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Analytical and Methodological Issues in the Measurement of Fiscal Deficits

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Abstract

This paper surveys various measures of the fiscal deficit. Issues addressed include: the definition of the deficit in a public sector of a given coverage (the conventional deficit, the current deficit, the domestic deficit, the operational deficit, etc.); the coverage and composition of the public sector; and present value approaches to deficit measurement.

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Summary

This paper surveys various measures of the fiscal deficit and discusses three main concerns relevant to measurement.

First, the deficit needs to be defined for a public sector of a given coverage. Thus, the criteria underlying the conventional deficit measure are discussed, together with some basic problems of definition (the treatment of net lending, grants, arrears, etc.). While the conventional deficit may be a useful measure of government financing needs, other deficit specifications (such as the current deficit, the domestic deficit, or the operational deficit) may provide more useful indicators for policy analysis. Attempts to measure the fiscal stance can also be appropriate.

Second, the coverage and composition of the public sector may have a significant impact on the size of the measured deficit. Appropriate treatments in the budget deficit are delineated for public enterprises, the quasi-fiscal deficit of the central bank, and the operations of the public financial sector.

Finally, though deficits are almost always measured on an annual basis, there are valid economic arguments for making an intertemporal, present-value calculation of the deficit. Such an estimate could be used to assess the sustainability of fiscal policy and the solvency of government. However, as is evident in the paper's description of attempts to measure the various components of the government balance sheet, development of an operational present-value specification of the deficit is still far away.

In sum, there are many useful measures of the fiscal deficit, but none is perfect.

"A budget deficit is like sin. To most of the public it is morally wrong, very difficult to avoid, not always easy to identify, and susceptible to considerable bias in measurement" (Eisner, 1984).

I. Introduction

When the public sector runs a deficit, it must be financed by the private sector or by the rest of the world. The balancing of the public sector's requirements with both the financing needs of the private sector and sustainable trading relations with other countries is a crucial element of fiscal policy in the pursuit of stability and growth. In practice, however, fiscal policies may fail to achieve government objectives because conventional measures of the deficit miscalculate the public sector's true budget constraint. The correct measurement of the public sector's net requirements is, therefore, a vital prerequisite for diagnosing economic problems and finding appropriate fiscal policies to address them.

The fiscal deficit has to be measured in three dimensions: (1) it must be defined for a public sector of a given coverage; (2) the coverage, or size, of the public sector, and its composition must be specified; and (3) the time-horizon relevant for assessing the magnitude of the deficit must be identified. 1/ Issues falling into these three categories have generated a substantial literature, which represents a methodology for assessing the true scope and consequences of fiscal policy. The purpose of this article is to provide an analytical survey of some of the issues covered in this literature.

Although the measurement of fiscal policy may be important mainly because of its macroeconomic consequences, the focus of this survey is not on analyzing the impact of the fiscal balance on the rest of the economy but rather on the methodological aspects of measuring it. Even within the confines of measurement issues, the survey has to be selective and, sometimes, draw arbitrary lines. Because they have already been the subject of exhaustive surveys (or because they merit

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1/ Although most of the issues discussed here apply to positive as well as negative imbalances in the public sector, this paper refers mainly to "deficits," in line with the terminology usually used in the literature. See, for example, Boskin (1982), p. 296.

such treatment), some subjects have purposely been excluded from detailed coverage. 1/ Issues covered are dealt with according to the three dimensions outlined above. Section II addresses basic definitional issues often forgotten when using a conventional budget deficit measure. Section III discusses different measures of the deficit that have been considered appropriate as policy tools in various contexts. Section IV deals with the scope and coverage of the public sector that is relevant for economic analysis. 2/ Section V is concerned with the intertemporal dimensions of public sector activities and their reflection in the government "net worth" concept.

II. The Conventional Public Sector Deficit

The impact of fiscal policy can be assessed with respect to any time frame. Nevertheless, the deficit has tended to be viewed as a summary of government transactions during a single budget period--usually one year--without attention to their longer-run implications. These short-run measures of the deficit are discussed first.

Such measures fall into two categories: variants of the "accounting" deficits that country authorities refer to in their budgets (discussed in this section); and more analytical refinements of the conventional deficit (covered in the next section) which attempt to isolate in the annual deficit measure the magnitudes relevant for assessment of the deficit's various economic effects. This is done by weighting budgetary transactions by their impact on endogenous macro variables, such as domestic demand, inflation, or the balance of payments.

The conventional deficit is more restrictive than the budget balance envisaged in the balanced budget laws in many countries' constitutions. 3/ Typically, such laws require only a very broadly

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1/ Most importantly, measurement of the impact of social security on the deficit is discussed only as part of the general issue of the appropriate time horizon over which the deficit should be measured (Section V), and the substitutability between tax and debt financing (Ricardian equivalence) is omitted. Surveys of social security include Atkinson (1987) and Thompson (1983; U.S. only) and the Ricardian equivalence is discussed in Bernheim (1987), and Leiderman and Blejer (1988).

2/ It is evident that control by the public sector can extend far beyond its direct use of resources, not only through its transfer policies but also through its regulatory powers. While transfers are discussed briefly (in Section III), coverage of the impact of government regulation on the allocation of resources is largely omitted, again, for purposes of conciseness rather than because of a conceptual disparity.

3/ See, for instance, the discussion of the Italian Constitution in Martino (1989), p. 708 ff, and the description of Indonesian "balanced budget policy" in Nasution (1989), p. 3.

defined balancing--that financing for all budgeted expenditures be identified prior to enactment of the budget. The tighter concept of budgetary balance embodied in the conventional deficit identifies expenditure plans that remain to be financed after the government has offset its income against its outlays. Most countries record (sometimes only for internal use) some variant of this deficit. Perhaps the variant most widely used is the public sector borrowing requirement (PSBR), which measures government's use of new financial resources, net of repayment of previously incurred debt. 1/

In the absence of standardized accounting rules for government, the conventional deficit is not well-defined, and the deficits of different countries are not directly comparable. Two main areas of variance are:

1. The distinction between the items that determine the deficit--income and outlays, and the items that finance it (drawing "the line"); and

2. Specification of the time at which the resource use is measured (the cash versus the accrual deficit).

1/ Tanzi et al. (1988, p. 5) use a definition of the deficit as follows: "Fiscal deficits, as conventionally defined on a cash basis, measure the difference between total government cash outlays, including interest outlays but excluding amortization payments on the outstanding stock of public debt, and total cash receipts, including tax and nontax revenue and grants but excluding borrowing proceeds. In other words, not all outlays related to public debt servicing are included in the measure of the deficit: interest payments are added to non debt-related expenditures but amortization payments are excluded. On the other hand, current revenues are recorded as government income while proceeds from borrowing are not. In this manner, fiscal deficits reflect the gap to be covered by net government borrowing, including direct borrowing from the central bank."

According to the World Bank (1988; p. 56), deficit-determining components are: "Expenditure includes wages of public employees, spending on goods and fixed capital formation, interest on debt, transfers, and subsidies. Revenue includes taxes, user charges, interest on public assets, transfers, operating surpluses of public companies, and sales of public assets." It may be noted here that the U.S. unified budget balance is, in this sense, a conventional deficit. Expenditure included in the measure includes capital formation as well as current transactions, though no distinction is made between them. Thus the unified budget deficit, like conventional deficits elsewhere, is not a measure of government saving, but of government saving less government investment (see Section III.1).

1. The line

There are two criteria for distinguishing between revenue/expenditure on the one hand, and financing on the other: the "government debt criterion" and the "public policy criterion."

a. The government debt criterion

Transactions are thought to affect the deficit, and are therefore classified above the line (i.e., as revenue or expenditure) if they do not create or extinguish a liability for the government; if they do, then these transactions are considered positive or negative financing. Thus, for instance, interest payments on government debt (an unrequited factor payment) are part of government expenditure, while the repayment of principal is recorded below the line.

The economic underpinning of this distinction is that, while a shift in the level of net public expenditure affects aggregate demand, the repayment of outstanding debt does not represent new income to asset-holders and therefore leaves demand pressures unchanged.

When the public debt criterion is used to determine the fiscal deficit, the deficit equals the difference between total public debt outstanding at the beginning and the end of the year. A central problem is that the criterion has always been applied narrowly, defined only over direct government debt and ignoring, inter alia, liabilities incurred by the receipt of social security taxes and other revenues tied to contingent claims (Section V.2.b(3) below) and the liabilities being repaid via the inflation component of interest payments on government debt (Section III.6 below).

b. The public policy criterion

Alternatively, transactions are deficit-determining and classified as revenue or expenditure instead of financing, when they further public policy rather than forming part of public sector liquidity management. Unlike liquidity management, public policy-motivated transactions change the prices facing the rest of the economy compared to what they would be if markets were left undisturbed.

This criterion is also imperfect because, in practice, government does not approach financial markets on the same terms as other borrowers. Typically, government can borrow on more favorable terms, for instance, by imposing restrictions on the placement of public institutions' funds. Moreover, governments often have a policy agenda underlying their ranking of financing sources (the central bank, commercial banks, different private sector groups, foreign sources), which may make them depart from least-cost borrowing/pure liquidity management. In other words, even through its financial intermediation, government may tax, subsidize, or effectively regulate parts of the economy and, therefore,the public policy criterion provides only a blurred analytical

distinction between what belongs to above or below the line.

The two criteria for drawing the line generate the same classification of most transactions; however, they diverge for three types of transactions which have led, in practice, to important discrepancies in the estimated size of the conventional deficit. These are: (i) budgetary "net lending;" (ii) external grants; and (iii) debt service.

(1) "Net lending"

Unlike the other budgetary outlays, government lending operations to the private sector involve liability management (overt and contractual), and hence, by the government debt criterion, should go below the line. However, a significant portion of budgetary "lending" is composed of direct capital infusion and of government credit programs undertaken for policy purposes, viz., to supply funds to preferred sectors who would otherwise not have access to financial markets or who would have to pay steeper rates. Given its implicit subsidy element, and the higher than market probability that some of the loans will never be repaid, net lending cannot be defined as pure financial intermediation, and the public policy criterion, then, would classify net lending as part of government expenditure--above the line. 1/ As illustrated in Table 1 by the case of Venezuela (where the government allocates its petroleum revenues through domestic and external lending programs), the difference in classification can turn a deficit into a large surplus. 2/

From an analytical viewpoint, neither treatment is completely correct. Unless budgetary loans are uncollectable from the start (which would imply an outright transfer), they contain both pure loan and pure grant components; only the latter should be considered as a public policy element and included as part of the deficit. 3/ Moreover, the subsidy

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1/ The two main international sources of budget statistics--the IMF and the UN--differ in their treatment of net lending, the forum showing it above the line, for policy reasons, and the latter classifying it as financing. See World Bank (1988), p. 45 ("Sources and limitations of public finance statistics") for a description of the United Nations (SNA) and IMF (GFS) systems of budgetary statistics.

2/ The scale of government's direct lending is extremely large, even in highly developed, market-oriented economies. For example, the United States Federal Government's outstanding stock of direct loans at the end of 1987 was US$234 billion, equivalent to 5 percent of GDP. See U.S. (1988).

3/ As discussed in the context of central bank activities (see Section IV.3) the economic cost of preferential credit is the amount that would have to be paid to a private bank to induce it to undertake the lending, i.e., the expected discounted future loss arising from the loan adjusted for risk.

Table 1. Venezuela: Consolidated Central Government 1/

(In billions of bolívares)

	1985	1986
Balance excluding net lending	32	4
Balance including net lending	24	-9

Source: IMF: Government Finance Statistics Yearbook, 1988.

1/ In this and following tables a minus sign indicates a deficit.

(grant) component is usually spread over the entire lifetime of the loan, going beyond the budgetary year in which the loan is extended. 1/

(2) External grants

Since grant aid from abroad represents financing without liability, the government debt criterion would include it with other government revenues. However, by the public policy criterion, grants are added to other foreign financing--below the line--on the argument that no government policy decision can elicit these grants, and, therefore, that the current expenditure that they finance could not take place if the grants are not forthcoming (Chelliah (1973), p. 749). 2/ Grants are discretionary financing by donors and can vary significantly from year to year. Their inclusion as regular revenue has been said to give an inappropriate confidence in their permanence, though they may have to be replaced by government borrowing at any time. Particularly in developing countries where domestic incomes are very low, the classification of grants below the line can widen the deficit by more than 5 percentage points of GDP (see Table 2).

(3) Debt service

In some countries, it may be argued that present levels of public debt are not sustainable, and that amortized debt may not be voluntarily reinvested in new government bonds. In such cases, replacement financing for amortization could require a policy effort on the part of government akin to that of generating extra tax revenue. Under this scenario, the public policy criterion would suggest the inclusion of amortization above the line, and the resulting deficit would correspond to the government's gross borrowing requirement, rather than to its net increase in liabilities.

Such differences in classification as described above can substantially affect the measured deficit. Typically, classifications have evolved apolitically, and countries have maintained one consistent treatment of government transactions over time. However, it is clear that much scope exists for distorting the picture through judicious reclassification. Kotlikoff (1988, 1989) makes this point, showing how the government, by

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1/ Wattleworth (1988) examines in detail the role of credit subsidies in government lending and presents a technique to measure the financial cost to the government of these subsidies under certainty. See also Bosworth et al. (1987), for extensive references on the budgetary dimension of U.S. Federal credit activity and U.S. (1989b) for credit budget reform proposals.

2/ Indeed, grants are often explicitly earmarked for certain expenditures. Another case for treating external grants as financing is that, unlike tax revenues, they represent no reduction in aggregate demand but add net resources to the economy, and widen the "domestic deficit" (Section III.3).

Table 2. The Gambia: Consolidated Central Government

(In percent of GDP)

	1981	1982
Deficit including grants	-12	-7
Deficit excluding grants	-17	-17

Source: IMF: Government Finance Statistics Yearbook, 1988.

relabeling its transactions (as taxes/borrowing, in various combinations with expenditure/amortization) can shift operations from above to below the line (and vice versa) but, essentially, carry out the same policy while choosing to report either a balanced budget, a deficit, or a surplus. If governments do not maintain what might be termed "ethics in accounting standards," the fiscal deficit ceases to convey useful information.

