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Government Contingent Liabilities and the Measurement of Fiscal Impact

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Abstract

Conventional fiscal accounting methodologies do not appropriately account for governments' noncash policies, such as their contingent liabilities. When these liabilities are called, budget costs can be large, as evidenced by the United States' saving and loan crisis. In general, deficit measures may underestimate the macroeconomic impact of government policies, promoting the substitution of noncash for cash expenditure and increasing future financing requirements. The paper describes extended deficit measures to address the problem, but notes their limited practical value. Nonetheless, some alternative methods of valuing contingent liabilities are proposed to gauge fiscal impact and facilitate budgetary control.

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Summary

Conventional budget methodologies ignore the issue of contingent liabilities, except when a cash flow is created. Thus, while conventional deficit measures may accurately describe the change in the government's nominal liabilities resulting from the need to finance cash expenditures, the change in its liability from noncash policies, that is, the extension of contingent claims, will generally be ignored. As a result, fiscal accounting systems provide insufficient data for adequate budgetary control over such policies. Moreover, constraints on conventionally defined levels of expenditures and the deficit may unintentionally create incentives to substitute noncash expenditure through the issue of loan guarantees and the like. As a result, conventional budget methodologies may lead to improper analysis of the trade-offs between current cash expenditure policies and the issuance of contingencies.

In addition, the design of macroeconomic policy will depend on an appropriate measure of the macroeconomic impact of the government's fiscal activities. There is substantial controversy regarding the impact of such contingency programs as social welfare, deposit insurance, and loan guarantees. Insofar as they ignore these noncash fiscal activities, conventional measures of fiscal impact may underrepresent the government's effect on the macroeconomy.

One solution to this problem is to define an extended deficit measure. Deficits can be defined that measure the intergenerational transfers implied by such contingency programs (and other government policies), or that sum government activity, including contingencies, over an infinite horizon. The choice will depend on the relevant planning horizon of the budget authority and the private sector. However, either alternative would likely be impractical given the data requirements.

Nonetheless, the value of government contingencies should be measured. Two alternatives are proposed: actuarial balance, which would represent the liability from the government's (long-term) perspective, and actuarial fairness, which measures the transfer or subsidy to current participants. In the latter case, a number of alternative measurement strategies can be defined, the choice depending on the type of contingency in question and the data available. These measures can be used to form the basis of the appropriate budgetary control over the government's provision of contingencies, as well as the analytic device for gauging their impact.

I. Introduction

Much of the debate regarding the efficacy of conventional cash-flow measures of the deficit as indicators of fiscal impact has ignored the fact that an increasingly significant instrument of government policy--the adoption of contingent liabilities--does not involve a current cash flow, but an obligation regarding possible future cash flows. 1/ Contingent liabilities issued by governments include, for example, deposit insurance, social security and health insurance, and loan guarantees. Their adoption implies future government outlays that are contingent on some event, for example, bank insolvency, ill health, or loan default. Conventional budget methodologies account for contingent liabilities not when the obligation is incurred but only when the actual expenditure is made. 2/ Insofar as the issue of contingent claims on government is valued more highly by the private sector than any fees charged in exchange, such claims may affect economic behavior in a fashion similar to a cash tax/subsidy. By excluding a measure of these policies until the actual cash outlay is made, the conventionally defined budget deficit may misrepresent the government's current fiscal impact and limit its analytic usefulness. In addition, since the issuance of such contingencies may have no impact on the current budget, while having severe cash-flow implications for the future, budgetary authorities may not be provided with the means to adequately monitor and control the government's overall fiscal position. 3/

1/ For example, the conventional deficit measure is said to underestimate the real resource transfer from the private sector to the public sector during inflations when the nominal and real rates of interest on government debt diverge. A useful summary of these arguments is provided by Tanzi, Blejer, and Teijeiro (1988). Other descriptions of this aspect of budget measurement include those by Boskin, Barham, Cone, and Ozler (1987), Buiter (1983), and Eisner and Pieper (1984). Criticisms of conventional deficit accounting have also included those with regard to the exclusion of the central bank's deficit, and the improper accounting for arrears and credit subsidies. See Robinson and Stella (1988), Diamond and Schiller (1988), and Wattleworth (1988), respectively. Others have argued that a more relevant measure of fiscal impact requires normalization of the deficit with respect to either an income measure or the deficit at full employment. See Heller, Haas, and Mansur (1986) and Buiter (1985) for a review and a comparison of such measures. See also Mackenzie (1989) for an evaluation of summary measures of fiscal stance.

2/ Note that in accrual-based methodologies expenditure is included when the commitment is made with certainty. See, for example, Diamond and Schiller (1988), p. 40.

3/ The United States is a topical example, where deficit targets have been legislated which include the current, but "temporary," surpluses of the Social Security Administration.

This paper reviews the types of contingent liabilities governments issue, discusses their impact on private sector behavior, and proposes means by which measures of the fiscal deficit could be amended to account for contingencies. While, in theory, deficit measures could be defined that would include the fiscal impact of governments' issue of contingent claims, it is argued that they would be based on the choice of relatively extreme views regarding the macroeconomy. A simple alternative would be to require calculation of the change in the degree of fundedness of contingency programs during each budgetary period. This would provide both an ancillary measure of the government's impact on the economy, and a device with which to gauge and enforce budget discipline.

Section II describes a taxonomy of contingent government liabil-ities and Section III describes the accounting of such liabilities in conventional deficit measures. Sections IV and V describe the drawbacks of such conventional accounting methods in relation to government provision of contingent liabilities and examine the possible use of extended deficit measures, concluding that practical drawbacks may preclude their use. Sections VI and VII propose various alternate measures of government contingencies, and discuss how these could be used as indicators of programs' economic impact and as a means of budgetary control. In Section VIII the paper's main conclusions are reviewed. It is argued that it may be impractical, and possibly inappropriate, to redefine fiscal deficit definitions to fully account for changes in the government's contingent or other liabilities. Nonetheless, appropriate intertemporal budget planning, and the analysis of fiscal impact, does require the calculation of an index of the change in the government's contingent liability, and therefore the expected future cash outlay associated with such programs.

II. Government Contingent Liabilities

The distinction between governments' contingent and noncontingent liabilities (e.g., interest-bearing debt) is that the nominal obligation and the settlement date of the latter are fixed at the date of issue, while in the case of contingent liabilities, the contractual obligation of the government is dependent, in its timing and/or amount, on the occurrence of a particular event. Therefore, the diversity of such liabilities is large. Below, the different types of contingent liabil-ities offered by governments, and the ways they are financed, are reviewed.

1. A taxonomy

a. Social security

Social security programs—sometimes referred to as annuity programs—such as state pension schemes, medical insurance programs, etc., imply an obligation by the government to provide financial

assistance to the private sector that is contingent on various criteria
including need, disability, retirement, unemployment, or death. 1/ The
rationale for such programs is most often normative--that provisions
should be made to redistribute income to the needy or aged, or that
households must be coerced into saving for old age, etc. Alternatively,
insurance market imperfections that restrict the development of private
insurance markets, such as informational asymmetries between the insurer
and the insured, are also viewed as an important reason for providing
social security.

