Analytical Approaches
to Stabilization and
Adjustment Programs

Cadman Atta Mills
Raj Nallari
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FOREWORD

This monograph is a nontechnical introduction to the analysis of stabilization and structural adjustment programs. Its objective is to facilitate discussions of issues related to the economic reform of open economies, and is intended for students of economics or policy analysts who are familiar with basic economic concepts. It provides an analytical framework for policy formulation to assist policymakers from the developing countries in negotiating World Bank/International Monetary Fund programs. The monograph was developed for use in seminars organized by the World Bank's Economic Development Institute.

Amnon Golan
Director
Economic Development Institute
INTRODUCTION

This monograph is a nontechnical introduction to the analysis of stabilization and structural adjustment programs. Its objective is to facilitate discussions of issues related to the reform and transformation of open economies. There are three reasons why this document is important.

First, the debate over macroeconomic policy in developing countries is often confused, because familiarity with the underlying macroeconomic framework is almost always taken for granted. Second, there are many theoretical books on open economy macroeconomics as well as on macroeconomic models for developing countries. However, the financial programming model of the International Monetary Fund (IMF) and the two-gap model of the World Bank have been the most influential models of economic analysis for the developing world. With the exception of Khan et. al. (1990), there is hardly any authoritative source on the Bank-Fund analytical frameworks. Third, much of the literature on the topic is mathematical and technical, thus facilitating academic discussions among graduate students and professors of economics rather than providing a clear understanding for the policy practitioner. The policy analysts and policymakers in the developing world are in need of a less rigorous but basic analysis of the macroeconomic framework and economic models used by the international institutions. It is at such an audience that this document is targeted.

This document will provide readers with an analytical framework for policy formulation to help policymakers in developing countries to negotiate adjustment loans with the World Bank and the IMF. It will also systematically present the development community’s criticisms of
the Bank-Fund approaches to stabilization and structural adjustment. The selected critics focus their contributions to the debate on stabilization and adjustment on the theoretical underpinnings of the Bank-Fund analytical framework, the understanding of the Bretton Woods institutions of the essential characteristics of developing countries, the nature of the current economic crisis, and, closely related to this, how these economies will (and do) react to given policy stimuli.

Readers are expected to be students of economics or policy analysts familiar with basic economic concepts. However, they are expected to understand only the most basic and elementary mathematics of addition, subtraction, multiplication, division, and substitution. Every effort is made to present the most rigorous models in as simple a manner as possible, without loss of generality or analytical precision. The identities and equations have been written using simple notations. The idea is to avoid strange notation, exotic theories, or difficult mathematics of equilibrium conditions. The language and analysis are kept deliberately simple and pedagogical.

Economic Models and Policymakers

There is a symbiosis between models and policymaking. Policymakers do not live and die by economic models; they do, however, depend on models to provide information about various policy responses and tradeoffs. Economic models are developed depending on the policymakers' statements of economic problems and their policy objectives. Economic policymaking and management generally draw upon economic models or frameworks implicitly or explicitly. Similarly, in their consultations and negotiations with officials of developing countries, the World Bank and the IMF use frameworks to ascertain borrowing needs of countries, as well as to analyze the implications of various policy prescriptions and conditions on the economies in question.

These international financial institutions make little effort to share their models with the borrowing country. The alternative for policymakers in developing countries that do not have access to the Bank-Fund models—which is usually the case in Africa—is for the creditors to impose general economic principles, such as get the prices
right and the market will perform better and so on, or to impose policy prescriptions. Models not only provide the analyst with a "what is" or a baseline view of the economic situation, but also provide an idea of "what will be" if alternative policies are implemented. Thus, models facilitate discussion and debate about policies. As Fischer (1987) points out:

> The likelihood that the economy will achieve targets derived using models is of course slight. Policy mistakes or other shocks will produce deviations of outcomes from target levels. But the models enforce discipline on the analysis of adjustment, ensure the consistency of policy measures, and provide a framework in which the prospects of meeting balance of payments and growth targets can be coherently discussed. (Fischer 1987, p. 173)

Economic models are mathematical representations of economic theory. It should be emphasized, however, that there is hardly any consensus among economists about much of economic theory, statements of economic problems and policy objectives in any specific context, the essential features of any specific economy to be highlighted in a model, and, as a result, what the impact of given policies are likely to be. The reason is that economists bring to the theory their own methodology and, to the study of concrete situations, their ideological and political biases and predispositions. Economic models have the underpinnings of paradigms, which manifest themselves in differences in specification of equations and underlying assumptions (such as whether government expenditures or investment crowd in or crowd out the private sector), the direction of causality, and model closures. Model closure is the specification of binding constraints. For example, is the economy constrained by domestic savings, credit creation, or availability of foreign exchange? Is the economy at full employment or are there significant underutilized resources that can be quickly brought into production? Depending on which constraint is binding, the model yields qualitatively different results. These pitfalls need to be fully grasped.
Identification of Essential Economic Models and Concepts

With these thoughts in mind, this document presents the following information to help policymakers understand the models behind their economic systems. Chapter 2 presents national income accounts based on the United Nations System of National Accounts. The macroeconomic framework for policy analysis is presented in a matrix form, called the consistency matrix, specifying the sources and uses of funds among various sectors. The consistency matrix facilitates the definition of the standard macroeconomic concepts and the derivation of the national income identities. It also serves as the building block for the analysis of the Bank and Fund models of later chapters. Much of the policy analysis and tradeoffs between variables that often generate heated debates in discussions on structural adjustment can be explained with the help of these national income identities. The chapter ends with a brief discussion on the nonmarket activities, such as environment accounting and evaluation of unpaid household work within macroeconomics. It is suggested that the system of national accounting (SNA) may be expanded to include the hitherto excluded nonmarket activities.

Chapter 3 equips the reader with simple definitions of open economy macroeconomic concepts, which are the basis for the Bank-Fund frameworks. The reader will note that the exchange rate is a privileged instrument, especially in the Fund model, given its impact on domestic price levels, incentives for exports and imports, and its effect on the government budget through its impact on the domestic currency equivalent of a government’s foreign exchange receipts and the cost of servicing the external debt. Chapter 3, which deals with definitions of such concepts as exchange rates and measures of protection, is, therefore, equally as important as chapter 2 in understanding the Bank-Fund analytical approaches.

The Polak-Fund model, otherwise known as financial programming, which is the model used by the IMF for economic policy consultations with the developing countries, is discussed in chapter 4. The emphasis of the Fund model is on the financial variables in relation to balance of payments position and inflation.
Recently the Fund has been criticized by various factions. These critiques have been collected, collated, and presented in a paradigmatic approach to provide the reader with an understanding of the intellectual leanings and ideological predispositions of the critics. Such a presentation will help the policy analysts in developing alternative economic models for their respective countries.

Chapter 5 presents the two-gap model, called the revised minimum standard model (RMSM) of the World Bank, along with criticisms of it and its recent extensions (RMSM-X and RMSM-XX). In contrast to the Fund, the World Bank framework focuses on the supply side of the economy: savings, investment, and real growth.

Some of the identities and simple economic relationships of the earlier chapters serve as the building blocks for discussions on the possible development of alternative models, presented in chapter 6. The discussion focuses on the integration of the real and financial aspects of the earlier chapters under the heading of the Bank-Fund merged model. Furthermore, the two-gap framework is manipulated to arrive at a framework useful in estimating alternative requirements of foreign resources given a target growth rate. It is suggested that these estimates be used in negotiating a reciprocal conditionality on the lenders. Finally, a three-gap model incorporating some structural features is analyzed.

References


Macroeconomic analysis is organized around three key accounting concepts: production, income, and expenditure. These are described below.

**The Boundaries of Production**

The production of goods and services is carried out by resident economic agents such as corporate entities, unincorporated enterprises, own-account workers, producers of government services, and producers of private nonprofit services to households and to business enterprises. The boundary of production is conventionally defined to exclude further processing of goods and services in households. Thus, as useful as the domestic services provided by family members are to their own households, these are not captured in national accounting systems. However, the domestic services that one household provides to another—maid, cooking, childcare, gardening, and so on—are included in the production boundary.

**Forms of Income**

Incomes are generated through production and are in the form of wages and salaries, operating surpluses of enterprises, incomes of self-employed, and/or the imputed value of production by households for own consumption. Of course, for any economic agent, incomes received will normally also include *property income*. Property income, such as interest, dividends, royalties, and land rent, accrues to one economic agent through the use of its assets—financial, tangible assets such as land, and its intangible assets such as patents and copyrights—by another economic agent. We have
chosen not to isolate property incomes because they are paid out of the operating surpluses of enterprises and, by national income accounting convention, the operating surpluses of enterprises accrue to households. However, the letting of structures, equipment, machinery, and other goods is considered production of a service. Total rent received (or imputed) is part of the output (income) of the owner, and net rent is part of the operating surplus of the owner in his or her capacity as a producer of a service. Total rent paid by producing units is part of intermediate consumption, and a final consumption expenditure, in the case of households.

A second form of income that accrues to households is often referred to as contractual transfers of income. It includes net premiums/contributions and claims/payments in respect to life and medical insurance, pension funds, and social security. A third form of income is gifts that an economic agent may receive from another. This is normally referred to as unrequited transfer. From the point of view of an economy, however, transfers between resident economic agents cancel out each other.

The value of the services provided by financial institutions—banks, savings and loans associations, insurance companies, and so on—is included in the domestic product. Because the service charges of these institutions rarely cover the costs of providing their services, it is often necessary to impute a value for the output of these institutions. This imputed value will normally consist of two parts: (1) service charges actually paid by the clients of the financial institutions, and (2) the difference between the income received by the financial institutions on loans and investments made with the deposits/premiums they hold, and the interest/claims paid on the deposits/premiums.

The Concept of Expenditure

Types of expenditures are normally distinguished by whether the expenditures are for final consumption of nondurable and durable goods, or for investment. In most cases production and consumption (expenditure) are very distinct activities. In particular, production decisions are often made by producing units that are quite different from the units (usually households or government) where
expenditure decisions are made. In the case of subsistence production (production by households for their own use) and the production of government services, however, production and expenditure coincide. Thus, the value of government services is the same as government current expenditures on goods and services, as is the value of production by households for their own use the same as the imputed value of the consumption of own-use production.

Three Basic Macroeconomic Relationships

From the point of view of an economy or an economic agent, production, income, and expenditure (or savings) are linked by three basic relationships: production and income, income and expenditure, and savings and assets acquisition. These are explained in the following paragraphs.

For any producing unit, the value of production must be equal to the value of incomes that the unit generates. A similar argument holds for an economy: the value of domestic production must be equal to the value of incomes—excluding transfers—that are domestically generated. Domestically generated incomes, however, may accrue to resident economic agents or to foreign residents. Similarly, resident economic agents may receive factor payments from abroad. Gross domestic product less net factor payments abroad equals national income, or incomes accruing to nationals.

For any economic agent, income earned (regardless of whether the source is domestic or foreign) plus transfers received finance expenditure. Income plus transfers, however, need not be equal to expenditure. Savings, which may be positive or negative, is the balancing item. The basic relationship linking income and expenditure is, therefore, as follows: for any economic agent, income plus transfers must be equal to expenditure plus savings.

A third basic relationship links savings and assets acquisition: for an economic agent, savings plus borrowing must equal asset acquisition. Assets may be physical entities, such as land, dwellings, machinery (but excluding consumer durables), office buildings, and so on; or financial instruments, such as equity on life insurance policies and other intangible assets, for example, patents and copyrights. There is no presumption about savings or
borrowing being positive or negative. Specifically, either or both can be negative, and the relationship will still hold.

**National Income Accounting Conventions**

A first step in the preparation of national accounts is to gather data on production, income generation, and expenditure activities of an economy in question. This requires a definition of the statistical units of observation or the identification of the transactors in an economy.

Production decisions are made in business enterprises, households, and agencies of government. Incomes earned from production accrue to households, whereas expenditure decisions are made by households, enterprises (on behalf of households), and government agencies. Thus, for the production, consumption expenditure, and capital formation accounts of an economy, the relevant units of observation are enterprises, households, and government agencies. The degree of detail in delineating the statistical units of observation should be guided by the availability of data and the purpose of the study.

Financial institutions—monetary and other financial institutions—play a key role as middlemen for transactions involving the acquisition of financial assets and liabilities. Central or reserve banks issue currencies and often hold the international reserves of a country. They may also have other liabilities in the form of demand deposits of other banks and, often, the government. Other monetary institutions are commercial banks that typically have liabilities in the form of deposits payable on demand and transferable by checks. Other financial institutions include insurance companies and pension funds, building societies, saving and loan associations, private savings banks, public savings institutions, credit unions, sales-finance, hire-purchase, and other personal and business finance companies.

In principle, it is possible to present all the economic transactions of each and every economic agent in an economy. For example, in the production account of an economy, we could conceivably present the purchases of each producing unit for intermediate consumption, its value added, indirect taxes paid, and subsidies received, as well as the sales and/or own consumption of its final
product. We could also describe the economic transactions of each and every government department or household unit. For many types of economic analysis, however, such detailed presentation of transactions and transactors is rarely necessary or useful. On the contrary, the sheer detail that such accounts would provide may well obscure an understanding of the structure of the macroeconomy. More insight is invariably gained by aggregating the activities of various transactors, provided they are reasonably homogeneous in terms of the nature of economic activities that they undertake, and by consolidating or omitting certain transactions.

**Current Accounts**

Table 2.1 presents transactions in an economy in the form of a consistency accounting matrix. The first row and first column (the national accounts) depict the production account of the economy. As presented, the national accounts group the activities of all producing units together. Thus, they include the production of all incorporated enterprises (including financial institutions), unincorporated enterprises, producers of government services, and production by households, regardless of the type of good or service produced.

Across row 1 the table describes how goods and services that are currently produced or imported are disposed of: goods produced domestically (Ymp) or imported (Z) in the current production period are used for government consumption (Cg), private consumption (Cp), exports (X), and government and private investment (Ig and Ip); that is, the acquisition of physical assets as distinct from the acquisition of financial instruments.

Column 1 breaks down the value at market prices of current domestic production by identifying the type of incomes that are generated through the sale (plus own consumption) of domestic production. These incomes are in the form of net indirect taxes (that is, indirect taxes (Ti) less subsidies (Sb)) the operating surpluses of government enterprises (OSg), wages and salaries (W), the operating surplus of all other enterprises (π), and the incomes of own-account producers, such as the self-employed and peasant farmers (πs).
Table 2.1 Consistency Accounting Matrix

<table>
<thead>
<tr>
<th>SAVINGS AND BORROWING OF:</th>
<th>CURRENT ACCOUNT OF [C1]</th>
<th>[C2]</th>
<th>[C3]</th>
<th>[C4]</th>
<th>[C5]</th>
<th>[C6]</th>
<th>[C7]</th>
<th>[C8]</th>
<th>[C9]</th>
<th>[C10]</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOVERNMENT</td>
<td>Government Savings (Sg)</td>
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<tr>
<td>HOUSEHOLD (PRIVATE) SECTOR</td>
<td>Private Savings (Sp)</td>
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<tr>
<td>TOTAL SAVING</td>
<td>Government Savings (Sg)</td>
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</tr>
</tbody>
</table>

**Government Savings**

\[ Δ \text{Govt. Credit to Gov. (AVCg)} \]

**Net Δ Govt. Borrowing from P (AVTgP)\]

**Net Δ Foreign Borrowing of G (AVFTg)\]

**Government Savings plus Δ in G Borrowing**

\[ = Sg + ΔAVCg + ΔAVTgP + ΔAVFTg \]

**Δ Broad Money**

\[ = M - \text{other Lab of MS (AM)} \]

**Δ MS Domestic Liabilities**

**Household Savings**

\[ Δ \text{MS Credit to P (AVCp)} \]

**Net Δ Foreign Borrowing of P (AVFTP)\]

**Private Sector Savings plus Δ in Borrowing**

\[ = Sp + ΔAVCp + ΔAVFTP \]

**Δ International Reserve (MS) (AR)**

**Current Account Deficit plus Δ in Reserve**

\[ = CA + AR \]

**Saving plus Current Account Deficit**

\[ = Sg + Sp + CA \]

The sum of wages, salaries, the incomes of own-account producers (that is, compensation of employees, as these three items are referred to in the United Nations System of National Accounts (SNA)) and the operating surplus of all enterprises (including funds set aside for depreciation by producing units) is value added at producers’ value or at factor costs ($Y_{fc}$) as opposed to purchasers’ value or market prices ($Y_{mp}$). By convention, value added at producers’ value accrues to households (and to the government in the case of the operating surplus of government owned enterprises) even though a portion of the operating surplus might be retained by enterprises on behalf of households or the government to finance accumulation. Value added at the purchasers’ value or at market prices (that is, what purchasers actually pay for goods and services) would include net indirect taxes. Value added at purchasers’ values plus imports would then be equal to the total available goods and services for final uses.

Row 2 and column 2 of table 2.1 depict the current transactions of the government. Government is defined as all levels of government (central, district, and local) as well as public corporations funded through the government budget. The scope of activities include services provided by government ministries, departments, or agencies; the police; judiciary; defense; and so on. Across row 2 the sources of government revenue ($Y_{g}$) are identified. These are net indirect taxes ($Ti - Sb$), the operating surplus of government owned enterprises ($OS_{g}$), direct taxes ($Td$), and the net transfers that the government receives from external sources ($NT_{Reg}$). Column 2 details current government expenditures ($CEXP_{g}$); government consumption of currently produced goods and services ($C_{g}$) (that is, the cost of providing government services), net transfers to domestic households ($NTR_{gp}$), interest paid to households on the domestic debt ($INT_{gp}$), and the interest that the government pays on its external debt ($INT_{ge}$). Government savings ($S_{g}$ at the intersection of row 6 and column 2) is the difference between government revenue and expenditure.

The monetary system identified in the consistency matrix includes central or reserve banks and all commercial banks, as well as credit unions, private savings banks, and other public savings institutions.
Because, ultimately, we are only interested in the role of the monetary system as an intermediary for channeling savings from one group of transactors to another, for example, from the private sector to the government, such an aggregation makes sense. However, a study that, among other things, is concerned with how the activities of central banks affect the money supply through commercial bank regulations, such as reserve requirements, discount rate, open-market operations, and so on, would require further disaggregation.

The accounts presented in row 3 and column 3 constitute a consolidated balance sheet of the monetary system. As a pure intermediary, the monetary system has no independent (own account) current revenues and expenditures. As previously pointed out, the revenues of financial institutions (service charges, interest on loans, and earnings on investments made with deposits or premiums) less the costs (interest on deposits or claims paid) constitute the value added of institutions within the monetary system as producing units. This value added is included in the production account of the domestic economy as income to households (or to the government). Row 3 and column 3 are, therefore, empty.

Row 4 and column 4 describe the accounts of the nongovernment (private) sector. The sector is simply a grouping of all households. Across the row the sources of income of households \( (Y_p) \) are identified: wages and salaries \( (w) \), the operating surpluses of nongovernment owned enterprises \( (\pi) \), incomes from self-employment including production for own consumption \( (\pi_S) \), net transfers received from government \( (NTR_{gp}) \), interest on the government’s domestic debt \( (INT_{gp}) \), and net transfers plus net factor payments from abroad \( (NTR_{ep} + NFP_{ep}) \). Column 4 identifies how private sector income is disposed of: consumption \( (C_p) \), payment of direct taxes \( (T_d) \), and interest on the private sector’s external debt \( (INT_{pe}) \). Private savings \( (S_p) \) at the intersection of row 8 and column 4) is the item that balances the current expenditures of households \( (CEXP_p) \) and household income \( (Y_p) \). Note that property incomes paid and received by resident households do not appear as separate entries in the matrix. As pointed out above, property incomes received by resident economic agents from other resident economic agents are accounted for in the
operating surpluses of producing units. In any case, they must, of necessity, cancel each other out.

Row 5 and column 5 depict the current account balance. Entries in row 5 show the sources of income accruing to foreign residents. These are government and private sector interest on the foreign debt (INTge and INTpe) and the proceeds of the domestic economy's imports of goods and services (Z). Payments of principal on the external debt are recorded in the capital finance account—that is, below the line (see rows and columns 6 through 9)—and are thus not included in the current account. Foreign residents, in turn (column 5), purchase the exports of the economy (X) and make transfers (current as opposed to capital transfers) to the government (NTReq), as well as make transfers and net factor payments to the private sector (NTERep + NFPep). The savings of foreign residents in their dealings with the economy—identical to the current account balance (CA)—is the balancing item between current external receipts and expenditures.

Capital Accounts

Rows and columns 6 through 9 describe the financing of asset acquisition by the government, the private sector, and the external sector through the intermediary of the monetary system. In row 6 government savings (Sg) and new borrowing from the monetary system (ADCg), net direct borrowing from the private sector (ANPBg), and foreign borrowing (ANFBg) are used to finance new asset accumulation by the government (column 6). Asset accumulation is of three forms: gross fixed investments (including physical assets, inventories and working capital, as well as intangible nonfinancial assets), financial assets in the form of loans to the private sector, and the acquisition of foreign assets. The last two items have been netted out from government borrowing from the private sector and foreign borrowing by government, respectively. These items do not, therefore, appear as separate entries in the matrix.

Row 7 and column 7 deal with the monetary system, which is described above. As an intermediary it acquires liabilities in the form of new domestic currency issues, demand deposits, and other
liabilities such as treasury bills, and so on (ΔM). It, in turn, acquires assets in the form of loans to the government and the private sector (ΔDCg and ΔDCp), and net foreign assets or international reserves (ΔR).

Row 8 and column 8 deal with the private sector. Private savings (Sp), borrowing by households from the domestic monetary system (ΔDCp), and net new private borrowing from foreign residents (ΔNFBp) are used to finance private investment (Ip), net lending to the government (ΔNPBg), new issues of the domestic currency, and the change in demand deposits held by the monetary system (ΔM). Similarly, in row 9 and column 9, the savings of foreign residents (CA) plus the proceeds from the acquisition of new foreign assets (accumulation of international reserves) by the monetary system (ΔR) are used to finance the net borrowings of the government (ΔNFBg) and the private sector(ΔNFBp).

A Macroeconomic Consistency Framework: The Derivation of National Income Identities

Table 2.1 summarizes the current and capital transactions of the four transactors in an economy: government, household or the nongovernment (private) sector, the external sector, and the monetary system as an intermediary. Recalling the three basic relationships that link production with income, income and net transfers with expenditure and savings, and savings and borrowing with asset acquisition, table 2.1 can be used to demonstrate that national income identities are no more than a series of budget constraints.

**Government Savings**

From row 6 and column 6 it can be shown that:

\[ S_g + ΔD_{Cg} + ΔN_{PBg} + ΔN_{FBg} = I_g \]  \hspace{1cm} (2-1)

Equation (2-1) basically expresses the savings, borrowing, and assets acquisition relationship (or the savings constraint): government savings plus net borrowing is identical to the (physical) assets acquired by the government during the accounting period. We
recall that the government’s acquisition of foreign assets and
domestic financial assets (such as loans to, or repayments of,
principal on debt to the private sector) are netted out from foreign
borrowing and borrowing from the private sector, respectively.
Similarly, the saving constraints of the private and external sectors
can be derived, as shown in the following equations and described
in the following paragraphs.

Private Sector Savings

Row 8 and column 8 give household savings and borrowing, and
acquisition of assets by households, respectively. Equating the sum
of elements in row 8 with the sum of elements in column 8 gives:

\[ Sp + \Delta DCp + \Delta NFBp = Ip + \Delta NPBp + \Delta M \]

(2-2)

From equation (2-2) it can be seen that assets acquired by
households (with their savings and net borrowing) consist of
physical assets, currencies and demand deposits, and loans made to
the government, such as the purchase of government bonds and so
on.

Foreign Savings

Equating the sum of the entries in row 9 with the sum of entries
in column 9 shows:

\[ CA + \Delta R = \Delta NFBg + \Delta NFBp \text{ and } CA = \Delta NFBg + \Delta NFBp - \Delta R \]

(2-3)

Equation (2-3) shows that a current account deficit—in the
terminology of the consistency matrix, positive savings by the
external sector—implies a drawing down of the international assets
(reserves) or an increase in international indebtedness of the
domestic economy. Either the public or the private sector may resort
to foreign borrowing. Equation (2-3) also reveals why many
countries may have difficulties monitoring the external debt. Foreign
borrowing (assets) is contracted (acquired) by three different
economic agents: government departments, the monetary system,
and directly by the private sector. Keeping track of these—especially
the privately contracted debt, but also those of government departments in some African countries—has often proved the undoing of many debt monitoring agencies.