2. The cash and accrual deficits

The other main conceptual variation among conventional deficit measures is the choice between cash and accrual accounting. At one end of the spectrum is the completely cash deficit, where only government outlays for which cash has been disbursed during the 365-day period, and only actual cash revenues received, are included in the budget balance. At the other end of the spectrum is the completely accrual deficit, which attempts to capture the actual net resource pre-emption of government--the consequences of its policy decisions--during the fiscal year, regardless of whether or not transactions have actually been paid for. Thus--an important example--depreciation of fixed capital is included as an outlay in the accrual deficit, but does not show up in the cash deficit. A deficit calculated on the basis of national accounts (SNA) would be an accrual measure; the public sector borrowing requirement (PSBR) is measured on a cash basis. 1/ 2/

In practice, countries' deficit measures lie somewhere in between the complete cash and complete accrual measures. Even in countries which use a PSBR (cash) deficit concept, interest payments are usually measured as they accrue, rather than when actually paid. 3/ On the other hand, revenues are almost always measured on a cash or quasi-cash basis because tax liabilities may be disputed and some percentage will never be collected. Finally, the accounting treatment of expenditures can make a significant difference to the measured deficit. The administrative procedures for executing government expenditures are complex, and take place in several stages from the time the government decides to undertake the outlay to the time the supplier considers himself paid. The size of the deficit can depend on the particular step at which

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1/ See Wasserman (1982), p. 39, for a detailed, albeit dated, comparison of SNA and cash budgetary accounting in several OECD countries.

2/ For instance, de Leeuw and Holloway (1983), p. 39, compare the accrual (NIPA) deficit for the United States (US$58 billion in 1981 and US$112 billion in 1982) with the borrowing requirement (change in federal debt held by the public at par value; US$79 billion in 1981 and US$135 billion in 1982).

3/ Since there are usually second-order effects of domestic transactions on the foreign deficit and vice versa, the measures are approximations of the concept.

expenditure is recorded as having taken place (IMF (1986), p. 87). 1/ Comparison of deficits across countries with different recording practices, particularly during any fiscal year, can be misleading, as most expenditure commitments are made toward the beginning of the year, and most payments are made toward the end.

The economic analysis of accrual basis deficits is complicated by the institutional tendency to apply accrual accounting to the budget document rather than to the fiscal year. In other words, countries often prolong beyond 365 days the period over which transactions authorized in a given budget document may be carried out. (The extension is known as a "complementary period.") Thus, in any fiscal year, transactions which change the measured deficit of the previous year can continue to take place alongside transactions determining the current year's deficit. In such cases, the temporal common denominator for analyzing the budget balance together with other macro variables is lost.

A difficult problem in the measurement of the conventional deficit arises with attempts to reconcile the cash and accrual concepts. As noted by Diamond and Schiller (pp. 32, 42-44), if delays in payment are unanticipated, they represent forced borrowing from suppliers, with the result that the cash measure of the borrowing requirement misrepresents the sources of credit to government. If the delays are anticipated, suppliers will inflate their prices to compensate, and the government will pay a premium for its purchases.

The total reconciliation item between the cash and accrual deficits is often defined as arrears, but, because of justifiable lags in the expenditure process, because arrears may be run up through extrabudgetary expenditures, or because the emergence of arrears is often hidden by offsetting tax reliefs to suppliers, the definition of arrears is more complicated than a resolution of timing differences in expenditure recording. The existence of arrears that cannot be measured reduces the validity of the deficit as a measure of the government's budget constraint or its impact on the economy.

Worse, countries with chronic liquidity crunches have developed formal procedures for turning arrears into longer-term debt instruments, which boost actual holdings of government debt above its long-run sustainable rate, inasmuch as they are usually held involuntarily by suppliers. The issue of chits or bonds in recognition of government's debt to suppliers is recorded as a cash payment, and thus, inflates the

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1/ The sequence of expenditure execution differs according to the budgetary tradition of the country (British, French, United States, Hispano-American, etc.) The U.S. budget records expenditure at the "checks issued" stage (IMF (1986), p. 89)--considered a quasi-cash measure; the French budget measures expenditure at the time the government decides to undertake it ("engagement")--a quasi-accrual measure. Diamond and Schiller (1988) discuss the British and French systems.

recorded cash measure of the deficit compared with actual cash disbursements by government (see Table 3). 1/

In the rest of this survey, it will be assumed that the conventional deficit is well-specified (following footnote 1 on p. 4), and the discussion of refinements to the conventional deficit will ignore the basic problem just discussed--that every budget speech refers to a different kind of deficit.

III. Weighted Deficits: A Redefinition for Policy Analysis

Though the conventional deficit measure exists in competing versions, all versions have at least one characteristic in common: they give every government transaction the same weight in calculating the budget balance. Implicit in this treatment is the assumption that all resources and uses are equally significant in assessing the impact of government. Alternative deficit measures have been developed, essentially analytical embellishments of the conventional deficit, in which budgetary transactions are not weighted equally but rather according to their importance in the total "fiscal impact"--on whatever macroeconomic variable is under study.

The main types of "analytical" deficit covered in this section are: (1) the current deficit; (2) the deficit weighted by the impact of each transaction on aggregate demand; (3) the domestic deficit, a variant of (2), important in open economies; (4) the liquidity balance; (5) structural and cyclically adjusted deficits; (6) the primary deficit; and (7) the operational deficit.

It should be noted here that weighted deficit measures are an open-ended set, not only in terms of the kind of impact that the weights are intended to identify, but also by the sophistication with which the weights are derived. In the simplest case, budget transactions are included or excluded (given a weight of one or zero) on a priori judgment. Alternatively, weights can be attached to transactions according to economic theory (such as the assumption that direct expenditure has a higher weight than transfers in affecting aggregate demand). A more complex approach is to estimate reduced form equations or structural economic models and use the derived multipliers. In the extreme, almost all macro-models incorporate weighted deficits, either directly, via an equation determining the deficit, or through the specification of the impact on the economy of public sector financing, or through revenue and expenditure equations.

1/ These procedures are particularly prevalent in francophone African countries which have externally imposed ceilings on bank credit, and thus customarily run up arrears as residual financing.

Table 3. Burkina Faso: Consolidated Central Government 1/

(In billions of CFA francs)

	1982	1983	1984
Reported cash balance	-6.2	0.5	-3.3
less:			
Deferred payment vouchers	1.7	-1.3	1.1
equals:			
True cash balance	-4.5	-0.8	-2.2

Source: IMF: Government Finance Statistics Yearbook, 1988.

1/ Burkina Faso is also a good example of a country where measured expenditures can be greatly affected by the existence of a complementary period. Expenditure from the 1985 budget during calendar year 1985 was CFAF 49 billion; total expenditure carried out in calendar year 1985 (including from past budgets) was CFAF 55 billion; and total expenditure from the 1985 budget (some of which took place in 1986) was CFAF 61 billion.

We take the view that the deficit implicit in a multi-equation model of the economy is not an easily measurable, easily comprehensible, summary measure of the government's net transactions, and thus falls outside the scope of the survey.

1. The current deficit: the impact of government on saving

The conventional deficit measures the difference between public investment and public saving. In order to isolate public (dis)saving, the current deficit assigns a weight of zero to investment outlays and capital revenues such as asset sales; that is, the current deficit is the difference between noncapital revenues and expenditures. The current deficit is of particular interest to economists because the lack of public sector capital budgeting appears to be shortcoming compared with accounting procedures of private firms: "If we maintained a separate and conceptually correct current and capital account system, the deficit on current account would be the true deficit, [...because] for capital items, any excess of expenditures over receipts on capital account does not change the net asset position of the government, since the new debt is matched by a new government asset." (Boskin (1982), p. 298.) Moreover, in the 1960s, it was commonly held that current expenditures should be fully financed by taxes, whereas, like a private firm, the government could legitimately finance its socially profitable investment by debt (Conklin and Sayeed (1983), p. 28). According to this view, the deficit on current account provided a measure of the extent the government strayed from "prudent management."

Though the current deficit is intuitively simple, it has proved difficult to calculate for several reasons. First, the measure is useful primarily when comparing the government with the other components of the national accounts, or assessing government's accounts according to the accounting norms of the private sector. However, detailed public sector accounts are usually first available on a financial basis, rather than on the accrual basis compatible with other sectoral and/or enterprise accounts. 1/

Second, accounting concepts of investment are much narrower than the economist would like. For instance, most investment in human capital is considered a current outlay, despite its importance in explaining growth (Chelliah (1973), p. 749; Goode (1984), p. 240). Third, the current/capital mix of any "investment" project can be dissected (or, indeed, politically manipulated) in an almost infinite number of ways, to give many different measures of government saving.

1/ Of the adjustments that must then be made, the treatment of depreciation is perhaps particularly important. See, for example, Boskin (1988), p. 79, and Boskin et al. (1985).

Because of these operational problems, restriction of the deficit measure only to current account transactions has been infrequent. However, as externally financed programs of structural adjustment have become more prevalent, there has been renewed interest in the concept for developing countries. This is so because structural adjustment programs tend to disequilibrate the conventional balance, through temporarily large injections of subsidized lending for capital expenditure, and large one-time budget revenues from privatization. There is, therefore, pressure on the conventional deficit to widen, with the paradoxical implication that the structural adjustment has left the country even further from sustainable medium-term growth. To provide a more appropriate benchmark for judging these programs, it is argued that a deficit measure that excludes their temporary influences on the capital account will give a better indication of permanent adjustment efforts. The change in government saving, though clearly a rough proxy, has thus resurfaced as a summary gauge of the gains from structural adjustment (World Bank (1988)).

There are problems in using the current deficit as this kind of indicator. First, structural policies (such as tax reform) often involve J-curve effects (such as short-run revenue losses during the shift to the new tax system) which reduce government saving at the time of the adjustment program, though with the expectation of improving them in the medium term. Conversely, many structural reforms involve investments which imply heavy recurrent costs following completion, so that government saving may fall in the medium term. Finally, it may be difficult, if not illegitimate, to separate the disequilibria caused by a structural adjustment program from the "disequilibria" caused by other exogenous shocks or the business cycle. If so, a core deficit or a cyclically adjusted deficit (discussed in 5. below) might be a more precise measure of the extent of permanent adjustment.

2. The impact of government on aggregate demand

While the conventional deficit is an approximation of government savings minus investment, it is a poor measure of government's contribution to aggregate demand. This inadequacy is evident from the Keynesian balanced budget multiplier--the simplest case of a weighted fiscal balance. More realistically, different elements of government expenditure and revenue generate different net increases to, and withdrawals from, demand. A measure of the budget's overall impact on aggregate demand can be derived by weighting its components according to the expansion/contraction in aggregate purchasing power they represent--assuming these can be estimated.

Aggregate demand-based deficit measures have focused on the separation of exhaustive expenditures (on goods and services) and transfers. If private and public propensities to consume differ, it becomes important to identify the ultimate user of budgetary resources. Transfers such as pensions and unemployment benefits merely redistribute purchasing power from one part of the private sector to

another. In terms of their impact on aggregate demand they are akin to negative taxes rather than to government's expenditure on goods and services (Boskin (1982), pp. 296-97; Buiter (1985), p. 14; Bean and Buiter (1987), pp. 5-6). 1/

Though transfers amount only to redistribution among different private sector groups, they will influence aggregate demand if the different groups have different marginal propensities to consume: that is, only in a simple case would the weight on transfers be the same as the weight on the taxes by which the transfers were financed. Borpujari and Ter-Minassian (1973) estimate the impact of the deficit on aggregate demand in an economy with three income groups: wage-earners, renters, and government transfer recipients.

The inclusion of transfers in government spending may overestimate government's contribution to aggregate demand also because there are lags in how quickly transfers can be spent. This problem arises particularly often in economies with several layers of government: a transfer from central to local government may not increase aggregate demand until the year after it was recorded in the budget of the central administration. To address this problem, the elements of the annual budget may be weighted not only by their eventual impact on demand but also by the time it takes for that impact to become evident.

It should be noted that the use of a weighted deficit to analyze aggregate demand is peculiarly Keynesian. A more monetarist approach would argue that any impact of government on aggregate demand comes through the monetary financing of the deficit. If so, then, at least in a closed economy, all expenditures carry the same weight, and the liquidity balance (see 4. below) would be a more appropriate calculation. 2/

3. The domestic deficit

If the economy is open, the full impact of government transactions may not be felt domestically. Since trade and capital flows between the public sector and the external sector vary enormously from country to country, a given conventional deficit can encompass a spectrum of contributions to domestic demand. For instance, expenditure on domestic goods that is fully financed by foreign grants increases aggregate demand with no offsetting withdrawal. Government imports financed by domestic taxes reduce aggregate demand by the full extent of the import

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1/ This point can be generalized to the revenue side, where different taxes may represent different net withdrawals from private sector aggregate demand, depending on the base of the tax.

2/ However, see Buiter (1985), p. 76, for a hybrid measure of the impact of the deficit on aggregate demand, where tax and expenditure elements are multiplier-weighted, but the impact of financing is included through its potential for crowding out.

bill--a case where government expenditure may have contractionary rather than expansionary effects on domestic demand. The overall deficit could well be zero in each of the two examples, though they each imply an opposite domestic impact. To isolate the effect of government on aggregate demand in an open economy, the "domestic deficit" must be separated from the "foreign deficit."

The domestic deficit is measured by assigning nonzero weights only to those budgetary elements that directly affect the domestic economy. The foreign deficit--the impact of the budget on the balance of payments--can be measured by assigning nonzero weights to budget transactions only if they are directly connected to the external sector. (See, for instance, Borpujari and Ter-Minassian (1973), p. 815; Chelliah (1973), p. 770.) 1/

Calculations of domestic and foreign deficits are particularly significant when the public sector itself has sizeable trade or capital flows to and from the rest of the world. Then, the overall deficit measure can be a particularly misleading indicator of the fiscal stance: for instance, devaluation may cause the budget deficit to widen if government imports or foreign debt service are large, suggesting an expansionary fiscal policy--though resources injected into the economy by government remain unchanged or may even fall.

Almost all applications of the domestic deficit measure have been carried out for oil exporting countries with a nationalized petroleum industry. Unless the monetary impact of oil receipts is sterilized, their use to finance expenditure will be expansionary but the conventional measure of the budget deficit would not predict the expansion. 2/ Similar expansions can occur when foreign grants are large. Oil exporting country studies include Morgan (1979: 12 major oil exporters); Stillson (1979: Indonesia, Jordan, and Oman); Mackenzie (1981: Kuwait, Nigeria, and Saudi Arabia); Nasution (1989: Indonesia); Gil Díaz (1988: Bolivia); and Vaez-Zadeh (1989: Venezuela). Similar considerations apply to the case of foreign grants.

4. The liquidity balance

Morgan (1979), p. 82, shows that the domestic budget balance determines the direct effect of the government budget on money creation. However, strictly speaking, the relevant deficit measure, if government's impact on aggregate demand comes from the way it finances its activity rather than from its tax and expenditure policies, is the

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1/ Since these are usually second-order effects of domestic transactions on the foreign deficit and vice versa, the measures are approximations of the concept.