While it has been estimated that governments of 143 countries now
provide some type of social security program, the scope and coverage of
such programs differ widely. 2/ Coverage may be employment related, in
which benefits are contingent on length of previous employment and/or
earnings and benefits are usually partially funded through compulsory
contributions by employers and/or employees. Nonetheless, the central
government usually contributes a major share of total revenue. Less
prevalent are systems in which coverage is universal and benefits are
untied to recipients' employment history.

b. Loan and other guarantees

Governments provide a myriad of other, nonsocial security-related,
programs which are primarily (but not exclusively) designed to stimulate
particular economic activities by reducing risk, rather than achieving
normative objectives like income support; these include loan guarantees,
deposit insurance, mortgage guarantees, trade and exchange rate
guarantees, etc. 3/ Unlike the annuity programs described above, which
usually are based on a principal of universal coverage, loan guarantees
and other similar insurance schemes are associated with the consumption
of a particular service that is deemed worthy of subsidy (for example,
deposit insurance and guarantees of student and housing loans, etc.). 4/

Loan and credit guarantees have become important, both in indus-
trial and developing countries, as a means of increasing access to

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1/ See Kotlikoff (1987) for a description of social security programs
and their economic implications.
2/ For a complete, cross-country, description of the typical charac-
teristics of social security programs see United States, Department of
Health and Human Services (1987).
3/ Allowing individuals access to capital markets which would have
been denied owing to informational asymmetries, etc., is argued to be a
welfare improving policy (see, for example, Mayshar (1984)). However,
others have argued that such guarantees promote an inappropriate
adoption of risky investments and are, therefore, inefficient (Chaney
and Thakor (1985) and Bosworth, Carron, and Rhyne (1987), p. 41).
4/ Nonetheless, these may also be seen as a means of achieving
redistributive goals.

credit markets, without any immediate budget impact. 1/ Such programs include guarantees of agricultural loans, student loans, mortgages, small (or other) business loans, etc. A significant proportion of such guarantees is related to deposit insurance, in which depositors are guaranteed the repayment of principal (and sometimes interest) in the event of the failure of the deposit-taking institution. Governments also frequently attach explicit guarantees to the borrowing of public enterprises, municipalities, and other parastatals, permitting them to borrow at lower rates of interest than otherwise.

Loan guarantee and deposit insurance programs have a broad range of characteristics. The guarantee may cover 100 percent of the credit arrangement, or up to some fraction or fixed amount. Most credit and deposit guarantee schemes require a fee or premium, which may be a one time or annual payment, and is usually based on a percentage of the amount guaranteed. Often these programs are "funded" in the sense that some attempt is made to ensure the maintenance of a reserve that matches the expected liability, and in some cases the program's liability is limited to the amount of the reserve. Guarantee or insurance schemes may be voluntary, for example, loan guarantee schemes, or mandatory, as in the case of deposit insurance.

Exchange rate guarantees and/or credit guarantees to exporters, etc. are also often provided by governments (or their central banks). 2/ These are usually intended to promote domestic exports by reducing the private sector's trade risk. In such cases, the financing often is provided by private sector financial institutions while the government agency provides a guarantee of interest and/or principal. The guarantee may be either to the exporter (suppliers' credit) or to the importer (buyers' credit), and may be denominated either in the exporter's or the importer's currency. In general, agencies require a premium, which may vary according to perceived risk, in exchange for the guarantee.

c. Implicit contingencies

It has been argued that a substantial share of governments' contingent liabilities is associated with the implicit guarantee of transactions of parastatal agencies or sectors of the economy. These implicit guarantees are distinct from those discussed above in that no specified contractual basis exists defining the government's liability. For example, government-sponsored enterprises (GSEs), while wholly privately owned, may be mandated to perform public policy. In the United States, examples of such enterprises include the Federal National

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1/ For a useful survey of the characteristics of credit guarantee schemes in a number of industrial and developing countries, see Levitsky and Prasad (1985).
2/ See Brau and Puckahtikom (1985) for a description and survey of such systems.

Mortgage Association and the Student Loan Marketing Association. As
GSEs are constrained to fulfill public policy objectives, and so may be
prevented from profit maximizing, it has been suggested that governments
face a "moral" (rather than a legal) obligation to guarantee their
debt. 1/ Similarly, while a government may not be contractually bound
to rescue industries and/or regions that suffer financial reverses,
there may be a similar implicit obligation. Salient examples in the
United States include the extension of substantial credit guarantees to
Penn Central Railway (in 1970), Lockheed (in 1971), New York City (in
1975), and Chrysler Corporation (in 1979). 2/

2.   Funded versus unfunded contingent liabilities

     A firm's contingent liabilities are considered funded if they are
matched by a reserve or charge against profits equal to the actuarial
value of the liability—that is, when the reserve equals the present
discounted value of expected payouts. The relevance of this distinc-
tion, as often applied to pension and insurance funds, is whether or not
the balance sheet is sufficiently strong to ensure that the liability
can be repaid if the plan were terminated. Actuarial examination of a
private sector pension plan, for example, will require estimation of
benefits accrued to date—the actuarial liability—which represents the
firm's current obligation to current plan participants. The firm's
contingent liability is considered funded if this value is matched by
reserve assets; the difference between the actuarial liability and any
reserve assets that exist is termed the unfunded actuarial liability.
However, actuarial examination usually also requires the calculation of
the expected present value of additional benefits expected to be accrued
in the future. The sum of past and expected future accruals is termed
the actuarial present value of future benefits. Firms are often legally
required to erase the difference between this latter value and the value
of reserve assets over a period of time through the adoption of a
schedule of contributions that fund the benefits of the plan. 3/

     It has been argued, however, that these actuarial concepts may be
less useful for the analytical requirements of the fiscal accounts.
First, the government's power to levy taxes or create debt instruments
to finance expenditure implies that it does not face the same solvency
constraints as the private sector so that actuarial techniques designed
with this purpose in mind may be of limited relevance for the analysis

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     1/ For a discussion of the "special relationship" that GSEs enjoy
with the U.S. Government, see United States, Executive Office of the
President, Office of Management and Budget (1989), p. F-24.
     2/ The budget implications of these "bailouts" are described in
Ippolito (1984), Chapter 4.
     3/ For a further discussion, see McGinn (1980).

of fiscal policy. 1/ Thus, an indicator of the impact of contingent liabilities on the economy, or information of value for longer-term assessment of budgetary trends, which actuarial methodology does not explicitly address, would be of greater relevance. Moreover, Selling and Stickney (1986) note that recent accounting standards set for the United States require pension liability to be calculated on the basis of accumulated benefit and projected benefit obligations, neither of which include consideration of the impact of expected future service on benefit obligations. 2/ Thus, actuarial methodologies and standards may have to be amended, as applied to fiscal accounting, to place a greater emphasis on expected future obligations, rather than on accrued obligations to date.

A more appropriate criterion for fundedness of government programs may be that of actuarial fairness. In this case, a contingency program would be termed funded if the expected present value of future payouts to each of a program's current participants equals the expected present value of any current and future payments by current participants (for example, fees or contributions) to the program in addition to the value of any reserve assets. This calculation would also include considera- tion of benefits accrued in the future. If this criterion were met, and the revenues of the program are not added to the general revenues of the government, a fund would exist that matches the expected value of participants' accrued benefits, and there should be no need for government tax revenue to be raised to meet the program's expenditure.