**Gross Domestic Product**

Gross domestic product (GDP), or the value of goods and services that are currently produced by the domestic economy, can be derived from the basic macroeconomic relationship, which states that the value of domestic production must be equal to the value of incomes that are domestically generated. In table 2.1, we could use two different approaches for estimating the gross domestic product of an economy: the expenditure approach, as the sum of purchases for final demand net of imports; and the value-added approach, as the sum of wages, operating surplus, and indirect taxes less subsidies. From row 1 and column 1 the national income identity can be derived as follows:

\[
Y_{mp} = C_g + C_p + X - Z + I_g + I_p \quad \text{or} \quad Y_{mp} = C + I + X - Z
\] (2.4a)

Equation 2.4a can be rewritten as:

\[
Y_{mp} + Z - X = C + I
\] (2.4b)

where the left side of (2.4b) is the total availability of goods of services for the domestic economy and is given by gross domestic product at market prices \(Y_{mp}\) plus imports \(Z\) less exports \(X\). The right side is domestic demand, also called domestic absorption \(A\), and is equal to consumption \(C\) plus investment \(I\). Equation (2.4b) can also be rewritten to reveal two of the guises of a trade deficit:

\[
Y_{mp} - (C + I) = (X - Z)
\] (2.4c)

\[
(Y_{mp} - C) - I = (X - Z)
\] (2.4d)

where \((C + I)\) is domestic absorption \((A)\), \((X - Z)\) the trade gap, and domestic savings \((S)\), and is given by \((Y_{mp} - C)\). Thus, a trade
deficit reveals itself in the form of an excess of domestic absorption over production, and of domestic investment over savings. Equation (2-4c) is of particular interest because it also reveals that if we assume that GDP and exports are fixed in any accounting period, then an increase (reduction) in absorption comes through an increase (reduction) in imports. These three implications can be seen from (2-4c):

\[ Y_{mp} - A = (X - Z) \]  

(2-4e)

and (2-4d) which is equivalent to:

\[ (S - I) = (X - Z) \]  

(2-4f)

where the left side is the domestic savings gap and the right side is the trade gap (see chapter 5). A more exact formulation of the savings equation is contained in row 10 and column 10 of table 2-1. Equating the sum of the entries in row 10 with the sum of the entries in column 10 shows:

\[ S_g + S_p + CA = I_g + I_p \]  

or \[ S + CA = I \]  

(2-4g)

where \( S_g \) is savings by government, \( S_p \) is private sector savings, \( CA \) is current account of the balance of payments, \( I_g \) is public investment and \( I_p \) is investment by the private sector. Domestic savings \( S \) is equal to \( S_g + S_p \) and similarly, investment \( I \) is equal to \( I_g + I_p \). The expression states that domestic investment is financed from domestic and foreign savings. In particular, if domestic savings are negative, external savings (the current account balance) will finance total domestic investment as well as the excess of consumption over domestic production. This is seen from:

\[ CA = I - S \]  

and \[ CA = I - (Y_{mp} - C) \]  

(2-4h)
The Government’s Budget Constraint

The basic relationship that must exist between the income and expenditure of any economic agent leads to the derivation of the government’s budget constraint by equating the current revenue of the government (Yg) with current government expenditure (CEXPg) plus government savings (Sg). Thus:

\[ Yg = CEXPg + Sg \]  

(2-5a)

Substituting the identical expression in equation (2-1) for Sg gives:

\[ Yg = CEXPg + Ig - (ADCg + ANPBg + ANFBg) \] thus,

\[ Yg + (ADCg + ANPBg + ANFBg) = CEXPg + Ig \]  

(2-5b)

Equation (2-5b), as should be expected, only states that government revenue plus borrowing is equal to total government expenditure (including outlays for asset acquisition). Equation (2-5b) can also be rewritten to reveal the sources of financing a government budget deficit:

\[ (Yg - CEXPg - Ig) = -(ADCg + ANPBg + ANFBg) \]  

(2-5c)

where the expression on the left side is the overall budget deficit. The sources of financing the budget deficit are, therefore, foreign borrowing and direct borrowing from the private sector (provided there is a well-developed capital market) or from the domestic monetary system. Equation (2-5c) can also be used to reveal two possible sources through which a government’s excessive borrowing can crowd out the private sector. Assuming that government borrowing from external sources is restricted in some way, for example, through an International Monetary Fund (Fund) conditionality, or problems related to creditworthiness, then crowding out can occur either through the government’s direct borrowing from the private sector or through borrowing from the monetary system. The latter, of course, assumes that there is a
ceiling on the overall credit of the monetary system, which is often the case in Fund and other antiinflationary programs. This explains why, in addition to setting overall ceilings on domestic credit, Fund programs may also have ceilings on central bank credit to the government.

The Private Sector Budget Constraint

The private sector budget constraint, similar to the government budget constraint, also states that private sector income (including transfers) equals current private expenditure \((\text{CEXP}_p)^2\) plus savings. From row 4 and column 4 of table 2.1:

\[
(W + \pi + \pi_s + \text{NTR}_g + \text{INT}_g + \text{NTRep} + \text{NFPep}) = \text{CEXP}_p + \text{Sp} \quad (2-6a)
\]

where the expression on the left side is total private sector income \([Y_p]\). Substituting the identical expression in equation \((2-6a)\) for \(\text{Sp}\) gives:

\[
Y_p = \text{CEXP}_p + I_p + \Delta \text{NPB}_g + \Delta M - (\Delta \text{DC}_p + \Delta \text{NFB}_p), \text{ thus}
\]

\[
Y_p = \text{CEXP}_p + I_p = \Delta M + \Delta \text{NPB}_g - (\Delta \text{DC}_p + \Delta \text{NFB}_p) \quad (2-6b)
\]

Equation \((2-6b)\) can also be rewritten to reveal that the private sector budget constraint states that private sector income plus borrowing less current private outlays (expenditure) equals private asset acquisition in the form of money (currency and demand deposits), fixed investment, and lending to government:

\[
Y_p + (\Delta \text{DC}_p + \Delta \text{NFB}_p) - \text{CEXP}_p = \Delta M + I_p + \Delta \text{NPB}_g \quad (2-6c)
\]

External Sector Budget Constraint

From row 5 and column 5 of table 2.1 we can derive the following identity:

\[
\text{INT}_g + \text{INT}_p + Z = X + \text{NTR}_g + \text{NTRep} + \text{NFPep} + \text{CA} \quad (2-7a)
\]
Substituting the identical expression in equation (2-3) for CA and simplifying further, we have:

\[ \text{INTge} + \text{INTpe} + Z = X + \text{NT Reg} + \text{NT Rep} + \text{NFPep} + (\Delta\text{NFBp} + \Delta\text{NFBg} - \Delta R) \]

and

\[
(Z + \text{INTge} + \text{INTpe}) - (X + \text{NT Reg} + \text{NT Rep} + \text{NFPep}) = \\
(\Delta\text{NFBp} + \Delta\text{NFBg} - \Delta R)
\]  

(2-7b)

where the expressions in brackets are, respectively, current receipts, current outlays (expenditure), and asset acquisition (negative asset acquisition, or borrowing of the domestic economy) of the external sector. The external sector budget constraint, therefore, states, as expected, that current receipts (of the external sector) less current outlays equals the assets acquisition.

Further simplifying equation (2-7b) by adding up all interest payments to the external sector, netting out the accumulation of reserves from foreign borrowing, and adding net transfers and net factor payments (receipts to the domestic economy) into exports, we have:

\[(Z - X) = (\Delta\text{NFB} - \text{INT})\]  

(2-7c)

Equation (2-7c) shows that if interest on the external debt exceeds new foreign borrowing (that is, the expression \((\Delta\text{NFB} - \text{INT})\) is negative), an economy can adjust in one of two ways or some combination of the two: reduced imports \((Z)\) or increased exports \((X)\). Note also that elements in the left side of the identity are in the form of goods and services, while the right side are in foreign exchange (currencies). In particular, imports constitute consumable or investable resource inflow, whereas exports constitute a resource outflow. This explains why it is argued that whenever interest payments on external debt exceed new borrowing (in the form of debt forgiveness, for example), a resource transfer takes place from the debtor to the creditor.
By the same token, it can be seen that capital flight, which is manifested by a dramatic rise in foreign asset holdings of the private sector (\( \Delta NFAp \)) or a fall in private external borrowing (\( \Delta NFBp \)), and the accumulation of assets (reserves) by the government (central bank) need to be financed by increased external sales of goods and services (exports), increased transfers from the external sector, or reduced consumption of goods and services from outside (imports) (see Krugman 1986). Therefore, there is an opportunity cost to holding foreign assets or reserves. This cost is in the form of foregone consumption and/or domestic investment. Depending on the rate of return on domestic investment or the level per capita consumption, the cost may not be negligible.

**Assets and Liabilities of the Monetary System**

From row 7 and column 7 of table 2.1 it can be shown that:

\[
\Delta DC_g + \Delta DC_p + \Delta R = M
\]

(2-8a)

This states that the assets of the monetary system, in the form of changes in credit to the government and the private sector and foreign assets (reserves), are identical to broad money and other liabilities of the monetary system. Rewriting the expression gives:

\[
\Delta R = M - (\Delta DC_p + \Delta DC_g)
\]

(2-8b)

Equation (2-8b) states that change in external reserves is identical to the demand for money (assuming that other liabilities of the monetary system are held constant) less the change in domestic credit. The equation also implies that if the flow demand for money is held constant, increases in domestic credit are offset by decreases in reserves on a one-to-one basis (see the Fund Model in chapter 4). Alternatively it implies that given a desired level of reserves, and with \( M \) exogenously determined, the required expansion (contraction) of domestic credit is easily solved for. Nothing in the relationship, however, implies that expansion of domestic credit (or the loss of international reserves) is necessarily a bad thing. First,
previous comments on the opportunity costs of holding international reserves (assets) are still relevant. Furthermore, equation (2-8b), like all national income identities, only expresses an accounting relation that must exist between various national income aggregates. There are no value judgments implied as to the appropriate level or value of any variable.

It has been argued that central banks can sterilize massive capital inflows (prevent capital inflows from increasing the domestic money supply) by buying foreign exchange while, at the same time, selling bonds. From equation (2-8b) it can be seen that for any given level of M, such a strategy would have the effect of increasing the reserves of the central bank while decreasing the indebtedness of the private sector to the monetary system. This is possible if there is a well-developed capital market. Otherwise, the government has to bear the brunt of sterilization by reducing its indebtedness to the monetary system. Sterilization may be necessary, because capital inflows spent on nontradables appreciate the real exchange rate by expanding the domestic money supply and thus increasing domestic price levels (see chapter 3).

Absorption and Domestic Credit

Equations (2-4d), (2-7c), and (2-8b) when combined reveal that domestic absorption will exceed available resources by the amount that domestic credit exceeds the flow demand for money. In particular, given:

\[
\begin{align*}
\text{Ymp} - A &= X - Z \\
Z - X &= (\Delta \text{NFB} - \text{INT}) - \Delta R \\
\Delta R &= \Delta M - (\Delta \text{DCp} + \Delta \text{DCg})
\end{align*}
\]

\[
(Y + \Delta \text{NFB} - \text{INT}) - A = (\Delta \text{DCg} + \Delta \text{DCp})
\]

where the expression in parentheses on the left side is resources available for domestic consumption and investment. The identity also reveals that with the expression in parentheses on the left side of equation (2–9) and the flow demand for money fixed, reductions in
domestic credit improve the balance of payments (increase reserves) by reducing domestic absorption.

**Focus on Current Government Deficit**

Much of the debate on structural adjustment focuses on the relationship between the government deficit and the external balance. From equations (2-4g) and (2-3), it can be seen that:

\[ S + CA = I \]

\[ Sg + (Sp - I) = -(\Delta NFp + \Delta NFg - \Delta R) \]  \hspace{1cm} (2-10)

The equation shows that improvement in the current external balance (the right side of the identity) can only take place if private savings rise relative to investment, or if government savings improve. This explains why it is argued (see Dornbusch and Helmers 1986) that if policies do not have the effect of improving either government or private sector savings, the external balance cannot be expected to improve.

**Modifications to National Accounts**

There are major problems in the United Nations’ System of National Accounting (SNA) as it is currently practiced. Gross national product (GNP), as defined under SNA, should, in principle, include the value of all output resulting from production. However, some output is not sold through markets and is therefore difficult to value. Furthermore, most countries, for example, include an imputed value for rent in GNP. The rationale is that houses produce services for the owners that would generate rent payments if the owner did not live in them. The flow of services from other durable consumer goods such as cars, refrigerators, television sets, and so on, however, are not similarly accounted for.

The inadequacies of the present system of SNA can be classified into three categories. First, there is the difficulty of assigning values to nonmarketed production, such as subsistence production, as mentioned above. Second, the production of certain goods and
services are invariably associated with "nuisances," such as noise, pollution, and congestion, while the production of others may be associated with benefits that are not reflected in the prices that consumers pay for them. To be complete, national accounts should be adjusted for these external economies and diseconomies. Third, in addition to the incomplete treatment of services from durable consumer goods, unpaid household work and the valuation of leisure are totally excluded in SNA. As in the case of rental income, an imputed value for unpaid household work has to be included in the measurement of GNP. A subsequent section surveys the evaluation methods that are useful in the valuation of unpaid household work.

It must be mentioned, however, that the United Nations, for some time, has been considering (in addition to the existing national accounts) the idea of creating "satellite" accounts that will contain environmental accounting and valuation of unpaid household work. This, when operational, should help countries to estimate their expanded, or modified, GNP.

**Environmental Accounting and National Accounts**

Studies on environmental accounting invariably resort to the tools of microeconomic analysis. These studies attempt to estimate the cost (benefit) of external diseconomies (economies) to society and to adjust estimates of GNP accordingly. Nordhaus and Tobin (1972) were the first to estimate a modified GNP. They estimated a measure called net economic welfare (NEW) for the United States using the following definition: \( \text{NEW} = \text{GNP} - \text{Value of external diseconomies} + \text{Value of external economies} + \text{Value of nonmarket activities} + \text{Value of leisure} \).

They concluded that the United States’ NEW was larger than its GNP. NEW, however, has grown more slowly than GNP as production of external diseconomies has grown fast, and leisure has not grown as fast as the output of goods and services. Needless to say, the NEW measure is only a rough approximation given the problems of imputing value to all the four factors to arrive at a modified GNP.
Furthermore, with the rise in environmental consciousness during the last decade or so, some economists have become increasingly dissatisfied with the traditional concepts in SNA. As Daly (1989) points out, the concepts of national product or national income, as currently measured, do not take into consideration the environmental protection costs (so-called defensive expenditures, or DE), and the degradation and depletion of natural resources or capital (DNC). Thus, GNP has to be adjusted not only for depreciation of physical capital (net national product, or NNP = GNP: capital consumption allowance), but also for the costs in these two areas. This corrected NNP would then provide for a measure of sustainable income, which is defined as the maximum amount that can be consumed in a given period without reducing the amount of possible consumption in a future period. This means that the concept (called sustainable social NNP) includes not only current income but also changes in value of the economy’s natural and environmental resources. It is not a precise concept, but serves as a practical guide to prudent policy (see Hicks 1946). Therefore,

\[
SSNPP = NNP - DE - DNC
\]

where DE is defensive expenditures and DNC is the cost of depletion of natural capital. Leipert (1985) has suggested some categories of defensive expenditures:

- DE is induced by overexploitation of environmental resources in the course of economic growth. These are costs of environmental protection activities.
- DE is due to industrialization and urban growth, such as increased commuting costs; housing and recreation costs; expenditures for protection against crime, accident, sabotage, and technical failure; and costs of repair and medical expenses due to increased automotive travel.
- DE is due to poor and unhealthy working and living conditions, such as smoking and substance abuse.
DNC can be depletion of geological (nonrenewable) resources or depletion of biological (renewable) resources. These natural resources are assets that generate flows of income over a period of time. The income lost should be reflected in GNP statistics. In other words, there should be a user cost involved in the use of natural capital. A country can spend the net income earned from the use of natural capital (receipts net of extraction costs) on present consumption or future consumption (investment), or any combination of the two. As El Serafy (1989, p.42) suggested, annual receipts from natural resources should identify a portion of the income for current consumption; the remainder should be set aside year after year as a capital element (investment) to "create a perpetual stream of income that would provide the same level of income, both during the life of the resource as well as after the resource has been exhausted." The methodology of conversion of value of assets into a flow of permanent income stream is found in Fisher (1930), Ando and Modigliani (1963), Friedman (1957), and Duesenberry (1949), among others. For economic policy it is necessary to estimate the proportion of net receipts (β) from the sales of a depletable natural resource (net of extraction cost) that can truly be called income (ψ).

For this purpose, the current value of a finite series of net receipts (β) accruing over a period of T years is first calculated. Similarly, the value of an infinite series of true income (ψ) is calculated. Following the calculations, El Serafy (1989), for example, arrives at a ratio of true income to total receipts, which is given by:

\[
\frac{\psi}{\beta} = 1 - \frac{1}{(1 + r)^{T+1}}
\]

where ψ is the true income, β the total receipts (net of extraction cost), r the social rate of discount, and T the number of periods during which the resource is to be liquidated. It is assumed here that the receipts β accrue at the beginning of each year. Thus, β − ψ is the depletion factor or user cost that should be set aside and not included in GNP. It can be seen from the expression that the larger the number of years after which the resource is expected to be exhausted
(T), or the larger the social discount rate \( r \), the more the right side of the expression approaches unity. \( \beta - \gamma \), therefore, approaches zero, implying that less capital needs to be set aside. As a result, more of the receipts can be allocated for current consumption.

Alternative methods of incorporating environmental accounting in SNA are found in the economics literature. Blades (1989), using a traditional input-output framework, shows how pollution costs can be incorporated in SNA. According to him pollution costs can be of two kinds: pollution damage costs (DC) and pollution abatement costs (PA).

Examples of pollution damage costs (DC) are expenditures for cleaning polluted water for human consumption or industrial use (in any specific industry); purchasing water filters, air filters, noise protectors; costs due to pollution related diseases, and so on. Pollution abatement costs (PA) are expenditures incurred by industry or a government agency to monitor pollution levels, pay for equipment to reduce exhaust gases from automobiles, and so on.

A slightly modified approach is to restructure the SNA into four sectors: industry, government, household, and nature, each with columns for inputs and outputs (see Bartelmus 1989). The consolidated national income accounts will then provide SSNNP, since it takes into consideration the environmental benefits and damages. Accordingly,

\[
\text{SSNNP} = \text{NNP} - \text{NEB}
\]

where NEB is net environmental benefits and is equal to environmental services (ES) less environmental damages (ED).

The new concepts and methodologies suggested above are only first steps in trying to include environment and natural resources in national accounting; they suggest ways of adjusting for shortcomings in systems of national accounting. Many empirical problems exist in the definitions, methodology, data collection, and imputing values to factors where the data are not available. Further work is necessary before a consensus can be reached on a standardized accounting procedure.
Evaluation of Unpaid Household Work

The household sector, as it has come to be known, includes unpaid household work in the form of value added in such activities as housekeeping, childcare, preparing meals, nursing the sick and elderly, vegetable gardening, do-it-yourself activities, and so on. The value of such activities does not pass through the market. However, there is a continuous interaction between the nonmarket household sector and other sectors of the market. For example, a full-time homemaker takes up employment at nominal wages and in turn pays for childcare or hires a nurse to take care of the sick. As a result, manpower is transferred from the household sector to the labor force, and production is transferred from the household sector to the market economy.

The services of housewife are similar to the situation of the farmer who consumes part of his produce. While the personal consumption of output by the farmer is accounted for in the GNP estimates, the services of the housewife are not part of the GNP. Given this anomaly in SNA, economists from time to time have put forth suggestions for evaluating the contribution of the household sector.

Following Havrylyshyn (1976) and Murphy (1980), Goldschmidt-Clermont (1982) reviews about seventy-five evaluation studies on unpaid work in industrialized countries. On the basis of this review, the value of household production is in the range of 25 to 40 percent of the GNP of the industrial countries. Based on Goldschmidt-Clermont (1982), a summary of evaluation methods used in quantification of unpaid work in the household is presented below. The point of reference is Reid's (1934) definition of household production, which is:

Household production consists of those unpaid activities which are carried on, by and for the members, which activities might be replaced by market goods or paid services, if circumstances such as income, market conditions and personal inclinations permit the service being delegated to someone outside the household group (p. 8).
Any activity that has the potential of being delegated to a paid worker is deemed productive.

Goldschmidt-Clermont (1982) categorizes the various methods into so-called “volumes” and “values” approaches. These methods are further distinguished as those measuring either inputs or outputs. Volume of inputs are generally expressed in terms of number of workers involved, number of hours, or quantities of goods consumed in the productive process. Volume of outputs are estimated in terms of goods and services produced. However, aggregation of estimates for macroeconomic policy can best be achieved by evaluations expressed in number of workers or work hours. At the micro level they illustrate the work effort in households and thus permit comparison. A shortcoming of the volume approach is that it does not clarify the mechanisms of interactions between the various sectors of the economy, market and nonmarket. This approach does not provide any clue to the efficiency of the productive process, and the accuracy of the time-use data varies a great deal between surveys.

The value approach evaluating the monetary value of household work, taking into consideration only the inputs, are based on market wages for the equivalent work, where wages of the workers performing similar functions requiring similar qualifications or skills are used to impute the value of unpaid household work.

Alternatively, wages foregone (or the opportunity cost of time) in the market by unpaid household workers are used to impute the value of unpaid work. This approach assumes that there is free substitution of labor between nonmarket and market sectors.

Evaluations of the value approach based on outputs are few and are therefore not discussed here. None of the methods discussed above provides a consistently satisfactory answer, because all of them have to rely on the accuracy of time-use data. Moreover, the purpose of evaluation varies between methods and surveys. It is therefore advisable to use a combination of methods for approximating the value of household work. As mentioned above, the United Nations has been considering expanding the national
accounts in which modified GNP will include some estimates of household activities.

**Endnotes**


2. (CEXPₚ) = Cₚ + Td + INTₚₑ.

3. Note that as in (2-7c) net foreign borrowing has been aggregated; current (net) transfers and net factor payments have been incorporated into exports. Unlike (2-7c), however, international reserves have been isolated.

4. The calculation is as follows: Let Bₜ be the net receipt accruing in year t. The present discounted value of this finite stream (PDB) is given by

\[ PDB = \sum_{t=0}^{T} \frac{\beta t}{(1+r)^t} \]

Assuming that Bₜ is constant (B₁=B₂=.....=Bₜ = B), we can derive PDB as follows:

\[ PDB = \frac{\beta}{(1+r)} \frac{1}{(1+r)^2} + \frac{\beta}{(1+r)^2} + \ldots + \frac{\beta}{(1+r)^T} \text{ and} \]

\[ PDB = \frac{\beta}{(1+r)} \frac{1}{(1+r)^3} + \frac{\beta}{(1+r)^3} + \ldots + \frac{\beta}{(1+r)^{T+1}} \text{ thus} \]

\[ PDB \left(1 - \frac{1}{(1+r)}\right) = \beta \frac{1}{(1+r)^{T+1}} \]

\[ PDB \left(1 - \frac{1}{(1+r)}\right) = \beta \left(1 - \frac{1}{(1+r)^{T+1}}\right) \]

By similar reasoning it can be shown that PDB, where V is a constant infinite stream of "true income," is given by the expression
PDV \left( \frac{r}{1+r} \right) = Y \left( \frac{1}{(1+r)^{T+1}} \right)

However, since T is infinite, the right hand side becomes simple Y. Thus

\[ \frac{PDV}{PD\beta} = Y \frac{\beta}{1} \left( 1 - \frac{1}{(1+r)T+1} \right) \quad \text{and} \]

\[ \frac{Y}{\beta} = 1 - \frac{1}{(1+r)^{T+1}} \frac{PDV}{PD\beta} \]

Normalizing the ratio PDV/PD\beta by setting its value to 1 (this is tantamount to expressing the ratio of Y to \beta in units of the ration PDV to PD\beta), the expression on the right hand side becomes:

\[ 1 - \frac{1}{(1+r)^{T+1}} \]

References


Chapter 2 presented some accounting relations that must exist between various macroeconomic variables. Much of macroeconomic analysis or model building is concerned with predicting the levels of some of the aggregates (such as national income, consumption, savings, demand for imports, and so on) on the basis of policies adopted by governments. The rate of taxation, government expenditures, interest rates, wage rates, and the exchange rate are the typical instruments that governments have at their disposal to influence economic activities. In macroeconomic analysis, variables whose levels are to be influenced or predicted are usually referred to as target (endogenous) variables, whereas the policy instruments are, not surprisingly, referred to as policy variables. In addition, truly exogenous variables may affect the analysis but may be neither policies nor targets. There is the presumption, explicit or implicit, that instrumental (and exogenous) variables have an impact on target variables in a predictable, albeit not always quantifiable, manner. Behavioral equations (equilibrium conditions, technological relations, implications of profit- and welfare-maximizing behavior, observed correlations between instruments and targets, and so on) are a means of formalizing the assumed relation between instruments and targets.

The debate on structural adjustment in developing countries has tended to focus on three key instrumental variables: exchange rates, wage rates, and government expenditures. This chapter surveys some macroeconomic concepts and theories that will be useful in understanding the debate on stabilization and structural adjustment. The following sections introduce the various definitions of the exchange rate and report on the empirical problems often
encountered in attempts to quantify them; describe the related topic of exchange rate arrangements; explain the measures that indicate the evolution of foreign versus domestic prices or costs (of which the wage rate is a crucial determinant); explore the concept of trade bias, which is the centerpiece of new trade theories; and discuss approaches to devaluation. Related concepts to the subject of this chapter, which are also discussed, are the index of effectiveness of devaluation; and a number of syndromes that are purported to be rampant in different economies, including the concept of rent seeking, the Dutch disease, the British disease, the European disease, and the Indian disease—syndromes that have become part of the vocabulary in the structural adjustment debate. The concluding section presents a brief analysis of the short-run adjustment problem in open economies using the definitions and concepts developed throughout the chapter.

**Exchange Rates**

The exchange rate is a key macroeconomic variable in discussions of economic reform. There are many ways to define an exchange rate.

