwati (1964) and Naya and Morgan (1969) show
that the partner country data comparison worked reasonably well for
Turkey and Southeast Asian countries, if the "noise" from the statistical
factors discussed by Morgenstern (1950) is not excessive.

More rigorous analysis of faked invoicing can be performed follow-
ing Sheikh (1974) in the context of Pakistan. Using the partner country
comparison technique, Sheikh worked with 36 different commodities and
with partner countries that supplied over 80 per cent of Pakistan's
imports. Commodities are then divided into two groups, "restricted"
and "liberal" based on a careful examination of the incidence of import
licensing thereon. If significant underinvoicing is going on, for the
restricted categories, the home country import values should fall
significantly below the partner country export values. Sheikh also
established a relationship between underinvoicing and the classification
of a commodity in a high tariff or low tariff category. If more goods
are under the "high tariff" category, this means the system is more
prone to underinvoicing.

2. Measuring the welfare costs by Johnson's (1960) method

Johnson distinguishes between two sources of costs due to
protection. Total costs, the sum of production, and consumption costs,
as a proportion of national output, is given as:

$$C = \sum_i k_i \; T_i \; v_i + 1/2 \sum_i e_i \; (\theta_i - m_i)(T_i - \sum_j s_{ij} \; T_i \; T_j)$$

where, k_i: proportion of the excess of domestic over foreign prices
              which is not rent

$\quad T_i$: the "effective" tariff rate in domestic price at the margin

$\quad \theta_i$: proportion of expenditure on domestically produced i-th good

$\quad e_i$: proportion of expenditure on i-th good

$\quad \eta_i$: uncompensated own price elasticity of demand for i-th good

$\quad m_i$: marginal propensity to spend on i-th good

$\quad N_i$: arc elasticity of supply at the production point with tariff

$\quad s_{ij}$: proportion of substitution between i and j-th good

When imports do not completely replace domestic production,
$k_i = 1/2 \; T_i \; N_i$, where N_i is as defined above.

3. Measuring the welfare cost by a small dimensional
    multisector general equilibrium model

General equilibrium formulation of an economy is characterized by:
(i) a set of market demand functions which are the sums of individual
demands derived from utility maximization subject to budget constraint;
(ii) a description of the technological production possibilities of the
economy; (iii) endowments of the consumers; and (iv) the conditions of
equilibrium. On the production side, the technology is described by an
activity matrix or production functions exhibiting nonincreasing returns
to scale. Various policy models can be specified to analyze the welfare
costs of trade restrictions and other policy evaluations for various
countries [Feltenstein (1980) and Whalley (1982)]. The appropriately
specified models can be solved iteratively using trial and error methods
or more accurately, by using the Scarf (1973) algorithm or its variants
[Merrill (1971) and Laan and Talman (1979)]. Counterfactural equili-
brium computed for the new policy regime is compared with the benchmark
equilibria for policy appraisal.

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