A less strict definition of fundedness that is often used in the case of social insurance programs is "actuarial balance." It differs from the previous definition in that account is taken of the net expected benefits of expected future, as well as current, partici- pants. Thus, a contingency program is said to be actuarially balanced if the expected value of future payouts to all current and future participants equals the expected present value of the inflows from all current and future participants, plus the value of any reserve fund. In this case, since there is not necessarily a balance between current participants' expected future contributions and benefits, while a reserve fund may exist, it will not in general be equivalent to the program's accrued liability. Nonetheless, when a program is actuarially balanced, government tax revenue will not be required to meet its obligations; for example, a growing population, inflation, etc., could

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1/ Nonetheless, while governments' ability to issue nominal domestic currency debt is not limited, it has become apparent in recent years that governments can be insolvent, especially with regard to foreign currency or their "real" obligations. See von Furstenberg (1979), Chapter I for a discussion of these issues.

2/ The accumulated benefit is calculated on the basis of current salary and accumulated service to date; the projected benefit is calculated on the basis of expected future salaries but accumulated service to date.

provide the resources to finance a social security system for which current participants' expected benefits exceed expected contributions. Moreover, while an actuarially balanced program may suffer a temporary negative cash flow, in turn requiring financing from the government's general revenues, actuarial balance implies that these negative cash flows will be transient and will be offset by future inflows so that deficits may be offset by borrowing, with repayments fully covered by the fund's own resources.

Unfunded programs will not meet one or both the actuarial balance of actuarial fairness criteria, and expected receipts may fall short of expected payouts. The simplest example is that of pay-as-you-go (PAYG) schemes, in which contribution rates are adjusted periodically, as necessary, to meet cash outlays. As will be discussed below, an important distinction between actuarially fair contingency programs and other (including both PAYG and actuarially balanced) programs is that the latter may imply an intertemporal transfer of wealth either to or from current participants. As a result of the implied subsidy or tax, macroeconomic behavior can be affected. Thus, it will be argued below that measures of programs' fundedness may provide a useful gauge of their fiscal impact.

III. Contingent Liabilities in Conventional Deficit Measures

The two most prevalent deficit measures--those prescribed by the United Nations in A System of National Accounts (SNA) or the IMF in A Manual on Government Finance Statistics (GFS)--index the current period's excess of governments' expenditures over revenues, on an accrual or cash basis, respectively. Both systems focus on current flows of goods and services rather than on current policy commitments which may imply future transfers between the public and private sector.

In particular, GFS recommends the exclusion of imputed or accrued transactions in accounting for government activity (GFS, p. 2) in favor of an accounting method based solely on cash transactions:

> The reliance on cash flow data is based on the view that unlike enterprises, which must keep account of their accrued liabilities to others (accounts payable) and of others' accrued liabilities to them (accounts receivable) in order to calculate net worth, costs, and income, government cannot maintain full accrual accounts. This is because most liabilities accruing to government or from government to others are generated not by deliveries but by occurrences in which the government is not a direct participant and of which government may have no immediate knowledge (GFS, p. 2).

While the importance of accrued assets and liabilities (for example, uncollected tax revenues) is conceded, they are excluded owing to the difficulty in accounting for them accurately and in a fashion consistent with other macroeconomic statistics. Other deficit measures, for example, those based on the concept of changes in net worth, would, it is argued, have ambiguous policy or economic implications, and require an undesirable reliance on estimates (GFS, p. 108). The GFS definition of the deficit accounts for contingent liabilities only when a cash flow results:

> Government guarantees of the debts of others should be excluded, along with any other contingent liabilities, unless and until the government is called upon to take over and service that debt. The contingent or actuarial liabilities of government insurance schemes or social security systems are also excluded... (GFS, p. 110).

Thus, with regard to loan guarantees, only payments in the event of default are included as an expenditure item. In particular, if these transactions give rise to a claim on the borrower, payment of principal and interest in the event of default is classified as net lending; receipts in repayment of defaulted amounts are included as repayment of a loan to the private sector (GFS, p. 105). 1/

As regards social security schemes, the consolidation of their cash flows with the central government, versus the public financial sector, is recommended since their operations will tend to reflect the government's policy goals rather than normal financial market incentives. Therefore, the economic impact of social security contributions and benefits is implicitly thought to closely resemble that of wage taxes and government transfers, so that the exclusion of these plans would tend to understate the impact of public policy (GFS, p. 16). 2/ However, as in the case of loan guarantees, only the cash flows associated with such programs are considered and any accrued liability is ignored.

The SNA's budget methodology differs from that prescribed in GFS, with implications for the treatment of contingencies. In particular, government transactions are included in the fiscal accounts on the basis of changes in ownership of goods and services and accrued tax liabilities; sales of assets and net lending are treated as financing items. Therefore, as regards social security flows, the recommended treatment,

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1/ If no claim is created against the defaulter, the payment of the interest obligation is treated as an interest expenditure while repayment of principal is considered negative financing (GFS, p. 179).

2/ The exceptions to consolidation include provident funds, government employee funds, and local and regional funds, which act more as savings instruments, and more closely resemble their private sector analogues.

"in the case of current transfers which represent obligations to, or commitments of, organs of general government, is to record the transfer as of the date when they are due without penalty" (SNA, p. 128), rather than when the cash flow is generated. This results, however, only in a difference in timing compared with the methodology described in GFS. Similarly, the SNA recommends accounting for payments upon default of government guaranteed loans on an accruals basis--again when the liability is due with certainty. As the SNA focuses on changes in the government's net indebtedness (rather than on the policy intent of its transactions), the settlement of such an obligation would be classed as a financing item.

IV. Macroeconomic Impact of Contingencies

The appropriateness of conventional fiscal accounting systems' treatment of contingencies would appear to depend on a view that the macroeconomic impact of such programs is primarily at the future date when the contingent claim is realized and the cash flow generated. It is important to consider, however, the extent to which the contingency, or insurance, program has simply supplanted the provision of like insurance by the private sector. In that case, it is unlikely to affect private sector behavior in the same manner as its after-tax or subsidy policies. However, to the extent that such programs are operated under different constraints than faced by the private sector--for example, if the programs are not actuarially fair or are subsidized--then their impact may be similar to that of other government transfer policies.

These issues have received much attention in recent years, especially in light of the growth of government social security programs. At the one extreme, it is argued that an increase in the government's contingent liability through the announcement of expanded future social security benefits will increase current aggregate demand on the assumption that life-cycle considerations dominate consumption decisions. In this case, demographics and the time profile of house-hold's income may imply that some of the tax burden of the future benefits will be borne by future generations. As households expect that their future benefits will exceed their future tax liability, their expected net wealth increases, thereby increasing their demand for current consumption.

At the opposite extreme, it has been argued that social security schemes may have no impact on current consumption. For example, if programs are actuarially fair, so that if current consumers are required to contribute current-period funds to the program that exactly match their expected receipt of future payouts, their net wealth will be unaffected, and there may be no incentive to change current consump-tion. Alternatively, even if contingencies are not actuarially fair, consumers may be myopic with regard to the future benefits that such schemes imply, or face liquidity constraints that inhibit the adjustment of current consumption to expected future benefits. In the latter case,

an increase in expected future benefits, while increasing consumers net wealth, will not permit an increase in current consumption as capital market imperfections restrict consumers from borrowing against future income (see Panel 1 for an illustration). 1/ Finally, it is often argued that private sector economic activity is unaffected by any tax/transfer policy of the government, since households include an assessment of the implicit future tax liability required to finance contingencies that exactly offset any associated benefits. 2/

Nonsocial security contingencies may similarly be thought to affect aggregate demand. For example, the provision of loan guarantees will tend to reduce the cost of capital to private sector borrowers, increasing the overall demand for credit and investment goods. 3/ Similarly, exchange rate guarantees may reduce export costs and stimulate aggregate demand, while deposit insurance will tend to increase banks' supply of loans and spur investment (see Villanueva and Mirakhor (1990)). However, as above, their impact on aggregate economic activity will also depend on the extent to which the program implies a net subsidy to recipients, as well as the private sector's expectations regarding its financing.