2/ Inflation caused by unsterilized government oil revenues in the presence of conventionally measured budget equilibrium, or even surpluses, has been one channel of transmission of Dutch disease.

liquidity budget balance--that share of government requirements that has to be financed by domestic credit. Resources financed from other sources would have a zero weight in the liquidity deficit. Hence, the liquidity balance differs from the domestic balance because it excludes domestic nonbank borrowing by government (which amounts merely to a rearrangement of private sector portfolios and not to money creation), while including central bank profits transferred to government and government interest payments to domestic banks.

Chelliah (1973), p. 774, notes a more restrictive definition of the liquidity balance: a measure of the impact of government on high-powered money. This definition would put zero weight on government credit from commercial banks.

5. Removing the effects of fluctuations in economic activity on the budget

While the budget deficit affects aggregate demand, aggregate demand also affects the budget deficit. Inter alia, income tax revenues will usually be lower and benefit transfers higher when unemployment is high. In other words, the budget deficit is affected by the business cycle, and the impact of discretionary policy changes may differ depending on at which stage of the business cycle they are implemented. Since the 1940s, but mainly in the 1970s, deficits abstracting from the impact of the business cycle have been calculated--that is, with weights of zero on the transitory/cyclical elements of revenue and expenditure. These measures have, in their heyday, been surveyed comprehensively (Blinder and Solow (1974), and Heller et al. (1986)).

There are two main classes of "permanent" or long-run deficits. The full-employment deficit (or structural balance) was derived in the belief that "a small surplus in that budget would ensure a high level of national saving while permitting built-in fiscal stabilizers to damp cyclical fluctuations" (de Leeuw and Holloway (1983), p. 27). 1/ Notwithstanding its virtues, following a rule of full-employment budget balance could still imply the expansion of the public debt--since, on average, economies operate below full employment, so that, on average, expenditure would exceed revenue. Therefore, the cyclically adjusted budget balance was developed to provide a budget balance rule that would maintain a constant level of public liabilities. The methods of calculation of the two approaches have differed little:

1/ Moreover, Eisner and Pieper (1988), p. 33 ff, found that high-employment deficits (adjusted for changes in the real value of net debt) were appropriate instruments of Keynesian expansionary policy, in the sense that they "were positively associated with subsequent increases in real GNP and reductions in unemployment."

> "To construct a cyclically adjusted budget, the essential steps are (1) choosing a reference trend for GNP free from short-run fluctuations, (2) determining the responsiveness of each category of receipts and expenditures to short-run movements in GNP (e.g., cyclical tax elasticities), (3) applying these responses to gaps between trend GNP and actual GNP, and (4) adding the expenditures and receipts "gross-ups" from step 3 to the actual budget to obtain a cyclically adjusted budget. The first step, selecting a GNP reference trend, is the most important and controversial. Other things being equal, the higher the level of the reference trend, the smaller the cyclically adjusted deficit" (de Leeuw and Holloway (1985), p. 232).

The full employment deficit can then be defined as the cyclically adjusted balance when the GNP reference trend selected is potential output (Muller and Price (1984), p. 1). Potential output was defined as "the highest possible utilization of resources without accelerating inflation--an extraordinarily difficult concept to quantify" (de Leeuw and Holloway (1983), p. 27).

In this case, when neither taxes nor expenditures are a function of actual output, the budget balance measures only the effect of discretionary policy, that is, it carries to a more sophisticated level the distinction between policy decisions (above the line) and their endogenous implications (de Leeuw et al. (1980)). The change in the full-employment balance from year to year measures the fiscal impulse, that is, the effect, of fiscal policy (as opposed to all budget items) in total aggregate demand. 1/

Attempts to measure the fiscal impulse have led to several intermediate estimates of budgetary stance that use potential output as a benchmark for measuring revenue or (usually) expenditure (Dernburg (1975), p. 829; Heller et al. (1986); and Muller and Price (1984)). As a guideline for debt management, the cyclically adjusted or trend deficit is more appropriate than the full-employment deficit. In it, "neutral" expenditures and revenues are not estimated as functions of potential output but instead as functions of "average output." In other words, estimation of the trend deficit separates those transactions that change long-run public liabilities from those that merely redistribute assets and liabilities within a cycle. While full-employment deficit estimates are cognizant of the impact of automatic stabilizers on deficit size, and adjust for them in various ways, the cyclically adjusted deficit includes the average value of the automatic stabilizer component of the deficit.

The trend deficit has been estimated by the Muller and Price (for the OECD), de Leeuw and Holloway, and Heller et al. (for the IMF). The

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1/ In order to avoid price level effects, the full-employment balance is usually calculated as a ratio to income.

OECD estimates the average automatic stabilizer directly, de Leeuw substitutes "mid-expansion" output for potential output, and the IMF removes the average automatic stabilizer implicitly through its subtraction of the fiscal impulse.

Trend deficit measures are subject to the disadvantage that they may not be equivalent to the "underlying" or "permanent" deficit in the economy, because they factor into the calculation of the trend transitory shocks. Particularly in countries undertaking structural reforms, these one-time disturbances could be equivalent to several percentage points of GDP. Tanzi (1982) has recognized this problem in his description of a variant of the trend deficit, the core deficit, which removes from the actual deficit not only cyclical influences but also one-time or transitory shocks ("such as temporary taxes, postponement of inevitable wage increases, building up of arrears and so on" (p. 6)). However, no published series of core deficit estimates exists.

It should be noted that a related branch of literature has developed, concerning the statistical techniques necessary to estimate the trend deficit. See, for instance, Cuddington and Urzua (1989). Trend stationary models are the most popular technique (Nelson and Plosser (1982)); however, because those are autoregressive moving average models, they would not succeed in estimating a core deficit, since they factor transitory shocks into the trend deficit.

Blanchard (1990) makes the point that deficit measures far simpler than trend deficits exist which distinguish between induced and discretionary fiscal policies, and which index sustainability. Trend deficits require needless assumptions about "whether there are cycles around a stable trend, (...) whether the economy will return to lower unemployment and so on" (p. 6). Instead, "[i]nduced changes in fiscal policy can be defined as those changes which come from changes in inflation, interest rates and output growth over the previous year--or over the previous ten year average--values. How to choose the benchmark is still a relevant question, but not one which requires taking a stand on where the economy will or should return." Moreover, "[w]hat matters in terms of sustainability is where the country expects to be over the next three to ten years, not necessarily some mid-cycle point" (p. 7). Blanchard derives alternative easy-to-calculate measures, the simplest of which do not require forecasts.

6. The primary deficit: removing the effects of previous deficits on the budget

Although the structurally adjusted deficit is sometimes presented as measuring the impact of discretionary government policy, it includes an important nondiscretionary variable, namely, interest payments on the stock of public debt--which is usually predetermined by the size of previous deficits. The primary deficit (or "noninterest deficit") attempts to measure the discretionary budgetary stance by attaching a zero weight to net interest payments in the budget (Barth et al.

(1989)). 1/ The primary deficit is also valuable as an indicator of the success of policies in moving the economy toward a sustainable growth path:

> "The primary deficit measures how current actions improve or worsen the public sector's net indebtedness, and it is important for evaluating the sustainability of government deficits. Although fiscal deficits can be run indefinitely, the primary balance must eventually become positive to cover at least part of the interest on current debt. If public revenue and the economy as a whole grow faster than the real interest rate, then even the primary balance can remain in deficit. However, it is generally not possible in the long run to always grow faster than the interest rate" (World Bank (1988), p. 56). 2/

A comparison of the primary and conventional deficits in Table 4 illustrates the heavy burden of interest payments even in relatively stable economies, such as Spain, that have accumulated large public debts. Despite positive primary balances, conventional deficits remain.

7. The operational deficit: removing the effects of inflation from interest payments

The interest bill is beyond the control of current fiscal policy, not only because it represents the cost of previous deficits, but also because monetary policy can affect interest rates and hence budgetary interest payments. In addition, fluctuations in inflation can significantly change the size of government nominal debt service.

Inflation affects the budget in many ways. First, inflation can alter the real flow of budgetary resources. For example, inflation can increase real tax liabilities in an unindexed progressive tax system by shifting taxpayers into higher tax brackets ("fiscal drag"). On the other hand, by lengthening collection lags, an acceleration of inflation might reduce real tax revenues (see Tanzi (1987)). Such inflation-induced real changes are a legitimate source of budgetary disturbance, and should not be removed from any meaningful deficit measure. 3/

1/ The primary deficit has usually been calculated by subtracting total interest payments from government expenditure. However, conceptually, only the net interest paid by government should be removed.

2/ See also Boskin (1988), p. 80. It should be pointed out, however, that under reasonable assumptions, interest payments, debt, and GNP can all grow continuously remaining constant in relative terms.

3/ Different revenue and expenditure components can have very different inflation elasticities. This raises significant problems which have hindered the development of budgets-in-real-terms. A satisfactory method for arriving at a fully inflation-adjusted deficit remains to be derived.

Table 4. Measures of the Fiscal Balance Under Alternative Treatments of Interest Payments 1/

(In percentage of GDP)

	Conventional	Operational	Primary
Argentina			
1983	-10.2	-10.2	-4.2
1985	-4.1	-4.1	-1.7
1987	-6.3	-5.6	-1.6
Brazil			
1981	-13.0	-6.2	-4.8
1985	-27.9	-4.3	-0.6
1988	-45.3	-4.0	1.6
Chile			
1983	-2.8	n.a.	1.0
1986	-1.9	-1.2	2.8
1988	3.6	3.8	8.0
Ghana			
1981	-6.4	5.5	-4.3
1985	-2.7	-0.4	-1.2
1987	-0.3	-0.4	1.2
Israel			
1985	-5.4	-1.6	10.0
1988	-4.9	-3.6	4.2
Kenya			
1982	-6.5	-3.2	-2.9
1986	-5.4	-0.8	-0.5
1987	-7.6	-6.3	-2.9
Mexico			
1981	-13.8	-10.8	-9.1
1985	-9.5	-1.0	3.3
1987	-15.9	2.0	5.0
Spain			
1982	-5.6	...	-4.6
1985	-6.7	...	-3.2
1987	-3.6	...	0.1

Sources: Argentina, Brazil, Chile, and Mexico: Tanzi (1989); Israel: Bank of Israel; Ghana and Kenya: Thanos Catsambas and Miria Pigato (1989); and Spain: IMF staff estimates.

1/ Since data are obtained from different sources and country definitions may vary, the magnitudes are not comparable across countries.

Second, inflation may have "balance sheet" effects, that is, it can change government net worth by altering the real value of its assets and liabilities, even though revenue and expenditure flows remain unaffected. Unrealized valuation effects are not captured by the annual flow measures discussed in this section, and are dealt with in Section V.

Finally, inflation can lead to confusion in interpretation when the real and nominal elements of a transaction represent different components of the budget, but are not disentangled by conventional budgetary accounting practices. In particular, inflation reduces the real value of the outstanding stock of unindexed public debt but may compensate creditors for such erosion in their real assets through higher nominal interest rates. In other words, some of the government's interest payments on its debt are in reality part of the amortization of that debt. If the inflationary component of interest rates is not removed from the interest bill, the deficit will be overstated by the size of the amortization element included as interest payments above the line, rather than below.

The magnitude of the deficit overstatement depends on the size of domestic debt outstanding and on its terms and denomination. When public debt is held in the form of short-term floating-interest domestic bonds, the growth rate of nominal interest payments will in general exceed the inflation rate, and, as inflation rises, the conventional deficit will expand in terms of GDP, even if inflation has no other impact on the budget. It is simple to show that, with floating-interest debt, the deficit/GDP ratio is a positive function of inflation and of the initial debt/GDP ratio. 1/

A consequence of this relationship is that countries with identical inflation, debt/GDP ratios, and ratios of tax revenues and noninterest expenditures to GDP may, nevertheless, show very different conventional fiscal deficits, depending solely on the composition of their debt. These shortcomings of the conventional deficit under inflation, and the validity of alternative measures to alleviate the problem have been analyzed, among others, by Catsambas (1988), Cukierman and Mortensen (1983), Eisner (1984), Eisner and Pieper (1984), Gil-Díaz (1986), Miller (1982), and Tanzi, Blejer, and Teijeiro (1988).

The most popular alternative suggested to alleviate the problem is the operational deficit, which places a zero weight on the inflation-induced portion of interest payments. It is defined as the conventional deficit minus that part of the debt service which compensates debt holders for actual inflation, that is, the primary deficit plus the real component of interest payments. Real interest payments are the interest

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1/ The opposite takes place with long-term fixed interest bonds. Tanzi, Blejer, and Teijeiro (1988), Appendix 1, includes a formal discussion of the effects of inflation on the conventional deficit in the presence of different types of debt instruments.

bill less the inflation-induced erosion in the value of the debt (measured, for example, by the outstanding debt times actual inflation). 1/ In some countries which had high inflation, such as Brazil and Mexico (Table 4), immense differences arise between conventional and operational deficits. Moreover, trends in the two alternative measures can diverge markedly. In both Brazil and Mexico, the conventional deficit indicates rapidly growing imbalances during the 1980s, whereas the operational deficit signals some improvement in Brazil and a remarkable adjustment in Mexico.

In order to compare the merits of the operational deficit with the conventional measure, it is necessary to review its economic rationale. The operational deficit excludes inflation-induced interest payments on the assumption that they are similar to amortization payments in their effects on the economy--namely, that they do not represent new income to recipients, and are willingly reinvested in government bonds, at existing market conditions, and therefore they do not affect the level of aggregate demand in real terms. Real interest payments, on the other hand, can be consumed without reducing a bondholder's net wealth, and thus have a similar expansionary impact as any other type of expenditure. The relative usefulness of the two deficit measures reduces, thus, to the question of how inflation-induced interest payments are spent: are they used to buy new bonds or to finance consumption? In other words, does rising inflation erode the real demand for government bonds, or is the sustainability of the public debt invariant to inflation? More precisely, full rollover of inflation-induced interest service as assumed by the operational deficit requires, first, a stable real demand for bonds, and, second, that the rate of inflation is not an argument in the demand function for government bonds, which is affected only by real interest rates.

The irrelevance of inflation from real demand for bonds, though essentially an empirical question, is supported by portfolio theory. 2/ There are, however, some channels through which rising inflation could reduce the real demand for bonds--for instance, a higher

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1/ Note, however, that nominal interest payments fully reflect the reduction in the real value of the outstanding debt only to the extent that the Fisher equation holds (i.e., to the extent that the real rate of interest is independent of inflationary expectations), and expected and actual inflation are identical. See Cagan (1981) and Cardoso (1990).