*The Nominal Exchange Rate*

The simplest definition of a nominal exchange rate is the domestic currency price of a unit of foreign exchange (for example, the number of kwachas per one U.S. dollar). An alternative way is to find out how many U.S. dollars can be obtained for one kwacha (the number of U.S. dollars per one kwacha). This is the nominal exchange rate. In kwacha terms, let $E_k$ be the number of kwachas per one U.S. dollar (say 23 kwachas to the dollar), then the nominal exchange rate, which we may also refer to as the currency exchange rate, or the rate at which two currencies are exchanged for each other, is given as:

\[
NER = \frac{E_k}{\$1} = 23 
\]

(3-1a)
Alternatively, the nominal exchange rate may be expressed in units of the U.S dollar to the kwacha:

\[ \text{NER} = \frac{E_{\text{k}}}{K.1} = 0.043 \]  

(3-1b)

A currency is said to depreciate (appreciate) whenever more (less) units of the currency are required to purchase a unit of foreign exchange. In terms of the nominal exchange rate in equation (3-1a) above, therefore, higher values would signify a depreciation, while lower values would signify appreciation of the kwacha. The reverse would be the case if we had adopted the convention of expressing the nominal exchange rate on the basis of units of foreign currency per one kwacha.

The nominal exchange rate may be either officially determined and/or unofficially determined; that is, in a market that is not officially sanctioned or a parallel market. This implies that the nominal exchange rate need not be unique. In particular, two or more nominal exchange rates (for example, the official rate and the parallel market exchange rate) may coexist.

**Rates of Devaluation**

Between January and December 1982, Ghana devalued the national currency (the cedi) from 2.75 cedis to the U.S. dollar to approximately 30 cedis to the U.S. dollar. In economic articles and newspaper reports, two different rates of devaluation were often cited: 990 percent and 91 percent. The rate of change in a currency's value is given by the change in the exchange rate (in the numerator) divided by the exchange rate (in the denominator). Depending on what exchange rate is used in the denominator (the old or the new), the resulting ratio would be radically different:

\[ E_0 = 2.75 \quad E_t = 30, \text{ thus } \Delta E = E_t - E_0 = 27.25 \]

\[ \frac{\Delta E}{E_0} = 9.91 \quad \text{and} \quad \frac{\Delta E}{E_t} = 0.91 \]  

(3-2)
There are, however, semantic problems with the statement that a currency has been devalued by 100 percent (not to mention, 99 percent). This is because the word devalue is often used interchangeably with loss in value. But if a currency has lost 100 percent of its value, it must be worthless! This explains why, by convention, the new exchange rate is used in the denominator in the calculation of rates of devaluation.

*The Real Exchange Rate: Purchasing Power Parity Version*

The real exchange rate (RER), as opposed to the nominal exchange rate, attempts to measure the rate at which goods and services are exchanged between the domestic economy and the outside world. It is given by adjusting the nominal exchange rate ($E_{kS}$) to differentials in prices at home and abroad (in our example, these countries are either Malawi or Zambia and the United States). In our two-country example, the definition of the real exchange rate would be given by:

\[
RER = \frac{E_{kS}P_D}{1/P_{US}} \quad \text{or} \quad \frac{E_{kS}P_{US}}{P_D}
\]  

(3-3a)

The alternate expression using the dollars to one kwacha rate is:

\[
RER = \frac{E_{kS}P_D}{K.1/P_D} \quad \text{or} \quad \frac{E_{kS}P_D}{P_{US}}
\]  

(3-3b)

where $E_{kS}$ is the nominal exchange rate (kwachas per U.S. dollar), $E_{kS}$ is the nominal exchange rate (U.S. dollar per one kwacha), $P_D$ is the price deflator for the domestic currency (kwachas), $P_{US}$ is the price deflator for foreign currency (U.S. dollar). The deflator for domestic currency is usually the consumer price index (CPI), whereas the deflator for the U.S. dollar is usually the CPI of the United States or the world price index (WPI). Thus, the denominator is a quantity (or volume) index: it measures the quantity of goods and services that can be purchased with one dollar in the United States at U.S. prices. The numerator, on the other hand,
measures the goods and services that can be purchased in the domestic economy, given domestic prices, with the same one dollar converted at the nominal exchange rate. This confirms that the real exchange rate is an indicator of the rate at which goods (as opposed to currencies) are exchanged between countries. Depending on whether the CPIs or the WPIs are used as the price indexes for deflators, therefore, RER is the relative price of foreign to domestic consumption, or production baskets. Of course, to the extent U.S prices exclude the costs of insurance, freight, and trade taxes, the would-be arbitrator would have to take these costs into account.

Apart from the CPI, the gross domestic product (GDP) deflator and wage rate indexes (see below) are sometimes used as deflators for the domestic economy in the calculation of the real exchange rate. The GDP deflator is an index of aggregate price movements of all goods and services in the domestic economy, while the CPI measures prices of consumer goods only. According to Harberger (1986), the WPI is a good proxy for world prices (United States prices, in our example), while the domestic CPI can be used to deflate the domestic currency. Moreover, these indexes are easily available. There are problems with this approach, however, because the basket of goods included in calculating CPI or WPI in each country differs depending on the culture, income, and tastes of each society. Moreover, price controls on certain items in one country may distort the consumer price index. Also, the CPI typically includes tradables and nontradables, but strictly speaking only tradables should be included to deflate the nominal exchange rate for policy purposes. The GDP deflator is a better proxy, but the data on the GDP deflator are available only annually. Moreover, the GDP deflator contains a large number of nontradables. In spite of its shortcomings, CPI is frequently used because it is available monthly in almost all the countries.

The Real Effective Exchange Rate: Purchasing Power Parity Version

Of course, a country does not trade with one country alone (the United States, as in our example). When there are many trading partners, a trade-weighted RER has to be estimated. Let us say that
the United States has a share of two-thirds in the domestic economy's trade and that Japan has the remaining one-third. A trade-weighted RER is given by:

\[
\text{REER} = 2/3 \left( \frac{E_{kY} P_J}{P_D} \right) + 1/3 \left( \frac{E_{kY} P_J}{P_D} \right)
\]  

(3-4a)

where \( E_{kY} \) is the kwacha-yen (¥) exchange rate and \( P_J \) is the Japanese price index.

More trading partners can be included in this way, and a basket of currencies can be used in the calculations as follows:

\[
\text{REER} = \sum_{i=1}^{m} S_i \left( \frac{E_{ki} P_D}{P_i} \right) = \sum_{i=1}^{m} S_i \left( \frac{E_{ki} P_i}{P_D} \right)
\]  

(3-4b)

where \( S_i \) is the share of the \( i \)th country in the domestic economy's trade, \( E_{ki} \) is the domestic currency (kwacha, in our example) defined in terms of the \( i \)th currency exchange rate, and \( P_i \) is the price index in country \( i \). This is known as real effective exchange rate (REER), real multilateral, or real basket exchange rate. Often, the world price index (\( P_W \)) is used as a proxy for the price indexes of the trading partners. Thus:

\[
\text{REER} = \sum_{i=1}^{m} S_i \left( \frac{E_{ki} P_W}{P_D} \right) = \frac{P_W}{P_D} \sum_{i=1}^{m} S_i E_{ki}
\]  

(3-4c)

The concept of purchasing power parity (PPP) is derived from the definition of the REER. In particular, suppose that in a given period (say, \( t=0 \)), the real exchange rate for a given country is known. Over time (say, \( t=1 \)), the real exchange rate may change, either because the nominal exchange rate changes and/or the ratio of domestic prices to world prices changes. This would mean that the commodities exchange rate (or the purchasing power of the domestic currency) has changed between the two periods. A country may
wish to restore the purchasing power parity of its currency between the two periods. This is accomplished by choosing a nominal exchange rate that bears an inverse proportional relationship to the initial nominal exchange rate as the proportional change in the ratio of prices, or (if the price ratios have remained constant) by simply undoing the change in the nominal exchange rate. For example, in the two-country case, let

\[
\text{RER}^0 = \frac{E^0_k}{P^0_D} \frac{P^0_{US}}{P^0_{US}} \quad \text{and} \quad \text{RER}^1 = \frac{E^1_k}{P^1_D} \frac{P^1_{US}}{P^1_{US}}
\]

be the real exchange rates calculated at times t=0 and t=1, respectively. Suppose, further, that between the two periods the ratio of U.S. prices has changed by a factor of x, namely,

\[
\frac{P^1_{US}}{P^1_D} = (1+x) \frac{P^0_{US}}{P^0_D}
\]

Restoring the purchasing power parity between periods 0 and 1 implies equating RER\(^0\) and RER\(^1\), thus:

\[
\frac{E^0_k}{P^0_D} \frac{P^0_{US}}{P^0_{US}} = \frac{E^1_k}{P^1_D} \frac{P^1_{US}}{P^1_{US}}(1+x)
\]

The two expressions will be equal if \(E^1_k = E^0_k/(1+x)\). Thus, the new exchange rate that restores purchasing power parity will be equal to the initial exchange rate divided by the change factor in the ratio of prices.

*The Domestic Wage Index as a Measure of the Real Exchange Rate*

Another version of the RER is given by:

\[
\text{RER} = \frac{E_k}{W_D} \frac{P_{US}}{P_{US}}
\]
where \( W_D \) is the domestic wage index. This variant of the real exchange rate differs from the previous definition in as much as the domestic wage index is used as a proxy for domestic prices. However, the domestic price level is closely related to the wage index. The domestic price (cost of production) of any commodity (say, \( j \)) may be written as:

\[
P_j = W_D (L_j) = \pi_j K_j + \sum_{i=1}^{p} a_{ij} (x_{ij})
\]

where \( P_j \), \( L_j \), \( \pi_j \), \( K_j \), \( a_{ij} \), and \( x_{ij} \) are respectively the price (cost) of commodity \( j \), labor used in \( j \), the rate of return on capital and primary factors of production used in the production of \( j \), the price of the \( i \)th intermediate input, and the quantity of the \( i \)th intermediate input used in the production of one unit of \( j \). Assuming that the productivity of labor, capital, and the price of (or rate of return on) intermediate inputs (capital and primary factors of production) remain constant, and barring the substitution of one factor of production for another, the price of commodity \( j \) (thus, the general price level) will vary directly with the wage rate. In particular, a rise in the wage index leads to a rise in domestic prices, which in turn implies an appreciation of the exchange rate. The RER, as defined above, also measures the ratio of the price of the tradables (\( P_{US} \)) to domestic cost (\( W_D \)). Thus, this index measures the competitive position of domestic industries that produce tradables. This explains why in structural adjustment programs, where a main objective is to increase (or at least maintain) the level of incentives to production without provoking an appreciation of the exchange rate, the pressure to keep domestic prices (cost of production) low invariably falls on the wage rate. The wage rate index is, of course, an average index. Keeping the wage index from rising, therefore, does not mean that all wages have to be kept constant or lowered. Within a constant total wage bill some wages can be increased (decreased) as a country may see fit.

It can also be seen that the expression \( \frac{P_{US}}{W_D} \) on the right side of this variant of RER is actually the inverse of the measure of the
domestic wage in U.S. dollars. Thus, studies that rely on the domestic wage index as a proxy for domestic prices invariably also resort to the convention of expressing the exchange rate in terms of the foreign currency equivalent of one unit of the domestic currency (that is, the dollar–kwacha rate). The real exchange rate is then presented as:

$$\text{RER} = \frac{E_{sk} W_D}{P_{US}}$$

(3-10)

This way of presenting the real exchange rate has two advantages: the real exchange rate can be expressed as the product of the nominal exchange rate and the domestic wage in U.S. dollars. Furthermore, rises in the wage index and the nominal exchange rate imply an appreciation of the domestic currency; thus, it is easier to remember the effect of wages on the real exchange rate. A variation of this index (attributed to the IMF) uses unit labor costs (ULC) as a measure of competitiveness. However, this is prone to cyclical productivity changes. Therefore, the IMF uses normalized indexes of ULC, correcting for productivity changes. But such data are limited, and only one factor (labor) is considered in the analysis. Moreover, capital–labor ratios differ across countries and over time in any one country. Thus unit labor costs as a measure of competitiveness is of doubtful significance.

**The Tradable–Nontradable Real Exchange Rate**

In a small open economy (dependent economy) the rate of exchange between tradables and nontradables is sometimes calculated. Tradables, as the term suggests, refers to goods and services that can (but need not) be traded. Nontradables, on the hand, usually cannot be traded. Most services and construction fall in this category. Commodities of high bulk and low value are usually also classified as nontradable. The RER in a dependent economy is defined as the commodity exchange rate of tradables (T) to nontradables (NT) (see Dornbusch 1974, and Krueger 1978). Using the dollars to the kwacha convention, this is given by:
where $P_{BT}$ is the border price of tradables and $P_{DNT}$ is the domestic price for nontradables. As formulated by Krueger and Dornbusch, international trade taxes are ignored. The numerator of the expression in equation (3-11a) is the quantity of tradables that can be purchased at any given nominal exchange rate, whereas the denominator is nontradables that can be purchased for one unit of the domestic currency (kwacha). The RER is, therefore, the commodity exchange rate between tradables and nontradables at any given nominal exchange rate. A depreciation in the RER, implying that the RER index in (3-11a) is lower, can come about either through a depreciation in the nominal rate of exchange, a rise in the border price of tradables, and/or a fall in the domestic price of nontradables (cost of producing). A depreciation also implies that fewer tradables are exchanged for a given amount of nontradables.

An appreciation of the RER, implying a rise in RER in equation (3-11b), reflects an increase in the domestic price (cost) of producing nontradables relative to tradables, and/or an appreciation of the nominal dollar to kwacha rate. Thus, domestic producers of tradables can match these cost increases (for example, pay as much or higher wages to attract or keep the labor force from moving to the nontradable sector) only at the risk of losing international competitiveness. Maintaining competitiveness in the context of exchange rate appreciation, however, implies a squeeze on wages, profits, or both in the tradable goods sector. By the same token, keeping the real exchange rate low, for example, by keeping the cost of producing nontradables low, increases the margin of maneuver of firms producing tradables.

It can be also be seen from equation (3-12b) that a devaluation (revaluation) of the nominal exchange rate will have no effect on the real exchange rate if, and only if, the pass-through effects of a devaluation (revaluation) are equal to 100 percent. This means that
the domestic price of nontradables (the cost of producing) rise (or fall) by an identical rate as a result of a devaluation (or revaluation).

We often hear the argument that devaluations have little effect the trade balance of typical African economies, and in some cases, devaluations have the perverse impact of worsening the balance of trade, because (1) the demand for imports are inelastic and (2) African exporters have only a small share of world trade in any commodity and, in any case, these exports are denominated in foreign exchange, and the exchange rate does not affect the foreign currency price. The implications of this argument can be seen from the above discussion: Accepting the argument that import demand is inelastic because imports have, in many cases, been compressed to the barest minimum, we note that the border price of an export commodity or an import substitute \( j \) (denominated in foreign currency and accepted as unaffected by devaluation) is given by:

\[
P_j = W_D(L_j) = \pi_j K_j + \sum a_{ij} x_{ij}
\]

(3-12)

where, to simplify the argument, we assume that all intermediate inputs are imported, thus their domestic currency costs (to the producer of exports) will go up by the same proportion as the devaluation. In domestic currency terms, however, the domestic currency received by the exporter (producer of an import substitute) for exporting (producing) a unit of \( j \) (\( P_j \)) will increase by the rate of devaluation. Thus, profitability—in the domestic currency—in export- or import-substituting industries will be unaffected if, and only if, the pass-through effect of a devaluation is 100 percent, or there is zero value added in export- and import-substituting industries (that is, \( W_D(L_j) + \pi_j K_j \) is zero). In the perverse case, the argument implies that domestic value added is negative. If none of these holds true, then a further implication is that producers of exports or import substitutes do not (or cannot) increase output as a result of an increase in profitability, or the border price of exports (import substitutes)—denominated in foreign currency—falls as a result of an increase in exports (increased domestic production thus reduced demand for imports). The latter, however, contradicts the
argument that the share of African countries in the exports of a given commodity is small relative to the world trade in that commodity.

From the above discussions it is also clear that the tradable-nontradable real exchange rate has important implications for resource allocation. In particular, for a given nominal exchange rate, the ratio:

\[
\frac{P_{DNT}}{P_{DT}}
\]

where \( P_{DT}^{*} \) is the domestic price of tradables including trade taxes (subsidies), can be a useful tool for channeling resources from one sector to another. Policies to improve incentives to the producers of tradables (keep the ratio low) would include maintaining a lid on wages and other costs of production in the nontradable sector, reducing trade taxes, and increasing trade subsidies. The last two would have the effect of increasing the producer's share for any given domestic price of tradables.

To summarize, we have presented four different ways of calculating the real exchange rate—equations (3-3a), (3-4b), (3-8), and (3-11a). Of these (3-4b) is only a refinement of (3-3a). Thus, basically, there are three: the trade weighted real exchange rate, the domestic wage index, and the tradable-nontradable exchange rate. The domestic wage index exchange rate will approximate the trade-weighted exchange rate only if the domestic wage is a good proxy for domestic prices. Presumably, however, there is no reason why real exchange rate calculated according to these two definitions needs to be similar or even move in the same direction. Furthermore, to the extent that CPIs or WPIs—the indexes reflect both tradables and nontradables—are used to calculate the trade weighted real exchange rates, the tradable-nontradable exchange rate may bear no resemblance to the real effective exchange rate.

Importers' (Exporters') Real Exchange Rates

For any given nominal exchange rate the real exchange rate faced by exporters as opposed to importers may be radically different. In any real life situation an importer rarely pays the world price for
importing a particular commodity. Generally, import taxes are assessed on the imports. Using the dollars to kwacha exchange rate notation, the exchange rate faced by importers is given by:

$$RER_z = \frac{E_{k\$}}{K.1/P_D} = \frac{E_{sk}P_D}{P_w(1+t_z)}$$  \hspace{1cm} (3-14)

where $t_z$ is the average rate of taxation (tariffs) on imports (c.i.f), and $RER_z$ is the importers' exchange rate. It can be seen that an increase in the import tax rate implies a depreciation in the real exchange rate faced by importers—$RER_z$ declines. This means that for any amount of domestic currency, an importer acquires fewer imported goods (again, the expression: $E_{sk}/P_w(1+t_z)$ is no more than the quantity of imports that can be obtained for given nominal exchange and import tax rates). An opposite effect is associated with a decrease in the import tax rate.

The real exchange rate for exporters is similarly given by:

$$RER_x = \frac{E_{k\$}}{K.1/P_D} = \frac{E_{sk}(P_D)}{P_w(1+t_x)}$$  \hspace{1cm} (3-15)

where $t_x$ is the ratio of export duties over exports (f.o.b.). Thus, an increase in the export tax rate implies an appreciation of the real exchange rate faced by exporters (since $RER_x$ goes up). This means that the competitive position of exporters is being eroded.

When different exchange rates are used for different transactions, for example, for commercial and capital transactions, the exchange rate regime is referred to as a dual exchange rate regime. When different exchange rates are applied to exports and imports (or a subset), tradables, nontradables, or capital transactions, the regime is characterized as a multiple exchange rate arrangement. Ghana in 1982, Egypt in 1972 and at various times, and Venezuela in 1984 experimented with the multiple exchange rates (this is discussed in a subsequent section).

**Overvaluation and Undervaluation**

Overvaluation of the exchange rate can be due to a number of factors, but the most common causes are expansionary monetary and
fiscal policies, resulting in increased domestic demand, and terms of
trade shocks, resulting in either reduced export revenues or
increased import costs. Overvaluation, if not corrected within a year
or two, has the potential of raising expectations of a major
devaluation and, within such an environment, may lead to capital
flight. Overvaluation of the exchange rate is a cause for loss in
international competitiveness that, if not corrected or prevented from
having an impact through quantitative restrictions, import taxes, or
export subsidies, will lead to higher imports (because they are
cheaper) and lower exports (because they become more expensive).
The resulting deficit in external accounts has to be financed by
drawing down international reserves or from borrowing abroad.

On the other hand, undervaluation of the exchange rate is not
necessarily a good or a prudent policy. Undervaluation results in
trade and current account surpluses, which implies that domestic
absorption is lower than domestic production. In other words,
domestic consumption and investment are lower than the economy
can afford. Consumable or investable resources are transferred
abroad at the expense of the domestic standard of living. Lower
investment in the long run will negatively affect economic growth
and development. Undervaluation also means that real wages are
lower than they need to be while profit rates in the tradable sector are
higher than necessary for international competitiveness. Thus,
undervaluation implies a shift in income distribution to the detriment
of labor. However, undervaluation may be the only policy option for
a country that has a large external debt: the country can repay its
loans from the trade and current account surpluses.

Equilibrium Real Exchange Rate

Equilibrium real exchange rate (ERER) is a general equilibrium
concept defined as the relative price of tradables to nontradables that
simultaneously attains balance in the external sector (tradables) and
in the domestic market (nontradables) for given long-run values of
trade taxes, international prices, capital, and aid flows. The short-
run ERER may be out of line with the long-run ERER. For example,
a huge temporary transfer of funds from abroad, that is not sterilized
(see chapter 2), will temporarily appreciate the value of RER that
equilibrates the internal and external sectors. Changes in RER may occur when the fundamentals, such as terms of trade, real interest rates, import tariffs, export taxes, capital controls, and so on, change. When the RER changes, the ERER is bound to change. Only in the PPP (purchasing power parity)—see equations (3-3a) and (3-4b)—version of the exchange rate, is the ERER constant. This is because equilibrium, in this context, is defined as restoring the real exchange rate to its previous level by correcting for price changes in the interim period. The price levels, however—which are corrected, thus leaving the real exchange rate unchanged—are precisely those that are affected by the fundamentals.

When the actual RER departs from its ERER, it may be because of higher domestic inflation resulting from expansionary monetary or fiscal policies, leading to exchange rate appreciation. In this case, it is called a macroeconomic induced exchange rate misalignment. However, a country’s terms of trade may worsen, leading to a fundamental change in ERER on because the higher relative price of tradables that is required to maintain equilibrium in the economy. Unless actual RER is adjusted to reflect this change in ERER, the exchange rate will be misaligned and is called structural misalignment.

**Exchange Rate Arrangements**

There is a wide spectrum of exchange rate arrangements found in developing countries. As of September 1986, 29 percent of the developing countries (also Fund members) were pegged to the SDR (special drawing rights of the Fund) or some other currency basket, 42 percent maintained pegs to a single currency, 18 percent were on managed float, and the remaining 11 percent maintained independent floating systems (see Quirk et. al. 1987, p. 3). At one end of the spectrum is a fixed exchange rate arrangement, where a country has its exchange rate fixed against a currency (say, the U.S. dollar) and it is seldom changed. This is also known as the adjustable peg. The Francophone African countries, which continue to peg their currencies to the French franc, are a good example of this arrangement. Another arrangement is that of the optimal currency area in which the free circulation of a foreign currency is permitted,
and often there exists a fixed exchange rate between the foreign and domestic currencies. Under the crawling peg arrangement the government fixes the exchange rate on any one day, and later, at regular intervals in a preannounced move, adjusts the exchange rate taking into consideration the inflation differentials between it and its (major) trading partners. Thus, the crawling peg has some built-in flexibility. Another variation is the currency peg, in which a small country’s currency has to be pegged to the currency of a country that is its most dominant trading partner: Lesotho, whose currency is pegged to the South African rand, is a good example.

A flexible exchange rate arrangement, as the name suggests, implies that the exchange rate is allowed to fluctuate, depending on the demand and supply of foreign currencies. The degree of flexibility, however, can depend on government intervention. If there is no government intervention it is called a “clean float.” Otherwise, it is a managed float (also called a “dirty float”), because the intention of the government’s intervention is to manipulate the exchange rate to a desired target rate.

Floating exchange rate systems may be either an interbank system or an auction system, or a combination thereof. Under an interbank system the exchange rate is negotiated in a market of commercial banks and authorized foreign exchange dealers and their clients. In theory, the exchange rate is allowed to fluctuate at any time. In practice, however, maximum and minimum limits are imposed by the central bank on the commercial banks and dealers in order to prevent “cornering all the foreign exchange” by any single member or group of dealers. It also avoids commercial banks’ large exposure to exchange risk. In some countries, officials intervene in the interbank system to fix exchange rates periodically. In others, the central bank can insist that all receipts of foreign exchange (say, from exports) be surrendered to commercial banks, while in some cases part of the foreign exchange is allocated outside the interbank system because the government deems it absolutely necessary for certain sectors to have foreign exchange available. The Gambia and Zaire have an interbank system.

In the auction system export receipts are surrendered to the central bank at the prevailing exchange rate, and the central bank in turn
decides the amount of foreign exchange to be auctioned; the minimum bid that is acceptable. Usually anyone with an import license can participate in the bidding. The bids are examined and foreign exchange is allocated to all bidders above the market clearing price (that is, bids in excess of the highest bid that fully exhausts the available supply of foreign currency). The central banks also closely monitor the buying and selling margins of the commercial banks. There are two variations of the auction system. Under the Dutch auction system (Zambia is an example) each bidder whose bid is accepted must pay his or her bid price. In other words, bidders may end up paying a significantly higher price if they incorrectly assess the demand for foreign exchange. In the marginal price system, as practiced in Uganda, Nigeria, and Guinea, a single rate called the market clearing price is applicable to all bidders whose bids have been accepted.