This suggests, therefore, that the macroeconomic impact of both social security and nonsocial security contingency programs is likely to be closely related to the programs' fundedness. For example, as mentioned above, if the contingency program operates as a forced savings vehicle, requiring contributions from participants that exactly match their expected payouts, the program will be fully funded, and it is unlikely that the program will have a macroeconomic impact. Similarly, a PAYG scheme, or one which is less than fully funded, may imply a net transfer from future generations to current consumers, and therefore induce an increase in aggregate demand. Note that this distinction appears to be also that used by the GFS, in which social security funds, for which benefits are not directly related to contributions, are assumed included as part of general government, while provident funds,

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1/ See Bernheim (1989) for an interesting discussion and survey of the literature regarding the effect of liquidity constraints on consumers and their relationship with deficits and aggregate demand.

2/ The empirical evidence regarding the economic impact of social security is ambiguous (see Atkinson (1987)), in some cases rejecting the pure Ricardian prediction that the private sector would react to the institution of a social welfare program by simply reducing savings, and in other cases rejecting the alternate, life-cycle, hypothesis that savings would be only partially depressed, causing consumption to increase.

3/ Fried (1983) demonstrates this result in the context of a simple Tobinesque portfolio balance model. Towe (1989) examines this issue in the context of a choice-theoretic general equilibrium model. See also United States, Congress (1981) for a detailed discussion.

Panel 1

The Effect of Liquidity Constraints on Consumption in the Face of Future Tax Liability

$$c_1 = y_1 + (y_2 + b_2 - c_2)/(1 + r)$$

$$c_1 = y_1 + (y_2 - c_2)/(1 + r)$$
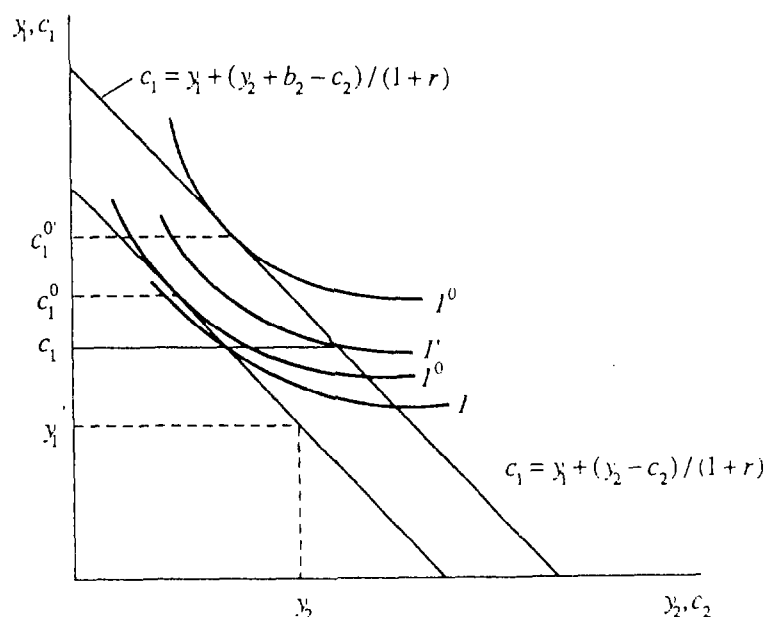
If current households' current and future income is y_1 and y_2, respectively, and households may save or lend at an interest rate r, then current consumption and borrowing will be c_1^o and $c_1^o-y_1$, respectively, where the indifference curve is tangent to households' budget constraint. The impact on current consumption of the government's announcement of future social security benefits of b_2 will be to shift out the households' budget constraint and increase current consumption to $c_1^{o'}$.

Suppose, however, that households are liquidity constrained such that borrowing may not exceed c_1-y_1. In this case, prior to announcement of the future social security benefits, households will choose, subject to the liquidity constraint (and assuming that it is binding), to consume c_1. Despite the increase in future social security benefits, the liquidity constraint still binds households to consume no more than c_1; thus there will be no impact on current aggregate demand.

which maintain the financial integrity of deposits, are excluded (GFS, p. 15). In the section below, the feasibility of applying these concepts to extended measures of the fiscal deficit is explored.

V. Contingent Liabilities and Alternate Budget Definitions

As described in Section III, conventional fiscal accounting methodologies and deficit measures exclude government contingent liabilities except when a cash flow is generated or the obligation is due with certainty. Moreover, these would imply a deficit measure that was a deficient indicator of fiscal impact except under extreme assumptions regarding private sector behavior--myopia regarding the future implications of current government policy or liquidity constraints. Described below are alternative measures of the deficit and fiscal impact that admit the possibility that government noncash activities-- the issue of contingent claims--may affect current private sector activity.

1.   The economic deficit

As noted above, it is often argued that private sector behavior results from economic agents' allocation of net wealth over their life cycle. In this context, it has been suggested that as social welfare programs offer a well-defined right to (possibly uncertain) benefits in the future, economic agents may view the payment of social security taxes as the purchase of an annuity or bond, rather than a compulsory tax, and similarly view the payout as repayment of principal and interest (Kotlikoff (1984, 1986, and 1988)); see also the discussion in Mackenzie (1989)).

In this circumstance, the prescription is to describe the government's fiscal stance in terms of an "economic deficit," in which social security tax receipts are reclassified as a financing item, while a portion of benefits are similarly included below the line as a loan repayment. Only the excess of benefits over payments to each individual is treated as an interest expenditure. 1/ Similarly, most expenditures associated with loan and other guarantees would remain above the line-- reclassified as interest payments--while any premia or fees would be placed below the line and classified as financing items. 2/

1/ As compared to the budget methodologies proposed by both the GFS and SNA, this system would place "below the line," for the purpose of defining a deficit, all receipts and payments except those in excess of participants' prior payments. Note, the proponents of this system do not address the issue of decomposing benefit payments into "principal" and "interest." Presumably an actuarial criteria could be applied.

2/ Adjustment to the SNA system would be more dramatic since payments on default of guarantees are already treated as a financing item.

Clearly, however, the extent to which social security, or any other contingency program, can be viewed as having the same fiscal impact as any other government financing instrument will depend on the degree to which the contingent claim represents a tax/subsidy. For example, for social security payments to have an equivalent economic impact as the sale of other financing items, as this approach would suggest, the rate of return on contributions would have to be the same as on other private sector savings instruments, adjusted for risk and other relevant factors. To the extent that the return is less (more) than on market instruments, households must be coerced into participation, and the program implies a tax (subsidy) in addition to a loan. A prescription, therefore, would be to include the (possibly noncash) transfer element of the contingency program in the fiscal accounts when the government issues the contingent claim.

Proponents of the economic deficit concept have also argued that the government's fiscal impact will also depend on the extent to which resources are transferred across generations. The impact of contingency programs would then depend on the degree to which current participants perceive that programs will be financed by future generations. Thus, calculation of the economic deficit would require detailed estimates of the intergenerational incidence of all fiscal activity, a task whose complexity limits its practical significance.