2/ There is little empirical evidence about the independent role of inflation in the real demand for bonds. For results based on portfolio analysis for the United Kingdom, see Perraudin (1987).

nominal stock of debt and a high rate of inflation could raise the perception of default risk. 1/

If inflation were to reduce the real demand for bonds, then, in an economy with accelerating inflation, inflation-induced interest payments would not be fully refinanceable under existing market conditions but would require either higher real interest rates or higher bond liquidity, thus increasing demand pressures. The operational deficit measure excluding the inflation component of interest payments would then underestimate the degree of fiscal imbalance.

There are also technical problems in the calculation of the operational deficit. For instance, the choice of the price index is not straightforward and there are presentational difficulties when interest rates are negative in real terms, in which case the conventional deficit measure would have to be adjusted downward by a magnitude greater than actual interest payments. Furthermore, the operational deficit has a macroeconomic deficiency: by correcting the deficit for the impact of inflation on it, we lose the ability to assess the impact of the deficit on inflation. Despite these difficulties, the operational deficit provides useful information to policymakers when the inflation rate is very high. In principle, it is a lower-bound estimate for the public sector deficit, relevant when full rollover of broadly defined amortization is realistic.

IV. The Composition of the Public Sector

The discussion so far has taken as understood the identity of government, which, indeed, is subject to a fairly broad, if imprecise, consensus:

> "The government of a country consists of the public authorities and their instrumentalities, established through political processes, exercising a monopoly of compulsory powers within a territorial area...and engaged primarily in the provision of public services differing in character, cost elements, and source of finance from the activities of other sectors". (IMF (1986), p. 7).

However, at the operational level, difficulties arise in defining the scope of government for purposes of measuring the fiscal deficit. Increasingly, governments perform operations usually associated with

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1/ While the perception of risk may indeed rise with the stock of real debt, a positive relation between perceived risk and nominal debt can be rationalized only through a relative increase in public debt compared with other sources of financing the deficit. Specifically, inflation may bring about a fall in government's capacity to raise taxes, to collect the inflation tax on the monetary base, and to borrow abroad.

other sectors: there are public enterprises, public financial institutions, and public administrative/nonprofit agencies. Conversely, other sectors have taken on quasi-governmental functions. 1/ Moreover, these divergences from traditional roles usually arise from country-specific political or social circumstances, which render cross-country comparisons of the government deficit painful.

An associated difficulty arises in defining and quantifying "transactions," when government has the option not only of purchases and sales and income transfers, but also of regulation and price-setting, whose financial magnitudes may be impossible to measure.

This section discusses the fiscal content of the components of the broader public sector, which includes public enterprises, the central bank, and public financial institutions.

1. The traditional scope of government

It is tempting to think of traditional government as a pyramid, from the apex of the central decision maker(s), through the central administration, down through the numerous regional, municipal and local governments. However, the different parts of traditional government are distinguished through more dimensions than are representable in a pyramid. 2/ Governments, even at the central level, include a plethora of public agencies which cannot easily be ranked "above" or "below" one another, such as investment boards, industrial development authorities, utility regulating bodies, space research laboratories, social security funds, etc. Only rarely are their powers neatly subordinated to an overseeing ministry.

The difficulty of constructing a generally applicable organizational structure for government is such that it may be impossible to derive an exhaustive list of entities that should be taken into account in arriving at an undisputable figure for the fiscal deficit. Nonetheless, there are some guidelines--completeness of coverage and of consolidation, and the recognition of nonfinancial governmental activities--that are important for determining the scope of government.

a. Completeness of coverage

Ideally, the more comprehensive the picture of the public sector--not defined by the names of so-called government institutions, but by the nature of the transactions they carry out--the easier the interpretation of fiscal actions, and the more evenly the government

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1/ For instance, there may be a difference only of degree between the compulsory pension system of a government and a firm's pension scheme which is mandatory for all employees.

2/ The most complete discussion of the coverage of government is contained in IMF (1986), Chapter 1.

will be able to spread out the impact of policy measures it deems necessary. However, there may be a trade-off between prompt fiscal responses to emerging policy problems and availability of information. Hence, the fiscal deficit for short-run policy purposes must often be calculated for a reduced subset of government levels, or, alternatively, for a reduced array of government activities. Moreover, as discussed below, there are many agencies who fit only partially into a meaningful definition of government. In these cases, a correct measure of the impact of government should include only the fiscal activities of such agencies; when this is impossible, the inclusion or exclusion of the agency becomes a matter of discretion.

b. Completeness of consolidation

A further aspect is the complicated web of financial interrelationships between agencies and levels of government. An accurate calculation of the deficit would net out all intra-governmental transactions, although the size of the deficit will be invariant to such netting out. However, if intra-governmental flows are (incorrectly) included, the size of government could be grossly overstated. Moreover, despite the resilience of the deficit measure to the completeness in consolidation, problems arise through the omission of a flow in one direction but not in the other, affecting the deficit's size.

c. Recognition of nonfinancial government activity

There is a further dimension in the distinction between the public and the private sector: government may affect the allocation of resources by changing the prices facing the private sector and by regulation of private activity (Boskin et al. (1987a), p. 2). An example of regulation is the pollution control devices required on new cars, which raise car prices and are counted as part of the automobile industry's activity "although they are close substitutes for the government levying a tax and paying the automobile companies to install them" (Boskin, op. cit.). The military draft also allows the government to provide services at below market rates. 1/ An ideal measure of government impact on resource use would place monetary values on all of these nonfinancial actions and include them in the calculation of the deficit. However, although much work has been done on assessing the economic impact of regulation, tax expenditures, and market intervention, the broad discussion of the valuation of these government actions goes beyond the scope of this survey.

2. Public production and trade

A strict definition of government presupposes a restricted array of public sector economic activities, merely the provision of nonmarket

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1/ Price controls, quantitative trade restrictions, and other forms of direct market intervention would also fall into this category.

goods and services and the redistribution of income. However, the concepts of public sector and government increasingly diverge the more involved in production and commerce publicly owned entities become. While the activities of public enterprises, marketing boards, and other publicly owned entities that produce or trade are to some extent motivated by profit, they have special characteristics, in many cases monopolistic, with prices and, sometimes, quantities being primarily the result of government policy. Clearly, the effects of these activities should be factored into a meaningful measure of the public sector balance. However, this poses a number of conceptual and methodological problems including the appropriate measurement of the fiscal component of public enterprises' activities.

There are two aspects specific to the assessment of the fiscal impact of public enterprises which have a bearing on the proper measurement of budgetary balance. 1/ First the enterprises that comprise the public sector must be selected, and, second, that portion of their operations which has a fiscal impact must be identified.

The choice of entities for inclusion in the public sector depends on the distinctions between government and enterprises and between "public" and "private." In IMF (1986), the criterion used to distinguish between general government and nonfinancial public enterprises is not legal or institutional, but rather the nature of the activities they perform. The distinction comes both from the nature of the goods and services they supply and the differing character of their revenues: taxes are compulsory levies while income from market sales is essentially voluntary. 2/ In general, when the unregulated market cannot be expected to generate the optimal provision of the good or service but some price mechanism could still be set in motion, public enterprises rather than government may be called upon to execute a desired intervention.

The operational distinction between "public" and "private," which determines the extent to which transactions by entities outside general government should be incorporated in measures of fiscal activity rather

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1/ We do not focus here on the roles, structure, and performance of public enterprises which have been the subject of extensive studies (see, for example, Floyd et al. (1984)).

2/ "Nonfinancial public enterprises are separated from the general government sector because they are engaged in activities different in nature from government and encounter production, cost, and financing problems involving nongovernmental considerations." (IMF (1986), p. 21.)

than classified as private sector operations, is more difficult to pin down. 1/ A common criterion is the simple ownership principle: any enterprise is considered "public," if direct and indirect government participation in its equity exceeds 50 percent. This legal concept is not really satisfactory because it does not assess the degree of government's actual control over the enterprises' decisions, nor does it evaluate the weight of public policy objectives in entities' operations. A different approach is taken by Stella (1989) who looks at the overall impact of enterprises on the public finances and on net worth transfers. The operations of many enterprises, privately as well as publicly owned, are supported by a variety of state guarantees, tax benefits, or other types of financial assistance. If these interplays of government financing and enterprise operations are such as to raise private sector net worth, these results are akin to government deficits in their effect on private perception of wealth and hence on consumption. In this sense, their operations could therefore be considered part of the public sector.

A unifying, although not very operational, criterion for classification comes from the "soft budget constraint" concept developed by Kornai. It defines "public" firms as being immune from bankruptcy and therefore unconcerned with covering costs. 2/ Soft budget constraints, with their contingent claim on budgetary resources, are the proximate reason for linking some of the operations of public enterprises with those of the government for an accurate assessment of global fiscal impact.

In addition to the explicit macroeconomic impact of enterprise policies which further government objectives, government backing gives the suppliers, creditors, and customers of enterprises security that their client will remain in business or that, if it fails, its debts will be paid. This security could have an impact on resource allocation through a crowding-out effect, by shifting resources away from other firms toward industries with government backing.

One approach for analyzing the macroeconomic dimension of public firms is to evaluate the budgetary impact of their operations--through the flows between public enterprises and the government (Premchand (1983)) and through the effects of public enterprises on the overall volume of government revenue, expenditure, and public investment (e.g., Ramanadham (1984), Chapter 3). A second approach, perhaps more valid,

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1/ A more common question in the literature deals with the analytical underpinning of the existence of publicly owned enterprises. See, for example, Baumol (1984).

2/ Kornai (1986). Hard budget constraints are defined not only by the threat of bankruptcy but also by the possibility of replacing management. In a private market, less than optimal performance could lead to a corporate takeover or a management change. This insecurity of tenure is usually lacking in public firms.

is to consolidate the relevant part of public enterprises' operations with the rest of the government budget. Consolidation, however, raises a number of important methodological measurement issues (Stella (1989)). The central question is how to define and measure enterprise revenue and expenditure in a way that is compatible with government's concepts. Clearly, enterprises' gross sales revenue is not comparable to tax revenue, nor should the purchase of inputs be added to current budgetary expenditure. It could be argued, however, that public enterprise prices contain implicit subsidies and taxes that will be reflected in profits and losses and that these profits and losses are the financial flows that should be consolidated since they closely correspond to budgetary inflows or outlays. 1/

A more difficult problem arises when profits are not explicitly transferred to the Treasury or they are lower than potential competitive profits owing to hidden subsidies. If the enterprise is making losses, the subsidy element may remain obscured through the enterprise's ability to borrow from domestic and foreign sources other than the government.

Practically, consolidation also faces the problem that the structure of government and enterprise budgets are very different:

> "The government budget is usually subdivided into receipts, expenditure, and borrowing. The budgets of enterprises are mostly organized, like commercial budgets, on a dual basis, viz., revenue and capital" (Premchand (1983)).

In addition, the statistical base of the accounts differs. 2/ Almost always, enterprise accounts are on an accrual basis while cash accounts are the usual budgetary standard. Stella (1989) claims that this difference cannot be resolved simply by converting enterprise flows into cash accounts because, in assessing the impact of the public sector on the economy, it is indeed more correct to measure enterprise activities, like any other business activities, on an accrual basis since this gives a truer reflection of performance. When capital expenditure is important, the divergences between cash and accrual accounting can be significant. 3/

In sum, the issue of how to measure the gross flow of government-like activities of public entities remains unresolved. In the case of a marketing board, for example, one would not want to amalgamate the gross

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1/ Indeed, the IMF methodology postulates that "Taxes also include the profits transferred to government from fiscal monopolies...which reflect use of the government's taxing power to collect excise-like revenue...." See IMF (1986), p. 102.

2/ For a review of the standard accounting practices of public enterprises, see Citajn (1984), Chapter 4.

3/ On the treatment of government capital transactions, see Section V.

value of purchases with treasury outlays, nor would one want to combine the gross value of sales receipts with tax revenue. The policy element is only the subsidy or tax implicit, if any, and the quantitative measure of the subsidy is the difference between buying and selling prices as reflected in the operating position of the enterprise.

3. The quasi-fiscal operations of central banks

In many countries, the distinction between the responsibilities of the Treasury and the central bank has become blurred, with the latter performing "quasi-fiscal" activities--not specifically connected with monetary policy. These activities are diverse: they include the management of explicit subsidies, debt service, and transfers, the provision of preferential credit, the bailout of ailing industries, etc. It has frequently been argued that these quasi-fiscal operations are similar to other budgetary activities and should be included in a comprehensive measure of the public sector balance. Particularly important, analytically, is the central bank's implicit levy of taxes, either through the exchange rate system, 1/ or through the imposition of unremunerated reserve requirements.

There are many difficulties in separating the central bank's monetary from its quasi-fiscal activities. 2/ Moreover, differences in accounting practices (e.g., cash versus accrual) raise consolidation problems akin to those with nonfinancial public enterprises. In a methodological study of central banks' fiscal activities, Robinson and Stella (1988) start from a benchmark case: they claim that central banks that have operating profits and transfer them fully to the Treasury 3/ do not distort the conventionally measured deficit even if they perform quasi-fiscal activities, provided that these activities

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1/ This occurs when exporters must surrender foreign proceeds at prices lower than some importers can buy it from the central bank. The opposite is also prevalent: central banks may subsidize certain sectors by selling foreign exchange at rates below the rate it pays to exporters.

2/ De Kock (1974) enumerates the activities normally considered "monetary." They include currency issue, the regulation and supervision of banking, the aggregate control of credit, the clearance of balances between banks, and custody of the government's reserves. However, clear differentiation between quasi-fiscal and monetary operations is difficult. For example, bond rediscounting is generally considered a monetary activity. But if it is performed at subsidized rates, it will take on a quasi-fiscal dimension.

3/ "Full" transfer of profits refers to the surplus remaining after a reasonable proportion of the profits has been assigned to the central bank reserves. Notice that the implicit taxes mentioned above (such as the unremunerated reserve requirements) would generally be picked up in the central bank profits and thus, when transferred, in the consolidated accounts. However, they would give a biased impression of the magnitude of compulsory levies imposed through the budget.

only affect the central bank's profit-and-loss accounts during the budget year in question. Deviations from this benchmark would require an adjustment.