In addition to these arrangements, authorities may establish a legal parallel market by deciding to have a dual or multiple exchange rate system. In such an arrangement, an official exchange rate is used in transactions pertaining to essential imports, important exports, and so on. All other transactions are relegated to the secondary market. The idea here is to let the secondary market float so that the authorities can get a feel for the appropriate exchange rate reflecting the free market forces, with the ultimate aim of unifying these various exchange rates. Therefore, this is a transitional measure adopted to ascertain the equilibrium exchange rate. An illegal, but tolerated, parallel market may also exist.

**Approaches to Devaluation**

Nominal devaluation is an abrupt change in the nominal exchange rate (assumes a fixed exchange rate regime). The purpose of this is to (1) improve the international competitiveness of the devaluing country, (2) generate a real devaluation, and (3) improve the current account and balance of payments position by changing the relative prices of home and foreign goods. In other words, the aim is to reduce the demand for foreign exchange by reducing the demand for imports, and to increase the supply of foreign exchange by selling more exports.
Other things remaining the same, devaluation raises the domestic currency price of imports and reduces the foreign currency price of exports (that is, it raises the domestic currency price of exports). By changing the relative prices of home and foreign goods, devaluation attempts to switch the pattern of expenditures in favor of goods and services of the devaluing country. As in all economics, however, the operative phrase is "other things remaining the same." Devaluation may increase the domestic price level, and this would not help in achieving an international competitive advantage, that is, objective (1) above. The real exchange rate may remain the same even though the nominal exchange rate has fallen. In other words, devaluation had no impact at all. Moreover, the producers may simply raise the markup on their unit costs, negating the effects of devaluation.

According to the *elasticities approach*, for the devaluation to be effective the Marshall-Lerner condition has to hold. This condition states that for a small country the sum of demand elasticities for domestic exports and demand elasticities for the country's imports has to be greater than one. If the elasticities are low (called elasticity pessimism), then devaluation is ineffective in improving the current account of the balance of payments; therefore, revaluation of the exchange rate may be effective! Empirical evidence suggests, however, that elasticities are not so low. Furthermore, there is evidence that long-run elasticities are higher than short-run elasticities. Therefore, devaluation is more likely to improve the current account in the long run than in the immediate future.

Apart from the price effects on imports and exports, the response of quantities to these price changes is also important. The response of quantities usually involves some time delay. The devaluation may worsen the terms of trade, and thus trade balance may get worse before it gets better. The slow adjustment of trade volumes to the price changes induced by devaluation gives rise to the J-curve effect. If exports are invoiced in local currency while imports are invoiced in foreign currency, the initial effect of a devaluation is to worsen the
trade balance as the value of exports in foreign currency falls, while the dollar value of imports is unchanged. This is the J-curve phenomenon. One way of escaping this effect is for the devaluing country to invoice its exports in foreign currency.

The absorption approach to devaluation states that the balance of payments position will improve if devaluation raises domestic output \( (Y) \) or reduces domestic absorption \( (A) \) [see equations (2-4c) and (2-4d)]. As mentioned above, domestic absorption equals gross domestic expenditure \( \text{(GDE)} \). According to this approach, for the devaluation to be effective expenditures should be switched and reduced. First, reducing expenditure requires that expenditures fall relative to real income. How is this possible? Devaluation raises the domestic price level, meaning lower real income; this may cause consumption to fall and savings to increase (the so-called real balance effect). The higher domestic price level also increases the nominal demand for money, leading to a rise in nominal interest rates and a fall in expenditures. Second, expenditure switching requires that expenditures move from foreign to domestic goods. If there are unutilized resources, switching expenditures will generate an increase in real income because of higher output and, hence, improvement in the current account. Thus, the effectiveness of devaluation will depend on expenditure switching and reducing.

Dornbusch (1975) has synthesized the elasticities and the absorption approaches. His approach has been important from a policy point of view, because it has led to a decision rule that is easy to remember: a devaluation is effective when elasticities are sufficiently high and when devaluation is not accompanied by expansionary monetary and fiscal policies.

The monetary approach to devaluation (see Frenkel and Johnson, 1976), as noted above, assumes PPP—and thus nominal devaluation—will have no effect on the relative prices or on the real exchange rate. Since under PPP domestic price level \( (P) \) is equal to nominal exchange rate \( (E) \) times the foreign price level \( (P^*) \), devaluation will raise the domestic prices in a one-to-one effect. The monetary approach is an open-economy version of the quantity theory of money and assumes neutrality and dichotomy between the real and monetary sides of the economy. In other words, the
monetary approach assumes that money does not influence real outputs.

**Index of Effectiveness of Devaluation**

Edwards (1988) defines the index of effectiveness of devaluation as a percentage change in real exchange rate divided by the percentage change in the nominal exchange rate during a given period. For example, if the data on nominal and real exchange rate are available quarterly, one can determine the effectiveness of nominal devaluation on real exchange rate, say, four quarters later. The underlying idea is to find out how successful a country is in keeping the RER above its pre-devaluation level. Countries following expansionary domestic credit policies and large fiscal deficits after nominal devaluation will find that there is a high erosion of the effect of devaluation. Based on twenty-eight episodes of devaluation, Edwards (1988) reports that on average a 10 percent nominal devaluation resulted in a real devaluation of about 7 percent in the first year and about 5 percent by the end of three years.

**Measures of Protection**

The nominal protection coefficient (NPC$_J$) is the ratio of the domestic market price of a commodity ($J$) and its price in the international market. It measures the extent to which the domestic price of an industry's (firm) output differs from its price of equivalent imports delivered at the country's borders (c.i.f):

\[
NPC_J = \frac{P_{DJ}}{P_{WJ}} 
\]  

(3-16)

where $P_{DJ}$ is the domestic market price and $P_{WJ}$ is the price (c.i.f) of the equivalent import. If the NPC $>$ 1, the industry is protected. The nominal rate of protection (NRP) is simply the ratio of the difference between the domestic and the world price on the one hand, and the world price on the other:

\[
NPC_J = \frac{P_{DJ} - P_{WJ}}{P_{WJ}} 
\]  

(3-17)
If NRP > 0 then the industry is protected. The price differential is due to import duties and trade restrictions. However, domestic taxes may well significantly reduce the portion of the domestic price that actually accrues to the producer. In addition, price controls may artificially suppress the domestic market price. Often, therefore, NRP at producer prices as well as NRP at shadow prices (for example, adding 50 percent to observed or regulated prices to incorporate premium) are calculated.

Some of the inputs of the domestic industry, however, may be imported and subject to import duties. Thus, the nominal rate of protection may tend to overestimate the extent of protection accorded to the industry. The effective protection coefficient (EPC) allows for this by concentrating only on the value added of the industry. This is achieved by subtracting the value of intermediate inputs from both the numerator and the denominator:

\[ EPC_J = \frac{VA_{DJ}}{VA_{WJ}} \]  

(3-18)

where VA is value added per unit of output, and is defined to include costs of land, labor, capital, and also nontraded costs, such as electricity, insurance, business services, and so on. Similar to the NRP, the effective rate of protection is defined as:

\[ ERP_J = \frac{VA_{DJ} - VA_{WJ}}{VA_{WJ}} \]  

(3-19)

**Domestic Resource Costs**

Domestic resource cost (DRC) measures the efficiency of an industry. DRCs compare the economic costs incurred in an industry and the benefits in terms of foreign exchange earned or saved by the industry. Economic costs are not necessarily the observed market prices of inputs. Rather, the true costs to society are calculated using shadow prices. The shadow prices correct for external economies and diseconomies (see chapter 2), as well as any imperfections in the factor markets by estimating their opportunity costs:
Economic costs of VA_{Dj} \\
VA \text{ at world prices} \hspace{1cm} (3-20)

If the DRC < 1 it means costs are lower than the benefits; thus, the industry is deemed efficient. Otherwise, the economy is better off importing the commodity because the costs, in foreign exchange, of producing the product domestically (the numerator) are greater than the foreign exchange saved by not importing. Gulhati (1990) assembled some indicators of efficiency in manufacturing in selected African countries; these are shown in table 3.1.

In table 3.1 it is tempting to equate the DRC with the EPC. Indeed, in conditions of pure and perfect competition and in the absence of externalities the two would be identical. However, the EPC is measured at market prices, whereas the DRC is at shadow prices. Thus, comparisons between the two, in all but the very unlikely circumstance of pure and perfect competition, are ill-advised.

**Trade Bias**

The commonly accepted price-incentives definition of trade bias (see Bhagwati 1987) is given by:

\[
\frac{\text{NEER}_X}{\text{NEER}_Z} \hspace{1cm} (3-21)
\]

where \( \text{NEER}_X \) is the effective exchange rate for the country's exports and \( \text{NEER}_Z \) is the effective exchange rate for imports. In turn, \( \text{NEER}_X \) is given by:

\[
\text{NEER}_X = \text{NER}_X (1 + \text{ratio of export subsidies to exports} (\text{f.o.b}) + \text{ratio of other incentives to exports}) \hspace{1cm} (3-22)
\]

where \( \text{NER}_X \) is the nominal exchange rate for exports. Similarly, \( \text{NEER}_Z \) is given by:
Table 3.1 Indicators of Efficiency of Manufacturing

<table>
<thead>
<tr>
<th>Country and year of study</th>
<th>Number of products in sample</th>
<th>Domestic resource cost(^1)</th>
<th>ERP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>At official exchange rate</td>
<td>At shadow prices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Range</td>
<td>Average</td>
</tr>
<tr>
<td>Zimbabwe (1981)</td>
<td>33</td>
<td>0.68–3.62</td>
<td>16</td>
</tr>
<tr>
<td>Kenya (1985)</td>
<td>106</td>
<td>0.71–6.29</td>
<td>47</td>
</tr>
<tr>
<td>Malawi (1987)</td>
<td>100</td>
<td>0.50–6.20</td>
<td>52</td>
</tr>
<tr>
<td>Mauritius (1982)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Ethiopia (1983)</td>
<td>19</td>
<td>0.36–4.37</td>
<td>6</td>
</tr>
<tr>
<td>Somalia (1985)</td>
<td>15</td>
<td>0.14–2.99</td>
<td>1</td>
</tr>
<tr>
<td>Sudan (1986)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Madagascar (1976)(^4)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Uganda (1983)</td>
<td>44</td>
<td>0.03–3.05</td>
<td>26</td>
</tr>
<tr>
<td>Zambia (1981)</td>
<td>48</td>
<td>0.47–3.02</td>
<td>17</td>
</tr>
<tr>
<td>Zaire (1985)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Tanzania (1984)(^6)</td>
<td>135</td>
<td>0.40–11.07</td>
<td>46</td>
</tr>
</tbody>
</table>

Notes: n.a. Not available

Countries are listed roughly in descending order of efficiency of their manufacturing sectors.

1. Of earning or saving one unit of foreign exchange. Calculations are based on the official exchange rate and the shadow rate (taking account of tariffs, subsidies, and the overvaluation of the official rate). The average is weighted by the share of various branches in total value added of the manufacturing sector.

2. Takes account of differentials between domestic and border prices of outputs and imported inputs. The average is weighted as in (1) above.

3. Number of products with a DRC of less than one, based on official exchange rate.

4. Protection rose substantially later in the 1970s and in the 1980s.

5. The DRC and ERP are based on official rate (window one) after a major devaluation in 1983. The DRC is based on short-run costs only.

6. The DRC and ERP are calculated at the shadow exchange rate.

where $\text{NER}_X$ is the nominal exchange rate for exports. Similarly, $\text{NEER}_Z$ is given by:

$$\text{NEER}_Z = \text{NER}_Z (1 + \text{average import tariff rate + import surcharge rate + premium on account of quantitative restrictions})$$ (3-23)

If the bias $< 1$, then the home market is more lucrative than the international market. Hence, trade is biased against exports, or it is inward oriented (IO). Import substituting (IS) strategies typically require inward orientation to be successful.

According to Bhagwati, if bias is equal to or close to one, then the economy is outward oriented (OO) or pursuing an export promoting (EP) strategy. Here, the international market is as lucrative as the home market; as such, there is no bias against exports. If bias $> 1$, then the country is deemed to be following an ultra-EP strategy. In such an environment it pays to export rather than to sell in the domestic market. This definition is based on an average of protectionist measures and incentives. Therefore, a country can have protection for some sectors, but on the whole (average) may not have an anti-export bias.

Trade bias, as defined here, is a measure of efficiency in resource allocation at a specific time (or static efficiency) in the neoclassical tradition. Chenery (1975), criticized the neoclassical view and pointed out that domestic resource allocation and trade policy have to be linked to a country's long-term strategy for industrialization and development. In Chenery's words,

During the 1960's a number of countries progressed from an initial strategy of import substitution to the promotion of manufactured exports after they had developed a sufficient industrial base to do so. As countries achieve a more diversified productive structure and reduce their concentration on a few exports, the difference between the neoclassical and structural prescriptions diminishes because some of the constraints that had previously limited growth are no longer significant. (Chenery 1975, p. 313)
A fourfold classification of trade orientation of forty-one developing countries was undertaken by Greenaway (1987). This paper formed the basis of chapter 5 of the World Bank’s *World Development Report 1987*, in which countries were classified as (1) strongly outward oriented, (2) moderately outward oriented, (3) moderately inward oriented, and (4) strongly inward oriented. This classification is similar to the concepts of trade bias defined earlier. Greenaway combined the following indicators in his classification:

- The higher the effective rate of protection, the greater the bias toward inward orientation.
- The greater the reliance on quotas and import licences to control imports, the more inward oriented.
- The more overvalued the exchange rate (relatively) the more inward oriented.
- The more export incentives are used—thus providing a distinct bias in favor of exports—the more outward oriented.

According to Greenaway’s classification, none of the Sub-Saharan African countries during 1973–85 was outward oriented. Côte d’Ivoire, Kenya, and Senegal were found to be moderately inward oriented. Ethiopia, Burundi, Ghana, Madagascar, Nigeria, Sudan, Tanzania, and Zambia were strongly inward looking during the period.

**Syndromes**

As mentioned above, the debate on policy reform and structural adjustment in developing countries has led to the introduction of a number of concepts that are now widely used. Two of these concepts are *rent seeking* and the *Dutch disease*. The reader will note, however, that the British and the European “diseases,” which are also defined here, are no more than new names for the old concept of stagflation. The Indian disease is of particular interest as
it points to the likely effects of artificially maintained low returns to capital.

Rent Seeking

The concept of rent seeking is attributed to Krueger (1974). It is closely related to the concept of the directly unproductive profit-seeking (DUP) activities of Bhagwati (1982) and the neoclassical political economy of Buchanan, Tollison, and Tullock (1980). The essence of the argument is that public policy—especially in the domain of import duties, tariffs, quotas, and licensing systems—has the potential of increasing the incomes of certain individuals and groups. These incomes accrue in the form of rents. Pressure groups, acting rationally, seek rents by spending money and using labor (lobbying) in order to get government authorities to confer upon them import licences, foreign exchange allocations, and the like.

The authorities who are in a position to decide foreign exchange allocations, administer import regimes, and confer other privileges, also have a vested interest in maintaining the system and exercising such power. In many instances, the power to decide becomes a source of supplementing the authorities’ official incomes.

The resource costs devoted to such activities is called rent seeking costs. Krueger (1974) measures that 7 percent of Indian GNP was devoted to rent seeking, and 15 percent of Turkey’s GNP went to rent seeking activities associated with the administration of the import licensing system alone. Ross (1984) estimates that 38 percent of the GDP in Kenya is directed toward such special-interest political economic activities.

Dutch Disease

Dutch disease is the name given to the phenomenon when a windfall associated with one booming sector (usually a natural resource sector) results in price increases—especially in the factor markets—and the subsequent decline in other sectors. The potential for the harmful consequences of the discovery of natural gas in the Netherlands, oil in Nigeria, the Middle East, Mexico, and Venezuela, or the dramatic rise in export prices of copper in Zambia (in the late 1960s and early 1970s), coffee and cocoa in Côte
d'Ivoire (in the late 1970s and early 1980s), sugar in Mauritius, and so on, is studied under the Dutch disease phenomenon.

One consequence of an export boom, or as van Wijnbergen (1986) showed, a huge amount of foreign aid, is a shift of labor from industry and agriculture to the booming or leading sector, resulting in upward pressure on the real wage. The potential consequences are severe structural problems and a decline in external competitiveness. The inflow of additional foreign exchange that characterizes such situations has the potential of its being spent on consumer goods and nontradables, leading to an appreciation of the real exchange rate.

The British and European Diseases

The British disease is characterized by slow growth with high inflation. This is caused when the government prevents real wage adjustments, in part because of the power of labor unions. This is in fact closely related to stagflation: a situation characterized by high unemployment along with higher inflation. In the British case, however, unemployment may not rise because of the ability of unions to prevent layoffs.

The European disease is also closely related to the British disease and stagflation. It is characterized by permanently high unemployment, coexisting with low output growth. The difference between the two diseases is that inflation is higher in the British disease.

The Indian Disease

The Indian disease is characterized by lower than world returns to capital and, over time, decreasing returns to capital. In a country affected by this syndrome labor becomes increasingly dominant as domestic capital accumulation slows to a trickle and foreign capital disappears. Production processes tend to be highly labor intensive, and technological innovations are discouraged.

Short-run Adjustment in Open Economies

Adjustment is needed whenever macroeconomic disequilibria are generated. Disequilibria may be due to exogenous shocks (such as
substantial changes in the terms of trade); natural events, such as drought, famine, or cyclones; or domestic macroeconomic policies. Terms of trade shocks can be positive or negative. Positive shocks, such as the discovery of natural resources, a boom in commodity prices, and so on, have led to expansionary fiscal policies in some developing countries (for example, Zambia in the early 1970s with copper prices, Nigeria during the oil boom, Côte d’Ivoire during the coffee boom of the late 1970s). Such cases have been studied under the Dutch disease syndrome.

A small open economy is prone to various other shocks due to its linkage with the rest of the world. A decline in remittances by migrant workers, a substantial rise in interest rates on a country’s external debt, significant devaluation by a major economic power leading to a decline in the value of assets held in currency of that country, and capital flight from the domestic economy are some of the other exogenous shocks that a small open economy can be faced with.

Macroeconomic policies leading to disequilibria are also quite common in developing countries. The now familiar pattern is that expansionary fiscal policies lead to an expansion of domestic credit, increased external borrowing (when feasible), a drawing down of international reserves, and the overvaluation of the exchange rate. To stop the loss of international reserves, trade and exchange controls are introduced. With foreign exchange in short supply at the official exchange rate, a parallel market for foreign exchange emerges. Inflation is initially kept under control by price and wage controls, but the credibility of government policies in arresting economic havoc is now in question. Expectations take over, and there is pressure on inflation and the official exchange rate.

The Macroeconomic Impact of Devaluation and Expenditure Reduction

The effects of negative external shocks or unsustainable expenditure policies need to be rectified by appropriate macroeconomic policies. The conventional approach is to reduce total expenditures (private and public consumption and investment) and to insist on a real devaluation of the exchange rate (that is, a
nominal devaluation accompanied by monetary and fiscal restraint, thus avoiding domestic price rises that would have the effect of negating the nominal devaluation). Figure 3.1 illustrates this approach. Real exchange rate is represented on the vertical axis, while gross domestic product (Y) is depicted on the horizontal axis. Line II represents the locus of equilibrium points of the internal balance (that is, the locus of equilibrium points in the goods market where the aggregate demand is equal to the aggregate supply of goods). Points to the right of YF represent situations where the gross domestic demand (expenditure) exceeds full employment output (supply), whereas points to the left of YF signify that domestic demand is less than full employment output. Line II assumes that at full employment there is internal balance. Line EE represents the external balance where the demand and supply of

Figure 3.1 Internal and External Balance
foreign exchange is in equilibrium. It is assumed that a real devaluation is expansionary; hence, a positive relationship between the real exchange rate and output exists as depicted by the EE line.

An economy in need of adjustment may be depicted at being at point A1 where gross domestic expenditure (GDE) is greater than full employment gross domestic output (YF). Per identity (2-4a) \( Y - A = X - Z \), which equates the trade balance with the internal balance; there will also be a deficit in the external account. For this economy, therefore, the purpose of adjustment would be to move to point A, which is characterized by internal and external balance. To arrive at A would in turn involve a real devaluation and a reduction in total expenditures. Paths (1) and (2), which are traced out by arrows, represent two different speeds of adjustment. The faster route (1) implies a simultaneous reduction of expenditure and a real devaluation of the exchange rate. Route (2), the slower route, relies, at least in the initial phases, only on expenditure reduction.

Most economists argue that expenditure reduction and real devaluations affect an economy through a number of linkages (see Corden 1989; Taylor and Arida 1989). First, when expenditures are reduced, there is expenditure reduction on both tradables and nontradables. Second, a devaluation raises the domestic price level, which in turn decreases the real value of assets (including money) in the domestic currency. Such a negative real balance (or wealth) effect has the potential of lowering expenditures (mainly consumption). Third, a devaluation also increases the domestic currency prices of imports (imported intermediate inputs as well as imported capital goods). This will increase the costs of production and, among other effects, result in a contraction of real output or aggregate supply. In addition, if credit to the public and private sectors is kept constant in nominal terms (by means of IMF credit ceilings, for example), investment in real terms would decline.

In addition to expenditure reduction effects, there are arguments for expenditure switching. These involve shifts in the pattern of domestic demand from tradables toward nontradables, and the pattern of domestic production from nontradables to tradables. The switch in demand from foreign goods toward domestic goods occurs as the devaluation increases the price of tradables relative to
nontradables. Indeed, expenditure switching ensures that external balance occurs as internal balance is maintained (or as excess supply of nontradables is avoided); switching compensates for the decline in the demand for nontradables due to the expenditure reduction effect of a devaluation.

Expenditure switching, however, will occur only if a nominal devaluation results in a real devaluation. As Edwards (1987) has shown, the initial effect of a nominal devaluation is a real devaluation, but over time the effects of a real devaluation are eroded. The speed of erosion depends on monetary and fiscal policies. If these policies are expansionary, the erosion is much faster.4

Other Impacts of Devaluations

Economists have advanced arguments (especially economists in international financial institutions) suggesting that devaluations also increase domestic production, thus eventually lowering domestic inflation; improve the fiscal deficit and, thus, the external balance; and improve income distribution by lowering or eliminating rents accruing to import quota holders and raising incomes of farmers as producers of tradables.

The positive effect of a devaluation on output comes about because devaluations set prices right. Prices are set "right" in two senses. There is a shift in incentives from rent-seeking activities toward directly productive activities, because devaluations, by increasing the costs of imports, lower the rents accruing to import quota holders. Within the directly productive activities the price signals favor the production of exports and import substitutes, that is, tradables. The net effect of these changes in price signals is to promote greater domestic production (increases in aggregate supply).

The effect of a devaluation on the fiscal deficit is as follows: a devaluation increases the domestic currency value of exports and imports, and if trade can be taxed by the government (either directly through ad valorem trade taxes or indirectly through government control of export marketing boards), more revenue will accrue to the government. However, a devaluation will increase the local currency
value of the government's external debt service payments as well as the domestic currency costs of government imports. The net effect of a devaluation on the government budget (usually assumed to be positive because of the importance of trade taxes in the revenues of a typical developing country) is a closing of the fiscal deficit and, thus, an improvement in the current account position.

In addition to the effect of a devaluation on incomes from rent seeking activities, devaluations affect the income distribution through the change in relative prices. For example, as devaluations change relative prices in favor of tradables, producers of nontradables will lose (as profits in these activities will shrink) while profits (incomes) of tradables will increase. Specifically, exporters and producers of import substitutes will gain as importers and producers of nontradables will lose. Assuming that exports are predominantly agricultural products, producers (and exporters) of agricultural products will gain. Urban workers (private and public) will lose, owing to higher import prices of consumer goods. Real wages of public sector employees may fall because of cuts in government expenditures and because public sector wages may not be indexed. The poor may lose, however, if there are cuts in government subsidies, and if the poor are not producers of tradables.

Alternatives to Devaluations and Expenditure Reductions

The above arguments assume that the Marshall-Lerner conditions (namely, that the elasticities are large enough) hold and that devaluations are indeed politically and administratively feasible. There may be countries (such as the CFA zone countries), however, where exchange rate changes may be precluded as a result of a specific exchange rate arrangement that they have adopted.

The alternative to devaluation and expenditure reduction policies is government control of wages and prices (that is, an incomes policy) accompanied by a simultaneous imposition of import tariffs and export subsidies. While import tariffs increase the price of imports and thus discourage imports, export subsidies provide incentives to exporters. The difference between a devaluation and the import tariffs/export subsidies approach is that a devaluation affects
both goods and non-factor services (including remittances, and so on) while tariffs and subsidies affect only goods. In addition, tariffs and subsidies have a direct budgetary impact: government revenues rise with a rise in import taxes and diminish with a rise in export subsidies, while the effect of devaluations on government revenues is more indirect.

While devaluations may be politically sensitive, tariffs and subsidies invariably result in rent seeking activities and pressures from various interest groups. In particular, producers of import substitutes will lobby for higher tariffs (in direct opposition to the interests of consumers), while exporters will lobby for higher subsidies. In some instances countries that avoid across-the-board devaluations resort to the use of multiple exchange rates (MER). In essence, multiple exchange rates amount to a semi-devaluation, because, at least for some transactions, more domestic currency is required (is obtained) to purchase (for the sale) a unit of foreign exchange. Resorting to multiple exchange rates, however, is, at best, to be recommended as a good transitional policy, because multiple exchange rates discriminate between sectors and would ultimately distort the economy.