2. Government net worth

Alternatively, it has been argued that private sector macroeconomic behavior is best described in terms of a Ricardian consumer--an economic agent whose consumption and savings behavior is based on an extremely long-term assessment of household net wealth. The private sector's net wealth will equal the expected present value of current and future income less the expected present value of its current and future tax liability plus the value of current assets. Therefore, the key variable that affects household net wealth, and therefore household behavior, is the government's net wealth position--the expected present value of current and future tax revenue less its current net liability to the private sector (see the Appendix for a simple derivation). Any government policy action that increases its net wealth (i.e., a planned tax increase) permits greater government consumption of goods and services while constraining the private sector's ability to finance its own expenditure. In its most general formulation, government net wealth will equal the expected present value of all taxes, including the seignorage on its nominal debt, plus the net value of current assets, including natural resources and fixed capital, less the current value of current liabilities. Note that this differs from the discussion in the previous section only insofar as households are assumed to have an infinite horizon--therefore, the need to gauge intergenerational transfers is eliminated.

The government's provision of noncash contingency programs—social insurance, loan guarantees, etc.—also implies future subsidies/transfers to the private sector, and, unlike the case of conventional deficit measures, affect the government's net wealth and therefore the index of fiscal impact. The government's issuance of loan guarantees will imply an expectation of a future cash payout (given a probability of default) and a reduction in the government's net wealth (i.e., the government will be unable to finance the same level of future consumption). Similarly, the expectation of a future transfer will increase household net wealth. The provision of social security-related insurance (or other such contingent payment systems) and the expectation of future transfers would also reduce the government's net wealth. In either case, the increase in the government's contingent liability will provide a stimulus to current private sector consumption. 1/

However, underlying this concept is the view that the infinitely lived household is the relevant economic unit. If the economy is better described by heterogeneous (by age and wealth) households with limited horizons, then changes in the government's net wealth position may not be the most appropriate measure of fiscal impact. 2/ In addition, it has proven difficult to apply this concept; for example, valuation of such assets as natural resources, future seignorage, and future tax revenue is extremely subjective. 3/ Further, it is likely that the private sector's expectations regarding its future tax liability is not limited to existing tax regimes, but includes consideration of government reaction to future financing requirements. These valuation and estimation difficulties argue in favor of more limited criteria with which to gauge the impact of the provision of contingencies.

VI. Measurement of Government Contingent Liabilities

The preceding discussion suggests that it may be impractical to abandon conventional deficit measures in favor of comprehensive indices of fiscal impact that include more economically relevant consideration of contingent liabilities. Nonetheless, indices of the extent of

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1/ Eisner (1984, 1986) is considerably more sanguine regarding the impact of contingent government liabilities on private sector activity, arguing that if such "unfunded obligations are expected to be met through increased taxes, the net impact on government net wealth will be zero."

2/ See Auerbach and Kotlikoff (1987) for an interesting discussion and application of these life-cycle concerns to the dynamics of fiscal policy.

3/ Examples of applications to specific countries include Boskin (1988) and Eisner and Pieper (1984) for the United States, and Hills (1984) for the United Kingdom. None of these studies were able to include consideration of expected revenues, seignorage, and net investment, nor was the impact of government contingencies considered.

governments' contingent liability are important. Since current contingent claims may imply future financing requirements, an index of the government's liability will enable proper long-term fiscal budgeting. In this regard, it is proposed that a useful index will be a program's actuarial balance--the expected present value of the budgetary support it will require. Similarly, as contingency programs do imply the use of scarce government resources, albeit possibly at a future date, the appropriate design of public policy will depend on some measure of the tax/subsidy element embodied in such programs. In this latter regard, an index of a program's subsidy value is required--which may include a measure of its actuarial fairness. Applications of these concepts are discussed below.

1. Actuarial balance

A measure of a government's net contingent liability that is closely allied with the net wealth concept of the overall deficit described above is that of actuarial balance. As mentioned above, it offers a useful gauge of the future tax liability or the required reduction in government consumption implied by a given program, information that is important both for the purpose of budget management and for economic analysis of fiscal impact. To the extent that a program is unfunded from the perspective of its actuarial balance, the fiscal authorities are provided with an indicator of the inadequacy of contribution rates or benefits.

The actuarial balance can be calculated by comparing the net present value of a program's assets to its liabilities:

actuarial balance

$$= E\{PV(\text{inflows-outflows-operating expenses})\} + \text{reserve},$$

where $E\{\bullet\}$ is the expectations operator and $PV(\bullet)$ is the present value operator. Since the underlying rationale for the above exercise is to examine the "net worth" of the program from the government's perspective, it is usually assumed that the appropriate discount rate is the government's opportunity cost--the real after tax interest rate on government bonds. 1/ In addition, while the formula above is defined in real terms, an alternate specification--using nominal magnitudes for cash flows and interest rates--could, and often is, defined to yield the appropriate nominal magnitude. The nominal formulation does not index the real balance of the program in question, and may be, therefore, of limited usefulness as a measure of true opportunity cost.

An advantage of using the actuarial balance as a measure of the government's net liability is that, especially in the case of social security and annuity programs, there are well-established accounting and

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1/ See Buiter (1984), p. 32 for a discussion.

actuarial practices to facilitate the calculation, especially with regard to the appropriate expectations regarding mortality, fecundity, etc. 1/ However, care must be taken with regard to the application of these actuarial methodologies to the public sector accounts. For example, private sector pension accounting is usually based on one of two alternate methodologies: (i) the accumulated-benefit obligation; and (ii) the projected-benefit obligation. The former defines the pension obligation as based on the current salary and accumulated service to date of current plan participants, while the latter is based on expected future salaries but accumulated service to date (Selling and Stickney (1986)). Both are myopic with regard to the future service of current and prospective participants, and exclude consideration of new entrants and their payment of premia or receipt of benefits. For the purpose of determining the net balance of government contingent liabilities, particularly public sector social security programs, an "economically" relevant measure is appropriate. Since participation in such programs is mandatory, the potential future funding requirement of such programs should be defined with reference to the inflow and outgo associated with not only current but also prospective enrollees (with appropriate assumptions regarding income growth, etc.).

However, as regards other, nonannuity, contingency programs, where participation is not universal or mandatory, long-term projections of participation would be difficult to incorporate in measures of actuarial balance. For example, the calculation of the balance for deposit insurance programs would require assumptions regarding the growth of deposits and new entrants, as well as an estimate of defaults. This difficulty would be compounded for those programs in which participation by the private sector is optional (i.e., loan guarantee and trade financing programs), where an assumption would be required regarding government policy toward their provision. In these instances projections could be made based either on a shorter horizon, or simply with respect to current participants (see discussion below).

A final issue is with regard to cash-flow deficits. A business strategy for private sector insurance companies may involve adjusting the level of reserves, premia, etc. to reduce the "probability of ruin" to some minimum acceptable level, where the probability of ruin is the probability that reserves will be more than depleted in any given period (Buhlmann (1970)). An actuarially balanced contingency program may face either the risk or the certainty of a negative cash flow in the near term, which would more than eliminate any reserve. At such a point, to maintain its commitments the program would require support from the general government budget. This could pose a significant problem for the budget, especially in the case of contingencies denominated in foreign currency, or for countries with limited access to domestic capital markets, or limited tax bases. Thus, rather than targeting so

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1/ For example, see United States, Department of Health and Human Services (1989) and the discussion in Ebrill (1990).

that contingencies are actuarially balanced on an expected value basis, a concern for the risks associated with the program may dictate a more prudent strategy.