The two most important departures arise: a. from quasi-fiscal activities that change the composition of the central bank's balance sheet (rather than the profit-and-loss account); and b. when the central bank makes a loss which is covered by an equivalent reduction in its net worth. 1/

a. A prominent quasi-fiscal activity which entails a change in central bank's balance sheet composition is its lending to the private sector for public policy purposes. An important example is preferential sectoral lending, financed by high-powered money. Because these loans could be very similar to budgetary loans, there is an argument for their inclusion as a deficit-determining item analogous to government's net lending. However, the gross incorporation of all central bank lending to the private sector into the fiscal deficit would clearly be misleading. Much of central bank lending is done for pure monetary--and not fiscal--reasons. This is the case with rediscounting, open-market operations, and sterilization. It is quite evident that such intervention for monetary purposes should not result in an increase in a consolidated fiscal deficit measure. To preserve distinctions among types of central bank lending, the ideal solution would be to transfer quasi-fiscal lending from the central bank to government's accounts, with a counterbalancing change in net credit to government from the central bank. 2/

Central banks' balance sheets can also be affected by capital gains and losses arising from valuation changes. This may take place when the central bank is forced to take over private (or public enterprise) debt or to rescue troubled financial institutions. Another common source of valuation changes is the change in the value of the central bank's net

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1/ Net worth will fall, for instance, when the deficit is "financed" by a reduction in reserves or by printing money. There is, however, considerable doubt whether the collection of seignorage by money creation (and through other sources of "inflation tax") should be considered a quasi-fiscal activity. These sources of revenue are, in some cases, the essence of the existence of the central bank (see Meyers (1985)) and, in any event, it is difficult to identify their financial counterpart in an operational definition of the fiscal deficit.

2/ The full incorporation of central bank lending to the fiscal deficit may be inappropriate for a reason that also applies to budgetary net lending. In theory, the economic cost of preferential lending should be equal to the expected discounted future loss arising from the loan, adjusted for risk. Lending should, therefore, increase the fiscal deficit only by this amount, that is, by the implicit "cost" of lending and not by the full volume of the loan. In any event, there should be consistency between budgetary and central bank lending.

foreign-exchange holdings, which could arise from external parity fluctuations or from a domestic devaluation that changes the domestic currency counterpart of net foreign assets, resulting in an accounting capital profit or loss. 1/

There is no clear view on how these valuation changes should be treated in relation to the fiscal stance. 2/ Robinson and Stella distinguish between unrealized and realized gains. They claim that unrealized gains should be excluded from central bank profits because they attract no new resources--that is, they are not revenue-enhancing--while the expenditure "financed" by them is a deficit-determining item similar to other expenditure financed by central bank credit. Should the unrealized gains become realized, Robinson and Stella claim that:

> "compared with the situation that would have obtained with no revaluation gain, purchasing power in the private economy is reduced by the amount of the valuation gain, and thus expenditure "financed" by realized gains is similar to expenditure financed from revenue. If the central bank's accountants took note of the capital gain...transfers to the government would increase, reducing the fiscal deficit."

b. The second deviation from the initial benchmark arises when central banks make losses. Significant central bank deficits are frequent in developing countries, sometimes exceeding conventional fiscal deficits (Table 5). Reasons for these losses vary. Their most common causes are quasi-fiscal, such as the requirement on central banks to lend without interest or at very low interest rates for policy purposes. Operational losses also arise from the administration of a multiple exchange rate system (which may include an implicit subsidy to preferred buyers) and from currency devaluations when the central bank has net foreign exchange liabilities vis-à-vis the domestic sector. 3/

Whether or not central bank losses arise from quasi-fiscal activities, there is a case for their explicit inclusion in the public sector deficit. In addition to their expansionary effect, there is an

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1/ On the issue of gains and losses on foreign assets, see Eisner and Pieper (1990).

2/ Mundell (1971), p. 92, discusses the monetary consequences of treating devaluation gains as a regular source of revenue to finance additional spending. More recently, many German and Swiss authors were concerned about the practical procedures for covering the losses of their central banks arising from the depreciation of the U.S. dollar. (See, for example, Goerres (1985).) British authors also analyzed the subject in connection with the losses of central banks which held pounds sterling following devaluation of the pound (Praet (1982)).

3/ For a discussion of sources and treatment of central bank loans, see Teijeiro (1989). The case of losses connected to foreign exchange liabilities is analyzed by Mates (1989).

Table 5. Central Bank Deficits 1/

(In percentage of GDP)

	1984	1986
Argentina	-2.5	-1.6
Costa Rica	-4.3	-3.8
Ghana	-2.1	-0.6
Kenya	-3.8	-5.4
Philippines	-5.2	-2.8
Uruguay	-4.2	-4.0

Sources: Argentina, Julio Piekarz (1987); Costa Rica, Ana Rodríguez Aguilera (1987); Ghana and Kenya, Catsambas and Pigato (1989); Philippines, IMF staff estimates; and Uruguay, Dionisio Onandi and Luis Viana (1987).

1/ Since the indicators are taken from different sources, they are based on various definitions of the concept of central bank losses and thus are not strictly comparable.

issue of symmetry of treatment. Although it is common practice to transfer central bank profits to government, thus reducing the fiscal deficit, current losses do not elicit a transfer from the government to the central bank, so the measured deficit does not rise. To prevent measurement biases, the impact of central bank losses should be included in the public sector balance by recording, for example, a budgetary transfer or a subsidy from the government, thus properly increasing the recorded fiscal deficit.

To summarize, ideally, government accounts should incorporate quasi-fiscal revenues and expenditures, leaving central bank accounts covering only monetary activities. A second-best solution would be, first, that central bank operational losses be consolidated into the fiscal deficit by the addition of a transfer from government to the central bank financed by credit from the central bank. Second, an estimate of the size of central bank quasi-fiscal activities falling outside the profit-and-loss account should be made, and then amalgamated into the adjusted fiscal deficit. Such a hybrid deficit would mix net worth with cash concepts, but would have value as a supplementary indicator showing the approximate impact of central bank quasi-fiscal activities on the overall public sector balance.

4. The budgetary dimension of the public financial sector

Typically, public financial institutions are excluded from the coverage of the public sector and are consolidated with the private banking system. However, these institutions often engage in a multitude of activities (such as preferential credit allocations, subsidized interest rates, etc.) with a clear fiscal content. To the extent that such activities go beyond pure liquidity management which could have been carried out by private financial intermediaries, it is possible that the exclusion of resources provided by the public financial system from the measured public sector balance creates a misleading impression of the fiscal policy stance.

As in the case of nonfinancial enterprises, in order to differentiate between public and private financial institutions, it would be appropriate to consider the implications of their operations on the distribution of income and wealth. Using this approach, pure commercial banks in which the government owns a large, or even a majority stake, should not be considered "public" if their activities have nothing to do with public policy and if they fully finance their operations at prevailing market conditions. The relevant public sector would, therefore, include only those public institutions such as development banks, sectoral credit institutions, mortgage banks, building and loan associations, finance and investment companies, as well as insurance companies

and pension funds, which mobilize savings through the receipt of contractual premia but invest in assets frequently selected by public policy considerations. 1/

Why should some or all of the activities of these institutions be considered quasi-fiscal? The answer appears to be related to the nature of their operations on both sides of the capital market. Public financial institutions are, in many countries, perhaps the most common means of directing credit for policy purposes. In several countries, they account for more than three quarters of all long-term finance. (See World Bank (1989).) Therefore, the same considerations that apply to direct budgetary net lending by the government and to quasi-fiscal lending by the central bank seem to apply here.

There is, however, an important difference. Unlike the government and the monetary authority, but like typical private financial institutions, many public ones act as intermediaries financing at least part of their long-term financial claims by selling long-term financial assets to the public. Nevertheless, public institutions clearly operate in the capital market under special conditions. They were created to provide services that, for whatever reason, other institutions had found not worthwhile or too risky to provide. Thus, public institutions are likely to be less profitable, and be more exposed to risk than other financial institutions, and at a disadvantage in mobilizing voluntary resources from the financial markets. Their survival, hence, often depends on government guarantees (giving them an edge in the market) or on explicit government subsidies, monopoly power over market segments, preferential access to government-mobilized resources, or other forms of preference or protection, including exclusive access to external loans. 2/ This being the case, the operations of these institutions would exert crowding-out pressures on financial markets not conceptually different from those arising from the financing of other government activities, and therefore should not be neglected when assessing the overall economic impact of the consolidated public sector. 3/

1/ In addition, access to their credit facilities is heavily restricted.

2/ A discussion of the fiscal role and the rationale for the public sector financial institutions is provided by Liviatan (1990).

3/ Liviatan mentions that consolidation problems could be serious because a large part of the financing for public financial intermediaries is provided by other parts of the public sector. Therefore, to prevent double counting, only the portion of their lending which is directly financed through the domestic capital market or from abroad should be taken into account.

V. The Intertemporal Budget Constraint of the Public Sector

Recent developments in the analysis of net public resource use have changed the way the deficit is viewed, and the uses to which the deficit measure is being put. This change in perspective has generated awareness of a further set of deficiencies in traditional measures of the deficit, refocused attention toward balance sheet-based deficit measures, and opened up a long menu of methodological issues of government balance sheet measurement. These are the topic of this section.

1. Intertemporal shortcomings of the conventional deficit

Developments in private sector consumer theory have been paralleled (albeit with a lag) by changes in our understanding of public sector behavior. It was always clear that the public sector (being less liquidity-constrained than any private individual) did not finance its expenditure completely out of current income. However, several recent developments in the world economy have highlighted the fact that the government, even if infinitely lived, is constrained--like private consumers--by the size of its permanent income.

The debt crisis has shown that there are perceived limits on governments' ability to repay borrowing from future generations to finance present consumption and the U.S. social security debate has generated awareness of the implications for today of government commitments to spend or repay tomorrow. The conclusion that governments face an intertemporal budget constraint not unlike that of private agents cannot be avoided. It has also become clear that governments' consumption path is determined by wealth as well as by income: privatization programs that seemed to improve the financial position of public sectors have shown that governments can dissave to finance consumption in any period. Finally, it is now recognized that governments' consumption paths can be importantly affected by price and valuation changes. This has been amply illustrated by the effect on governments' financial position of swings in the value of the dollar over the 1980s, the various Latin-American hyperinflations and the development of debt buyback schemes through which governments have profited by the fall in value of their debt. 1/

Some deficiencies in traditional measures of the deficit become particularly evident when government behavior is recast in an intertemporal rather than annual framework--and when attention is shifted

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1/ Comparisons with developments in consumer theory cannot be taken too far. Few attempts have been made to situate government behavior in an optimizing framework. Buiter ((1983), p. 337, text discussion and especially footnote 3), however, presages such an advance in his illustration of a case where a rule of government consumption to maintain a constant net worth would not be optimal.

from short-run demand management to the sustainability of the deficit. Deficiencies include the omission of valuation adjustments, the treatment of asset sales, and of the financial implications of entitlement programs and government guarantees. Specifically, the problems are as follows:

a. The conventional deficit includes no provision for valuation changes in government assets or liabilities, though these could conceivably change the sign of the budget balance in any fiscal year. One facet of this issue has already been discussed: adjustments to the deficit that separate amortization from interest payments on public debt in inflationary regimes are a partial recognition of the impact that prices can have on the nominal deficit. However, government's ability to pay can also be affected, in real terms, by inflation, devaluation, changes in the terms of trade or in relative prices, and real capital gains or losses on the purchasing power implicit in government assets and liabilities, though none of these effects are captured by a summary of government transactions during that fiscal period. 1/

b. Conventional deficit measures usually include receipts from privatization and the sale of other assets as a revenue item. Structural programs or pressures to cut the flow deficit have resulted in the conversion into liquid assets of nonfinancial tangible and even intangible assets that were not previously considered. When assets such as land, embassies, or aircraft are sold, they provide immediate cash to alleviate the current year's financing burden. The amounts can be important--and help to overcome drastic temporary downturns in tax revenue (as in the case of Argentina during its recent hyperinflation (Table 6)). However, the government is worse off by the replacement cost of the assets (arguably their realized market sale value; Goldsmith (1985), p. 92).

The nature of the problem asset sales pose for the deficit differs depending on whether the assets disposed of have previously been purchased by government through the budget or whether they have "always" formed part of the public patrimony (for instance, in the case of mineral rights). Treating as revenue, the sales of previously purchased investment goods in computing the measured deficit is justified by the unorthodox treatment of capital expenditure in government accounts. Unlike private sector capital (and the treatment of public capital in the SNA) which is depreciated over its lifetime, public capital is fully expensed in the fiscal year it is purchased. 2/ This merging of the current and investment accounts, which makes consistent the inclusion of

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1/ Since the government has little control over valuation changes, there are arguments for omitting them from deficit measures to be used for policy design.

2/ "On both a gross and a net basis the NIPA [National Income and Product Accounts measure for the USA] measure was shown to understate the size of government saving mainly because NIPA treats capital outlays as a current rather than a capital account item." (Ott and Yoo (1980), p. 195.)

Table 6. Argentina: The Sale of the Tokyo Embassy 1/

(In percentage of GDP)

	1988	1989 (II)	1989 (IV)
Current revenue	17.6	13.0	18.2
Capital revenue 2/	0.9	3.8	0.3

Source: Centro de Estudios Macroeconomicos de Argentina, Buenos Aires (unpublished).

1/ GDP ratios for 1988 are quarterly averages for the full year; 1989 ratios are for the second and fourth quarters.

2/ Includes proceeds from asset sales.

the full value of an asset sale as a revenue item, can be justified when looking at the annual financing needs of government (Stella (1989), pp. 19-22), but is, however, a misleading indicator of the sustainability of the government's policy stance.

The inclusion of revenues from assets other than investment goods as an "improvement" in government's ability to pay is incorrect by any private sector accounting practice. When the government sells land or mineral rights, for example, it has merely changed the composition of its portfolio: it has the cash but it no longer has the asset. If it earned the market value of the asset, then it is no better or worse off than prior to the sale. 1/ 2/

c. The conventional deficit can be severely affected by "revenues" which create liabilities for the future or "expenditures" which represent the liquidation of past liabilities. On the revenue side, the traditional deficit often includes changes in the net position of social insurance programs. However, social insurance contributions supposedly confer entitlements on contributors and as such commit the government to higher future spending. Thus, social security contributions do not represent free-and-clear revenues, and their inclusion in the deficit overstates government's ability to pay. On the other hand, because they are contingent claims (contingent not only on contributors' attaining old age, or ill health, but also on changes in government legislation), the magnitude of outlays they will eventually require is difficult to determine. 3/

Analogously, the conventional deficit can be dramatically inflated in any year by government's payment of previously guaranteed debt, or insurance contracts, such as exchange guarantees or bail-outs of underwritten entities (like insolvent public enterprises, or the U.S. savings and loan industry). In reality, such payments are stock adjustments--the sum of the accumulated risk costs borne by government over the life of the guarantee. Unlike the private sector, which mitigates the impact

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1/ This is strictly true only when the value of the asset to the private sector is the same as to the government. If efficiency is higher in the private sector, the gain from the sale of the asset will be greater than or equal to the loss of its income stream (depending on whether the government or the private sector captures the capitalized value of the efficiency improvement). See Mansoor (1988). In cases where the gain is non zero, the inclusion of a revenue item (positive or negative) would be appropriate.