Endnotes

1. This formulation of the problem basically assumes away the demand elasticities issue by fixing the elasticity of demand for imports at zero and by making the elasticity of demand for exports irrelevant through the assumption of fixed export prices. Improvements in the trade balance can, therefore, only come about through a positive export supply response. For a treatment of the impact of demand elasticities on the trade balance see the Marshall-Lerner conditions, which are derived in the next endnote.

2. To derive the Marshall-Lerner conditions in a simple manner, four assumptions are made: (1) neither exports (X), imports (Z), the price of exports denominated in foreign currency, nor the price of imports in the domestic currency are zero; (2) the change in exchange rate affects export and import prices; (3) the change in exchange rate adjustment is marginal, thus the resulting affect on prices will also be marginal; and (4) the supply of exports is infinitely elastic. In particular, a devaluation will lead to a drop in export prices and an increase in the domestic currency price of imports, while a revaluation will have the opposite effect. The implication of this assumption is that producers of
exports will not increase the domestic currency price of their exports by the full amount of the devaluation (that is, the pass-through effect of the devaluation is not 100 percent).

We define the balance of trade as:

\[ BT = X - Z, \] where \( X \) and \( Z \) are exports and imports, respectively. It follows that

\[ \Delta BT = \Delta X - \Delta Z. \]

But \( X \) and \( Z \) (since they are the products of prices and quantities) will only change as a result of changes in the prices and/or quantities of exports and imports. In particular:

\[ \Delta X = \Delta P_X Q_X + P_X \Delta Q_X + \Delta P_X \Delta Q_X, \]

where \( \Delta P_X \Delta Q_X \) can be ignored given the assumption that \( \Delta P_X \) is marginal. Thus:

\[ \frac{\Delta X}{\Delta P_X Q_X} = \frac{\Delta P_X Q_X}{\Delta P_X Q_X} + \frac{P_X \Delta Q_X}{\Delta P_X Q_X} = 1 - \varepsilon_X. \]

It can similarly be shown that

\[ \frac{\Delta Z}{\Delta P_Z Q_Z} = 1 - \varepsilon_Z. \]

Therefore,

\[ \Delta BT = \Delta P_X Q_X (1 - \varepsilon_X) \quad \text{and} \quad \Delta BT = \frac{\Delta P_X}{P_X} X (1 - \varepsilon_X) - \frac{\Delta P_Z}{P_Z} Z (1 - \varepsilon_Z). \]

An improvement in the balance of trade implies that \( \Delta BT = 0 \). This means

\[ (1 - \varepsilon_X) > \frac{\Delta P_Z P_Z}{P_Z \Delta P_X} \left( \frac{Z}{X} \right) \left( 1 - \varepsilon_X \right) > 0 \quad \text{and} \quad (1 - \varepsilon_X) > \frac{\Delta P_Z P_Z}{P_Z \Delta P_X} \left( \frac{Z}{X} \right) \left( 1 - \varepsilon_Z \right). \]

It can be seen that the expression

\[ \frac{\Delta P_Z P_Z}{P_Z \Delta P_X} \left( \frac{Z}{X} \right) = c < 0, \] since all the variables (except \( \Delta P_X \) and \( \Delta P_Z \)) are strictly positive, and, by assumption, \( \Delta P_X \) and \( \Delta P_Z \) are of opposite signs. (Note that \( P_X, \Delta P_X \) and/or \( X = 0 \), means that \( c \) is undefined, while \( \Delta P_Z, P_X \) and/or \( Z = 0 \) means that the inverse of \( c \) is equally undefined. This explains the assumption that all the variables are nonzero.) Therefore,
\[(1-\varepsilon_x) > (-c)(\varepsilon_z - 1)\] where we note that \((-c)\) is clearly positive.

Now, it can be seen that:

a. \((\varepsilon_z - 1) < 0\) implies that \(\varepsilon_z < 1\) and \(\varepsilon_z < 1\) and since, by definition \(\varepsilon_z \geq 0, (\varepsilon_z + \varepsilon_x) > 1\)

b. \((\varepsilon_z - 1) < 0\) implies that \(\varepsilon_z > 1\) and \(\varepsilon_z < 1\) and since, by definition \(\varepsilon_x \geq 0, (\varepsilon_z + \varepsilon_x) > 1\)

c. \((\varepsilon_z - 1) = 0\) implies that \(\varepsilon_z = 1\) and \(\varepsilon_x < 1\) and since, by definition \(\varepsilon_x \geq 0, (\varepsilon_z + \varepsilon_x) \geq 1\)

We note, however, in c) if the equality holds, it implies that \(\Delta BT = 0\), thus for all the possible signs that \((\varepsilon_z - 1)\) can adopt, the condition for the balance of trade to improve is that the sum of the demand elasticities of imports and exports should exceed unity. This is the Marshall-Lerner condition.

3. There is no a priori reason for this assumption. In fact, line EE may be negatively sloped if devaluations are contractionary, as is suggested by some authors. Furthermore, there is no a priori reason for the EE line to intersect the II line at full employment.

4. As an illustration of this point, consider the impact of expansionary policies on wages and prices. A devaluation, by increasing the price of imports, raises the general price level in the domestic economy and reduces real wages, leading to pressures for nominal wage increases. If fiscal policies are accommodating (or if nominal wages are indexed to the rate of inflation), wages and the price of domestic goods will also rise. But a real devaluation will not occur if wages rise proportionately with import prices and prices of consumer goods.

References


One of the objectives of the International Monetary Fund is to facilitate the expansion and balanced growth of international trade in order to promote economic prosperity for all countries. This, according to the Fund’s original mandate, is to be achieved by establishing convertibility among currencies, maintaining stability in exchange rates, and removing barriers to trade and investment (Nowzad 1981, p.4). The Fund closely monitors the balance of payments and the rates of inflation—both nominal variables—in member countries.

The analytical framework of the IMF focuses on the short term. It uses a flow of funds methodology to determine a sustainable balance of payments position while ensuring price stability. Domestic credit ceilings and changes in the exchange rate are the key instruments on which the Fund focuses; these are described in the following section. The process by which the Fund achieves the desired targets through use of policy instruments (called financial programming) is also discussed in this chapter. The Fund approach has been widely criticized as not being oriented toward the economic development of developing countries. The vast criticism of the Fund’s analytical framework is collated and classified under six broad headings in this chapter: structuralist, heterodox, disequilibrium, post-Keynesian, mainstream, and the dependency school.

The Polak-Fund Model

As Taylor (1987) points out, the Polak model is the most influential piece of work since Keynes’ General Theory, especially because it has become the cornerstone of IMF supported programs and policy prescriptions. Polak was dissatisfied with Keynes’ (1935)
emphasis on fiscal policy and the inappropriate treatment of the monetary analysis in the General Theory. Therefore, he attempted to "streamline the monetary side of the analysis" (see Polak 1957, p. 32). The spotlight, in Polak’s analysis, is on the functioning of the central bank, hence, credit expansion in the economy becomes the focal point of inquiry. According to Polak (1957), economic development can be financed either by raising taxes or borrowing abroad, and factories can be built by curtailing consumption expenditures or repatriating capital. In all these cases, however, the desire to spend does not lead to balance of payments problems. Thus, Polak concludes that credit expansion is the cause of balance of payments crises.

A succinct treatment of the Polak model is found in Khan et. al (1990), which is the basis of discussion in this section. The general framework is as follows: the economy, as in the consistency framework presented in chapter 2, consists of five sectors: private, public, foreign, the domestic banking system, and the national economy. It is assumed that the private sector owns all the means of production. The budget or financing constraints for each of these sectors are the building blocks of the Fund model.

In chapter 2 the budget constraint of the private sector is given by equation (2-6b), repeated again here:

\[ Y_p - CEXP_p - I_p = \Delta M + \Delta NPBg - (\Delta FBP = \Delta DCp) \] (4-1)

where \( Y_p \) is the income accruing to resident households; it includes wages and salaries, self-employment income, net transfers from the government and the external sector, and interest on the government debt. \( CEXP_p \) is the current expenditure of the private sector; \( I_p \) is private investment, \( \Delta M \) is the flow demand for money by the private sector, \( \Delta NPBg \) is the change (net) in government borrowing from the private sector, \( \Delta FBP \) is the change in foreign borrowing by the private sector, and \( \Delta DCp \) is the change in borrowing (net) from domestic banks by the private sector. The left side of the identity is the difference between income and current expenditure (including fixed
investment), which is used to accumulate financial assets (shown on the right side of the identity) by the private sector.

Similarly, the budget constraint of the public sector is given by equation (2-5b), repeated here:

\[ Yg - CEXPg - Ig = -(\Delta NFBg + \Delta NPBg + \Delta DCg) \]  \hspace{1cm} (4-2)

where \( Yg \) is income accruing to the government, \( Ig \) is government investment, \( \Delta NFBg \) is the change in net foreign borrowing by the government, \( \Delta NPBg \) is net government borrowing from domestic households, and \( \Delta DCg \) is government borrowing (net) from local banks. The difference between revenues and current expenditures (including investment) is financed by borrowing.

The external sector's financial constraint is given by equation (2-7b), repeated here:

\[ (Z + INTge + INTpe) - (X + NTReg + NTRep + NFPep) = (\Delta NFBp + \Delta NFBg - \Delta R) \]  \hspace{1cm} (4-3)

where \( Z \) is imports, \( INTge \) is interest payment on the government's external debt, \( INTpe \) is interest on the private sector's external debt, \( X \) is exports, \( NTReg \) is external transfers to the government, \( NTRep \) is external transfers to the private sector, \( NFPep \) is net factor payments from abroad, \( \Delta NFBp \) is the change in the private sector's external borrowing, \( \Delta NFBg \) is the change in government borrowing from abroad, and \( \Delta R \) is the change in international reserves. The left side of the identity is the current account balance of a country; it has to be equal to foreign borrowing and a drawing down of reserves.

From the definition of the monetary system as a financial intermediary, the change in money supply (\( \Delta M \)) will consist of the changes in reserves (\( \Delta R \)) and claims on the private and public sectors (\( \Delta DCp + \Delta DCg \)), as in equation (2-8b), and repeated here:

\[ \Delta R = \Delta M - (\Delta DCp + \Delta DCg) \] \hspace{1cm} or
\[ \Delta M = \Delta R + (\Delta DCp + \Delta DCg) \]  \hspace{1cm} (4-4)
Finally, the national income identity of the economy is given by the summation of the budget constraints of all the transactors—identities (4-1) through (4-4) as in equation (2-4), repeated here:

\[ Y_{mp} = C_g + C_p + X - Z + I_g + I_p \]

or

\[ Y_{mp} - (C_p + I_p) - (C_g + I_g) - X + Z = 0 \]  

(4-5)

Given this basic macroeconomic framework, the Fund model, as should be expected, focuses on equations (4-3) and (4-4) as the key relations. In both equations, external reserves appear explicitly. In fact, equation (4-3) is simply the external sector accounts, while the assets and liabilities of the monetary system are highlighted in equation (4-4). This is what leads to the conclusion that the Fund model is a monetary model of an open economy used to identify sources of temporary balance of payments disequilibria and inflation. In the external sector accounts and the assets and liabilities position of the monetary system, there are two equations with 13 unknowns: Z, INTge, INTpe, X, NTReg, NTRep, NFPep, ΔNFBp, ΔNFBg, AR, AM, ΔDCp, and ΔDCg. Thus, by determining the values of 11 of these variables, we will be able to solve for the values of the remaining two. The Fund solves the two simultaneous equations by making a number of assumptions, which are outlined below.

The Fund assumes that the values of eight of the variables are exogenous, predetermined, or observed. These are INTge, INTpe, X, NTReg, NTRep, NFPep, ΔNFBp, and ΔNFBg. This does not mean that these variables adopt any arbitrary values or that their values cannot be influenced by government policies. The assumption that they are exogenous means that the values of these variables are influenced by factors (variables) outside the model. Thus, once these factors have been identified and their impact on the exogenous variables have been estimated, the values of the exogenous variables so established are inputted into the model. We denote exogenous variables by placing a bar over them. For example, \( \overline{\text{INTge}} \) denotes that the government's interest payment on the external debt is predetermined.

With exports, net transfers, net factor payments, net foreign assets, and interest payments on the external debt predetermined, we are left
with five variables of which the values of only three need to be determined in order to determine unique values for the other two. The Fund does this by designating reserves (\(\Delta R\)) as a target variable whose desired level is determined by government policy. \(\Delta M\) (the change in money supply) and \(Z\) (imports), are then determined as follows:

\[
Y = Py
\]

(4-6)

where \(Y\) is nominal income, \(y\) is real GDP (assumed to be exogenous), and \(P\) is the general price level. The general price level is a weighted average of the price of imports and the price of home goods:

\[
P = (1 - \Theta)P_d + \Theta e \Delta P_z \quad \text{or} \quad (4-7)
\]

\[
\Delta P = (1 - \Theta) \Delta P_d + \Theta e \Delta P_z
\]

(4-7b)

where \(P_d\) and \(P_z\) are the prices of home goods and imports, respectively, \(e\) is the exchange rate, and \(\Theta\) (a parameter) is the share of imports in the overall price index. The prices of imports and home goods are assumed exogenous, whereas the exchange rate is a policy variable. Thus, the general price level \((P)\) and nominal income \((Y)\) are controlled (only partially) through the exchange rate policy.

Determination of nominal income is important to the Fund model because the demand for money depends on it:

\[
M_d = \bar{v}Y \quad \text{or} \quad (4-8)
\]

\[
\Delta M^d = \bar{v} \Delta Y
\]

(4-8b)

Equation (4-8a) is based on the Quantity Theory of Money, where the inverse of the velocity of money \((v)\) is assumed exogenously determined and constant over time. Thus, changes in money demand \((\Delta M^d)\) are assumed to be a stable function of variations in nominal income \((\Delta Y)\).

The flow (or continuous) equilibrium of the money market is given by:
The Fund Model

\[ \Delta M^e = \Delta M^d = \Delta M \]  
(4-9)

which means that supply for money is set equal to the demand for money. Substituting (4-9) and (4-8b) in (4-4), we have:

\[ \Delta R = \bar{v}\Delta Y - (\Delta DC_p + \Delta DC_g) \]  
(4-10a)

The balance of payments position, as reflected by the changes in international reserves (\(\Delta R\)), is expressed as the difference between the private sector's demand for money (\(\bar{v}\Delta Y\)) and the flow of domestic credit (\(\Delta DC_p + \Delta DC_g\)). When the change in domestic credit exceeds the change in money demand, international reserves will be reduced. Here, it is assumed that changes in nominal income are independent of variations in domestic credit. Thus, reductions in domestic credit will yield a one-to-one increase in international reserves. This is called the monetary approach to the balance of payments (MABP).

For small changes in the general price level and in real GDP, however, the change in nominal income can be approximated by:

\[ \Delta Y = \Delta \bar{y}_{t-1} + \bar{p}_{t-1} \Delta \bar{y} \]  
(4-10b)

where \(\bar{y}_{t-1}\) is the previous period's real income (observed), \(\Delta \bar{y}\) is the change in real income (predetermined), \(\bar{p}_{t-1}\) is the general price level of the previous period (observed), and \(\Delta P\) is the change in the general price level. \(\Delta P\), as mentioned above, is a function of the prices of imports and home goods (assumed exogenous) and the exchange rate, which is a policy (or instrumental) variable. Thus, equation (4-10a) can now be rewritten as:

\[ \Delta R = \bar{v}\Delta \bar{y}_{t-1} + \bar{v}\bar{p}_{t-1} \Delta \bar{y} - (\Delta DC_p + \Delta DC_g) \]  
(4-10c)

Equation (4-10c) states that the external reserves position is a function of the velocity of money, change in the price level, the change in real GDP, and changes in domestic credit to both the private and the public sectors. Given, however, that the velocity of money is constant and predetermined, the change in real income is also
predetermined while the previous period's real GDP and price levels are observed. The Fund's argument that reduction in domestic credit will either improve the balance of payments (ΔR) or reduce inflation (ΔP) follows from this equation. Equation (4-10c) contains three unknowns: ΔR, ΔP, and the overall credit ceiling (ΔDC), which is equal to ΔDCp + ΔDCg. For given values of ΔDC, it is not possible to solve for unique values of ΔR and ΔP. However, it can be seen that equation (4-10c) is a straight line in ΔR and ΔP space with a positive slope equal to \( \frac{\mu r}{1 - v} \). This is depicted by the MM line in figure 4.1.

Figure 4.1 The Polak Model

For given values of any two of the three variables, it is possible to find a unique value for the third. Thus, for example, the Fund attempts to find the values of policy instruments (domestic credit and exchange rate devaluation) so that the desired values of the targets (the reserve
position and change in inflation) can be achieved. The procedure is as follows: choose desired values of reserves ($\Delta R^*$) and rate of inflation ($\Delta P^*$)—by way of exchange rate policy—in equation (4-10a). Then equation (4-10c) can be rewritten as:

$$(\Delta DC_p + \Delta DC_g) = \bar{v} \Delta P^* \bar{y}_{t-1} + \bar{v}_t \Delta \bar{y} - \Delta R^*$$

(4-10d)

where domestic credit is now expressed as a function of variables, all of whose values are known, either because they are predetermined variables $\bar{v}, \bar{y}_{t-1}, \bar{P}_{t-1}$, and $\Delta \bar{y}$ or their target levels are determined by government policy ($\Delta P^*$ and $\Delta R^*$).

Equation (4-10d) justifies the use of credit ceilings as a conditionality in Fund programs: given a targeted reserve position, the rate of inflation desired, an assumed constant velocity of money, and a predetermined level of real income, the level of domestic credit compatible with the targets is also given.

But within an overall credit ceiling ($\Delta DC$), subceilings can also be established. For example, a desired level of credit expansion to private sector $\Delta Dp^*$ can be established. Then, given the ceiling on total credit expansion ($\Delta DC$), the allowable credit expansion to the government (public sector) can then be derived [see equations (4-11) and (4-12)]. The idea behind subcredit ceilings is not to crowd out the private sector. Equation (4-12) can be said to be the private sector's "demand for domestic credit" function, with the implicit assumption that there is a ratio of domestic credit to nominal income that is the norm. It can further be assumed, as the Fund assumes, that changes in nominal income are independent of variations in domestic credit. As such, if the overall credit ceiling is very tight, the crunch falls on the credit expansion to the public sector.

$$\Delta DC_g = \Delta DC - \Delta DC_p^*$$

(4-11)

$$\Delta DC_p^* = \left(\frac{DC_p}{Y}\right)_{t-1} \Delta Y$$

(4-12)
Until now it has been assumed that the desired levels of external reserves ($\Delta R^*$) and of the rate of inflation ($\Delta P^*$) can be arbitrarily chosen. However, to the extent that the rate of inflation may also affect some of the variables (specifically, imports) in equation (4-3), it is far from clear that values of $\Delta P$, $\Delta R$, and $\Delta DC$ that satisfy equation (4-10d) will also satisfy equation (4-3). In fact, it is only by pure accident that the values will be the same. Thus, to remove this indeterminacy, the Fund specifies equation (4-3) further. In equation (4-3), we have another equation relating the reserve position to exports, imports, net transfers, interest payments, and net capital flows (foreign asset accumulation):

\[
(\bar{Z} + \bar{INT}pe) - (\bar{X} + \bar{NT}Re\bar{g} + \bar{NT}Re\bar{p} + \bar{NFP}ep)
= (\Delta NFBp + \Delta NFBg - \Delta R) \tag{4-13a}
\]

where the bars over some of the variables denote, as before, that the variables are either predetermined or observed. Collecting all the predetermined or observed variables and consolidating them, this equation can be rewritten as:

\[
\Delta R = \mu_1 - Z \tag{4-13b}
\]

where $\mu_1$ is a predetermined or observed constant.6

Assuming that imports are a linear function of nominal income:

\[
Z = aY \tag{4-14}
\]

and recalling that nominal income is real income ($y$) times the general price level, we have $Y = Y_{t-1} + \Delta Y$, where $\Delta Y = \Delta P_{t-1} \bar{y} + P_{t-1} \Delta \bar{y}$. Thus, equation (4-13b) can be rewritten as:

\[
\Delta R = \mu_1 - a(\bar{Y}_{t-1} + P_{t-1} \Delta \bar{y}) - a\Delta \bar{y}_{t-1} \tag{4-15a}
\]

Equation (4-15a) can be further simplified by collecting the predetermined or observed variables to arrive at:

\[
\Delta R = \mu_2 - [a\bar{y}_{t-1}] \Delta P \tag{4-15b}
\]
where \( \mu_2 \), also a constant (predetermined) value, is equal to
\( \mu_1 - a(\bar{Y}_{t-1} + \bar{P}_{t-1}\Delta y) \). Equation (4-13b) is also a linear equation in
\( \Delta R \) and \( \Delta P \) space with \( \mu_2 \) as its intercept and a negative slope
\( (-a\bar{y}_{t-1}) \). This equation is the BP line represented in figure 4.1. At the
intersection of the BP and the MM lines we have values of \( \Delta R \) and \( \Delta P \)
that simultaneously satisfy the external sector's and the monetary
system's budget constraints.

We may examine the BP and MM lines further to establish the
factors that determine the positions of the lines: for the BP line, \( \Delta P \) in
equation (4-7b) is equal to \( (1-\Theta)\bar{P}_d + \Theta e\bar{P}_z \). Equation (4-15b) can
therefore be rewritten as:

\[
\Delta R = \mu_2 - [\bar{y}_{t-1}]\left[(1-\Theta)\bar{P}_d + \Theta e\bar{P}_z\right]
\]  

(4-15c)

The variable \( e \), it should be recalled, is the exchange rate, and the hat
(\(^\hat{\cdot}\)) on top of it denotes that it is a policy or an instrumental variable.
Thus, the desired change in reserves (\( \Delta R \)) as well as in the domestic
price level (\( \Delta P \)) will be influenced by the exchange rate policy. It can
be shown that with a devaluation the BP line moves upward.

Similarly, the MM line, which is given by equation (4-10d) can be
rewritten as:

\[
\Delta R = \mu_3 + \left[\bar{y}_{t-1}\right] \Delta P - (\Delta DC_p + \Delta DC_g)
\]  

(4-16a)

where \( \mu_3 \) is a constant or predetermined value equal to \( \bar{v}\bar{P}_{t-1}\Delta y \).
Substituting the equivalent value in equation (4-7b) for \( \Delta P \) gives:

\[
\Delta R = \mu_3 + \left[\bar{v}_{t-1}\right] \left[(1-\Theta)\bar{P}_d + \Theta e\bar{P}_z\right] - (\Delta DC_p + \Delta DC_g)
\]  

(4-16b)

where the hat on top of \( DC_g \) also denotes that it is a policy instrument.
Thus, from (4-16b), it can be seen that a decrease in domestic credit to
the government and/or a devaluation—implying a higher value for the
exchange rate \( e \)—improve the reserve position by shifting the MM
line upward.

Turning now to figure 4.1, if (as an example) the objective is to
attain point B, which signifies an improvement in the reserve position
Analytical Approaches to Stabilization and Adjustment Programs

(balance of payments improvement) associated with a lower inflation, the Fund's approach would suggest the following strategy: first, a ceiling on the expansion of domestic credit will shift the MM line up toward point B and second, a devaluation will also shift both the MM and the BP lines upward toward point B. Both policies are necessary to arrive at point B because, for example, a decrease in domestic credit to the government will shift only the MM line, and there can be no guarantee that it will intersect the BP line at point B.7

The model described above [equations (4-1) through (4-16b)] has the structure represented in table 4.1. We note, however, that the above presentation is only the bare bones of the framework. For example, to use this model to determine the balance sheet of the monetary system, it would be necessary to reevaluate the existing stock of international reserves at the new exchange rate. Exports, net foreign assets, foreign debt, interests on existing debt, and net transfers will also have to be reevaluated.

Table 4.1 Structure of the Fund Model

<table>
<thead>
<tr>
<th>Targets:</th>
<th>ΔR, ΔP, ΔCp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endogenous:</td>
<td>ΔY, ΔM, Z</td>
</tr>
<tr>
<td>Exogenous:</td>
<td>y, ΔPz, ΔPd, X^8 ΔNFAp, ΔNFAg, INTge, INTpe, NTReg, NTRep</td>
</tr>
<tr>
<td>Policy instruments:</td>
<td>ΔDC, ΔDCg, Δe</td>
</tr>
<tr>
<td>Parameters:</td>
<td>v (inverse of income velocity of money), Θ (share of imports in the price index), a (marginal propensity to import), b (coefficient of response of imports to relative prices).</td>
</tr>
</tbody>
</table>

Financial Programming

The IMF uses the term financial programming to define the process of finding the values of policy instruments to achieve the desired target levels by going through the following steps:
• **Step 1.** Specify the desired values of $\Delta R^*$ and $\Delta P^*$.

• **Step 2.** Project the values of exogenous variables for the entire program period.

• **Step 3.** Given steps 1 and 2, calculate the adequacy of exchange rate changes (devaluation) needed in equations (4-15) and (4-16). If the amount of devaluation is not enough to achieve the targets, either the target values or the amount of devaluation (or both) have to be experimented with, making it a trial-and-error method of problem solving.