2. Subsidy measures

The actuarial balance of a program may be inadequate to gauge the subsidy or transfer to current participants of contingency programs, and thus of their short-run fiscal impact. A more economically relevant index may then require valuation from the perspective of current participants only.

a. Actuarial fairness

A simple alternative to the net worth or actuarial balance definition discussed above would be to calculate a program's index of actuarial fairness. This would require the derivation of an index similar to that for a program's actuarial balance except that it would only include consideration of the net transfer to current participants-- the expected present value of their current and future contributions less their current and future benefits, plus the current value of any reserve fund.

Since the index is intended to measure the change in current participant's net wealth, rather than that of the government, the appropriate discount rate may differ from that used to calculate net wealth from the government's perspective, owing to tax distortions, the existence of externalities (for example, the private sector may undervalue the impact of its investment on future generations), or risk. In principle, the appropriate discount rate would be the private sector's opportunity cost of the cash flow associated with the contingency. 1/

The calculation of such an index would be relatively simple if procedures were already in place for calculation of the actuarial balance (for example, as is done for the U.S. social security system). However, if the actuarial exercise is not already routinely performed, the cost of developing the actuarial model--that is, the assumptions regarding the probabilities of default, illness, etc., as well as future economic scenarios--as well as performing the calculations may be prohibitive. Therefore, the following alternatives may be more appropriate.

1/ The choice of the appropriate discount rate is discussed in the context of cost/benefit analysis by Broadway and Wildasin (1984).

b.   "Market value" measures

An alternative is to utilize current market information to derive a market value of the contingency. For example, in the context of a loan guarantee, the market value of a program would simply be the difference between the rate that the borrower pays versus that rate paid in the absence of the guarantee. 1/ A nominal measure of the subsidy per period would be $(i^P - i^g)L$, where i^g and i^P are the annual rates of nominal interest on private sector unguaranteed and guaranteed loans, respectively, and L is the loan principal. The implicit subsidy, or the value of the guarantee (G), over the life of the loan (n) is simply the net present value of associated cash flows:

$$G = \sum_{t=1}^{n} (i^P - i^g)L/(1+i^P)^t$$

$$= (i^P - i^g)L\ [1 - 1/(1+i^P)^n]/i^P$$

where the subsidy value would be reduced by the amount of initiation fees, etc. that the recipient is required to pay. 2/ The value of a government guarantee of an annuity contract, in which interest and principal are repaid by means of a fixed cash payment over the contract period, can be derived in a similar fashion. For example, suppose private sector credit is available such that a contract for an n year loan of L dollars requires annual payment of c^P dollars. Given the effective interest rate of i^P, the annual payment will satisfy

$$L = c^P[1-1/(1+i^P)^n]/i^P.$$

If the analogous rate and debt service payments (i^g and c^g, respectively) on a government guaranteed loan for the same initial amount L satisfy:

$$L = c^g[1-1/(i+i^g)^n]/i^g.$$

The periodic subsidy to the holder of the guaranteed loan can be measured by the difference between the annual cash flows between the two loan contracts

$$c^P - c^g = L(D^P - D^g),$$

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1/ For a brief description of this methodology's application to credit subsidies and guarantees, see United States, Congress (1989).

2/ Note that it is assumed for the sake of simplicity that the appropriate discount rate, from the prospective of the recipient of the guarantee, is the yield in the private and unguaranteed loan market, that is, that it is this rate that is the opportunity cost to the recipient.

where

$$D^P \equiv i^P/[1-1/(1+i^P)^n]$$

$$D^g \equiv i^g/[1-1/(1+i^g)^n].$$

The full value of the guarantee is the present discounted value of the cash flow defined above, which in this case can be shown to equal

$$G = L(1-D^g/D^P).$$

While the foregoing discussion has been in terms of loan guarantees, the same methodology could be applied to the full range of government contingent liabilities. For example, the subsidy associated with social security could be defined as the difference between the premia paid to the government program and that amount which the private sector would have charged for the same or similar insurance contract. The net present value of any subsidy could be calculated accordingly. Exchange rate guarantees would be similarly valued as the cost of purchasing a forward exchange contract with the same features as provided by the government.

In some cases, however, it may be difficult to determine the rate of interest which would have been paid in the absence of the guarantee since a representative sample of a guaranteed contract with similar risk characteristics may not be available, especially in those instances in which the program in question is initiated to resolve a market failure, or in cases in which the program has supplanted a private sector market. Moreover, even if a market rate is observable it may understate the value of the guarantee since the exit of the guaranteed borrowers may reduce the pressure on private sector rates. Finally, by guaranteeing private sector credit, the government also assigns many of the characteristics of government debt, both with regard to risk and transactions costs (since the guarantee may be associated with government management of the secondary market for the guaranteed debt). If the government is faced with anything but a perfectly elastic demand for its debt, the effect may be to increase its own cost of borrowing, in turn implying an additional indirect cost of the contingency program that would be difficult to quantify.

c.   Options-pricing approach

An alternate approach to measuring the subsidy associated with contingent claims is suggested by recent advances in option-pricing theory. In financial markets, a call (put) option is defined as the right to buy (sell) a prespecified quantity of a financial instrument (or commodity) at a prespecified price on or before a prespecified date. 1/ The purchaser of an option will exercise the right to purchase

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1/   A European put option may only be exercised at the expiration date; an American put option may be exercised at any time up to the expiration date.

the underlying instrument if the market price exceeds the specified exercise price. Merton (1977) has observed that government provision of a loan guarantee or deposit insurance may also be viewed as the provision of an option. If the underlying value of the credit instrument falls below a given level, the borrower is in default and will exercise the option for the government guarantee. Using modern option-pricing theory, an exact pricing formula (initially derived by Black and Scholes (1972)) for the implicit market value of such guarantees can be derived as a function of readily available market data.

For example, consider the government guarantee of a loan B. If, at the maturity date of the loan, the value of the assets on which the guarantee was issued of borrower (V) exceeds B, then there is no default. However, if the value of the assets is less than the value of the loan, then the guarantee implies that the government must pay B-V, the difference between the loan value and the surrender value of the assets. The implicit value of the guarantee at the maturity date of the loan (time T) is

$$G(T) = \text{Max } [0, B-V].$$

Under the assumption of frictionless markets and that the return process to the underlying assets evolves according to a continuous stochastic process, Black and Scholes demonstrate the exact pricing formula for the option. 1/ For example, the value of the loan guarantee, (at the initial date t) is

$$G(t) = Be^{-r(T-t)}\phi(x_2) - V\phi(x_1),$$

where

$$x_1 \equiv \{\log(B/V) - (r+\sigma^2/2)(T-t)\}/\sigma\sqrt{(T-t)}$$

$$x_2 \equiv x_1 + \sigma\sqrt{(T-t)}$$

and ϕ is the cumulative normal density function, σ^2 is the variance rate of the logarithmic changes in the value of V, and r is the "risk free" rate of interest.