2/ The other side of the coin should be that the private sector is made neither better nor worse off by the sale of public assets: the composition of its portfolio has changed but there should be no impact on its perception of its net worth.

3/ The discussion here does not depend on whether programs are funded or unfunded; however, the size of net future government expenditures will obviously depend on future social security revenues.

of bad debts by accumulating loan loss reserves as offsetting stocks, the government usually fails to make provision for expected defaults. Hence, the costs of risk-bearing are not spread out over the life of the risk, but are charged only upon realization of the risk's downside.

The measurement problem in the conventional deficit is not just that meeting current entitlements or paying up for past guarantees boosts the deficit, but also that, at any time, the conventional deficit provides an over-optimistic indicator of government's long-run ability to pay, because it does not factor in the expected future cost of entitlements and contingent liabilities assumed by government. Moreover, the calculation of the expected cost of contingent claims is complicated by the possibility of moral hazard: even if the entitlements and guarantees are not funded or provisioned against, the assumption of liability by government may change private sector behavior. Eisner (1990) clearly rephrases the problem:

> "It may be pointed out that loan guarantees or deposit insurance indirectly finance real spending just as they might if treasury expenditures were made up front. In a sense, the explicit and implicit deposit insurance or guarantees raised the budget deficit at the time the S&Ls made the loans that ultimately turned bad...the expenditures were made then. They then financed the now half-empty office buildings or homes worth only a fraction of their construction costs. Current government borrowing to finance the purchases of S&L assets only makes explicit an element of deficit or debt that was implicit earlier in the commitment of backing to S&L liabilities."

Towe (1989), p. 2, takes these problems one step further, recasting them in terms of their implications for budgetary control:

> "...since the issuance of such contingencies may not impact the current budget, while having severe cash-flow implications for the future, there may not exist sufficient controls, under conventional accounting constraints, to maintain the level of such contingent liabilities at a prudent level."

Clearly, appropriate accounting for contingent claims requires an intertemporal framework.

2. The deficit as an indicator of government solvency: changes in public sector net worth

The so-called deficiencies described above have one thing in common: they do not affect the current year's borrowing requirement. 1/

1/ Although they may well have an impact on the government debt.

Moreover, while the consequences of these issues generate ample debate, their combined effect on aggregate demand in any single year would be well-nigh impossible to measure. Hence, it should be stressed that the main reason for tackling these difficulties is in order to refocus the deficit measure as an indicator of the long-run sustainability of government policy--put dramatically: of the solvency of government.

According to Bean and Buiter (1987), p. 27:

> "A government is solvent if its spending programme, its tax-transfer programme and its planned future use of seigniorage are consistent with its outstanding, initial financial and real assets and liabilities (in the sense that the present value of its spending programme is equal to its comprehensive net worth)."

In other words, over its lifetime, while a government can shift consumption between periods by saving and borrowing, it will be unable to consume more than its total income plus its initial endowment. 1/ Under this definition, the "fiscal deficit" would be equivalent to the dissaving of government in any year (reduction in its net worth).

Like the net worth of a firm, the net worth of government is specified in its balance sheet, and the overall fiscal deficit in any period is equal to the difference in balance sheets at the beginning and end of the period. The methodological and measurement difficulties which bedevil the specification of the government balance sheet--far more than the firm's--are discussed below.

a. Existing government balance sheets

Government balance sheets have two bases, one with its roots in government financial statistics and the other inspired by national income accounting. Financial balance sheets based on the governments' net financial asset position can be extrapolated from studies which reconcile annual flow deficits with changes in outstanding public debt. (See, for instance, Eisner (1986), p. 16.) The most important methodological issue for this type of balance sheet is the treatment of valuation changes in government assets and liabilities (sub-section b.(1), below).

1/ Governments are normally considered infinitely lived. However, the issue of solvency seems to imply a terminal point. Practically, the issue is irrelevant, in the sense that present value calculations at a positive discount rate assign a weight approaching zero to transactions in the distant future.

Alternatively, government balance sheets on an SNA basis attempt to put the government on a par with the other sectors of the economy in the income and wealth accounts of the nation, with the purpose of determining the sectoral distribution of the components of wealth. Goldsmith (1985) presents the most comprehensive international collection of SNA-based government balance sheets. Here, measurement problems are more extensive, encompassing as well the valuation of government real and intangible assets (subsection b.(2), below). Some of the difficulties are not conceptually different from measurement problems in other SNA sectors--for instance, the choice of deflators and price indices, the derivation of stocks from flows, 1/ and the treatment of inventories. This paper covers only measurement issues of particular relevance or sizeable importance to the public sector. For a broader discussion see Goldsmith (1985).

Continual time series of SNA-based balance sheets almost never exist, and so (with the exception of the change in net worth series presented by Ott and Yoo (1980), pp. 190-91) there appear to have been no studies which compare the change in balance sheets from one year to the next with flow-based deficits. Moreover, while SNA-based balance sheets provide valuable first approximations of governments' permanent income, they include only a subset of assets and liabilities and thus may not be a good indicator of the sustainability of fiscal policy.

b. An ideal government balance sheet

Buiter (1983, especially p. 310); also Bean and Buiter (1987, p. 28ff); describes the ideal "comprehensive consolidated public sector balance sheet at current market or implicit prices." To capture the complete array of ways in which government can increase or run down its net worth in a global balance sheet, government assets should include: financial assets; real capital--including nonmarketable social overhead capital, equity (mainly in public enterprises--partly marketable); land and mineral assets (discovered and undiscovered--partly marketable); the present value of the future tax program (including social security contributions); and the imputed present value of seigniorage. Liabilities would include government debt (domestic and foreign, indexed or not); the stock of high-powered money; and the present value of social insurance and other entitlement programs (including guarantees). Government net worth is then the balancing item.

While Buiter's construct provides a clear conceptual framework defining government net worth, it is far from operational. Even at the conceptual level, the definitions of capitalized values of tax and spending programs are subject to enormous controversy. And the valuation of tangible assets presents special difficulties when it must be undertaken on the massive scale necessary to encompass complete public

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1/ For a brief comment on the perpetual inventory method and its shortcomings, see Goldsmith (1985), p. 333.

sector holdings. Moreover, since public assets are less frequently traded than private assets, their prices may be difficult to identify. Indeed, were public assets traded, their prices and those of their currently traded substitutes might be very different from private sector prices in a thinner market (not augmented by government purchases and sales). 1/

Despite these problems, valuable work has been done on many items in the comprehensive balance sheet. In particular, Eisner and Pieper (1984), Eisner (1986), and Boskin, Robinson and Huber (1987a), present improved balance sheets containing many innovations which address the deficiencies in deficit measurement detailed above. 2/ Specifically, as discussed below, efforts have been made: (1) to assess the magnitude of valuation changes in financial net assets, for a more accurate picture of government liquidity; (2, a) to provide a more economically correct estimate of capital formation and the capital stock, by applying a more realistic depreciation scheme than the current system of annual expensing; (2, b and c) to provide a more comprehensive picture of government's ability to pay by including in the balance sheet public land and mineral rights; and (3) to create a framework for assessing the eventual impact of contingent claims on the budget. However, the remaining element of the comprehensive balance sheet, the present value of the tax program (4), presents conceptual difficulties large enough to cast doubt on the interpretation of any measure of government net worth.

(1) The valuation of financial assets

Budget deficits have been considered damaging, in an intertemporal sense, because they add to the public debt and thereby erode the sustainability of the government's expenditure path at current levels of tax revenue. However, as Eisner (1984), p. 140 points out:

"The "underlying reality...that every dollar of deficit...adds a dollar to debt" is simply not true in a real sense if prices are not constant. And if interest rates fluctuate, the statement is not true even with reference to the market value of nominal debt." In particular, positive inflation rates erode the real value of public debt, so that governments which are net debtors can have rising net worth while continuing to run deficits. Moreover, increasing interest rates erode the market value of previously issued fixed-interest debt.

Thus, to arrive at the change in net worth attributable to changes in the values of (net) financial assets, the change in their nominal par value from one balance sheet to the next should be augmented by two

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1/ See Eisner (1976) on establishing the prices of capital assets.

2/ Boskin's work forms part of a large on-going project to refine government accounts; Eisner (1988) has incorporated his work in a proposal for improved global national income accounts.

adjustments--the difference between the real and nominal values of net financial holdings, and the difference between their face value and their market value at the time the net worth calculation is being made.

These adjustments have been more widely applied than any other balance sheet reconciliation item, because, even when economists were not concerned directly with net worth measures, they were troubled by the discrepancy between measures of net government spending and measures of changes in net government liabilities (see Muller and Price (1984), p. 8; Eisner and Pieper (1984), p. 12). Adjusted series for public debt appear in Miller (1982); Eisner and Pieper (1984; recalculated in Boskin et al, 1987a); de Leeuw and Holloway (1985); and Eisner (1986). Eisner (1976) presents revaluation estimates for a range of government assets and liabilities.

Russo (1987), p. 12, however, has objected to the par-to-market adjustment, on the grounds that (save if the government were to raise taxes in order to prepay its debt) the public debt is always amortized at its face value; neither gains nor losses from shifts in market valuation over the life of the loans are ever realized. 1/ Hence, he claims, such shifts, however large their effect may be in any year, are irrelevant to the consideration of the sustainability of the deficit.

(2) The valuation of real assets

While some valuation problems are common to all assets, specific issues arise in the valuation of depreciable assets, land and mineral rights.

(a) Real capital and depreciation

Because the capital stock is estimated by accumulating annual government capital formation, 2/ it is sensitive to the form of depreciation assumed across vintages of capital, that is, to the assumption of the rate of net investment by government. The impact of different depreciation schemes on estimates of the capital stock is discussed in Boskin, Robinson, and Roberts (1985a). Of course, the validity of any depreciation scheme depends on how closely it approximates economic depreciation. Boskin et al. (1985b) apply a geometric depreciation scheme with rates inferred where possible from the ratio of new to used asset prices, on the argument that "Equipment depreciates faster than straightline in the early years, and structures

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1/ Prepayment of debt may not be unusual. It occurs, for instance, in the secondary foreign debt market or any time consols have been retired.

2/ "The two main ingredients [in the perpetual inventory method of estimating the capital stock in the government sector] are a retirement pattern to yield gross stock and a depreciation method which will reasonably estimate net stocks." (Ott and Austin (1980), p. 266.)

depreciate more slowly." (p. 16) 1/ Goldsmith, Ott, and Austin, Eisner, and the BEA use straightline depreciation in their calculations, while Kendrick (1976) uses double-declining depreciation.

(b) Land

Methods of land valuation have been of concern to policymakers since governments started to collect taxes, and a wide literature exists at the microeconomic level. The problem for the government balance sheet is one of aggregation: the information required for the micro-oriented techniques is too detailed to be applied to all public sector holdings. There are also pitfalls in making global inferences from partial data: for many reasons, public sector land (such as military land) may not be a close substitute for private land; and, as mentioned above, were all public land marketable, land prices might be very different from what they are at present.

In fact, as Boskin et al. (1985b), pp. 931-32 point out, global estimates of the value of U.S. federal government land (in Goldsmith (1985), Milgram (1973), Ott and Yoo (1980), Eisner and Pieper (1984), and Boskin et al. are each simply extrapolations (using different combinations of price indices, and adjustments for changes in total acreage and in land composition) of a 1946 estimate made by J.E. Reeve et al. (1950; quoted in Boskin et al.). "These studies [...] demonstrate how successive refinements of basic data often hang by a very slender thread." (p. 931) "A new benchmark estimate for the value of federal land in a particular year is especially important." (p. 935).

As to the valuation of government land in other countries, Goldsmith (see. p. 119) cites difficulties in valuing nonagricultural land, which is often consolidated with the value of the buildings erected on it (so that a proportional valuation factor must be assumed), and in assessing the share of forest on so-called agricultural land.

(c) Mineral rights

The inclusion of mineral rights in the government balance sheet is arguably even more important than the inclusion of government land, because changes in the pace of their direct exploitation, sale or lease are seen by governments as an important way of improving their short-term financial position, and are therefore a prime generator of the problem mentioned earlier, whereby the sale of an asset/exhaustible resource gives a misleadingly optimistic picture of government wealth accumulation, by not offsetting the revenue by the cost of the depletion

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1/ The SNA recommends excluding military asset expenditure from capital formation. However, Goldsmith (1985), p. 67 notes that statistics usually do not permit the exclusion.

of the asset. 1/ It is also true, however, that the large fluctuations in oil prices observed over the last two decades could create much volatility in government net worth from year to year, if applied directly to valuing the stock of mineral rights--unhelpful volatility since only a small portion of stocks would be sold.

One way or other, as Boskin et al. (1985b), p. 924 point out, no work was done prior to their pioneering study on the valuation of federal mineral rights; and we have seen no applicable study in other countries. Boskin et al. estimate expected unproven as well as proven gas and oil reserves--in the spirit of Buiter's forward-looking comprehensive public sector balance sheet. 2/ The inclusion of undiscovered reserves is important for the correct interpretation of government revenues, because the lease of mineral rights typically begins with the sale of exploration rights to unproven fields. The government earns revenue (bonuses) by exploiting firms' expectations about reserves, even if the fields prove to be dry; and, as before, the revenues are not free and clear but come from the government's having ceded an (expected) asset.

Two measurement complications make accounting for exhaustible resources more difficult than accounting for the government's capital stock. First, stocks of undiscovered reserves must be recalculated each time discoveries are made--and relationship between proven and unproven reserves may not be linear. Second, the inclusion of an estimate for mineral rights with estimates of the value of land is problematic, because it is not clear to what extent the value of land already internalizes the value of the minerals underneath. 3/ Ignoring these complications, Boskin's work (Table 7) gives an idea of the implications of changes in the value of real assets for the fiscal deficit. 4/

1/ "National balance sheets for about a dozen countries [...] are nearly worthless unless they include the value of subsoil assets, particularly oil and gas." (Goldsmith (1985), p. 69).

2/ The paper contains a valuable exposition of measurement techniques (comparing the present value method, the land price method and the net price method of determining a base year value to anchor the perpetual inventory calculation). Capital gains (an important issue in the case of exhaustible resources) are included via the assumption that prices grow with the interest rate. Estimates of federal mineral rights are extended to state and local levels in Boskin et al. (1987a).

3/ These complications are exacerbated in the case of reproducible natural resources such as forests and fisheries (Goldsmith (1985), p. 68).

4/ If net worth series are calculated over a longer period, it would be more appropriate to adjust Table 7 for general inflation.