• **Step 4.** After finding the percent devaluation needed to achieve the targets, knowing $P_z$ and $P_d$, the aggregate price level changes ($\Delta P$) are calculated using equation (4-7b). Then use equation (4-6) to arrive at the nominal income $Y$.

• **Step 5.** Knowing the change in reserves targeted, equation (4-10) is used to calculate the credit ceiling required ($\Delta DC$) to achieve the target level of reserves. $\Delta DC$ is further disaggregated between ceilings on private sector and public sector, respectively, using equations (4-11) and (4-12).

• **Step 6.** Public sector budget constraint equation (4-2) is reconciled with the financing possible from credit expansion, which is known from step 5.

**Critiques of the Fund Approach**

In recent years the Fund has been the target of criticism from various quarters. As Nowzad (1981) noted, the staunchest critics of the Fund have been the "development community." The commentary on the Fund has ranged from pillory of its institutional beginnings (that is, at Bretton Woods), the defects in its mandate, and its reform in 1970s, to criticism of the Fund's philosophy, approach, analytical framework, program, and conditionality. It is beyond the scope of this document to assemble and collate all the criticism. Because this document focuses on the analytical framework, however, an attempt is made to classify the criticism in terms of structuralist, post-Keynesian, and Marxian paradigms. This classification is somewhat arbitrary,
because some of the critics do not belong to any school of thought and would rather prefer to be labeled as pragmatists or policy practitioners.

The Structuralist Critique

Taylor, Bacha, Diaz-Alejandro, and perhaps Killick and Helleiner are the main advocates of the structuralist critique of the Fund approach. They accuse the Fund of overkilling domestic demand in its stabilization programs. The Fund's analysis, according to the structuralists, is based on the assumption that excessive domestic demand (domestic absorption) is the cause of balance of payments difficulties. Therefore, reductions in fiscal expenditures, including subsidies (that is, balancing the budget) and money supply, along with adequate devaluation, is expected to reduce the excess demand. The structuralists argue that this approach is of little relevance for the developing countries because their problems are structural. As such, the developing countries are not in a position to reduce or switch expenditures. Also, the foreign exchange difficulties of developing countries are more due to structures of international trade and patterns of domestic production and demand (Nowzad 1981, p.10). The structuralist argument is that the IMF austerity program links supply-determined output and economic efficiency, with constant velocity of money, law of one price, and strong substitution responses. Any of these complex links may give in; thus, the high frequency of breakdowns in Fund supported programs. Their argument is that devaluation, like tight monetary policy, reduces the trade deficit in the short run only by inducing a contraction.

Again, the structuralists criticize the Fund for its monetary approach to inflation, arguing that inflation is an outcome of monetary and structural forces and that self-interested groups drive up prices. It is markups and administered prices that are the culprits of inflation. The aftermath of a program for a developing country is higher inflation, higher interest rates, and a worsening of the income distribution.

Taylor (1987, 1989) points out that the Polak model (and thus Fund's financial programming) is, theoretically, an incomplete
The Fund Model

description of an economy, because it fails to incorporate one of the crucial linkages found in the developing countries. This linkage is:

\[
\text{Value of output} = \text{wage income} + \text{income of small proprietors} + \text{profits of firms} + \text{interest paid to banks} + \text{costs of imported inputs in production}.
\]

Taylor's criticism is summarized in the following paragraphs.

The addition of this new identity is necessary to arrive at the policy prescriptions of the Fund. The costs of imported intermediate inputs should be included here as production in developing countries is strongly dependent on imported inputs, such as fertilizer for agriculture, petroleum for energy, and so on. Moreover, Taylor (1987) feels that the Fund, by emphasizing identities (4-3), (4-4), and (4-8a), ignores identity (4-1), which brings out the fact that private savings can take the form of physical capital or financial claims on the public sector and the rest of the world.

If the Fund considers other identities, such as (4-1) and (4-17), it will realize that by reducing credit to the public sector, private savings will increase (other things being the same). In other words, aggregate demand will decline, which will result in lower production and thus lower imports of (intermediate) inputs. In such a case, there is no doubt that the trade balance will improve, but this improvement in balance of payments has been achieved at the cost of a recession and not through the price shifts that the neoclassicals have hypothesized.

The cost of a tight monetary policy that the Fund advocates is higher interest rates, which will raise the borrowing costs of working capital for the entrepreneur. Higher costs of production will result not only in some inflation but will also force cutbacks in output production. Thus, stagflation is the end result of a Fund program.

The impact of devaluation on an economy can also be analyzed if the relationship of equations (4-1) and 4-17) are considered. A devaluation increases the price of imported inputs in domestic currency, and the higher the pass-through effect, the higher will be the prices of finished goods. If money wage rates are held down, higher prices mean lower real income to wage earners and higher profits to producers, thus skewing the pre-devaluation income distribution.
Because it is empirically known that the savings rate (marginal and average) is higher from profits, lower real wages means a decline in consumption expenditure. Therefore, the balance of payments position will improve, as in the above paragraph. If wages are fully indexed, as they are in some Latin American countries, then devaluation is fully nullified.

The key to observing the impact of an IMF program is found in identity (4-17). Profits have to be high enough to avoid bankruptcies and stimulate investment (and production). Under liberalization, interest rates are expected to be high to attract savings and avoid capital flight. However, because devaluation increases the costs of imported inputs in domestic currency, the only logical areas where austerity is forced is on the incomes of wage earners and/or small proprietors.

Other critics point out that most developing countries, and especially those in Sub-Saharan Africa, have a low capacity to adjust (Dell 1983, and Helleiner 1983), because their problems are structural and thus cannot be treated by demand-management policies or in the short run. The most critical structural constraint is the foreign exchange availability (Williamson 1987). Structural factors do not play a role in the Fund programs, yet it is structural change that is asked for in the programs in the form of increasing the share of tradables in overall production to overcome foreign exchange constraint (Helleiner 1987).

The Heterodox Critique

Heterodox stabilization programs represent an alternative to the orthodox Fund approach. They have been implemented in Israel, Argentina, Brazil (1985–86), and Peru. The primary objective of such programs is to drastically reduce inflation within a period of less than one year. Avoiding a recession and maintaining the existing income distribution are also of concern in heterodox programs. To this extent, the approach has clear intellectual links with structuralism. However, the heterodox approach, in addition to orthodox fiscal and monetary policies, includes income policies, such as wage and price freeze, the pegging of the exchange rate, and de-indexation of wages.12
The following is a brief analytical framework of heterodox programs. High levels of inflations (hyperinflation) are not only due to demand pressures (as they are in the Fund orthodoxy) but are also due to the role of inertia and expectations. For example, if the general public expects an inflationary trend to continue in the near future, it would bargain for nominal wage increases that would be higher than the expected inflation; and producers would continue to push prices higher than the expected inflation. To break this expectations cycle, a price freeze is advocated to bring the public's expectation of continued inflation to an end. This would constitute a perception of a turn-around in public policy.

The perception of the government's determination to halt the inflationary spiral enhances the credibility of the government's stabilization policy package and improves the probability of successful implementation of other reforms, such as de-indexing wages (to halt the inflationary spiral) and pegging the exchange rate (to reduce pressures in the traded goods sector). In many Latin American countries the fiscal deficit is partly financed by an inflation tax or seignorage, which is the advantage that a government has in being the sole authority to print and issue money. Thus, monetary policies accommodate expansionary fiscal policies and perpetuate the already high inflation, leading to hyperinflation. The credibility of the government's determination to halt inflation, therefore, enables governments to cut expenditures and pursue restrictive monetary policies, the hallmarks of orthodox stabilization programs that play an important complementary role in heterodox programs.

As Kahler (1990) point outs, however, heterodox programs are primarily meant for rapid disinflation of an economy and cannot address the fundamental issue of structural change and economic transformation. Mention must also be made that only Israel can be considered a heterodox success. Israel's success was possible partly because of high levels of external finance, while Brazil, Argentina, and Peru were constrained by external debt and negative external resource flows.
The Disequilibrium Critique

Following the pioneering work of Barro and Grossman (1976), and Malinvaud (1977), Arida and Bacha (1987) use a disequilibrium model to suggest that where prices are exogenously given or are rigid, short-term adjustments take place in quantity demanded only through quantity rationing. They also argue that balance of payments deficits in semi-industrialized countries are structural in nature. They therefore identify situations in which the “IMF medicine” could be appropriate and other situations where “structuralist recipes” would seem to be called for.

The first situation is what they characterize as classical deficit. In this situation, unemployment is high and domestic production is low. Wages are high because of domestic policies. Effective demand is high, and the balance of payments is in deficit because of demand. This is the context in which orthodox policies of wage contraction and reductions in demand (or absorption) improve both employment levels and the balance of payments position.

A second situation is characterized as structural deficit, in which there is unemployment and an excess supply of goods. Domestic demand is adequate, but structural bottlenecks prevent the supply of goods from meeting this demand. As a result, this demand is satisfied by imports; thus, the balance of payments deficit. In such a situation a wage squeeze, as suggested by orthodox stabilization policies, redistributes income against wage earners and only worsens the unemployment situation. Expansionary fiscal and monetary policies improve the employment situation, but at the cost of deteriorating the balance of payments position.

A third situation of interest is the Keynesian surplus, which is similar to the structural deficit. The economy has unemployment and excess supply of goods, but the reason for unemployment and excess supply is insufficient domestic demand (that is, Keynesian unemployment). In this situation, expansionary policies improve employment without negatively affecting the balance of payments position.

Arida and Bacha argue that semi-industrialized countries are most likely to find themselves in either the classical deficit or the structural
deficit situations. In the structural deficit situation, however, IMF policy prescriptions are decided on the horns of a dilemma between improving the balance of payments position or increasing employment levels. Getting the prices right or balancing the budget cannot solve the problem, because the country is in a situation of structural labor surplus. Full employment and external balance can be achieved only through import substitution and measures to remove the structural bottlenecks, and/or a favorable external environment (Arida and Bacha 1987, p.100)

The Post-Keynesian Critique

Kaldor (1983) and Chakravarty (1987) have been the most vocal of the post-Keynesian group. Kaldor (1983) points out that the Fund generally recommends a substantial devaluation, not only to improve a country’s competitiveness, but also to supplement budgetary measures to reduce domestic demand and consumption. According to Kaldor, “the main objection to this approach is that it assumes that devaluation is capable of changing critical price and wage relationships that are the outcome of complex political forces and that could not be changed by domestic fiscal and monetary policies.” Further, devaluation results in additional inflation and, as such, there may be “no unique appropriate rate of exchange” (Kaldor, 1983, p. 36). Like the structuralists, Kaldor feels that devaluation worsens the income distribution. The following paragraphs summarize post-Keynesian criticism of orthodox stabilization programs.

According to the post-Keynesians, the growth and development theory of both the World Bank and the IMF is in a state of confusion, because they fail to make a distinction between capital as a “sum of value” and capital as a “concrete stock of means of production.” The result of this confusion is the assumption that international aid can be transformed into capital equipment. The post-Keynesians believe that transfer of aid is a mere transfer of finance, which does not automatically lead to a transfer of equipment or technology. In other words, funds pumped into plant and equipment do not automatically translate into technological development. There are many steps between availability of funds and restructuring of capital, and the output composition in the developing countries. Transfer of
finance, after a certain time, leads to debt difficulties. The recent debt problems of the developing countries would appear as a vindication of the post-Keynesian belief.

The balance of payments difficulties of developing countries are not a cause, but an effect of a disarticulation of the economic structure. Like the structuralists, this group believes that a variety of structural bottlenecks are the root cause of developing countries' problems. These obstacles are rigidity of production coefficients, low productivity in the wage goods sector (particularly in the food sector), and real wage resistance. One cause of the external crises is that the supply response of developing countries' exports has to be very high in order to achieve trade balance. Furthermore, improvement in the terms of trade may not necessarily lead to development. Post-Keynesians point to the recent experiences of OPEC countries' (Mexico in particular) where, in spite of a better external environment, self-sustaining growth did not occur. In addition, the propensity to save and invest are what determine development. These propensities depend on existing income distribution in the country in question.

The international financial institutions believe that "getting the prices right" constitutes a Pareto-superior move. The post-Keynesians point out that because workers have to receive a conventional real wage, this will mean a disequilibrium in the labor market. Other markets may also not be in equilibrium. Thus, they argue that stabilization and adjustment programs will hit some sectors harder than others, because of a move toward price realignment among sectors.

Mainstream Critique

The Fund's approach has come under attack even from mainstream economists, such as Edwards, Sachs, and Dornbusch. Edwards (1989) indicates that the Fund's basic operational framework has remained unchanged in the last 25 years. As such, the Fund has failed to incorporate new developments in economic theory that have important policy implications. As examples, he cites the static nature of the model, the rudimentary financial sector, the economics of equilibrium exchange rate, and so on.
Sachs (1989) suggests that the Fund’s emphasis on fiscal discipline is correct, but the emphasis on devaluation should be toned down, because repeated devaluations can undermine a government’s credibility in controlling inflation and would also make it difficult to maintain fiscal discipline. He cites Edwards’ (1989) empirical evidence that between 1963 and 1972, only 30 percent of Fund programs (involving upper tranches) included a devaluation. This figure rose to 50 percent between 1977 and 1980, and to 79 percent in 1983 alone.

Dornbusch (1982, 1989), like the above critics, questions why income distribution and real growth rate are not part of the IMF model. He criticizes the model for not taking into consideration the complex link between devaluation, inflation, real wages, and real exchange rate. He also points out that links between domestic and foreign savings, credit, confidence, and investment are needed in the model.

Demand restraint will have little effect through the mechanism of expenditure reduction or expenditure switching, because the substitutability of traded for nontraded goods is low, especially in Sub-Saharan Africa, and imports do not compete with home goods, while exports are not significantly consumed locally (Crockett 1981). Exports may not respond to price incentives, and if they do it will take time (output may respond three to five years after the price stimulus). Also, non-price factors are often the crucial constraint. The Fund is accused of pinpoint targetry, which, in a world of data deficiencies and long time lags, is misleading (Helleiner 1983, Loxley 1986). The Fund is also accused of not being committed to supply stimulation (Killick 1981, Williamson 1982).

The Brandt Commission (1980) criticizes the Fund for not guaranteeing employment or preserving basic needs. By cutting budgets and subsidies, imposing wage restraints, and raising inflation, children and women are vulnerable (UNICEF 1984, Cornia et. al. 1986, Green 1984). The faith in the growth of exports leading the way to development has been criticized by Streeten (1982) as theoretically incorrect and practically exaggerated. Finally, Nelson (1984) points out that the shock treatment of the Fund may undermine the political sustainability of the reforms.
While all the critics of IMF point out that the Fund’s approach is monetarist, it is fair to mention that the economic logic of the IMF can also be given a Keynesian interpretation and will lead to similar policy conclusions. For example, the Keynesians will argue that a reduction in aggregate demand is needed to transfer resources to improve the current account of the external sector. Thus, policies to deflate domestic demand are needed. Credit ceilings and financial discipline are such policies. Moreover, the IMF, like the Keynesians, believes in the efficiency of prices and markets (Bird 1987).

The Dependency School

The dependency school (a brand of Marxism) has criticized the Fund for facilitating a drain of economic surplus from developing countries (the periphery) toward the industrialized world, which they characterize as the center of the world capitalist system. According to this school the capitalist world system is characterized by a division of labor that is basically unequal: the periphery specializes in the production of primary products that have little domestic demand, while the center specializes in the exports of manufactures and other commodities that are basically an extension of domestic demand. It is scarcely surprising, therefore, that the periphery faces long-term declining terms of trade and has production structures that are disarticulated and inflexible. Domestic production cannot be easily transformed to meet domestic demand in cases of declines in the terms of trade.

The emphasis on exports in Fund programs, therefore, does not only lead to the locking in of the economies of developing countries to the uncertainties of the international market, but also perpetuates unequal exchange. The Fund, therefore, prevents “indigenous autonomous development” (see Payer 1974, Pastor 1987). In fact, the Fund (and the World Bank) is viewed by many in this school as simply facilitating the access of finance capital into the economies of the periphery, and ensuring that the periphery plays according to the rules. These rules basically require greater emphasis on exports while keeping domestic demand low in order to facilitate the re-export of capital (plus interest).
Again, the dependency school, like the structuralists, emphasizes the economic and social structures of developing countries. They criticize the Fund for being seemingly oblivious to inequities among social groups (classes) that seem to emerge or become accentuated as a result of Fund programs. A case in point is austerity through real wage cuts under Fund programs (Phillips 1983).

Endnotes


2. We recall that \( C\text{EXP}_{p} = C_{p} + T_{d} + \text{INT}_{pe} \), where \( C_{p} \) is current private consumption, \( T_{d} \) is direct taxes, and \( \text{INT}_{pe} \) is the private sector's interest payments on its external debt. In Polak's original formulation, there is no external borrowing (and thus no interest payments on debt) either by the private or public sectors.

3. It should be recalled that \( Y_{g} \) is composed of \((T_{i} - S_{b}) + O\text{S}_{g} + T_{d} + N\text{T}_{Reg}\), that is, direct and indirect taxes, less subsidies, the operating surpluses of fully government owned enterprises, plus net transfers from the exterior. \( C\text{EXP}_{g} \) (current government expenditure) is composed of \( C_{g} \) (current government consumption), \( N\text{T}_{Re}p_{g} \) (net transfers from the government to the private sector), \( \text{INT}_{gp} \) (interest on the government's domestic debt), and \( \text{INT}_{ge} \) (interest payments on the external debt).

4. The derivation of the national income identity as the summation of equations (4-1) through (4-4) is as follows:

\[
\begin{align*}
Y_{p} - C\text{EXP}_{p} - I_{p} &= \Delta M + \Delta NB_{p} + (\Delta NF_{Bp} + \Delta DC_{p}) \quad (4-1) \\
Y_{g} - C\text{EXP}_{g} - I_{g} &= - (\Delta NF_{Bp} + NPB_{g} + DC_{g}) \quad (4-2) \\
(Z + INT_{ge} + INT_{pe}) - (X + N\text{T}_{Reg} + N\text{T}_{Rep} + NF_{Pep}) &= (\Delta NF_{Bp} + \Delta NF_{Bg} - \Delta R) \quad (4-3) \\
\Delta M &= \Delta R + \Delta DC_{p} + \Delta DC_{g} \quad (4-4)
\end{align*}
\]

where, it will be recalled that:
Adding (4-1) and (4-2), therefore, gives:

\[ Y_p + Y_g - CEXP_p - CEXP_g - I_p - I_g = \Delta M \]

Further adding (4-2a) and (4-3) gives:

\[ Y_p + Y_g - CEXP_p - CEXP_g - I_p - I_g + (Z + INTge + INTpe) - (X + NTRReg + NTRGp + NFPep) = \Delta M - (\Delta R + \Delta DCp + \Delta DCg) \]  

Finally, (4-3a) and (4-4) gives:

\[ Y_p + Y_g = CEXP_p + CEXP_g + I_p + I_g - (Z + INTge + INTpe) + (X + NTRReg + NTRGp + NFPep) \]  

Identity (4-4a) can be further simplified as follows: net external transfers and net factor payments drop out because they appear on both sides of the equation with the same sign; interest payments to the external sector drop out because they appear in current expenditures (on the right side) with a positive sign and again with imports on the right hand side with a negative sign; government interest payments on the domestic debt and net transfers to the private sector are part of government expenditures and private sector income. Thus, they appear on both sides with the same sign and can be eliminated; and direct taxes, which are (at the same time) part of government revenue and private expenditures also appear on both sides of the equation with the same sign and can be eliminated. We are thus left with:

\[ (W + \pi) + (Ti - Sb) + OSg = C_p + I_p + C_g + I_g + X - Z \]  

(4-5)

where it can be seen from chapter 2 that the expression on the left side is clearly the gross domestic product at market prices.

5. We are interested in how changes in reserves (\(\Delta R\)) and in domestic prices (\(\Delta P\)) are related to each other for a given level of domestic credit. But equation (4-10a) expresses the relationship between \(\Delta R\) and \(\Delta P\), which can be simplified as follows:
The Fund Model

\[ \Delta R = A + b \Delta P \]

where \( A \) is a constant and equal to \( \left\{ v_{1-t} \Delta y - (\Delta DCP + \Delta DCg) \right\} \) and \( b \) (equal to \( v_{1-t} \)) is also a predetermined constant. With \( \Delta R \) on the vertical axis and \( \Delta P \) on the horizontal axis, we can plot the line that satisfies this relationship (line MM): Its slope will be \( b \), and its intercept (when \( \Delta P \) is zero) will be \( A \).

6. The value of \( \mu 1 \) is

\[ \{\Delta NFBP + \Delta NFBg\} - \{\text{INTge + INTpe}\} + \{X + NTReg + NTRep + NFPep\} \]

This is equivalent to export earnings plus transfers and net factor payments and new foreign borrowing less interest on existing debt. In almost all cases (except exceptionally indebted countries that are unable to contract new foreign loans but still manage to service their debt and/or countries with equally exceptionally high transfers and external payments abroad), we would expect \( A \) to be highly positive.

7. The impossibility of reaching point B with only one policy instrument illustrates a general principle: in modeling it is not possible to attain two (n) targets with only one (less than n) policy instrument(s).

8. Khan et al. (1986) argue (and we agree) that the incorporation of a positive export supply elasticity would have no qualitative effects on the analysis. However, to the extent that exports respond positively to devaluations, the more effective would be the exchange rate as an instrument for reaching a given target of external reserves.

9. Taylor (1983, p.3) defines structuralism as “an economy has structure if its institutions and the behavior of its members make some patterns of resource allocations and evolution substantially more likely than others. Economic analysis is structuralist when it takes these factors as foundation stones for its theories.”

10. The term “overkill” is attributed to Diaz-Alejandro (1981).

11. See also chapter 3, page 9.


13. This means that somebody will be better off with nobody being worse off than before.
14. According to the school, unequal exchange should not be confused with declining terms of trade. Basically, the argument is presented in terms of labor values, and unequal exchange is said to exist whenever a product (of the periphery) containing a given amount of labor exchanges for products of less labor content (from the center), even after due allowances have been made for differences in skills, and so on.

References


5

THE WORLD BANK FRAMEWORK

The World Bank, whose official title is the International Bank for Reconstruction and Development (IBRD), is also a creation of Bretton Woods. As the name suggests, the World Bank was founded to finance the developmental needs of developing countries. This was in contrast to the mandate of IMF, whose financing was to be temporary in nature to tide over balance of payments difficulties. Therefore, by mandate, the Bank was assigned the task of finding foreign resources to finance investment projects in all sectors, with the ultimate objective that such investment will enable the economy to attain a higher growth path, thereby improving the standard of living of the population in the long term.

The Harrod-Domar models of 1950s, which linked domestic savings and capital output ratios to real growth rate, proved to be a useful starting point for the World Bank. The two-gap models of the 1960s, which extended the Harrod-Domar framework with availability of foreign savings, soon became the analytical basis for the Bank’s operations. This is discussed in the next section. The revised minimum standard model (RMSM), a disaggregated programming model of the two-gap model, is still used by the World Bank to ascertain the resource needs of each country. This model is presented in this chapter. Like the Fund, the Bank’s framework has come under attack, but mostly from neoclassical economists and post-Keynesians. The neoclassical economists criticize the Bank for ignoring the role of relative prices in economic efficiency and growth, while the post-Keynesians argue that finding resources will not automatically lead to development. The chapter addresses these criticisms.

The 1980s witnessed an evolution in the Bank’s role in the developing countries. The Bank became involved with program
lending in addition to financing projects. The World Bank thus had to pay increasing attention to macroeconomic policies. This meant that alternative economywide models were needed or the RMSM had to be extended to include all sectors of an economy (see chapter 2). The extensions to RMSM are discussed in this chapter, while the alternative models are presented in chapter 6.

The Bank's Framework

The Bank focuses on higher real growth and standard of living in the medium and long term. The Bank's framework, therefore, concentrates on the real variables of the economy. Its primary concern—as is the purpose of the two-gap models of Chenery and Bruno (1962), McKinnon (1964), and Chenery and Strout (1966)—is to estimate the levels of investment, imports, and external finance needed to achieve a targeted real GDP growth rate. Thus, the Bank's framework is essentially a planning model reflecting the needs, or requirements, approach. In the day-to-day operations of the Bank, however, the framework is used to arrive at the actual real GDP growth rate that is possible given the committed amount of foreign capital. This is usually called the constraints, or availabilities, approach.

The structure of the Bank's model is a two-gap accounting framework. It ensures consistency between the balance of payments and the national accounts through the resource gap (Addison 1989). The variables are shown in table 5.1. As in the Fund model of chapter 4, y is real national income, \( \Delta R \) is change in international reserves, Z is imports of goods and nonfactor services (gnfs), I is total investment, Sp is private savings, X is exports (gnfs), Cg is government consumption, T is total tax revenues, and \( \Delta NFA \) is change in foreign assets held by private and public sectors.

The following list presents the World Bank framework in its simplest form. As in the previous chapters, greater emphasis is placed on making the presentation as nontechnical as possible. The following are some of the underlying assumptions:

1. Prices are assumed constant (\( \Delta P = \Delta P_D = \Delta P_Z = 0 \)). If the rate of inflation is needed to arrive at the real GDP growth rate, then it is calculated exogenously.
Table 5.1 Structure of the Bank’s Framework

<table>
<thead>
<tr>
<th>Targets:</th>
<th>$\Delta y^<em>$, $\Delta R^</em>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endogenous:</td>
<td>$Z$, $I$, $Sp$</td>
</tr>
<tr>
<td>Exogenous:</td>
<td>$X$, $\DeltaNFA$</td>
</tr>
<tr>
<td>Policy Instruments:</td>
<td>$C_g$, $T$</td>
</tr>
<tr>
<td>Parameters:</td>
<td>$s$ (savings rate), $a$ (marginal propensity to imports), $k$ (ICOR).</td>
</tr>
</tbody>
</table>

* indicates targeted variable.