The formula above is not general; it must be amended according to the terms of the guarantee arrangement and the underlying assumptions

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1/ The frictionless market assumption requires no transaction costs, continuous trading, unrestricted borrowing and lending at identical rates, and unrestricted short sales.

regarding the market structure and the type of contingent claim. 1/
While this approach could be applied with some modification to the
measurement of the value of social security programs, it is most
relevant to financial market insurance programs. However, it is not
clear that this measure would be any simpler to calculate than those
described above. Moreover, the underlying assumption of the option-
pricing model--that of frictionless markets in which asset prices,
including those on options, adjust so as to eliminate the risk of the
market portfolio--may invalidate its use in many cases, especially those
in which markets are insufficiently deep to permit the creation of the
perfect hedge assumed.

d.   Welfare measures

The above subsidy measures are explicitly based on the calculation
of the financial worth of the contingency program. An alternative is to
consider the welfare implications of the extension of a contingent claim
to the private sector. 2/

A welfare measure of the gain (or loss) resulting from the
provision of (for example) a loan guarantee would simply require the
examination of the change to the consumer and producer surpluses, as
defined by the areas under the private sector's demand and supply curves
for credit, that resulted from the government's intervention in the
market for credit (for an example, see Panel 2). 3/ Note, however, that
this approach is poorly suited to consideration of the second-round
effects on the demand and supply for credit of the government policy,
such as might result from substitutions from other markets, or from the
dynamic consequences of default on welfare. 4/ Moreover, while this
type of approach may be useful for the purpose of gauging the cost or
benefit of specific government programs, it is less relevant for the
purposes of government budgeting. This is especially apparent given the
obvious difficulties associated with measuring the parameters underlying

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1/ For example, Jones and Mason (1981) extend these results by
examining a richer array of guarantee arrangements. By relaxing certain
assumptions regarding the payment of interest, Merton (1977) derives a
similar formula for the case of deposit insurance, which is extended by
Pennacchi (1987). Borensztein and Pennacchi (1990) estimate the value
of interest guarantees on developing country debt.
2/ See Wattleworth (1988) for an application to explicit credit
subsidies.
3/ The area under the demand curve above the price paid is termed the
consumer surplus, that is, the difference between what the consumer
would have been able and willing to pay and the price paid. Under
certain restrictions (see Auerbach (1985) for a discussion) this can be
thought of as the monetary equivalent of the consumers' utility or
welfare.
4/ For an examination of these issues in the context of an
overlapping generations growth model, see Towe (1989).

Panel 2

The Welfare Implications of Government Loan Guarantees
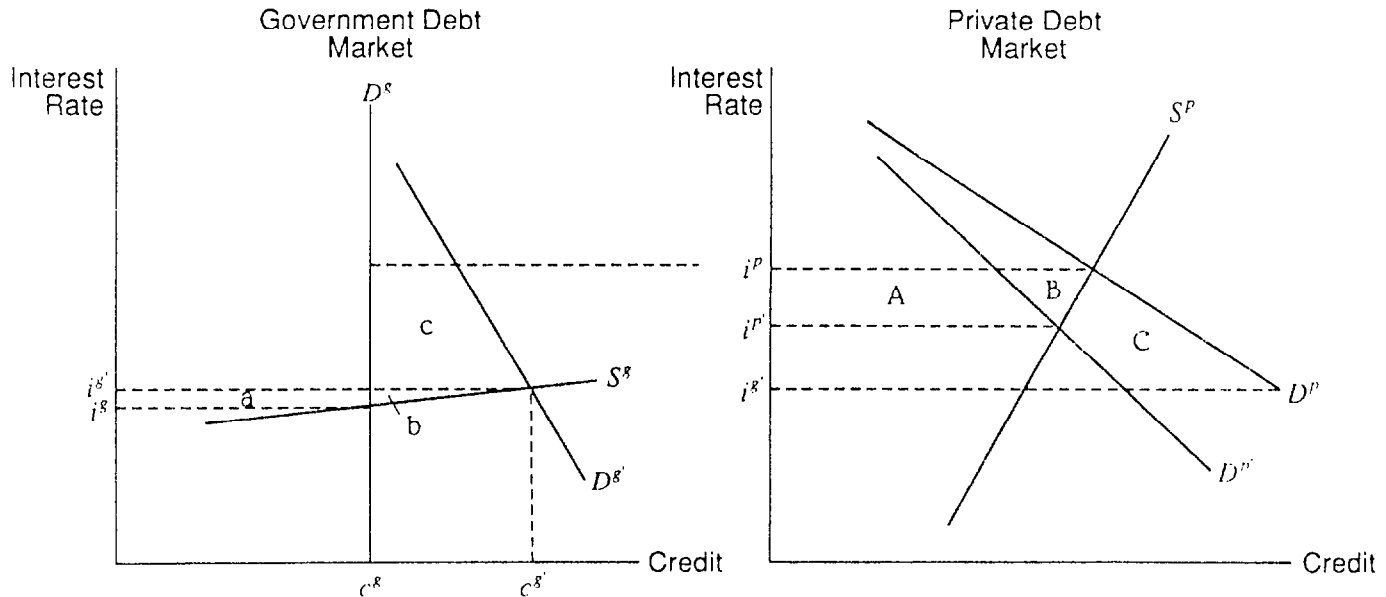
Suppose there are two credit markets: the market for loans to the government sector (g) and the market for loans to the private sector (p). The supply of credit in each market is increasing with respect to interest rates, while the demand for loans to the private sector (D^p) is decreasing. In the absence of government guarantees, each market clears at interest rates i^g and i^p, respectively. The effect of offering government guarantees to a proportion of private sector borrowers will be to assign to them the characteristics of government debt, effectively increasing the demand for loans in the government debt market to $D^{g'}$ and reducing the demand for loans in the private sector market by a similar amount.

The remaining borrowers in the private debt market gain welfare equal to area A, owing to the fall in i^p. Recipients of the guarantee will gain a surplus equal to area c (= B+C). Suppliers of credit to the private sector will lose welfare equal to the area of A+B, while suppliers of credit to the government and guaranteed private borrowers gain area a+b. If it is assumed that the loss to taxpayers owing to higher interest rates on government debt is area a, the net welfare gain would be area C+b. Note, however, the effect on welfare of financing future defaults is ignored.

the demand and supply of credit as well as the well-known methodological problems associated in measuring consumer surplus (see Auerbach (1985) for a discussion).

VII. Budgetary Controls

As noted above, conventional budget methodologies and deficit measures tend to ignore the future cash-flow implications of government contingent liabilities. As a result, the cost of providing contingencies may be inadequately accounted for at the time of their provision. Moreover, the inadequacy of conventional budget methodologies may imply an incentive for the fiscal authorities to substitute away from cash to noncash activities as a means of circumventing constraints on the overall cash-based deficit or expenditure. 1/ While it may not be feasible to adopt the comprehensive deficit measures discussed in Section V, a more piecemeal approach, incorporating the concepts described in the previous section, may provide the necessary budgetary control.

1. Ad hoc constraints

One approach is to place an ad hoc limit on the level of the government's liability. For example, preparation of the government's annual budget could include a forecast of the desired increase in total loans on which a government guarantee applies and the imposition of explicit constraints on agencies' ability to exceed these limits during the year. This method may be useful in the case of programs where measurement of the subsidy component is difficult, or where technical expertise is unavailable. Thus, this approach is most often used in the case of loan and other guarantee programs, and not for social insurance programs where there exist relatively well-established and actuarial methodologies. Moreover, such constraints ignore the value of contingencies and do not permit proper accounting of their cost or the implied subsidy; therefore, a comparison with other programs is impossible. 2/

Given that the fiscal authorities' resources are limited, proper budgetary planning will require a measure of the subsidy transfer embodied in contingency programs. Three possibilities are discussed below.

1/ This point has been made in the context of the United States by United States, Congress (1989).

2/ These points are also made in United States, Congress (1989).