Table 7. United States: Influences on Federal Net Worth

(In billions of current U.S. dollars)

	1979	1980
1. NIPA balance 1/	-16.1	-61.3
2. Change in value of federal land	+17.2	+36.9
3. Change in value of oil and gas rights	+93.8	+208.8
4. Augmented balance (lines 1 + 2 + 3) 2/	+94.9	+184.4

Sources: Line 1: United States (1989a, Table B-79); Lines 2 and 3: Boskin et. al. (1985b).

1/ Federal Government receipts less expenditures on a National Income and Product Accounts basis.

2/ Line 4 is illustrative only; it has not been checked for inconsistencies in definition.

(3) The valuation of entitlements, contingent claims and guarantees

Particularly in the United States, the proper treatment of social security obligations in the fiscal accounts has generated much discussion (see, for instance, Rosenbaum (1990)). Towe (1989), p. 10 ff. describes the main options, from the most restrictive method (the accumulated benefit-cost approach) to that most comparable to net worth (the actuarial balance). While these accounting treatments have been developed mainly for social security programs, their application can be considered for much broader ranges of entitlement schemes and insurance programs.

The accumulated benefit-cost approach to valuing the net impact of an entitlement/insurance program is used in the private sector, where the expected liability of the program is defined only with respect to current participants, and according to current rules (see also Boskin et al. (1987b), p. 44). This approach would narrowly restrict the consideration of contingencies (and therefore of government solvency) to the question of whether present participants will continue to pay their expected subscriptions/premia and become eligible (for example, by living long enough) to collect their expected benefits.

The somewhat less restrictive actuarial fairness approach to valuation defines the deficit or surplus in a contingency program as the difference between the (aggregated) expected present value of the payouts to each of a program's participants over the program's duration and the expected net present value of their payments, thus allowing consideration of expected changes in policy and participation. "Fairness" requires that over the lifetime of each participant, the program must be in balance.

Actuarial balance requires that expected (present value) payments to all present and future participants be equivalent to total expected contributions (adjusted for operating expenses and any relevant endowment or reserve). If the former exceeds the latter, the program has a negative net worth. Boskin et al. (1987b) present estimates of the U.S. social security balance based on this criterion calculated over 75 years. However, they use these estimates to illustrate the extreme sensitivity of such present value calculations to assumptions about contingencies: "[M]oving all of the economic and demographic projections from intermediate to either optimistic or pessimistic [assumptions] results in a change which is larger than the privately held national debt." (p. 45)

The calculation of program deficits under any of the above criteria also requires an estimate of probabilities. Degrees of certainty in payments can vary widely between programs, and have been used as classification criteria--distinguishing between, for instance, pension schemes, where expected outcomes are smooth and predictable once the demographics have been identified, and deposit insurance to financial

institutions, where the risks are highly correlated, leading with a small probability to extremely high payouts. (Boskin, et al., (1987b) especially p. 15.) Moreover, risks may be even higher than guarantees or premia paid would suggest, if political or other pressures force government to treat non-insured agents on a par with insured agents during a systemic crisis. 1/ Boskin et al. (1987b) derive backward-looking estimates of probabilities for defaults on loans from the Small Business Administration, but caution that "In the case of an insurance program [...], where the risks of default across borrowers are highly correlated and very rare, a model based on historical experience can be misleading." (p. 32)

The approaches described measure only the first-order present value of the contingency program. Thus, according to these criteria, all programs in which guarantees are issued without charge (often the case with exchange guarantees (Robinson and Stella (1988), p. 29), are deemed to be in deficit--though the government would not have issued them without the expectation of some social benefit (such as risk spreading). The value of the social benefit might conceivably be estimated (in some cases, by comparing costs in a market without the guarantees (Wattleworth (1988), p. 58), and imputed to the government accounts, but it will usually be impossible to assess the impact of the social benefit on other elements of the government balance sheet. 2/

A final point made by Towe concerns the treatment of reserves sometimes set up to finance contingency programs. While these reserves would seem to represent an offset to any calculation of a deficit in the program, they will do so only when not held in the form of other government liabilities.

(4) The valuation of the present value of the tax program

Eisner (1984), pp. 139-40 takes the view that changes in the value of contingent claims are likely to be met by changes in taxes (or other redistributory legislation, and hence, that the inclusion of such claims in the deficit could give a misleading measure of the fiscal stance, out of line with the private sector's perception of its claims on government. But if Ricardian equivalence is broadly defined, this view could be generalized to all potential reductions in government net

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1/ Robinson and Stella (1988), p. 29 cite the case of debt rescheduling, where the public sector is often forced to assume the external transfer portion of private sector debt even when the debt has not been guaranteed by government.

2/ The difficulty in capturing the second-order effects of government policy on government's balance sheet is, of course, generalizable to any revenue or expenditure program whose impact is diffuse. This issue could become particularly relevant in budgeting for pollution control and environmental management, which might have important effects--though unpredictable and far in the future--on government real assets.

worth, and the present value of the tax program simply replaces net worth as the balancing item in the comprehensive balance sheet.

Even if Ricardian equivalence does not hold, the government's power to control its long-run net worth through altering tax and expenditure legislation 1/ suggests that, even if government has a negative net worth given today's policy package, it is not insolvent in the private sector sense, but merely must adjust the tax program by the amount of its "permanent deficit" 2/ in order to return to sustainability. The indeterminacy of the net worth measure inherent in the flexibility of the government's power to tax is the main philosophical problem with balance sheet or net worth concepts of the deficit. Given this indeterminacy, it is not clear that net worth measures can be constrained to be any less arbitrary than are flow measures.

In the limit, thus, government's control over resources encompasses all of private sector income and wealth as well. Obviously, the sustainability of government policy would then depend on its impact on the total wealth of the economy--in other words, on private agents' view of their net worth. 3/

Kotlikoff (1989) recognizes this broadest of interrelationships in his proposal to substitute a "Fiscal Balance Rule" for present indicators of budget sustainability:

> "[The Fiscal Balance Rule] says take in net present value from each new young generation an amount equal to the flow of government consumption less interest on the difference between (a) the value of the economy's capital stock and (b) the present value difference between the future consumption and labor earnings of existing older generations. ...[O]ne can use existing data to check whether it is being obeyed and, therefore, whether future generations are likely to be treated better or worse than current generations." (p. 2).

1/ One good example is the large drop in U.S. social security obligations following legislation in 1982 (Eisner (1986), p. 37).

2/ The permanent deficit (defined by Bean and Buiter (1987), p. 31) is the real perpetuity equivalent of the difference between the present value of real government spending plans and of net worth. "Although ex-ante permanent deficits will not actually materialize, let alone be permanent, they represent the permanent adjustment that must be made, relative to the ex-ante inconsistent plans, to the flows of spending, tax receipts, or seigniorage revenue in order to achieve solvency."

3/ Abramovitz (in private correspondence) puts the point succinctly: "The government's "total income" is not an exogenous datum. It is a function of economic growth, which itself is influenced by government budget policy both on the expenditure and revenue sides [...] and by politics. How large a portion of future income will politics permit the government to obtain--and from whom?"

In other words, if the present labor force pays for government consumption by taxes augmented by its interest earnings on the capital stock net of that part which finances dissaving by the old, government policy will not run down the economy's capital stock and future generations will be as wealthy as past generations. Under this criterion, the fiscal deficit would be defined as government consumption in excess of taxes plus interest.

c. Shortcomings of net worth concepts of the deficit: a tentative conclusion

The jury is still out on the superiority of net worth calculations of the deficit compared with traditional flow measures. On the one hand, it is clear that they correct for several blatant errors in treatment in currently accepted economic indicators. On the other hand, they fall between two stools. As discussed above, they are not broad enough to internalize the indeterminacy created by the government's power to change the present value of tax and entitlement programs. However, they are very broad measures. All of the authors surveyed have stressed the huge movements in net worth that can be occasioned by valuation changes in assets such as land that the government has no immediate intention of liquidating. Hence, net worth measures could be dangerous if used as indicators for near-term fiscal policy. Even in the long run, as Stella (1989), p. 21, points out:

> "[A]n important, though seemingly ignored, point is that the appropriateness of using the net present value approach depends on the government ultimately realizing the capital gains. While this might be reasonable for financial assets, it is certainly not the case for all real assets. [...] A key factor upholding the validity of accrual accounting is the expectation that the income will eventually be realized. In cases where the income will never be realized, accrual accounting is not justified."

VI. Final Remarks

The fiscal balance has a central role in macroeconomic analysis, and countless econometric studies have been constructed around data on fiscal deficits. Yet, a seemingly straightforward indicator such as "the overall government deficit" hides a minefield of ambiguities, questions of usage, and conflicting definitional issues. Ideally, these should be resolved before conclusions from budgetary statistics are drawn. Problems include the accounting and classification procedures for government operations, the feedback between the budget and macroeconomic developments, the coverage of "government," the manner in which nonbudgetary operations (such as regulation and implicit guarantees)

should be accounted for, and the temporal dimension of government operations. These measurement issues have generated the large body of methodological literature that has been the subject of this survey.

Although the survey was to some extent taxonomic, several central messages emerge. These bear on the implications of deficit measurementfor policy, for cross-country comparison and time-series analysis, and on the futility of a search for "one" deficit measure.

In the first place it is evident that the measurement of the deficit is not a minor issue but one that has significant policy implications. Indeed, depending on how it is measured, and over what period of time, the government deficit can signal different stances and therefore call for different fiscal policies. Similarly, the definition of the public sector and the type of operations included have important consequences for the design, implementation, and monitoring of a macroeconomic package.

Second, cross-country comparisons may be extremely deceptive if they do not adjust for country-specific economic characteristics and accounting conventions. Moreover, even the analyses of time trends in a given country may require the constant upgrading of concepts in response to changing economic conditions.

Third, the sole reliance on pure flow concepts of fiscal accounting can be misleading and inadequate for fiscal analysis. Rather, the literature suggests that the standard flow measures should be supplemented, and in some circumstances replaced, by stock-change concepts such as changes in government financial and real assets, actual and contingent liabilities, and global measures of net worth. It should be stressed, however, that many of these stock-based measures are no less arbitrary, and probably more difficult to quantify, than the flow concepts they are attempting to replace. Moreover, conventional flow measures are not to be discarded since they have a specific use in gauging the short-term financial impact of government imbalances. But in order to generate longer-run measures of true fiscal impact it is necessary to consider what determines the solvency of the public sector, and perhaps even of the nation.

References

Arrow, Kenneth J., and Michael J. Boskin, The Economics of Public Debt (New York: St. Martin's Press, 1988).

Atkinson, Anthony B., "Income Maintenance and Social Insurance," in The Handbook of Public Economics, ed. by Alan J. Auerbach and Martin Feldstein (North Holland: Elsevier Science Publishers B.V., 1987).

Barth, James R., George Iden, Frank S. Russek, and Mark Wohar, "Effects of Federal Budget Deficits on Interest Rates and the Composition of Domestic Output," presented at the Conference on Fiscal Policy (Washington: The Urban Institute, 1989).

Baumol, William J., "Toward a Theory of Public Enterprise," Atlantic Economic Journal, Vol. 12 (March 1984), pp. 13-19.

Bean, Charles R., and Willem H. Buiter, The Plain Man's Guide to Fiscal and Financial Policy (London: Employment Institute, October 1987).

Bernheim, B. Douglas, "Ricardian Equivalence: An Evaluation of Theory and Evidence," NBER Macroeconomics Annual, Vol. 2 (1987), pp. 263-303.

Blanchard, Olivier J., "Suggestions for a New Set of Fiscal Indicators," OECD Economics and Statistics Department, Working Papers, 79, April 1990.

Blejer, Mario I., and Ke-young Chu, Measurement of Fiscal Impact: Methodological Issues, IMF Occasional Paper, No. 59 (Washington: International Monetary Fund, June 1988).

Blinder, Alan S., and Robert M. Solow, "Analytical Foundations of Fiscal Policy," in The Economics of Public Finance, ed. by Alan S. Blinder, Robert M. Solow, George F. Break, Peter O. Steiner, and Dick Netzer (Washington: Brookings Institution, 1974).

Borpujari, Jitendra G., and Teresa Ter-Minassian, "The Weighted Budget Balance Approach to Fiscal Analysis: A Methodology and Some Case Studies," Staff Papers, International Monetary Fund (Washington), Vol. 20, No. 3 (November 1973), pp. 801-31.

Boskin, Michael J., "Federal Government Deficits: Some Myths and Realities," American Economic Review, Papers and Proceedings, Vol. 72, No. 2 (May 1982), pp. 296-303.

_____, "Concepts and Measures of Federal Deficits and Debt and their Impact on Economic Activity," in The Economics of Public Debt, ed. by Kenneth J. Arrow and Michael J. Boskin (New York: St. Martin's Press, 1988).

_____ (1985a), Marc S. Robinson, and John M. Roberts, "New Estimates of Federal Government Tangible Capital and Net Investment," NBER Working Paper, No. 1774 (Cambridge, Massachusetts: National Bureau of Economic Research, 1985).

_____ (1985b), Marc S. Robinson, Terrance O'Reilly, and Praveen Kumar, "New Estimates of the Value of Federal Mineral Rights and Land," American Economic Review, Vol. 75, No. 5 (December 1985), pp. 923-36.

_____ (1987a), and Alan M. Huber, "Government Saving, Capital Formation and Wealth in the United States, 1947-1985," NBER Working Paper, No. 2352 (Cambridge, Massachussets: National Bureau of Economic Research, 1987).

_____ (1987b), Brad Barham, Kenneth Cone, and Sule Ozler, "The Federal Budget and Federal Insurance Programs," in Modern Developments in Public Finance: Essays in Honor of Arnold Harberger, ed. by Michael J. Boskin (Oxford, New York: Basil Blackwell, 1987).

Bosworth, Barry P., Andrew S. Carron, and Elizabeth H. Rhyne, The Economics of Federal Credit Programs (Washington: The Brookings Institution, 1987).

Brennan, Geoffrey, and James M. Buchanan, The Power to Tax: Analytical Foundations of a Fiscal Constitution (Cambridge: Cambridge University Press, 1980).

Buiter, Willem, "Measurement of the Public Sector Deficit and Its Implications for Policy Evaluation and Design," Staff Papers, International Monetary Fund (Washington), Vol. 30, No. 2 (June 1983), pp. 306-49.

_____, "A Guide to Public Sector Debt and Deficits," Economic Policy: A European Forum, Vol. 1, No. 1 (November 1985), pp. 14-79.

Cagan, Phillip, "The Real Federal Deficit and Financial Markets," The AEI Economist (November 1981), pp. 1-8.