- Incremental capital-output ratio (ICOR) is known from estimation using historical data.
- Exports are exogenously given.
- Real import demand function is assumed to be a stable function of real income (that is, $Z = ay$).
- Foreign savings supplement domestic savings. Foreign resources not only help close the trade gap but also contribute positively to domestic savings and, thus, investment.

At the core of the Bank’s framework are the following relationships. Equation (5-1) provides a link between real GDP, ICOR, and total investment as in the Harrod-Domar growth model. This equation determines the required level of investment for a targeted growth rate of output (GDP), given an estimate of ICOR.

$$\Delta y^* = \frac{1}{k} I$$  \hspace{1cm} (5-1)
where $\Delta y^*$ is change in real output, and total investment ($I$) is the sum of investment in the private and public sectors.

Given the parameter $s$ (ratio of private savings to disposable income), the implicit consumption function of the private sector is given by:

$$C_p = (1 - s) (y^* - T)$$  

(5-2)

where consumption of the private sector is a function of the average (marginal) propensity to consume ($1 - s$), and the real disposable income (income after taxes).

The national income identity, as in equation (4-5) in chapter 4, can be rewritten as:

$$I = (y^* - T - C_p) + (T - C_g) + (Z - X)$$  

(5-3a)

where the first term on the right side of the identity is private savings, the second term represents public savings, and the last term indicates foreign savings. Based on (5-3a) the following statements can be made: a reduction in public consumption results in increased public savings; and an increase in tax revenues ($\Delta T$), other things being equal, raises public savings and reduces private savings. It is assumed that the reduction in private savings will be smaller than the increase in public savings. This is because government savings increase by the full amount of the tax increase while private savings increase only by $s\Delta T$ which is less than one. Thus, an increase in taxes leads to an increase in total domestic savings.

Identity (5-3a) can be rewritten as:

$$I = (y^* - T - C_p) + (T - C_g) + \Delta NFB - \Delta R$$  

(5-3b)

It can be seen that (5-3b) is a linear equation in $I$ and $\Delta NFB$ space with a slope equal to unity. This is represented in figure 5.1 as the "savings gap" line.
Substituting the private consumption function—see equation (5-2)—and import demand function \( Z = ay^* \) in identity (5-3), we have:

\[
I = s(y^* - T) + (T - Cg) + (ay^* - X) \quad (5-4a)
\]

which can be rewritten as:

\[
I = (s + a)y^* + (1 - s)T - Cg - X \quad (5-4b)
\]
Equation (5-4b) reveals that the slope of the aggregate demand function is given by \((s + a)\), where \(s\) is the marginal propensity to save and \(a\) is the marginal propensity to import.

From identity (2-7) of chapter 2, we know that:

\[
Z - X = (\Delta NFB - \Delta R) \quad \text{or,}
\]

\[
\Delta NFB = ay^* + \Delta R^* - X \tag{5-5a}
\]

Equation (5-5a) can be rewritten as:

\[
\Delta NFB = a(y_{t-1} + \Delta y^*) + \Delta R^* - X
\]

Using equation (5-1), we have:

\[
\Delta NFB = ay_{t-1} + \frac{1}{k} I + \Delta R^* - X \quad \text{or,}
\]

\[
\Delta NFB = ay_{t-1} + \frac{1}{k} I + \Delta R^* - X \tag{5-5b}
\]

The above expression (5-5b) shows that for given levels of exports and reserves any limits on foreign borrowing is a constraint for domestic investment and hence real growth rate. This is understandable as foreign (savings) capital inflows supplement domestic savings and also provide much-needed foreign exchange for imported inputs.

Equation (5-5b) can be manipulated further:

\[
I = -ky_{t-1} + \frac{k}{a} \Delta NFB - \frac{k}{a} \Delta R^* + \frac{k}{a} X \tag{5-5c}
\]

Again, it can be seen that (5-5b) is a linear equation in \(I\) and \(\Delta NFB\) space, with a slope \(\frac{k}{a} > 1\), and an intercept which, in all likelihood, is negative. This equation is represented as the “trade gap” in figure 5.1.
In the two-gap model, foreign exchange is the limiting factor, or in the view of Latin American economists, "external strangulation" is the major structural constraint. If total investment—\( I \) of equation (5-4)—is less than or equal to the flow of foreign resources—\( \Delta NFB \) of equation (5-5a)—plus total savings—private and public from equation (5-4)—then either the savings gap or constraint is binding. On the other hand, the trade gap is binding if the flow of foreign resources (\( \Delta NFB \)) is not even enough to bridge the gap between imports and exports. Figure 5.1 provides a graphic representation of the analysis. The slope of trade gap is greater than the slope of savings gap, as the coefficient of imported goods (\( a \)) is less than one and ICOR (\( k \)) is greater than one. At point B, the savings gap is binding, while at point E there is no gap. At point D the trade gap is binding.

The main assumption in the above analysis is that some proportion of investment is imported (say, machines). If savings determines investment, then foreign resources raise the amount of capital formation in a one-for-one fashion. If foreign exchange is withdrawn, then either exports must rise or imports must fall. Beyond a point, however, it is investment, and thus output, that will be reduced in the face of external strangulation (see Taylor 1983).

**Revised Minimum Standard Model**

The revised minimum standard model (RMSM) was constructed in 1973 to provide a consistent model for all developing countries in the World Bank's day-to-day operations. The number of economic linkages in the model were kept to a basic minimum in view of the paucity of data available in the developing countries. However, country economists were free to use it as a thinking tool and modify the model to meet their country specifications. The result is that today the RMSM used for country policy by the World Bank economists have over 425 variables. Therefore, it is not possible to describe the whole model. However, the following are some of the important observations about RMSM:

- In spite of its simplicity the RMSM can be effectively used to find the time paths of various variables by easy manipulation of the models' parameters. This provides a useful insight into the
long-term perspective of a country—its growth potential, per capita consumption, external financing needs, and so on.

- RMSM can accommodate about nine export categories and several import categories. For this, various import elasticities need to be specified. While the import function for consumer goods imports is tied to the total consumption expenditure, the imports of intermediate goods, such as fuels and nonfactor services, are linked to GDP; imports of capital goods are tied to investment; and imports of food are made a function of personal consumption.

- A separate module takes into consideration the gains and losses due to terms of trade effects using the identity gross domestic income (GDY) = GDP + gain/loss of income due to changes in terms of trade.

- The balance of payments module takes into consideration exports; imports; interest accrued on foreign borrowing, and other factor services, such as net payments on direct foreign investment and income from labor and property; long-term capital flows, such as direct foreign investment, grants, official transfers, and net long-term borrowing; and other short-term capital flows.

RMSM, however, has many shortcomings of RMSM. It does not contain policies or prices that are needed to arrive at the targeted growth rate or the balance of payments position. Moreover, exports are not linked to GDP. Capacity utilization and employment are significantly absent, and so are the government sector and the financial sector. Therefore, in many respects it is an incomplete model.

The programming is as follows:

- **Step 1.** Specify values of the targets, $\Delta y^*$ and $\Delta R^*$.

- **Step 2:** Given ICOR ($k$), marginal propensity to import ($a$), and exchange rate ($e$), investment ($I$) and imports ($Z$) needed to achieve $y^*$ are estimated.

- **Step 3:** The value of exports ($X$) are projected exogenously.
Step 4: Given Z and X and the target value of \( \Delta R^* \), foreign savings \( \Delta NFA \) needed is obtained from equation (5-5b).

Step 5: Private savings are determined after public savings are calculated.

Step 6: Savings, as derived in step 5, are checked for consistency.

Critique of the Bank Framework

The two-gap model, as formulated by Chenery and his associates, considers a structural constraint, which is the restrictive availability of foreign resources. Much of the criticism of the Bank's framework is from economists of neoclassical persuasion. Bhagwati (1966) and Findlay (1971, 1983) have criticized the model for its neglect of relative prices. As Fischer (1987) points out, the model is criticized for "assuming credit rationing in the international capital markets, for ignoring substitution possibilities, and thus underestimating the equilibrating role of the relative prices" (p.164).

Cairncross (1961), Lal (1972, 1983, 1989), and Little (1982) have been some of the most vocal critics of the two-gap (structural) approach. According to Cairncross (1961) the two-gap model assumes a fixed capital-output ratio and a "sink" theory of international capital flows. According to the sink theory, as Cairncross explains, it is assumed that rich capitalist countries save more than they can invest at home; therefore, they need to transfer the surplus savings as foreign investment, and obviously developing countries (which are assumed to have domestic savings that are less than investment needs) act as a sink. This premise of the savings gap is questionable; since Kuznets (1966) pointed out the lack of historical evidence substantiating the claim that capital flows from (rich) high saving societies to low savings countries. Moreover, the recent experience of the United States is a testimony to the fact that rich nations do not always have surplus savings.

The other aspect of the two-gap model, namely the foreign exchange constraint of the economy, has been questioned by Little (1982) and Lal (1972, 1983) on the basis of the following implausible assumptions:
• Imports of inputs are necessary for current production, and the proportion is unalterable and further substitution between the factors of production is not possible.

• Export earnings are almost fixed, either because the volume of exports is fixed by world demand and/or the export prices are always declining. On the basis of this assumption, it follows that devaluation (the increasing price of foreign exchange) will not bring about a reduction in expenditure (of the exported good) or an increase in the supply of exports.

Most economists agree that it is difficult in policymaking to decide on the binding gap a priori. However, this decision is of crucial importance. The framework assumes that an imported commodity, not produced domestically, is essential for the production of investment goods. The availability of foreign exchange is assumed to ease the purchase of imported capital goods, thus raising the growth of output. Other critics have accused the two-gap model of being static, because it is difficult to justify the assumptions of a fixed savings rate and a target growth rate. In the neoclassical world the savings gap can be closed by reducing imports or increasing exports (or both), which frees foreign exchange necessary for investment.

To counter the neoclassical critique, Gunning (1983), Waelbroeck (1984), Standaert (1985), and van Wijnbergen (1986) interpret the two-gap model as a disequilibrium model (in the tradition of Chenery). Wijnbergen (1986) demonstrates that in a two-sector model with traded and nontraded goods, if the savings gap (income-expenditure) differs from the trade gap, then the domestic goods market must be in disequilibrium. In his view, a binding trade gap corresponds to excess supply of home goods and thus leads to Keynesian unemployment, while a binding savings gap results in an excess demand for home goods and the ensuing classical unemployment.

The post-Keynesian criticism (described in chapter 4) that the transfer of foreign resources does not automatically lead to a transfer of technology is applicable to the World Bank as well. The Bank is unable to dramatically improve the growth prospects of the African
economies in spite of a transfer of funds, a case in point for the post-Keynesians.

The United Nations Economic Commission for Africa (ECA), with its report of 1989, joined the ranks of the critics of the World Bank's approach. However, the ECA's criticism is much more relevant to the Bank's new vocation in program lending than in its traditional project-lending activities. This explains why, in the ECA report, structural adjustment is treated as a simple extension of IMF stabilization programs. Basically, the ECA fully associates itself with UNICEF's (Cornia et. al. 1987) lament that the social and political consequences of stabilization and adjustment programs are only of secondary concern of the Fund and the World Bank. Otherwise, the ECA criticism falls squarely in the structuralist tradition:

While the African experience does not completely negate these principles, it illustrates, perhaps in a most profound manner, the difficulties that would be encountered if the underlying assumptions are far from reality. In the African situation, the simple truth is that many countries have moved towards freer markets without being in a position to take advantage of available market opportunities because of the low capacity to adjust their fragile production structures. The consequences of these structural rigidities are evident in many areas, but most notably in the limited capacities of African farmers to respond to price incentives without assured supplies of relevant production inputs; in the failure of domestic production to respond to new opportunities in export and domestic markets, following a currency devaluation, because of a myriad of technical and supply difficulties; and, in the slow response of savings to high interest rates (UNECA, 1989, p 18).

As Balassa (1989) points out, the World Bank during the 1980s has moved away from the two-gap model in which exports are exogenous, ICOR is predetermined, and import propensity and savings rate are given ex-ante. Under the structural adjustment programs (SAPs), the objective is to increase exports, raise efficiency levels by reducing ICOR, include policies to affect imports (and type of imports), increase real interest rates to stimulate savings, and so on. A complicated model is needed to analyze SAPs. According to Balassa, such a model has to capture the subsidy nexus of the exchange rate, import protection, and export; the distribution link between price
controls, wages, and income; the relationship between interest rates, savings, investment, and the tax system; and so on.

The fact is that the World Bank continues to use RMSM and its extensions in arriving at requirements of foreign resources in its lending operations. This is the subject of the next section.

Extensions to RMSM

In the 1980s the Bank, in addition to project finance, began program lending under which it was faced with the task of suggesting macroeconomic policy prescriptions to the developing countries. Given this change in the functions of the World Bank, there was need for the RMSM to be completed as well as updated with richer specifications. Only recently has the Bank moved to fill this void. Extensions to RMSM, called RMSM–X and RMSM–XX, are now under way.6

RMSM–X

As mentioned above, RMSM is a balance of payments and capital flows (debt) model. To the extent that estimates of import demand function, and so on, are needed, some basic national income accounts are used. There was no need for public finance or the financial (monetary) sector to be included. Since 1980, there was an increasing need to include all sectors of the economy such that the extended RMSM would facilitate macroeconomic policy dialogue with policymakers in the borrowing countries, as well as with the IMF. In other words, RMSM–X in addition to the original RMSM now includes the financial programming aspect of the Fund. Relative prices (of tradables and nontradables) are introduced through the exchange rate so that substitution effects can be analyzed. The purpose is to use the RMSM–X more as an analytical tool for policy purposes by exploring the impact of changes in assumptions, parameters, and targets. In this way, alternative scenarios can be generated. Policymakers will then have to choose and pick the most feasible scenario.

Typically, RMSM–X consists of five or six sectors.7 In this version, six sectors are specified, namely government (g), other public sector (o), the private sector (p), the banking system (d), the central bank (c),
and the foreign sector (f). Thus, there are six budget constraints, which can be represented in a matrix form (like the consistency framework of chapter 2). The national accounts (the seventh budget constraint) is derived as the aggregation of the previous six sectors and completes RMSM-X (endnote 4 in chapter 4). Four types of monetary assets exist: money (M), central bank credit (CR), a domestic bond (B), and foreign debt (F). Thus, there are four equilibrium conditions in each of the four markets.

From the national income identity, the equilibrium condition in the goods market can be rewritten as:

\[ y + Z = C_p + C_g + I_p + I_g + I_o + I_f + X \]  

where \( y, Z, C, I, \) and \( X \) denote output, imports, consumption, investment, and exports (gnsfs), respectively. Subscript \( p \) is for private sector, \( g \) for government, \( o \) for other public sector, and \( f \) for foreign sector. All the variables are measured in real terms. The left side of the equation represents the supply side of the goods market, while the right side provides a summation of demand for goods.

Money demand is given by \( M_d = v P y \), where \( v \) is the inverse of income velocity of money, \( P \) is the overall price level, and \( y \) is real output. Money supply is determined by \( M_s = h H \), where \( h \) is the money multiplier and \( H \) is the base money. The base money (H) consists of currency, deposits, and reserves of the central bank (R). The equilibrium condition in the money market is:

\[ M_s = M_d \]  

It is assumed that all the monetary assets are perfect substitutes.

On the assumption that there is only one type of foreign asset (that is, denominated in foreign currency), the equilibrium condition in the foreign asset market is:

\[ F_g + F_o + F_p + F_d + (F_c - R_c) = F_s \]  

where the demand for foreign currency of the various sectors (left side) is set equal to the supply of foreign exchange available in the
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economy (Fs). Note, however, that because the central bank may already have some reserves in foreign currency (Rc), this has to be accounted for by either adding to the right side (supply side) or netted out from the central banks’ demand for foreign currency (Fc).

The domestic assets market consists of two assets, namely bonds and central bank credit. The equilibrium conditions for the bond market is given by:

\[ B_g + B_o = B_p + B_d \] (5-9)

where the left side represents the supply of bonds basically from the central government (including the other public sector). The demand for these government bonds (the right side) is from the private sector and the banking sector.

Similarly, the equilibrium condition for the central bank credit is given by:

\[ CR_s = CR_g + CR_o + CR_d \] (5-10)

where the supply of credit (CRs) is set equal to the demand for central bank credit from government (including the other public sector) and the banking sector.

In addition to these identities, RMSM–X (like RMSM) has the following relationships:

- The relationship is between ICOR, investment, and growth rate.
- Import demand is a function of output, taking into consideration the income elasticity of imports.
- Consumption depends on the marginal propensity to consume and disposable income.
- Foreign investment and foreign borrowing in dollars and exports are treated exogenously.

RMSM–X also facilitates in specifying some behavioral equations, such as a consumption function for the private sector, export and import equations, or a money demand function.
The objective of RMSM--X is to find fiscal, monetary, and exchange rate policies that are consistent with macroeconomic policy objectives. The solution is recursive, because RMSM--X is basically a planning model. The following steps may be helpful in the programming:

- **Step 1**: Set the targets for the rate of inflation, potential GDP growth rate (evaluated at full employment), real exchange rate, real interest rate, and international reserves (specified in months of imports).

- **Step 2**: The potential growth rate, together with the predetermined ICOR, will provide an estimate of the investment requirements. The potential growth rate is then adjusted for the projected capacity utilization to determine the actual growth rate.

- **Step 3**: The demand-side relationships are calculated after the projections of exogenous variables.

- **Step 4**: The demand for foreign credit of different sectors is projected as a percentage of nominal GDP. Then the foreign reserve requirements by the central bank are calculated for an exogenously given target of imports (in months of reserves). Given the demand for foreign credit and knowing the supply of foreign credit (a residual from BOP module), the amount of foreign borrowing needed by the authorities (government/central bank) can be determined.

- **Step 5**: The targets for inflation and output growth rate determine the growth of money supply from equation (5-7) above. (This assumes information on velocity of money, reserve requirements on deposits by the central bank, currency to deposits ratio, and the money multiplier.) The amount of domestic credit demanded and to be supplied can be determined in the monetary sector.

- **Step 6**: The residual in the goods market is government consumption; amount of foreign borrowing is the residual in balance of payments; and credit from the central bank to other
nonfinancial public enterprises is a residual from the other public sector budget constraint.

**RMSM-XX**

RMSM-XX is a further extension of RMSM-X in the sense that it not only facilitates econometric estimation of consumption, investment, and import demand functions but also allows other complex relations to be specified. These relations include a function of price-formation in the structuralist tradition: prices are linked to wage-costs through a markup (determining profits). The real wage is then a function of the level of employment, which in turn affects the production function. Moreover, the supply side of the economy is given special consideration. The solution method in RMSM-XX is simultaneous equation; this comes closer to a macroeconometric model of an economy.

The demand side has the following equations in real terms:

\[ C_p = C_p(r, y_{DP}) \]  \hspace{1cm} (5-11)

\[ I_p = I_p(r, y_p) \]  \hspace{1cm} (5-12)

\[ X_p = X_p\left( e \frac{p^*}{p}, Y^* \right) \]  \hspace{1cm} (5-13)

\[ Z_p = Z_p\left( \frac{p_z}{p}, y_p \right) \]  \hspace{1cm} (5-14)

where \( y_{DP} \) is the real disposable income of the private sector, \( r \) is the real interest rate (and is equivalent to the nominal interest rate minus the expected inflation rate of the next period), \( p^* \) is the foreign price of goods and services that compete with exports, \( Y^* \) is foreign income, \( e \) is the nominal exchange rate, \( p_z \) is import prices, and \( p \) is the domestic price level. Equations (5-11) through (5-14) are the specifications for consumption, investment, exports, and import demand.
The supply side of the economy has the following equations. The total output is given by production in both the private sector ($y_p$) and the public sector ($y_g$).

\[ y = y_p + y_g \]  \hspace{1cm} (5-15)

The price of the composite good is determined, following Kalecki (1971)

\[ P = (1 + t)W \]  \hspace{1cm} (5-16)

where $W$ is the nominal wage rate and $t$ is a fixed markup over unit labor costs. The real wage can be obtained by deflating the nominal wage rate with a price index of a basket of consumer goods. A real-wage resistance is assumed (a la post-Keynesians); thus, real wage is a function of the level of employment. This neatly ties in with the estimation of income at full employment by a production function with two factors: labor and capital. The next chapter explains the structural model with the underlying assumptions. Currently, the Bank is trying to construct country-specific macroeconomic models. In this regard, suggestions made in chapter 6 may be helpful.

**Endnotes**

1. As in chapter 2, GDP = C+I+X-Z; also GDP = C+S. Therefore, I-S=Z-X. These are the two gaps: the savings gap and the trade or foreign exchange gap.

2. The complete Bank model consists of nine equations. These are the identities (2-1) through (2-8) and (2-10) derived in chapter 2 (see below). In the presentation that follows, we have simplified the framework considerably by (1) consolidating indirect and direct taxes, (2) eliminating the operating surplus of government owned enterprises, and (3) suppressing interest payments and net transfers. The focus in the Bank's analysis is on identities (2-4) and (2-7).

\[
\begin{align*}
(2-1) & \quad S_g = I_g + \Delta NF A_g - \Delta D C_g - \Delta N P B_g \\
(2-2) & \quad S_p = I_p + \Delta N F B_g + \Delta N F A_p + \Delta M - \Delta D C_p \\
(2-3) & \quad CA = - (\Delta NF A_g + \Delta NF A_p + \Delta R )
\end{align*}
\]
(2-4) \[ Ymp = C + I + X - Z \]

(2-5) \[ Yg + \Delta NPBg + \Delta DCg = Cg + \Delta NTRgp + \Delta Tgp + \Delta Tge + Ig + \Delta NFAg \]

(2-6) \[ YgpCp - Td - INTpe - Ip = \Delta M + \Delta NPBg + \Delta NFAp = \Delta DCp \]

(2-7) \[ (Z + INTge + INTpe) - (X + NTReg + NTRep) = -(DNFAp + DNFAg + DR) \]

(2-8) \[ \Delta R = \Delta M - (\Delta DCp + \Delta DCg) \]

(2-10) \[ Sg + Sp + CA = Ip + Ig \]

3. The following is based on Khan, et al. (1990).

4. Note that with the suppression of interest payments and net transfers, \(Z - X\) is the current account balance (CA) or foreign savings. Thus, it is identical to \((\Delta NFB - \Delta R)\). This can be seen from equations (2-7) and (2-3) in chapter 2.

5. Step 6 is crucial to satisfy the savings-investment balance needed to achieve the targeted growth rate.

6. The discussion on RMSM-XX and RMSM-XXX are based on Luc Everaert et. al. (1989); Serven and Ventura (1989).

7. In practice, RMSM-XX has many more sectors, because each of the six basic sectors can and are further disaggregated.

References


Beginning with the building blocks of national income accounting of chapter 2, an attempt was made in chapters 4 and 5 to present the Fund and Bank models in terms of simple economic relationships and national income identities. The purpose of this chapter is to continue in this direction by presenting alternative models that are no more than mere manipulations, reinterpretations, and integration of equations already developed in earlier chapters. The reader will notice that simple macroeconomic models can be constructed, starting from a consistency framework with a set of sectors for each of which there exists a budget constraint (called identities). The identities may then be integrated with a set of behavioral equations (relationships depending on the existing economic theory and the modeler’s assessment of the structure of the economy) and parameters. The values of the parameters can be predetermined from historical data.

In presenting alternative models, a convenient starting point is to merge the frameworks of World Bank and IMF. This merged Bank-Fund model is based on Khan and Montiel (1989). The next model, one of reciprocal conditionality, is a reworking of the identities developed earlier, coupled with a few assumptions that may be more realistic. The final section discusses the three-gap model, which rewrites the savings and trade gaps by introducing a third gap: the fiscal budget gap. It also highlights some of the basic relationships of a structuralist model.

The Merged Bank-Fund Model

The 1980s witnessed increased collaboration between the World Bank and the IMF in their conditional lending to developing countries. It soon became clear that for stabilization and adjustment
purposes, the demand side and the supply side needed to be integrated into a consistent framework linking government policies and availability of foreign resources to targets, such as growth, inflation, and the balance of payments. This is known as “growth-oriented adjustment” programs and involves merging the Fund’s monetary model of balance of payments with the Bank’s two-gap approach.

Khan and Montiel (1989) have attempted to do this. They begin with the now familiar macroeconomic framework (see chapters 4 and 5). It is assumed that the country is a small open economy maintaining a fixed exchange rate, and that the private sectors own all factors of production. For the sake of brevity, we rely on relationships already developed in chapters 4 and 5. However, there are some differences between the analysis of this section and earlier chapters. First, all international transactions are made a function of the nominal exchange rate \( e \). Second, borrowing from abroad \( e \Delta \text{NFB} = e \Delta \text{NFBp} + e \Delta \text{NFBg} \) is permitted. This necessitates the payment of interest on external debt \( i e \text{NFB} = i e \text{NFBp} + i e \text{NFBg} \); interest payments by private and public sectors, where \( i \) is the interest rate on foreign borrowing and \( e \), as above, is the exchange rate. Third, since this is an open economy macroeconomic model, we need to distinguish between the gross domestic product, GDP \( y \) and the gross national product, GNP \( Y \).