2. Divestiture

A straightforward method of establishing the current cost from the provision of contingent liabilities is for the government to divest itself of the liability. This goal may be accomplished by purchasing offsetting insurance from the private sector, or by a voucher system, in which borrowers are provided vouchers to purchase either explicit insurance or to provide lenders compensation for default risk. 1/ On the date the contingent claim is offered, a cash expenditure would therefore be required by the government representing the explicit subsidy or transfer. As a result, the future contingent cash obligation would be eliminated in favor of a current cash flow which should approximate the actuarial fairness index described above. 2/

While this proposal has been primarily associated with loan guarantees, it could be envisaged as applying to social welfare and other government insurance programs. Its advantage is its transparency; the cost of the contingency program is made explicit at the point the contingent claim is issued. Moreover, by eliminating the ongoing administrative burden of such programs, a net savings to the budget may arise. Finally, the advantage of this approach is that the valuation of the contingent claim is provided by the market. However, as a result it may only be relevant to those types of contingencies for which a private market would normally be viable. It would be difficult, for example, to apply a voucher system when the government's intervention was originally intended to alleviate the market's inability to provide the socially desirable level of insurance. This will be especially true in the case of social welfare systems. Second, it is possible that by pooling risks, the public sector would be the least cost provider of insurance. By shifting the risk to the private sector, budgetary costs may be increased. Thus, while this approach has merit, it may be less useful in those cases where the government's original purpose in providing the contingency was to correct a perceived inadequacy, on either economic efficiency or equity grounds, of the private sector.

1/ These possibilities have both been suggested for the United States Congress (see United States, Congress (1989) for a discussion).

2/ Note that this type of scheme is substantially different from placing the cash flow associated with contingencies on an extrabudgetary basis. This latter approach, while avoiding funding of other expenditure from temporary cash surpluses from contingencies, does not address the issue of how future deficits are to be funded. Moreover, the liabilities of the extrabudgetary agency administering the contingency program will certainly be implicitly guaranteed by the central government. Finally, as such extrabudgetary agencies are performing governmental functions, GFS recommends consolidation with the government's accounts.

3. Redefining the deficit

A proposal, which is closely allied with the concept of the economic deficit discussed above, is to redefine government expenditure and revenue concepts to take explicit account of the subsidy component of contingency programs. Accordingly, the cash flows associated with the administration of contingency programs would be dichotomized; instead of including all cash receipts and disbursements as revenue and expenditure, respectively, only the net implicit subsidy resulting from the change in contingent liabilities outstanding would be included (as an expenditure). The difference between the calculated net subsidy and the program's total net receipts would be reclassified as a financing item. 1/

It is proposed that annual subsidy outlays would be calculated on the basis of the market value of contingencies issued over a given period. 2/ At the beginning of a given budgetary period, agencies responsible for issuing contingencies would be provided a constraint on their ability to issue additional contingencies that was based on their subsidy value rather than the additional gross liability of the government. In this manner, the budget authorities would be provided with the appropriate tradeoff between expenditure allocations since the longer-run financing implications of contingencies would be accounted for. Moreover, as the budget deficit would be calculated on the basis of the subsidy component rather than the current cash flows associated with contingencies, it could more accurately represent the government's fiscal impact on the macroeconomy.

Note that the subsidy under this scheme would be (broadly speaking) defined in terms of the net present value transferred to the current recipients of the newly issued contingent claim--that is, that amount which would render the contingency actuarially fair. Moreover, implicitly it would be assumed that the current fiscal impact of any subsidy to future participants would be nil. Therefore, the resultant measure of the overall fiscal deficit would be implicitly similar to the economic deficit discussed above.

This approach would likely be most effective when applied to programs for which administering agencies have significant discretion regarding the amount and value of claims issued. In such cases, a constraint on the subsidy value of contingent claims issued during a given budgetary period may ensure that the issuing agency either restricts the issue of claims or adjusts the terms under which the claim is issued to reduce the subsidy component. However, the relevance of

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1/ This is essentially the recent proposal of the U.S. Congressional Budget Office to address the issue of credit reform (United States, Congress (1989)).

2/ See United States, Congress (1989), p. 43 for an example of the derivation of this amount.

Thus, insofar as conventional measures of fiscal impact ignore these noncash fiscal activities, they may underrepresent the government's effect on the macroeconomy.

One solution is to define an extended deficit measure. Deficits can be defined that measure the intergenerational transfers implied by such contingency programs (and other government policies), or that sums government activity, including contingencies, over an infinite horizon. The choice will depend on the relevant planning horizon of the budget authority and the private sector. However, either alternative would likely be impractical given the data requirements, as well as requiring the choice between polar views regarding the determinants and the horizon relevant for private sector consumption/savings.

Nonetheless, the value of government contingencies should be measured. Two alternatives are proposed that correspond closely to the underlying focus of the extended deficit measures: actuarial balance, which would represent the liability from the government's (long-term) perspective; and actuarial fairness or a contingency's subsidy value, which measures the transfer to current participants. In the latter case, a number of alternative measurement strategies can be defined, the choice depending on the type of contingency in question and the data available. These measures can be used to form the basis of the appropriate budgetary control over the government's provision of contingencies, as well as the analytic device for gauging their impact.

A Simple Illustration of the Net Wealth Deficit

To demonstrate the net wealth concept of the deficit, the simplest dynamic macroeconomy is considered. [1] The economy is assumed to exist for two periods—the present and the future—and is inhabited by a representative agent whose utility is log linear in current and future consumption (e.g., $u = \ln(c_1) + \beta\ln(c_2)$). In each period the agent is endowed with exogenous income (y_1 and y_2) and, in the first period, is constrained after payment of taxes (t_1 to choose between consumption and savings in the form of capital (k) or government bonds (b). The first period's level of capital is y_1 and the initial level of government bonds outstanding is assumed to be b_0. In the second period, the agent must consume, after taxes (t_2), the sum of exogenous income and savings, where capital returns an exogenous rate of r and bonds return a rate r^b.

Given that the government faces the requirement to finance its own exogenous consumption in each period (g_1 and g_2) through taxes and the issue of bonds in the first period, the condition that aggregate supply equals demand requires that exogenous income plus the return to capital in the second period equal the sum of government and private sector consumption. Equilibrium will be characterized by the following first order conditions:

$$c_1 = c_2/\beta(1+r), \text{ and } r = r^b;$$

market-clearing conditions that

$$c_1 + g_1 + k = y_1, \text{ and } c_2 + g_2 = y_2 + (1+r)k; \text{ and}$$

government budget constraints

$$g_1 + r_{b0}b_0 - t_1 = b - b_0, \text{ and } g_2 - t_2 = (1+r_{b1})b_1.$$

These equations will define the equilibrium level of first-period consumption (and therefore investment) as:

$$c_1 = \frac{1}{1+\beta}\left[y_1 + \frac{y_2}{1+r} + b_0 - t_1 - \frac{t_2}{1+r}\right].$$

Current consumption will be a function of the present discounted value of income less the government's net wealth, which in turn is equal (in this simple example) to the present value of its tax revenues less currently outstanding liabilities. The index of fiscal impact, therefore, may be defined as d where

$$d \equiv t_1 + \frac{t_2}{1+r} - b_0 = -g_1 - \frac{t_2}{1+r}.$$

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[1] The model may be viewed as a simplification of that contained in Blanchard (1985). However, the result generalizes to most models of permanent income.

Extending the horizon of the consumer beyond two periods similarly extends the period over which the discounting is required.

While closed form solutions for consumption, etc. are not feasible in the case of uncertainty, the same result follows that current economic activity is a function of the expected future tax obligation of the private sector. However, only under the restrictive assumptions made above will there exist a one-to-one correspondence between the accounting definition of the government's net wealth and that measure which is relevant to the private sector.

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