Cardoso, Eliana, "From Inertia to Megainflation: Brazil in the 1980s" (manuscript, Bank of Israel, Jerusalem, January 1990).

Catsambas, Thanos, "Budget Deficits, Inflation Accounting, and Macroeconomic Policy: A Skeptical Note," Journal of Public Policy, Vol. 8, No. 1 (January-March 1988), pp. 49-60.

_____, and Miria Pigato, "The Consistency of Government Deficits with Macroeconomic Adjustment: An Application to Kenya and Ghana," World Bank PPR Working Paper, No. 287 (Washington: World Bank, 1989).

Chelliah, Raja J., "Significance of Alternative Concepts of Budget Deficit," Staff Papers, International Monetary Fund (Washington), Vol. 20, No. 3 (November 1973), pp. 741-84.

Citajn, Arthur, Creating and Financing Public Enterprises (Washington: Government Finance Research Center, 1984).

Conklin, David W., and Adil Sayeed, "Overview of the Deficit Debate," in Deficits: How Big and How Bad?, ed. by David W. Conklin and Thomas J. Courchene (Toronto: Ontario Economic Council, 1983).

Cuddington, John T., and Carlos M. Urzua, "Trends and Cycles in Colombia's Real GDP and Fiscal Deficit," Journal of Development Economics, Vol. 30, No. 2 (April 1989), pp. 325-43.

Cukierman, Alex and Jorgen Mortensen, "Monetary Assets and Inflation-Induced Distortions of the National Accounts," Commission of the European Communities, Economic Papers, No. 15 (June 1983), pp. 1-15.

de Kock, Michiel Hendrick, Central Banking (London: Crosby Lockwood Staples, 1974).

de Leeuw, Frank, and Thomas M. Holloway, "Cyclical Adjustment of the Federal Budget and Federal Debt," Survey of Current Business, Vol. 63, No. 12 (December 1983), pp. 25-40.

_____, "The Measurement and Significance of the Cyclically Adjusted Federal Budget and Debt," Journal of Money, Credit and Banking, Vol. 17, No. 5 (May 1985), pp. 232-42.

de Leeuw, Frank, Thomas M. Holloway, Darwin C. Johnson, David S. McClain, and Charles A. Waite, "The High-Employment Budget: New Estimates, 1955-80," Survey of Current Business, Vol 60, No. 11 (November 1980), pp. 13-43.

Dernburg, Thomas, "Fiscal Analysis in the Federal Republic of Germany: The Cyclically Neutral Budget," Staff Papers, International Monetary Fund (Washington), Vol. 22, No. 3 (November 1975), pp. 825-57.

Diamond, Jack, and Christian Schiller, "Government Arrears in Fiscal Adjustment Programs," in Measurement of Fiscal Impact: Methodological Issues, ed. by Mario I. Blejer and Ke-young Chu (Washington: International Monetary Fund, 1988).

Eisner, Robert, "Capital Gains and Income: Real Changes in the Value of Capital in the United States, 1946-77," in The Measurement of Capital, ed. by Dan Usher (Chicago: University of Chicago Press, 1976).

_____, "Which Budget Deficit? Some Issues of Measurement and Their Implications," American Economic Review, Papers and Proceedings, Vol. 74, No. 2 (May 1984), pp. 138-43.

_____, How real is the federal deficit? (New York: Free Press, 1986).

_____, "Extended Accounts for National Income and Product," Journal of Economic Literature, Vol. 26, No. 4 (December 1988), pp. 1611-84.

_____, "That (Non) Problem, the Budget Deficit," Wall Street Journal, June 19, 1990, p. 15.

Eisner, Robert, and Paul Pieper, "A New View of the Federal Debt and Budget Deficits," American Economic Review, Vol. 74, No. 1 (March 1984), pp. 11-29.

_____, "Deficits, Monetary Policy and Real Economic Activity," in The Economics of Public Debt, ed. by Kenneth J. Arrow and Michael J. Boskin (New York: St. Martin's Press, 1988).

Floyd, Robert H., Clive S. Gray, and R.P. Short, Public Enterprise in Mixed Economies: Some Macroeconomic Aspects (Washington: International Monetary Fund, 1984).

Gil Díaz, Francisco, "Government Budget Measurement under Inflation in LDCs," in Public Finance and Public Debt, Proceedings of the 40th Congress of the International Institute of Public Finance, ed. by Bernard P. Herber (Detroit, MI: Wayne State University Press, 1985).

Gil-Díaz, José, "La Medición del Resultado Global de la Política Fiscal en Bolivia" (manuscript, International Monetary Fund, August 1988).

Goerres, Peter Anselm, "Die Ausschuetung der Notenbankgewinne an den Bund--weder 'free lunch' noch unsittlicher Griff in die Ladenkasse," Jahrbuch fur Nationaloek. und Stat., Vol. 200, No. 4 (1985).

Goldsmith, Raymond, Comparative National Balance Sheets: A Study of Twenty Countries, 1688-1978 (Chicago and London: University of Chicago Press, 1985).

Goode, Richard, Government Finance in Developing Countries (Washington: The Brookings Institution, 1984).

Heller, Peter S., "The Underfinancing of Recurrent Development Costs," Finance and Development, Vol. 16, No. 1 (March 1979), pp. 38-41.

_____, "The Problem of Recurrent Costs in the Budgeting and Planning Process" (unpublished, International Monetary Fund, Washington, 1982).

Heller, Peter S., Richard D. Haas, and Ahsan Mansur, A Review of the Fiscal Impulse Measure, IMF Occasional Paper, No. 44 (Washington: International Monetary Fund, May 1986).

International Monetary Fund, A Manual on Government Finance Statistics (Washington: International Monetary Fund, 1986).

_____, Government Finance Statistics Yearbook (Washington: International Monetary Fund, various issues).

Kendrick, John, The formation and stocks of total capital (New York: Columbia University Press, 1976).

Kornai, Janos, "The Soft Budget Constraint," Kyklos, Vol. 39, No. 1 (1986), pp. 3-30.

Kotlikoff, Laurence J., "The Deficit is Not a Well-Defined Measure of Fiscal Policy," Science, Vol 241, No. 486 (August 1988), pp. 791-95.

_____, "From Deficit Delusion to the Fiscal Balance Rule: Looking for an Economically Meaningful Way to Assess Fiscal Policy," Working Paper, WP/89/50 (Washington: International Monetary Fund, 1989).

Leiderman, Leonardo, and Mario I. Blejer, "Modeling and Testing Ricardian Equivalence," Staff Papers, International Monetary Fund (Washington), Vol. 35, No. 1 (March 1988), pp. 1-35.

Liviatan, Oded, "The Impact of Public Financial Institutions on the Fiscal Stance" (unpublished, International Monetary Fund, 1990).

Mackenzie, George A., "The Role of Non-Oil Revenues in the Fiscal Policy of Oil Exporting Countries" (manuscript, International Monetary Fund, January 1981).

Mansoor, Ali M., "The Budgetary Impact of Privatization," in Measurement of Fiscal Impact: Methodological Issues, ed. by Mario I. Blejer and Ke-young Chu (Washington: International Monetary Fund, 1988).

Martino, Antonio, "Budget Deficits and Constitutional Constraints," The Cato Journal, Vol. 8, No. 3 (Winter 1989), pp. 695-712.

Mates, Neven, "Measurement of Government Budget Deficit, Losses of Central Banks, and the Impact of the Aggregate Deficit of the Public Sector on Inflation" (manuscript, Zagreb, July 1989).

Meyers, Roy T., The Budgetary Status of the Federal Reserve System (U.S. Congressional Budget Office (Washington: Government Printing Office, 1985).

Milgram, Grace, "Estimates of the Value of Land in the United States Held by Various Sectors of the Economy, Annually, 1952 to 1968," in Institutional Investors and Corporate Stock--A Background Study, ed. by Raymond W. Goldsmith (New York: Columbia University Press (NBER), 1973).

Miller, Marcus, "Inflation--Adjusting the Public Sector Financial Deficit," in The 1982 Budget, ed. by John Kay (Oxford: Basil Blackwell, 1982).

Morgan, David R., "Fiscal Policy in Oil Exporting Countries, 1972-78," Staff Papers, International Monetary Fund (Washington), Vol. 26, No. 1 (March 1979), pp. 55-86.

Muller, Patrice and Robert W.R. Price, "Structural Budget Deficits and Fiscal Stance," OECD Economics and Statistics Department, Working Papers, No. 15 (July 1984).

Mundell, Robert, Monetary Theory (Pacific Palisades, CA: Goodyear, 1971).

Nasution, Anwar, "Monetary and Banking Policy in its Relationship to Economic Growth in Indonesia, 1965-89" (manuscript, International Monetary Fund, 1989).

Nelson, Charles R., and Charles I. Plosser, "Trends and Random Walks in Macroeconomic Time Series: Some Evidence and Implications," Journal of Monetary Economics, Vol. 10 (September 1982), pp. 139-62.

Onandi, Dionisio, and L. Viana, "El Déficit Parafiscal: Un Análisis de la Experiencia Uruguaya," paper presented at the Central Bank of Brazil, 1987.

Ott, Attiat F., and Jang H. Hoo, "The Measurement of Government Saving," in The Government and Capital Formation, ed. by George M. von Furstenberg (Cambridge, MA: Ballinger, 1980.

Ott, Attiat F., and Thomas D. Austin, "Capital Formation by Government," in The Government and Capital Formation, ed. by George M. von Furstenberg (Cambridge, MA: Ballinger, 1980).

Perraudin, William, "Inflation and Portfolio Choice," Staff Papers, International Monetary Fund (Washington), Vol. 34, No. 4 (December 1987, pp. 739-59).

Piekarz, Julio A., "El Déficit Cuasifiscal del Banco Central," paper presented at the Central Bank of Brazil, 1987.

Praet, Peter, "Rates of Return on EEC Central Banks' Foreign Reserve Holdings (1960-1981)," Cahiers Economiques de Bruxelles, No. 93 (1982), pp. 53-77.

Premchand, Arigapudi, "Government and Public Enterprise: The Budget Link," in Government and Public Enterprise, ed. by Ram Reddy (London: Frank Cass, 1983).

Ramanadham, Venkata V., The Nature of Public Enterprise (London and Sydney: Croom Helm, 1984).

Reeve, J., and others, "Government Component in the National Wealth," Studies in Income and Wealth, Vol. 12 (1950).

Robinson, David J., and Peter Stella, "Amalgamating Central Bank and Fiscal Deficits," in Measurement of Fiscal Impact: Methodological Issues, ed. by Mario I. Blejer and Ke-young Chu (Washington: International Monetary Fund, 1988).

Rodríguez Aguilera, Ana, "Actividades Cuasifiscales de la Autoridad Monetaria: La Experiencia de Costa Rica," paper presented at the Central Bank of Brazil, 1987.

Rosenbaum, David E., "Scoring Political Points on Social Security Tax," New York Times, January 15, 1990, p. A12.

Russo, Benjamin, "The Real Market Value of the Net Federal Debt: Interest Rate Effects, Money Illusion, and the Efficacy of Fiscal Policy" (unpublished, University of North Carolina, 1987).

Stella, Peter, "Toward Defining and Measuring the Fiscal Impact of Public Enterprises," Working Paper, WP/89/76 (Washington: International Monetary Fund, 1989).

Stillson, Richard T., "Some Policy Implications of Foreign Capital Flows in Certain Developing Countries," in Money and Finance in Economic Growth and Development, ed. by Ronald I. McKinnon (New York and Basel: Marcel Dekker, Inc., June 1979).

Stuvel, G., National Accounts Analysis (London: Macmillan, 1986).

Tanzi, Vito, "Fiscal Disequilibrium in Developing Countries," World Development, Vol. 10, No. 12 (December 1982), pp. 1069-82.

_____, "The Public Sector in the Market Economies of Developing Asia," Asian Development Review, Vol 5, No. 2 (1987), pp. 31-57.

_____ (1989a), "Fiscal Policy and Economic Reconstruction in Latin America," Working Paper, WP/89/94 (Washington: International Monetary Fund, November 1989).

_____ (1989b), "Lags in Tax Collection and the Case for Inflationary Finance: Theory with Simulations," in Fiscal Policy, Stabilization, and Growth in Developing Countries, ed. by Mario I. Blejer and Ke-young Chu (Washington: International Monetary Fund, 1989).

Tanzi, Vito, Mario I. Blejer, and Mario O. Teijeiro, "The Effects of Inflation on the Measurement of Fiscal Deficits," in Measurement of Fiscal Impact: Methodological Issues, ed. by Mario I. Blejer and Ke-young Chu (Washington: International Monetary Fund, 1988).

Teijeiro, Mario O., "Central Bank Losses: Origins, Conceptual Issues, and Measurement Problems," World Bank Policy, Planning and Research Working Paper, No. 293, October 1989.

Thompson, Lawrence H., "The Social Security Reform Debate," Journal of Economic Literature, Vol. 21, No. 4 (December 1983), pp. 1425-67.

Towe, Christopher M., "Government Contingent Liabilities and the Measurement of Fiscal Impact" (manuscript, International Monetary Fund, 1989).

United Nations, Department of Economic and Social Affairs, Statistical Office of the United Nations, A System of National Accounts, Series F, No. 2, Rev. 3 (New York: United Nations, 1968).

United States, Department of Commerce, Bureau of Economic Analysis, Fixed reproducible tangible wealth in the United States, 1925-79 (Washington: Government Printing Office, 1982).

_____, Executive Office of the President, Office of Management and Budget, Budget of the United States Government, Fiscal Year 1989 (Washington: Government Printing Office, February 1988).

_____ (1989a), Executive Office of the President, Council of Economic Advisers, Economic Report of the President (Washington: Government Printing Office, January 1989).

_____ (1989b), Congressional Budget Office, Credit Reform: Comparable Budget Costs for Cash and Credit (Washington: Congressional Budget Office, December 1989).

Vaez-Zadeh, Reza, "Oil Wealth and Economic Behavior: The Case of Venezuela, 1965-81," International Monetary Fund Staff Papers, Vol. 36 (June 1989), pp. 343-84.

Wasserman, Mark, "Public Sector Budget Balances," OECD Economic Outlook: Occasional Studies (July 1976), pp. 37-51.

Wattleworth, Michael, "Credit Subsidies in Budgetary Lending: Computation, Effects, and Fiscal Implications," in Measurement of Fiscal Impact: Methodological Issues, ed. by Mario I. Blejer and Ke-young Chu (Washington: International Monetary Fund, 1988).

World Bank, World Development Report 1983 (New York: Oxford University Press, 1983).

_____, World Development Report 1988 (New York: Oxford University Press, 1988).

_____, World Development Report 1989 (New York: Oxford University Press, 1989).