From equation (4-10c) of chapter 4, we know that the change in reserves will depend on the demand for money, variations in income, and domestic credit creation in the economy. As before, the velocity of money is assumed to be constant over time. Note that \( v \) is the inverse of the velocity of money, as in the previous chapters. The only difference here is that exchange rate \( e \) plays a role in conversion of international reserves \( AR \) into local currency.

\[
e\Delta R = v\Delta P\overline{y}_{t-1} + vP\Delta \overline{y} - (\Delta DCp + \Delta DCg)
\]

Similarly, equation (4-3) of chapter 4 provides us with a balance of payments relationship

\[
e\Delta R = X(e) - Z(Pz, PD, y, e) - ie\text{NFB} + e\text{NFB}
\]
where exports \((X)\) is a function of the exchange rate with a positive relationship between the two; imports \((Z)\) is negatively related to import prices \((P_z)\), positively related to the price of home goods \((P_D)\), positively related to real GDP \((y)\), and negatively related to the exchange rate \((e)\); i.e. \(\Delta NFB\) is interest payments on external debt; and \(e \Delta NFB\) is new borrowing from abroad. Equation (6-2) introduces the constraint of the external sector as the difference between foreign exchange receipts and payments.

Again, from chapter 4 equation (4-7b), we know that changes in the price level are weighted averages of changes in the price of importables and the price of domestic goods.

\[
\Delta P = (1 - \Theta) \Delta P_D + \Theta \Delta P_z \tag{6-3}
\]

where \(P_D\) is the price index of home goods, \(P_z\) is the price of imports measured in foreign currency, and \(\Theta\) is the share of imports in the overall price index.

From equation (5-1) of the Bank's model in chapter 5, we know that growth of real GDP \((\Delta y)\) is related to ICOR \((k)\) and total investment \((I)\).

\[
\Delta y = \frac{1}{k} I \tag{6-4}
\]

Because this is an open economy, nominal GNP \((\tilde{Y})\) differs from nominal GDP \((Y)\) by the amount of interest payments on external debt \((i.e. \text{NFA})\) and net factor payments \((\text{NFPep})\). This equation is presented below to complete the model.

\[
\tilde{Y} = Y - i\text{eNFA} + \text{NFPep} \tag{6-5}
\]

Equation (6-5) can be converted into a difference equation \((\Delta \tilde{Y})\) to be consistent with other equations of the model.

From equation (5-3) of chapter 5, we have the national income identity rewritten as:
I = (y - T - Cp) + (T - Cg) + (Z - X) \quad (6-6a)

Note that in equation (6-6), only real GDP (y) is in real terms while all the other variables are in nominal terms. So we convert all variables in real terms by dividing throughout by P, the overall price index. Also, as in equation (6-1) above, we express imports (Z) and exports (X) as implicit functions of the exchange rate.

\[ I = s_p(y - t) + (t - c_g) - x(e) + z(y, e) - \left( \frac{ie - \Delta NFB}{P} \right) \quad (6-6b) \]

where real total investment (I) is related to private savings (s_p), public savings (t - c_g - ieF), foreign borrowing (e ΔNFB), and the trade gap.

Substitution of equation (6-6a) in (6-4) yields a relationship of real GDP growth with savings, taxes, government spending, exchange rate, foreign borrowing, and interest payments on external debt:

\[ \Delta y = \frac{1}{k} \left( s_p(y - t) + (t - c_g) - x(e) + z(y, e) - \left( \frac{ie - \Delta NFB}{P} \right) \right) \quad (6-6c) \]

Equations (6-6b), (6-1) through (6-3), and (6-5), when solved, can provide us with solutions for the four endogenous variables of the model: inflation, balance of payments, and growth of real GDP and real GNP (see table 6.1 for structure of the model).

**Table 6.1 Structure of the Bank-Fund Merged Model**

<table>
<thead>
<tr>
<th>Endogenous variables</th>
<th>Exogenous variables</th>
<th>Predetermined variables</th>
<th>Policy instruments</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \Delta y )</td>
<td>( \Delta NFA )</td>
<td>( y_0, x_0, z_0 )</td>
<td>t</td>
<td>k</td>
</tr>
<tr>
<td>( \Delta y )</td>
<td>i</td>
<td>( F_0, R_0 )</td>
<td>( \Delta e )</td>
<td>s</td>
</tr>
<tr>
<td>( \Delta P )</td>
<td>( \Delta P )</td>
<td>( P_0 )</td>
<td>g</td>
<td>v</td>
</tr>
<tr>
<td>( \Delta R )</td>
<td>( \Delta DC, \Delta DCp )</td>
<td>( \theta )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Subscript o represents the value of the variable in the initial year.*
The analytical solution to the model provides us with the results found in table 6.2. This table shows the signs of the effects on main endogenous variables due to changes in policies, parameters, and exogenous variables. Some of the effects are already familiar from earlier chapters. In summary, from equation (6-1), an increase in domestic credit will result in deterioration in reserve position ($\Delta R$), other things remaining the same. Similarly, equation (6-1) postulates a positive relationship between changes in domestic credit ($\Delta DC$) and changes in the price level ($\Delta P$), as well as changes in real output ($\Delta y$).

From equation (6-3), an increase in exchange rate ($\Delta e$) will result in higher import prices ($P_i$), which will positively affect the overall price level. In turn, through equation (6-6c) real output ($\Delta y$) will be negatively affected. From equation (6-2), an increase in the exchange rate will result in an increase in reserves ($\Delta R$). Other things remaining the same, an increase in government expenditure ($\Delta cg$) will result in a reduction in real output as in equation (6-6c), and also as in equation (6-6a). The impact of an increase in government expenditure on the balance of payments is, however, ambiguous since an increase in government spending implies an increase in domestic absorption resulting in a further deterioration of the balance of payments. On the other hand, a reduction in real output because of lower investment, as in equation (6-6a)—the results of an increase in government expenditure—will have the effect of reducing the need for imported inputs, which may improve the balance of payments position.

From equations (6-6b) and (6-6c), an increase in private savings ($s_p$) will have a positive effect on investment ($I$) and therefore, real output ($\Delta y$). In turn, an increase in real output will result in a lower overall price level from equation (6-1). The impact on the balance of payments is difficult to determine.

From equations (6-2) and (6-6b), an increase in capital inflows will help increase total investment and result in higher real output. In turn, through equation (6-1), the prices will decline.

As in the extensions of RMSM (see chapter 5), this simple model can be extended to include different financial assets, both the demand and supply aspects of these assets, which will determine the domestic interest rate. The relationship between the central bank, the fiscal
Other Useful Models

Table 6.2 Effect on Endogenous Variables

<table>
<thead>
<tr>
<th>Effects of increases</th>
<th>Domestic prices $\Delta P$</th>
<th>Real output $\Delta y$</th>
<th>Balance of payments $\Delta R$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic credit ($\Delta DC$)</td>
<td>$&gt; 0$</td>
<td>$&gt; 0$</td>
<td>$&lt; 0$</td>
</tr>
<tr>
<td>Exchange rate ($\Delta e$)</td>
<td>$&gt; 0$</td>
<td>$&lt; 0$</td>
<td>$&gt; 0$</td>
</tr>
<tr>
<td>Government spending ($\Delta cg$)</td>
<td>$&gt; 0$</td>
<td>$&lt; 0$</td>
<td>?</td>
</tr>
<tr>
<td>Private saving rate ($\Delta sp$)</td>
<td>$&lt; 0$</td>
<td>$&gt; 0$</td>
<td>?</td>
</tr>
<tr>
<td>Capital inflows ($\Delta NFA$)</td>
<td>$&lt; 0$</td>
<td>$&gt; 0$</td>
<td>?</td>
</tr>
</tbody>
</table>

1. Matched by an offsetting change in imports.

... sector, and the domestic banking sector should also be formalized. Capacity utilization may be introduced to determine growth. Capital flows have to be endogenized—as Balassa (1988) points out—but this needs a theory of capital flows. This model can be extended or modified, taking into consideration the structure of the economy.

Model of Reciprocal Conditionality

The debate over the policy prescriptions of the Bank and the Fund in stabilization and adjustment programs has provided new concepts such as “asymmetric adjustment” and “asymmetric conditionality.” Among other arguments, the critics of the Bank-Fund programs charge that the frequency of failed reform efforts is high because of the underfunding from the lenders. The burden of adjustment is unfairly imposed on the borrowers (developing countries), while the lenders (developed countries and international financial institutions) are not accountable for the disbursement of funds already committed at the time of loan agreements. In other words, borrowers should rightfully impose a reciprocal conditionality on the lenders in an attempt to monitor the lenders’ performance. Bacha (1987) shows how a simple manipulation of the equations in chapters 2 through 5...
provides a framework for not only estimating the requirements of foreign resources (as in the two-gap model in chapter 5) but also imposing this reciprocity for foreign creditors. If the requirement is not met, then the borrowing country should be automatically entitled to either an increase in drawings from the international financial institutions or having the interest payments due on foreign creditors’ outstanding external debt capitalized, thus making sure that the required foreign exchange is available during the process of reforms (Bacha 1987, pp. 1464–65).

From equation (5-1), we know that

$$\Delta y = \frac{1}{k} I$$  \hspace{1cm} (6-7a)

where $k$ is ICOR, $\Delta y$ is variations in nominal income, and $I$ is total investment. To convert equation (6-7) into proportions, divide throughout by $y$.

$$\frac{\Delta y}{y} = \frac{1}{k} \frac{I}{y}$$  \hspace{1cm} (6-7b)

From the discussion on two-gap models it follows that total investment ($I$) is equal to sum of domestic savings ($S = S_p + S_g$) and foreign savings, where foreign savings is the sum of the changes in foreign borrowing of the domestic economy ($\Delta NFB = \Delta NFB_p + \Delta NFB_g$) less the accumulation of international reserves ($\Delta R$).

$$I = S + \Delta NFB - \Delta R$$  \hspace{1cm} (6-8)

Equations (6-7a) and (6-8), after reshuffling, yield:

$$\Delta NFB = y \left( \frac{1}{k} \frac{\Delta y}{y} - \frac{S}{y} \right) + \Delta R$$  \hspace{1cm} (6-9)

This equation is the “savings gap.” It provides an estimate of the requirement of foreign resources needed to achieve a targeted growth
rate $\frac{\Delta y}{y}$, after taking into consideration the domestic savings $\frac{S}{y}$, accumulation of international reserves ($\Delta R$), and the ICOR.

From equation (5-5a) it is known that changes in foreign asset accumulation is equal to the sum of surplus from the current account, exports ($X$) - imports ($Z = ay$) and changes in international reserves ($\Delta R$). As in chapter 5, $a$ is the propensity to import.

$$\Delta NFA = X - ay - \Delta R \quad (6-10)$$

Substituting for $y$ from equation (6-7) and rearranging the terms:

$$\Delta NFA = y\left(\frac{X}{y} - ak \frac{1}{\Delta y} \frac{\Delta y}{I} \right) - \Delta R \quad (6-11)$$

This equation establishes the foreign exchange gap relating the target GDP growth, from equation (6–7), and foreign resources needs, taking into consideration the propensities to export ($X$), import ($a$), ICOR ($k$), and the targeted accumulation of international reserves.

Equations (6-9) and (6-11) provide two estimates of foreign credit needed to sustain a targeted GDP growth rate. Bacha (1987, p. 1465) suggests that the higher of these values be incorporated as an additional variable into the financial exercises of the Fund. These values of foreign resource needs will serve as a “performance criteria for foreign creditors, the violation of which would entitle the program country to an automatic increase in its drawings either from the IMF or the World Bank, if not to an automatic capitalization of the interest due on its outstanding external debt.”

A Three-gap Structural Model

The analysis presented in the above sections revolved around a two-gap framework. In this section, the two-gap framework is extended to include a third gap: that of a fiscal gap between government revenues and expenditures (see Bacha 1990). In addition,
following the structuralists (Kalecki, Taylor, Ardia, Bacha, and Solimano, among others), a model of a developing country with some structural features is explored. Such a model incorporates a rudimentary class analysis in the form of three functional groups: wage earners, profit recipients, and foreigners. A simple markup rule linking nominal wage rates to costs, including the cost of critically needed imported inputs in production, determines the price formation (inflation theory). The markup rate determines the profit rate. Note, however, that the model emphasizes the real side of the economy.

The analysis begins with the presentation of three gaps. These gaps are then linked to the potential GDP growth rate. Structural features are then introduced to complete the model. The policy implications on income distribution are highlighted.

As before, the national income identity can be rewritten as:

\[(Y - C) + (T - G) + (Z - X) = I \tag{6-12}\]

where \(Y\) is output (GDP), \(C\) is total consumption, \(T\) is direct taxes paid by the private sector to the government from which the government expenditure is \((G)\), \(Z\) is total imports (gnfs), \(X\) is exports (gnfs), and \(I\) is total investment. To be more realistic, one can introduce interest payments on external debt (INT), differentiate between government consumption \((Cg)\) and investment \((Ig)\), and disaggregate imports into imports of consumer goods \((Zc)\), intermediate inputs \((Zi)\), and capital goods \((Zk)\).

\[
(Y - C_p - INTpe) + (T - C_g - INTge) \\
+ (Z_k + Z_i + Z_c - X + INTpe + INTge) = (Ip + Ig) \tag{6-13a}
\]

Here the private sector savings \((Sp)\) is equal to \((Y - C_p - INTpe)\), net of direct taxes. Public sector savings \((Sg)\) is the difference between government revenues and expenditure on government consumption and interest payments on public borrowed external debt. Thus, \(Sg\) is equal \((T - C_g - INTge)\). The difference between public investment \((Ig)\) and public savings \((Sg)\) is called the public sector borrowing requirement. External sector savings \((Sf)\) is the difference between
foreign exchange used to pay for total imports \((Z=Z_k+Z_i+Z_c)\) and interest payments on external debt of both private and public sectors \((\text{INT}_{p} + \text{INT}_{g})\) and foreign exchange earned from total exports \((X)\). Foreign savings \((S_f)\) is the deficit in the current account balance.

From equation (2-7) it is known that:

\[
Z - X = \text{net foreign inflows (ANFB)} - \text{change in reserves (AR)} - \text{net factor payments to abroad} \tag{6-13b}
\]

This identity can be also be called as the equation of foreign transfers.

Therefore, the model has three gaps: the trade gap, the savings gap, and the fiscal gap. The savings constraint for the whole economy is then given by:

\[
(I_p + I_g) = S_p + S_g + S_f \tag{6-14a}
\]

Note that from equation (6-13a), the sign of \(S_f\) is positive whenever the current account balance is in deficit.

Equation (6-14a) is normalized with the level of potential GDP \((Y^*)\) as in (6-14b) below. Such a representation enables a linking of the savings constraint with the potential growth rate of an economy.

\[
\left( \frac{I_p + I_g}{Y^*} \right) = \left( \frac{S_p + S_g + S_f}{Y^*} \right) \tag{6-14b}
\]

From equation (6-7b) we know that the growth rate of the GDP is linked to the ICOR and the proportion of total investment to potential GDP. Thus,

\[
\frac{\Delta Y^*}{Y^*} = \frac{1}{k} \left( \frac{I}{Y^*} \right) \tag{6-15}
\]

where \(I = I_p + I_g\). Equations (6-14b) and (6-15) provide us with estimates of potential GDP growth that is consistent with the savings constraint. Together with equation (6-14a) they also provide us with the following general conclusion: for a country to reduce its current account deficit—for example in order to lower its debt-income ratio—
investment may be negatively affected if the private savings ratio does not increase and the fiscal deficit is not reduced. A cutback in private consumption may, however, be difficult because of the "ratchet effect," while pressure from interest groups may prevent the reduction of the fiscal deficit. Thus, the debt crisis has a negative effect on investment and output growth.

Following Kalecki (1971), the class analysis can be modeled in terms of wage earners versus profit recipients, workers versus capitalists, agriculturists versus non-agriculturists, domestic investors, versus foreign investors, and so on. However, by disaggregating production costs into wage bill, profits, and costs of imported inputs, a third class, say "foreigners," is implicitly introduced in the analysis. In the tradition of Kalecki it is assumed that:

- Commodity output is not limited by available capital stock or capacity.
- Final goods prices are determined from variable costs by a simple markup rule defined over prime cost of labor and imported intermediates, which are critical in production.
- Interest rates, tax rate, and wage rate or markup rate can be incorporated in the analysis, and these will drive up the price level.
- Nominal wage rate $w$ is fixed at any time and is the outcome of a history of bargaining and class struggle.
- Firms operate under oligopolistic conditions; hence, the markup rule.

Production costs are disaggregated into the cost of imported intermediate inputs, labor costs, and profits. Interest charges and taxes can also be introduced, but for the sake of simplicity they are ignored. Costs per unit ($B$) is given by:

$$B = Wb + e P^* a$$  

(6-16)

where $W$ is the money wage rate, $b$ is the labor-output ratio, $e$ is the nominal exchange rate (price of foreign currency in domestic currency), $P^*$ is the price in foreign currency of imported
intermediate inputs, and \( a \) is the input-output coefficient of foreign inputs (that is, foreign input component of a unit of output). In equation (6-16), \( W_b \) is the wage bill, and \( e P^* a \) is the cost of imported intermediate inputs in domestic currency. Nominal devaluation (an increase in \( e \)) will raise the domestic currency cost of imported inputs.

The price level \( P \) will be given by adding a markup rate to the per unit price cost.

\[
P = (1 + q)(W_b + e P^* a)
\]

where \( q \) is the markup rate and is assumed to be constant. As mentioned above, interest rate and tax rate can be introduced, in addition to the markup rate. These will merely drive up the overall price level. Nominal devaluation by increasing the domestic currency cost of imported inputs will result in a higher price level.

The model can be closed using the equation of exchange, according to which:

\[
MV = Py
\]

where \( M \) is the money supply, \( V \) is the velocity of money, \( P \) is the overall price level, and \( y \) is output. With \( V \) assumed to be an institutional constant, money is supposed to play a passive role of facilitating exchange of goods (output) among the people in the economy.

To obtain the real wage \( \frac{W}{P} \), divide both sides of equation (6-17) by the price level \( P \). The real wage can be written as:

\[
\frac{W}{P} = \frac{1}{B} \left( \frac{1}{1+q} \frac{aeP^*}{P} \right)
\]

Equation (6-19) provides a negative relationship between the real wage rate and the real exchange rate \( \frac{eP^*}{P} \) given the constant markup rate and coefficients of input-output (that is, labor-output ratio and
imported input-output ratio). The policy of nominal devaluation (an increase in $e$) will reduce real wages through an increase in the price level. Because the workers have some control over the money wage rate ($W$), there will be a tendency for workers to push for faster increases in the money wage. Such a phenomenon is called wage inflation. However, the Bank-Fund programs suggest that money wage rates be held down. The reduction in real wages means higher profits to producers and, therefore, will result in further skewing the income distribution between these two classes.

The rise in general prices will reduce the real value of money balances—(equation (6-18)—which will then lead to a reduction in total expenditure, either consumption or investment, or both, as in equation (6-13a).

Devaluation raises the price (in domestic currency) of imported capital goods ($Z_k$) and imported inputs ($Z_i$), as in equation (6-13a). Thus, total investment, in real terms, declines. This is true, especially if credit in nominal terms to the private and the public sectors is kept constant (which means interest rates are higher). The situation of declining real investment is compounded by rising interest rates.

Equation (6-13a) can also provide a clue as to why the fiscal deficit ($T - C_g - INT_{ge}$) is worsened after a devaluation. Devaluation raises the domestic currency value of the government's external debt service payments. In other words, the fiscal gap has now increased. The widening of the fiscal gap is exacerbated if the public sector also imports (as is usually the case), because the domestic currency value of these imports has increased because of a devaluation. To keep the budget deficit within reasonable bounds, the government is locked into a position of cutting back on its expenditures (especially investment). However, note that devaluation boosts the income of domestic exporters, which can bring in higher tax revenues (from exporters) to the government. This may alleviate the budgetary imbalance.

According to this analysis, foreigners would definitely benefit from a devaluation. For in terms of resource transfers, the net effect is that more goods are flowing toward the foreign economy from the domestic economy.
Equation (6-18) also shows an inverse relationship between the real wage and the markup rate \((q)\), given the real exchange rate and constant coefficients of input-output. Any increase in markup rate, by driving up general prices as in equation (6-17), will lower the real wage rate.

From equations (6-13a) and (6-13b), it can be said that if there is a reduction in foreign transfers (for whatever reason), the domestic economy should be able to generate additional savings (either from private or public sectors) to maintain the existing level of total investment. Otherwise, it faces stagnation and unemployment. Because the fiscal budget of developing economies is usually in deficit, total investment, instead of consumption, is cut back. Another option for the government is to have inflationary financing of public investment. Sooner or later this policy has the potential of hyperinflation. Another possibility is for the government to use the international reserves (if any) until they are exhausted, at which stage public sector investment has to be cut off. It is likely that at this stage foreign exchange controls may be introduced.

In summary, the model consists of five equations: savings constraining investment [equation (6-14b)], and investment influencing the potential GDP growth [equation (6-15)], the relationship between prices, the real wage, and the real exchange rate [equations (6-17) and (6-19)], and the equation of exchange [equation (6-18)]. The financial aspects of the model can be reinforced by introducing various financial aspects. The supply and demand of these financial assets will determine the domestic interest rates, as shown in chapter 5.

Conclusions

This document began by pointing out that the design of an economic model is influenced by the statement of economic problems and the policy objectives to be pursued; the identification of the essential features (characteristics) of the economy—and for open economies, the modeler's perception of the nature of the world economy—and the major constraints to be captured by the model; and the use of economic theory—including specific behavioral assumptions that may be made—which posit directions of causality
and thus identify specific instruments that may be used to achieve given objectives.

We further pointed out that a lack of consensus on any of these (policy objectives, essential characteristics and basic constraints, and economic theory) will not only lead to different model specifications and different policy instruments to be privileged, but to different derivations of the likely impact of given policies as well.

The bulk of the critiques of the Fund and the Bank approaches that were presented in chapters 4 and 5 demonstrate that there is scope for legitimate differences of opinion to exist on the essential characteristics of the economies of developing countries and the world economy. It is in this sense that we interpret Taylor's lament of the Fund's incomplete description of an economy, the ECA's characterization of African economies as being fraught with structural rigidities, the admonition by the heterodox approach of the Fund and Bank for ignoring the role of inertia and expectations in inflation, and so on. Chapter 6 demonstrated, however, that where differences between modelers neither pertain to policy objectives nor to economic theory, it is important to refine the models to capture the features of the economy, which may have been ignored.

The critique of the dependency school of the Bank and Fund approaches is, among other things, a critique of the theoretical foundations of the Bank-Fund models. Basically the school denies that economic value can be created by any factor of production other than labor; that profits are the just rewards for entrepreneurship and risk-taking; that wages (or for that matter, the return to any factor of production) reflect the marginal productivity of labor (of that factor of production); that economic relations between countries is dictated by the pursuit of comparative advantage, which leads to all nations being better off as a result of free trade; and that it is possible to comprehend economic phenomenon and socioeconomic evolution without a class analysis. To the extent that the difference between this school and the Bank and Fund is also of a theoretical nature, therefore, accommodation is much more difficult.

In the area of policy objectives, accommodation is equally difficult where divergences exist. For example, the Fund (especially) and the Bank have been accused by many developing country policymakers
of being preoccupied with the achievement of internal and external macroeconomic balances to the neglect of longer term development objectives. In other words, and to the extent that the accusation is true, the Bank and the Fund attach more importance to promoting a sustainable balance of payments and to reducing budget deficits than to promoting economic growth and transformation. The models in chapters 4 and 5 indeed established that there is a tradeoff between absorption (domestic consumption and investment) on the one hand, and the budget deficit and the external balance on the other. Thus, this suggests that the Bank and the Fund tend to have reform agendas that are biased in favor of demand management rather than of policies to increase the levels of investment and thus economic growth and transformation.

Finally, even where complete agreement on objectives, essential characteristics, and economic theory exists, subtle differences of emphasis in the interpretation of the implications of a model could well lead to breakdowns in the dialogue between the Bretton Woods institutions and the governments of developing countries. The reciprocal conditionality approach (described in chapter 6) revealed that the same model that is used to estimate credit ceilings on public sector borrowing, the rate of devaluation, and so on, can also be used to estimate the foreign resource requirement for a given adjustment program. To the extent, therefore, that differences in emphasis may lead to make or break conditionalities being attached to actions by the borrower, and none to essential actions by the creditor, we have yet another area where legitimate differences of opinion can, and often do, exist.

**Endnotes**

1. Bacha (1987) is another who attempts to integrate the flow of funds approach with two-gap growth models.

2. Khan and Montiel (1989) also introduce central bank profits that are transferred to the government. To keep the model simple, we have ignored this.

3. The detailed mathematical derivations are beyond the scope of this monograph, but interested readers may refer to Khan and Montiel (1989).
4. A structural feature than can be incorporated here is the "crowding-in" hypothesis. If it is assumed, as in the crowding-in hypothesis, that there is complementarity between government and private investment, then we could express private investment as:

\[(6-14b) \quad I_p = \alpha I_g\]

where \(\alpha\)—the crowding in factor—is strictly positive.

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